

# DSP

Quarter 2, 2009  
SG1004Q22009 Rev 0



## 56800 FAMILY

### 56F800 Series General Purpose 16-Bit Fixed Point <sup>Note</sup>

| Applications   | Development Tools                                       | Benefits   |
|--|---|--|
| Motion Control <ul style="list-style-type: none"> <li>Smart appliances</li> <li>Environmental controls</li> <li>Instrumentation</li> </ul>   | Refer to <i>Development Tools</i> beginning on page 15. | Precise programming of drive waveforms allows control over power consumption, reducing noise and other forms of energy usage. Provides either vector or vectorless control depending on application need and motor type; hybrid controller type can be selected to match exact design requirements. Distortion correction to assure waveform purity.   |
| Industrial <ul style="list-style-type: none"> <li>Uninterruptable power supplies</li> <li>Noise cancellation/suppression</li> <li>Temperature control</li> <li>HVAC</li> <li>Inverters and AC-to-DC conversion</li> <li>Lighting</li> <li>Automation</li> </ul>  | Refer to <i>Development Tools</i> beginning on page 15. | Provides specific I/O and memory tailored to the design need. Capabilities range from lowest cost part for sensorless speed-control algorithms to parts having extended memory and I/O suitable for high-end systems. Has extended PWM and ADC modules, as well as low-cost Boot Flash, for all types of motor-control, conversion, and automation requirements. High number of MIPS allows control of each axis in multi-axis systems.                      |
| Transportation <ul style="list-style-type: none"> <li>Fuel management system</li> <li>Proximity sensors</li> <li>Airbags</li> <li>Traffic light control</li> <li>Engine management and control               <ul style="list-style-type: none"> <li>Knock detection</li> <li>Aircraft, automotive, marine</li> </ul> </li> </ul> | Refer to <i>Development Tools</i> beginning on page 15. | CAN (Controller Area Network) protocol designed to be used as a vehicle serial data bus, meeting the specific requirements of real-time processing and reliable operation within a vehicle's EMI environment. It is extremely cost effective, while still providing the wide bandwidth needed for variety of transportation-related needs. The 56F805 and 56F807 provide dual motor control and full dual motor control, respectively, for high versatility. |
| Instrumentation <ul style="list-style-type: none"> <li>Medical</li> <li>Scientific</li> <li>Servo controllers</li> </ul>   | Refer to <i>Development Tools</i> beginning on page 15. | Excellent choice for position control in applications using AC induction and synchronous PM motors. These controllers can be used for low-end position control, vector control, and sensorless vector control. Extended CAN (Controller Area Network) for advanced applications. High MIPS for performance control of multi-axis systems. Allows for multiple fault inputs. High waveform purity is achieved by constant distortion correction.              |

Note: Contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for product availability. Dolby and DTS Software Licenses are Required.

## 56800E FAMILY

### 56F8300 Series General Purpose 16-Bit Fixed Point <sup>Note</sup>

| Product                          | Performance       | Flash/RAM (KB) | Off-Chip Memory Expansion (EMI) | Peripherals   | Packaging                     | Additional Information   |
|----------------------------------|-------------------|----------------|---------------------------------|---|-------------------------------|--|
| MC56F8322VFA60<br>MC56F8322VFAE  | 60 MHz<br>60 MIPS | 48/12          | n/a                             | 2 SPI, 2 SCI, 2 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers, FlexCAN           | 48-pin LQFP<br>48-pin LQFP*   | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, temperature sensor and up to 21 GPIOs.  |
| MC56F8322MFA60<br>MC56F8322MFAE  | 60 MHz<br>60 MIPS | 48/12          | n/a                             | 2 SPI, 2 SCI, 2 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers, FlexCAN           | 48-pin LQFP<br>48-pin LQFP*   | Extended (-40°C to 125°C) MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, temperature sensor, and up to 21 GPIOs.    |
| MC56F8323VFB60<br>MC56F8323VFB6E | 60 MHz<br>60 MIPS | 48/12          | n/a                             | 2 SPI, 2 SCI, 2 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers, FlexCAN           | 64-pin LQFP<br>64-pin LQFP*   | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, temperature sensor, and up to 27 GPIOs. |
| MC56F8323MFB60<br>MC56F8323MFB6E | 60 MHz<br>60 MIPS | 48/12          | n/a                             | 2 SPI, 2 SCI, 2 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers, Decoder, FlexCAN  | 64-pin LQFP<br>64-pin LQFP*   | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, temperature sensor, and up to 27 GPIOs.   |
| MC56F8335VFG60<br>MC56F8335VFG6E | 60 MHz<br>60 MIPS | 80/12          | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, 2 Decoders, 4 Quad Timers, FlexCAN        | 128-pin LQFP*                 | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs.                                |
| MC56F8335MFG60<br>MC56F8335MFG6E | 60 MHz<br>60 MIPS | 80/12          | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, 2 Decoders, 4 Quad Timers, FlexCAN        | 128-pin LQFP*                 | Industrial (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs.                                |
| MC56F8345VFG60<br>MC56F8345VFG6E | 60 MHz<br>60 MIPS | 144/12         | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, 2 Decoders, 4 Quad Timers, FlexCAN        | 128-pin LQFP<br>128-pin LQFP* | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs.                                |
| MC56F8345MFG60<br>MC56F8345MFG6E | 60 MHz<br>60 MIPS | 144/12         | n/a                             | 2 SPI, 2 SCI, 4 ADC<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 128-pin LQFP<br>128-pin LQFP* | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs,                                  |

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\*This package is RoHS compliant.

## 56800E FAMILY (continued)

### 56F8300 Series General Purpose 16-Bit Fixed Point <sup>Note</sup> (continued)

| Product  | Performance       | Flash/RAM (KB) | Off-Chip Memory Expansion (EMI) | Peripherals  | Packaging   | Additional Information  |
|--|-------------------|----------------|---------------------------------|--|---|---|
| MC56F8346VVF60<br>MC56F8346VFE   | 60 MHz<br>60 MIPS | 144/12         | Yes                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs. |
| MC56F8346MFV60<br>MC56F8346MFE   | 60 MHz<br>60 MIPS | 144/12         | Yes                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 144-pin LQFP<br>144-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs.   |
| MC56F8347VPY60 (LQFP)<br>MC56F8347VPYE (LQFP)<br>MC56F8347VFE (MAPBGA) | 60 MHz<br>60 MIPS | 144/12         | Yes                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 160-pin LQFP<br>16-pin LQFP*<br>160-ball MAPBGA*  | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs. |
| MC56F8347MPY60<br>MC56F8347MPYE  | 60 MHz<br>60 MIPS | 144/12         | Yes                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 160-pin LQFP<br>160-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs.   |
| MC56F8355VFG60<br>MC56F8355VFE   | 60 MHz<br>60 MIPS | 280/20         | n/a                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 128-pin LQFP<br>128-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs. |
| MC56F8355MFG60<br>MC56F8355MFE   | 60 MHz<br>60 MIPS | 280/20         | Yes                             | 2 SPI, 2 SCI, 4 ADC,<br>2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN | 128-pin LQFP<br>128-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs.   |
| MC56F8356VVF60<br>MC56F8356VFE   | 60 MHz<br>60 MIPS | 280/20         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN    | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs. |
| MC56F8356MFV60<br>MC56F8356MFE   | 60 MHz<br>60 MIPS | 280/20         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN    | 144-pin LQFP<br>144-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs.   |
| MC56F8357VPY60 (LQFP)<br>MC56F8357VPYE (LQFP)<br>MC56F8357VFE (MAPBGA) | 60 MHz<br>60 MIPS | 280/20         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN    | 160-pin LQFP<br>160-pin LQFP*<br>160-pin MAPBGA*  | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs. |
| MC56F8357MPY60<br>MC56F8357MPYE  | 60 MHz<br>60 MIPS | 280/20         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, FlexCAN    | 160-pin LQFP<br>160-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs.   |
| MC56F8365VFG60<br>MC56F8365VFE   | 60 MHz<br>60 MIPS | 576/36         | n/a                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 128-pin LQFP<br>128-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs. |
| MC56F8365MFG60<br>MC56F8365MFE   | 60 MHz<br>60 MIPS | 576/36         | n/a                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 128-pin LQFP<br>128-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 49 GPIOs.   |
| MC56F8366VVF60<br>MC56F8366VFE   | 60 MHz<br>60 MIPS | 576/36         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs. |
| MC56F8366MFV60<br>MC56F8366MFE   | 60 MHz<br>60 MIPS | 576/36         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 144-pin LQFP<br>144-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 62 GPIOs.   |
| MC56F8367VPY60 (LQFP)<br>MC56F8367VPYE (LQFP)<br>MC56F8367VFE (MAPBGA) | 60 MHz<br>60 MIPS | 576/36         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 160-pin LQFP<br>160-pin LQFP*<br>160-ball MAPBGA* | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs. |
| MC56F8367MPY60<br>MC56F8367MPYE (LQFP)                                 | 60 MHz<br>60 MIPS | 576/36         | Yes                             | 2 SPI, 2 SCI, 4 ADC, 2 PWM, COP, PLL,<br>2 Decoders, 4 Quad Timers, 2 FlexCAN  | 160-pin LQFP<br>160-pin LQFP*                     | Extended (-40°C to 125°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 76 GPIOs.   |

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\*This package is RoHS compliant.



## 56800E FAMILY (continued)

### 56F8300 Series General Purpose 16-Bit Fixed Point <sup>Note</sup> (continued)

| Applications  | Development Tools                                       | Benefits  |
|---|---|---|
| Motion Control <ul style="list-style-type: none"> <li>Smart appliances</li> <li>Environmental controls</li> <li>Instrumentation</li> </ul>  | Refer to <i>Development Tools</i> beginning on page 15. | Precise programming of drive waveforms allows control over power consumption, reducing noise and other forms of energy usage. Provides either vector or vectorless control depending on application need and motor type; DSP type can be selected to match exact design requirements. Distortion correction to assure waveform purity.  |
| Industrial <ul style="list-style-type: none"> <li>Uninterruptable power supplies</li> <li>Noise cancellation/suppression</li> <li>Temperature control</li> <li>HVAC</li> <li>Inverters and AC-to-DC conversion</li> <li>Lighting</li> <li>Automation</li> </ul>   | Refer to <i>Development Tools</i> beginning on page 15. | Provides specific I/O and memory tailored to the design need. Capabilities range from lowest cost part for sensorless speed-control algorithms to parts having extended memory and I/O suitable for high-end systems. Has extended PWM and ADC modules, as well as low-cost Boot Flash, for all types of motor-control, conversion, and automation requirements. High number of MIPS allows control of each axis in multi-axis systems.   |
| Transportation <ul style="list-style-type: none"> <li>EPAS</li> <li>Electromechanical/Hybrid Braking</li> <li>Active Suspension</li> <li>Automatic Gearbox/Transmission</li> <li>Fuel management system</li> <li>Proximity sensors</li> <li>Airbags</li> <li>Traffic light control</li> <li>Engine management and control               <ul style="list-style-type: none"> <li>Knock detection</li> <li>Aircraft, automotive, marine</li> <li>Electronic valve actuation</li> </ul> </li> </ul> | Refer to <i>Development Tools</i> beginning on page 15. | CAN (Controller Area Network) protocol designed to be used as a vehicle serial data bus, meeting the specific requirements of real-time processing and reliable operation within a vehicle's EMI environment. It is extremely cost effective, while still providing the wide bandwidth needed for variety of transportation-related needs. The 56F834x and 56F835x provide dual motor control and full dual motor control, respectively, for high versatility.<br><br>The 56F8300 Series enables lower overall system costs by including several built-in safety features that are unique among devices in its class. |
| Instrumentation <ul style="list-style-type: none"> <li>Medical</li> <li>Scientific</li> <li>Servo controllers</li> </ul>  | Refer to <i>Development Tools</i> beginning on page 15. | Excellent choice for position control in applications using AC induction and synchronous PM motors. These chips can be used for low-end position control, vector control, and sensorless vector control. Extended CAN (Controller Area Network) for advanced applications. High MIPS for performance control of multi-axis systems. Allows for multiple fault inputs. High waveform purity is achieved by constant distortion correction.   |

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### 56F8100 Series General Purpose 16-Bit Fixed Point <sup>Note</sup>

| Product   | Performance       | Flash/RAM (KB) | Off-Chip Memory Expansion (EMI) | Peripherals  | Packaging   | Additional Information   |
|---|-------------------|----------------|---------------------------------|--|---|--|
| MC56F8122VFA<br>MC56F8122VFAE   | 40 MHz<br>40 MIPS | 40/8           | n/a                             | 2 SPI, 2 SCI, 2 ADC, COP, PLL, Quad Timer                  | 48-pin LQFP<br>48-pin LQFP*                       | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, and up to 21 GPIOs. |
| MC56F8123VFB<br>MC56F8123VFBE   | 40 MHz<br>40 MIPS | 40/8           | n/a                             | 2 SPI, 2 SCI, 2 ADC, COP, PLL, Quad Timer                  | 64-pin LQFP<br>64-pin LQFP*                       | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, on-chip relaxation oscillator, and up to 27 GPIOs. |
| MC56F8135VFGE   | 40 MHz<br>40 MIPS | 72/8           | n/a                             | 2 SPI, 2SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers  | 128-pin LQFP*                                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, and up to 49 GPIOs.                                |
| MC56F8145VFG<br>MC56F8145VFGE   | 40 MHz<br>40 MIPS | 136/8          | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 128-pin LQFP<br>128-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 49 GPIOs.                                 |
| MC56F8146VFF<br>MC56F8146VFVE   | 40 MHz<br>40 MIPS | 136/8          | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 62 GPIOs.                                 |
| MC56F8147VPY (LQFP)<br>MC56F8147VPYE (LQFP)<br>MC56F8147VFFE (MAPBGA) | 40 MHz<br>40 MIPS | 136/8          | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 160-pin LQFP<br>160-pin LQFP*<br>160-ball MAPBGA* | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 76 GPIOs.                                 |
| MC56F8155VFG<br>MC56F8155VFGE   | 40 MHz<br>40 MIPS | 272/16         | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 128-pin LQFP<br>128-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 49 GPIOs.                                 |
| MC56F8156VFF<br>MC56F8156VFVE   | 40 MHz<br>40 MIPS | 272/16         | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 62 GPIOs.                                 |

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\*This package is RoHS compliant.



## 56800E FAMILY (continued)

### 56F8100 Series General Purpose 16-Bit Fixed Point <sup>Note</sup> (continued)

| Product  | Performance       | Flash/RAM (KB) | Off-Chip Memory Expansion (EMI) | Peripherals  | Packaging   | Additional Information   |
|--|-------------------|----------------|---------------------------------|--|---|--|
| MC56F8157VPY (LQFP)<br>MC56F8157VPYE (LQFP)<br>MC56F8157VFE (MAPBGA) | 40 MHz<br>40 MIPS | 272/16         | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 160-pin LQFP<br>160-pin LQFP*<br>160-ball MAPBGA* | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 76 GPIOs. |
| MC56F8165VFG<br>MC56F8165VFG E                                       | 40 MHz<br>40 MIPS | 544/32         | n/a                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 128-pin LQFP<br>128-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 49 GPIOs. |
| MC56F8166VFF<br>MC56F8166VFE   | 40 MHz<br>40 MIPS | 544/32         | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 144-pin LQFP<br>144-pin LQFP*                     | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 62 GPIOs. |
| MC56F8167VPY (LQFP)<br>MC56F8167VPYE (LQFP)<br>MC56F8167VFE (MAPBGA) | 40 MHz<br>40 MIPS | 544/32         | Yes                             | 2 SPI, 2 SCI, 4 ADC, PWM, COP, PLL, Decoder, 2 Quad Timers | 160-pin LQFP<br>160-pin LQFP*<br>160-ball MAPBGA* | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug and up to 76 GPIOs. |

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\*This package is RoHS compliant.

| Applications  | Development Tools                                       | Benefits  |
|---|---|---|
| Motion Control <ul style="list-style-type: none"> <li>Smart appliances</li> <li>Environmental controls</li> <li>Instrumentation</li> </ul>  | Refer to <i>Development Tools</i> beginning on page 15. | Precise programming of drive waveforms allows control over power consumption, reducing noise and other forms of energy usage. Provides either vector or vectorless control depending on application need and motor type; controller type can be selected to match exact design requirements. Distortion correction to assure waveform purity.   |
| Industrial <ul style="list-style-type: none"> <li>Uninterruptable power supplies</li> <li>Noise cancellation/suppression</li> <li>Temperature control</li> <li>HVAC</li> <li>Inverters and AC-to-DC conversion</li> <li>Lighting</li> <li>Automation</li> </ul> | Refer to <i>Development Tools</i> beginning on page 15. | Provides specific I/O and memory tailored to the design need. Capabilities range from lowest cost part for sensorless speed-control algorithms to parts having extended memory and I/O suitable for high-end systems. Has extended PWM and ADC modules, as well as low-cost Boot Flash, for all types of motor-control, conversion, and automation requirements. High number of MIPS allows control of each axis in multi-axis systems.         |
| Instrumentation <ul style="list-style-type: none"> <li>Medical</li> <li>Scientific</li> <li>Servo controllers</li> </ul>  | Refer to <i>Development Tools</i> beginning on page 15. | Excellent choice for position control in applications using AC induction and synchronous PM motors. These controllers can be used for low-end position control, vector control, and sensorless vector control. Extended CAN (Controller Area Network) for advanced applications. High MIPS for performance control of multi-axis systems. Allows for multiple fault inputs. High waveform purity is achieved by constant distortion correction. |

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### 56F8000 Series General Purpose 16-Bit Fixed Point <sup>Note</sup>

| Product       | Performance       | Boot ROM/Program RAM, Data RAM | Off-Chip Memory Expansion (EMI) | Peripherals   | Packaging   | Additional Information  |
|---------------|-------------------|--------------------------------|---------------------------------|---|-------------|---|
| MC56F8013VFAE | 32 MHz<br>32 MIPS | 16K/4K                         | —                               | 6 Channel PWM, Quad Timer, SPI, SCI with LIN slave, PLL, dual 3 Channel 12-bit ADCs, COP, POR, I <sup>2</sup> C, On-Chip oscillator | 32-pin LQFP | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 26 GPIOs. |
| MC56F8014VFAE | 32 MHz<br>32 MIPS | 16K/4K                         | —                               | 5 Channel PWM, Quad Timer, SPI, SCI with LIN slave, PLL, dual 4 Channel 12-bit ADCs, COP, POR, I <sup>2</sup> C, On-Chip oscillator | 32-pin LQFP | Industrial (-40°C to 105°C), MCU-friendly instruction set, Enhanced OnCE for debug, temperature sensor, and up to 26 GPIOs. |

| Applications  | Development Tools  | Benefits  |
|---|--|---|
| <ul style="list-style-type: none"> <li>Smart sensors</li> <li>Industrial motor control</li> <li>Dimming lamp ballast</li> <li>Switched-mode power supply</li> <li>Coft-switching PFC</li> <li>AC-DC power supplies</li> </ul> | Refer to <i>Software and Development Tools</i> beginning on page 15. | Because of its low cost, configuration flexibility, and compact program code, the 56F8013 is well suited for many applications. The 56800E core is based on a Harvard architecture consisting of three execution units operating in parallel, allowing as many as six operations per instruction cycle. The microprocessor-style programming model and optimized instruction set allow straightforward generation of efficient, compact code for both DSP and MCU applications. |

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## 56800E FAMILY (continued)

### 56850 Series General Purpose 16-Bit Fixed Point <sup>Note</sup>

| Product  | Performance         | Boot ROM/<br>Program RAM<br>Data RAM | Off-Chip<br>Memory<br>Expansion<br>(EMI)                             | Peripherals  | Packaging  | Additional Information   |
|--|---------------------|--------------------------------------|--|--|--|--|
| DSP56852VF120<br>DSP56852VFE   | 120 MHz<br>120 MIPS | 1K/6K/4K<br>(words)                  | Up to 2M<br>program and 6M<br>of data                                | SCI, SPI, ISSI, EMI,<br>COP, Quad Timer                      | 81-ball MAPBGA<br>81-ball MAPBGA*  | MCU-friendly instruction set, Enhanced OnCE for debug, up to four programmable chip select signals, and up to 11 GPIO.   |
| DSP56854FG120<br>DSP56854FGE   | 120 MHz<br>120 MIPS | 1K/12K/4K<br>(words)                 | Up to 2M<br>program and 8M<br>of data                                | 2 SCI, SPI, ESSI, HI, EMI,<br>COP, DMA, TOD, Quad<br>Timer   | 128-pin LQFP<br>128-pin LQFP*  | MCU-friendly instruction set, Enhanced OnCE for debug, six channels of DMA, up to four programmable chip select signals, and up to 41 GPIO.                                |
| DSP56854FG120<br>DSP56854FGE   | 120 MHz<br>120 MIPS | 1K/16K/16K<br>(words)                | Up to 2M<br>program and 8M<br>of data                                | 2 SCI, SPI, ESSI, HI, EMI,<br>COP, DMA, TOD, Quad<br>Timer   | 128-pin LQFP<br>128-pin LQFP*  | MCU-friendly instruction set, Enhanced OnCE for debug, six channels of DMA, up to four programmable chip select signals, and up to 41 GPIO.                                |
| DSP56855BU120<br>DSP56855BUE   | 120 MHz<br>120 MIPS | 1K/24K/24K<br>(words)                | Up to 2M<br>program and<br>8M of data                                | 2 SCI, ESSI, EMI, COP,<br>DMA, TOD, Quad Timer               | 100-pin LQFP<br>100-pin LQFP*  | MCU-friendly instruction set, Enhanced OnCE for debug, six channels of DMA, on-chip relaxation oscillator, up to four programmable chip select signals, and up to 18 GPIO. |
| DSP56857BU120<br>DSP56857BUE   | 120 MHz<br>120 MIPS | 1K/40K/24K<br>(words)                | n/a  | 2 SCI, SPI, 2 ESSI, HI,<br>COP, DMA, TOD, Quad<br>Timer      | 100-pin LQFP<br>100-pin LQFP*  | MCU-friendly instruction set, Enhanced OnCE for debug, six channels of DMA, and up to 47 GPIO.   |
| DSP56858FV120 (LQFP)<br>DSP56858FVE (LQFP)<br>DSP56858VF120 (MAPBGA)   | 120 MHz<br>120 MIPS | 1K/40K/24K<br>(words)                | Up to 2M<br>program and<br>8M of data                                | 2 SCI, SPI, 2 ESSI, HI,<br>EMI, COP, DMA, TOD,<br>Quad Timer | 144-pin LQFP<br>144-pin LQFP*<br>144-ball MAPBGA   | MCU-friendly instruction set, Enhanced OnCE for debug, six channels of DMA, up to four programmable chip select signals, and up to 47 GPIO.                                |
| Applications   |                     |                                      | Development Tools  |  | Benefits   |  |
| Telephony <ul style="list-style-type: none"> <li>• Telco interface</li> <li>• Codecs</li> <li>• LCD and Keypad support</li> </ul>  |                     |                                      | Refer to <i>Software and Development Tools</i> beginning on page 15. |  | Provides seamless connection to codecs from SSI or ESSI peripherals. SPI allows connection to Flash card devices and real-time clock display.  |  |
| Client-side IP phone <ul style="list-style-type: none"> <li>• Voice-band codec</li> <li>• Keypad</li> <li>• Optional LCD</li> <li>• Connection:               <ul style="list-style-type: none"> <li>- Ethernet or USB to LAN</li> <li>- DAA to Telco</li> <li>- RF to wireless LAN</li> </ul> </li> </ul> |                     |                                      | Refer to <i>Software and Development Tools</i> beginning on page 15. |  | With MCU functionality and DSP processing power combined with a large number of peripherals and I/O, the 800E parts offer a single chip solution for client-side IP phones.  |  |
| Internet Audio <ul style="list-style-type: none"> <li>• Internet Audio decoding</li> <li>• Internet Audio stand-alone player</li> </ul>  |                     |                                      | Refer to <i>Software and Development Tools</i> beginning on page 15. |  | Provides sufficient peripherals and I/O to connect with minimal or glueless logic to internet audio. These programmable DSP devices also offer the ability to support future audio formats.  |  |
| Voice Processing <ul style="list-style-type: none"> <li>• Multichannel VoIP</li> <li>• Voice Recognition</li> </ul>  |                     |                                      | Refer to <i>Software and Development Tools</i> beginning on page 15. |  | The 800E family of products offer additional channels and/or extra signal processing for VoIP applications using other Freescale Semiconductor processors. The PowerPC and ColdFire System Interface Units (SIUs) connect directly to the 5685x Host Interface peripheral. For each available chip select on the PPPC or ColdFire, an additional 5685x device can be added without glue logic. |  |

Note: Contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for product availability.

\*This package is RoHS compliant.

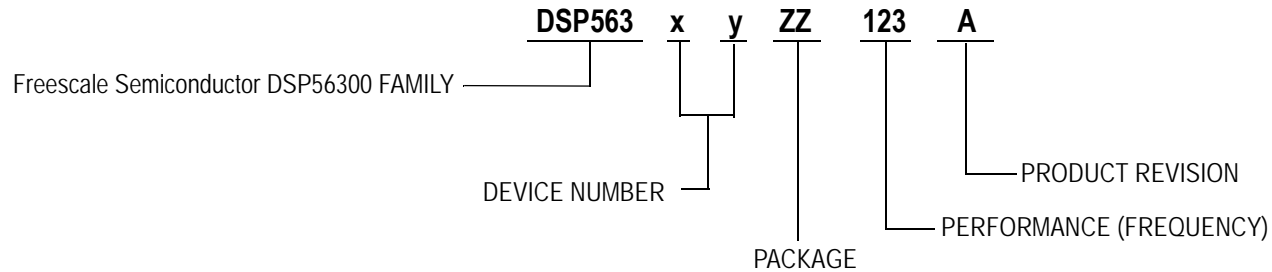


## DSP56300 FAMILY

### DSP56300 Family High Performance 24-Bit Fixed Point

| Product                        | MOQ | Packaging                           | Performance                           | Sample Part Number (2-Unit Sample Pack) | Voltage Core, I/O | Internal Memory  | Peripherals   | Applications  |
|--------------------------------|-----|-------------------------------------|---------------------------------------|---|-------------------|--|---|---|
| DSP56311VF150<br>DSP56311VL150 | 126 | 196-ball MAPBGA (Lead Free Package) | 150 MHz<br>300 MMACS<br>150 MHz EFCOP | SPAKDSP311VF150<br>SPAKDSP311VL150      | 1.8,<br>3.3 V     | 384K-bytes<br>93 to 288K-byte program<br>96 to 288K-byte data<br>0 to 3K-byte Instruction Cache  | 8-bit Host Interface,<br>Two ESSI, SCI,<br>Triple Timer | Networking applications requiring low-cost, high-performance digital signal processing such as voice/data/fax processing, video conferencing, audio applications and control. |
| DSP56321VF200<br>DSP56321VL200 | 126 | 196-ball MAPBGA (Lead Free Package) | 200 MHz<br>400 MMACS<br>200 MHz EFCOP | SPAKDSP321VF240<br>SPAKDSP321VL240      | 1.6,<br>3.3 V     | 576K-bytes<br>96 to 336K-byte program<br>480 to 240K-byte data<br>0 to 3K-byte Instruction Cache |   |   |
| DSP56321VF220<br>DSP56321VL220 | 126 | 196-ball MAPBGA (Lead Free Package) | 220 MHz<br>440 MMACS<br>220 MHz EFCOP | SPAKDSP321VF240<br>SPAKDSP321VL240      | 1.6,<br>3.3 V     |  |   |   |
| DSP56321VF240<br>DSP56321VL240 | 126 | 196-ball MAPBGA (Lead Free Package) | 240 MHz<br>480 MMACS<br>240 MHz EFCOP | SPAKDSP321VF240<br>SPAKDSP321VL240      | 1.6,<br>3.3 V     |  |   |   |
| DSP56321VF275<br>DSP56321VL275 | 126 | 196-ball MAPBGA (Lead Free Package) | 275 MHz<br>550 MMACS<br>275 MHz EFCOP | SPAKDSP321VF275<br>SPAKDSP321VL275      | 1.6,<br>3.3 V     |  |   |   |

### DSP56300 Networking DSP Product Numbering





## DSP563<sub>XX</sub> FAMILY — AUDIO

### Symphony™ Audio DSP Products

| Product                     | Performance               | Program RAM                            | Data RAM (X memory)                   | Data RAM (Y memory)                     | Peripherals   | Packaging    | Additional Information  |
|-----------------------------|---------------------------|--|---------------------------------------|---|---|--------------|---|
| DSPB56362AG120              | 120 MHz/120 MIPS          | 2K - 5K <sup>1,2</sup> (words)         | 5.5K (words)                          | 3.5K - 5.5K <sup>2</sup> (words)        | ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, Off-Chip Memory Expansion                                     | 144-pin LQFP | OnCE; 3.3 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C   |
| DSPB56364AF100              | 100 MHz/100 MIPS          | 0.5K - 1.25K <sup>2</sup> (words)      | 1K (words)                            | 0.75K - 1.5K <sup>2</sup> (words)       | ESAI, SHI, GPIO, Byte wide Off-Chip Memory Expansion  | 100-pin LQFP | OnCE; 3.3 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C   |
| DSPB56366AG120              | 120 MHz/120 MIPS          | 2K - 10K <sup>1,2</sup> (words)        | 8K-13K <sup>2</sup> (words)           | 5K - 7K <sup>2</sup> (words)            | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, Off-Chip Memory Expansion                                 | 144-pin LQFP | OnCE; 3.3 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C   |
| DSPB56367AG150              | 150 MHz/150 MIPS          | 3K (words)                             | 8K-13K <sup>2</sup> (words)           | 5K - 7K <sup>2</sup> (words)            | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module; Off-Chip Memory Expansion                                 | 144-pin LQFP | OnCE; 1.8 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C; Off-Chip Memory Expansion  |
| DSPD56367AG150 <sup>3</sup> | 150 MHz/150 MIPS          | 3K (words)                             | 8K-13K <sup>2</sup> (words)           | 5K - 7K <sup>2</sup> (words)            | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module  | 144-pin LQFP | OnCE; 1.8 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C; Off-Chip Memory Expansion  |
| DSPB56371AF150              | 150 MHz/150 MIPS          | 4K - 44K <sup>1</sup> (words)          | 28K-36K <sup>1</sup> (words)          | 16K - 48K <sup>2</sup> (words)          | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, EFCOP   | 80-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C  |
| DSPB56371AF180              | 180 MHz/180 MIPS          | 4K - 44K <sup>1</sup> (words)          | 28K-36K <sup>1</sup> (words)          | 16K - 48K <sup>2</sup> (words)          | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, EFCOP   | 80-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C  |
| DSPC56371AF150 <sup>3</sup> | 150 MHz/150 MIPS          | 4K - 44K <sup>1</sup> (words)          | 28K-36K <sup>1</sup> (words)          | 16K - 48K <sup>2</sup> (words)          | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, EFCOP   | 80-pin LQFP  | OnCE; WMA, PLIIx; NEO:6, DTS2.3 AAC Dolby Headphone/Dolby Virtual Speaker; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C       |
| DSPC56371AF180 <sup>3</sup> | 180 MHz/180 MIPS          | 4K - 44K <sup>1</sup> (words)          | 28K-36K <sup>1</sup> (words)          | 16K - 48K <sup>2</sup> (words)          | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, EFCOP   | 80-pin LQFP  | OnCE; WMA, PLIIx; NEO:6, DTS2.3 AAC Dolby Headphone/Dolby Virtual Speaker; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C       |
| DSPD56371AF180 <sup>3</sup> | 180 MHz/180 MIPS          | 4K - 44K <sup>1</sup> (words)          | 28K-36K <sup>1</sup> (words)          | 16K - 48K <sup>2</sup> (words)          | Two ESAI, SHI, DAX, GPIO, HDIO8, Triple Timer Module, EFCOP   | 80-pin LQFP  | OnCE; DD/DTS 5.1 decoding + Dolby Headphone & Dolby Virtual Speaker 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C              |
| DSPB56374AE                 | 150 MHz/150 MIPS          | 2K - 10K <sup>1</sup> (words)          | 4K-10K <sup>1</sup> (words)           | 4K - 6K <sup>2</sup> (words)            | One ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 52-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C  |
| DSPB56374AF                 | 150 MHz/150 MIPS          | 2K - 10K <sup>2</sup> (words)          | 4K-10K <sup>1</sup> (words)           | 4K - 6K <sup>2</sup> (words)            | Two ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 80-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C  |
| DSPB56374AEC                | 150 MHz/150 MIPS          | 2K - 10K <sup>1</sup> (words)          | 4K-10K <sup>1</sup> (words)           | 4K - 6K <sup>2</sup> (words)            | One ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 52-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = -40°C to 85°C; Auto  |
| DSPB56374AFC                | 150 MHz/150 MIPS          | 2K - 10K <sup>2</sup> (words)          | 4K-10K <sup>1</sup> (words)           | 4K - 6K <sup>2</sup> (words)            | One ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 80-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = -40°C to 85°C; Auto  |
| DSPD56374AE <sup>3</sup>    | 150 MHz/150 MIPS          | 2K - 10K <sup>2</sup> (words)          | 4K-10K <sup>2</sup> (words)           | 4K - 6K <sup>3</sup> (words)            | One ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 52-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = 0°C to 70°C; PLII, Dolby Digital, Dolby Headphone and Dolby Virtual Speaker            |
| DSPD56374AEC                | 150 MHz/150 MIPS          | 2K - 10K <sup>2</sup> (words)          | 4K-10K <sup>2</sup> (words)           | 4K - 6K <sup>3</sup> (words)            | One ESAI, SHI, GPIO, Triple Timer Module, Watch Dog Timer   | 52-pin LQFP  | OnCE; 1.25 V Core; 3.3 V I/O; T <sub>A</sub> = -40°C to 85°C; Auto; PLII, Dolby Digital, Dolby Headphone and Dolby Virtual Speaker    |
| DSPA56720AG <sup>3</sup>    | 200 MHz per core/400 MIPS | 8K - 36K <sup>2</sup> per core (words) | 32K/36K <sup>2</sup> per core (words) | 24K - 48K <sup>2</sup> per core (words) | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, External Memory Controller, GPIO, Inter-Core Communication | 144-pin LQFP | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C, Dolby Digital+, Dolby TrueHD, DTS-HD and Legacy Dolby/DTS 5.1 Decoders and Post Processing |
| DSPB56720AG                 | 200 MHz per core/400 MIPS | 8K - 36K <sup>2</sup> per core (words) | 32K/36K <sup>2</sup> per core (words) | 24K - 48K <sup>2</sup> per core (words) | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, External Memory Controller, GPIO, Inter-Core Communication | 144-pin LQFP | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C   |

1. Including 1K of selectable cache.

2. Various memory switches available for re-allocating PRAM, XRAM and YRAM.

3. Where applicable, Dolby and DTS licenses are required prior to product purchase.





## DSP563<sub>xx</sub> FAMILY — AUDIO (continued)

### Symphony™ Audio DSP Products (continued)

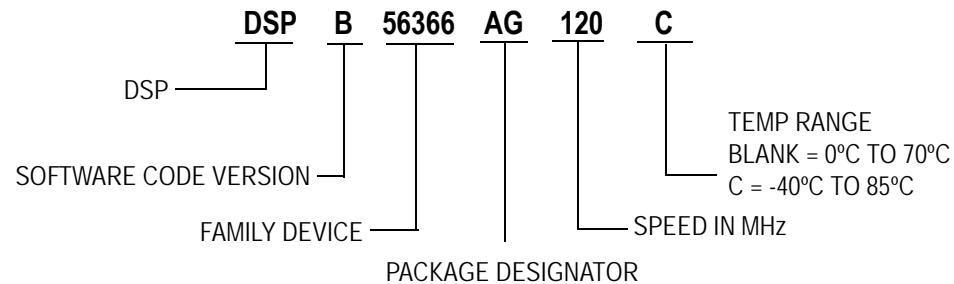
| Product                  | Performance                 | Program RAM  | Data RAM (X memory)  | Data RAM (Y memory)  | Peripherals   | Packaging    | Additional Information  |
|--------------------------|-----------------------------|--|--|--|---|--------------|---|
| DSPA56721AG <sup>3</sup> | 200 MHz per core/400 MIPS   | 8K - 36K <sup>2</sup> per core (words)                                   | 32K/36K <sup>2</sup> per core (words)                                    | 24K - 48K <sup>2</sup> per core (words)                                  | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication, Parallel Host Interface    | 144-pin LQFP | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C, Dolby Digital+, Dolby TrueHD, DTS-HD and Legacy Dolby/DTS 5.1 Decoders and Post Processing |
| DSPB56721AG              | 200 MHz per core/400 MIPS   | 8K - 36K <sup>2</sup> per core (words)                                   | 32K/36K <sup>2</sup> per core (words)                                    | 24K - 48K <sup>2</sup> per core (words)                                  | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication                             | 144-pin LQFP | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C   |
| DSPA56721AF <sup>3</sup> | 200 MHz per core/400 MIPS   | 8K - 36K <sup>2</sup> per core (words)                                   | 32K/36K <sup>2</sup> per core (words)                                    | 24K - 48K <sup>2</sup> per core (words)                                  | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication                             | 80-pin LQFP  | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C, Dolby Digital+, Dolby TrueHD, DTS-HD   |
| DSPB56721AF              | 200 MHz per core/400 MIPS   | 8K - 36K <sup>2</sup> per core (words)                                   | 32K/36K <sup>2</sup> per core (words)                                    | 24K - 48K <sup>2</sup> per core (words)                                  | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication                             | 80-pin LQFP  | OnCE, 1.0 V, T <sub>A</sub> = 0°C to 70°C   |
| DSPB56724AG              | 250 MHz per core / 500 MIPS | Core0: 4K-40K <sup>2</sup> (words)<br>Core1: 2K-16K <sup>2</sup> (words) | Core0: 8K-28K <sup>2</sup> (words)<br>Core1: 4K-12K <sup>2</sup> (words) | Core0: 8K-24K <sup>2</sup> (words)<br>Core1: 4K-10K <sup>2</sup> (words) | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication, External Memory Controller | 144-pin LQFP | OnCE, 1.2V, T <sub>A</sub> = 0°C to 70°C  |
| DSPB56725AF              | 250 MHz per core / 500 MIPS | Core0: 4K-40K <sup>2</sup> (words)<br>Core1: 2K-16K <sup>2</sup> (words) | Core0: 8K-28K <sup>2</sup> (words)<br>Core1: 4K-12K <sup>2</sup> (words) | Core0: 8K-24K <sup>2</sup> (words)<br>Core1: 4K-10K <sup>2</sup> (words) | 4 ESAI, S/PDIF, ASRC, 2 SHI, 2 Triple Timer Modules, GPIO, Inter-Core Communication                             | 80-pin LQFP  | OnCE, 1.2V, T <sub>A</sub> = 0°C to 70°C  |

1. Including 1K of selectable cache.

2. Various memory switches available for re-allocating PRAM, XRAM and YRAM.

3. Where applicable, Dolby and DTS licenses are required prior to product purchase.

### DSP563<sub>xx</sub> DSP Product Numbering





## MSC7100 FAMILY

Based on StarCore® Architecture

| Product       | MOQ | Packaging                    | Performance                  | Sample Part Number (2-Unit Sample Pack) | Voltage Core, Memory, I/O (V) | Internal Memory   | Peripherals   | Applications   |
|---------------|-----|------------------------------|------------------------------|---|-------------------------------|---|---|--|
| MSC7119VM1200 | 90  | 400-ball MAPBGA Lead-Free    | 1200 MMACS @ 300 MHz, DDR300 | KMSC7119VM1200                          | 1.2, 2.5, 3.3                 | 472 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 256 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 2 TDM (128-ch/port), 10/100 Ethernet MAC, UART, I <sup>2</sup> C | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose.                                    |
| MSC7119VF1200 | 90  | 400-ball MAPBGA Lead-Bearing | 1200 MMACS @ 300 MHz, DDR300 | KMSC7119VF1200                          | 1.2, 2.5, 3.3                 | 472 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 256 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 2 TDM (128-ch/port), 10/100 Ethernet MAC, UART, I <sup>2</sup> C | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose.                                    |
| MSC7118VM1200 | 90  | 400-ball MAPBGA Lead-Free    | 1200 MMACS @ 300 MHz, DDR300 | KMSC7118VM1200                          | 1.2, 2.5, 3.3                 | 472 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 256 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 3 TDM (128-ch/port), UART, I <sup>2</sup> C                      | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose Applications that require Ethernet. |
| MSC7118VF1200 | 90  | 400-ball MAPBGA Lead-Bearing | 1200 MMACS @ 300 MHz, DDR300 | KMSC7118VF1200                          | 1.2, 2.5, 3.3                 | 472 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 256 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 3 TDM (128-ch/port), UART, I <sup>2</sup> C                      | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose Applications that require Ethernet. |
| MSC7116VM1000 | 90  | 400-ball MAPBGA Lead-Free    | 1000 MMACS @ 266 MHz, DDR266 | KMSC7116VM1000                          | 1.2, 2.5, 3.3                 | 408 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 192 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 2 TDM (128-ch/port), 10/100 Ethernet MAC, UART, I <sup>2</sup> C | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose Applications that require Ethernet. |
| MSC7116VF1000 | 90  | 400-ball MAPBGA Lead-Bearing | 1000 MMACS @ 266 MHz, DDR266 | KMSC7116VF1000                          | 1.2, 2.5, 3.3                 | 408 KB Total RAM (16 KB ICACHE, 8 KB Boot ROM, 192 KB M1 192 KB M2) | HDI16 Host Port, DDR Controller, 2 TDM (128-ch/port), 10/100 Ethernet MAC, UART, I <sup>2</sup> C | High-density VoIP Enterprise/ROBO Wireless comm., Security Systems, Instrumentation, Industrial Control, Automation, General Purpose Applications that require Ethernet. |

## MSC7100 GPON FAMILY

Based on StarCore® Architecture and the e300 Power Architecture™

| Product | MOQ | Packaging         | Performance   | Sample Part Number (2-Unit Sample Pack) | Voltage Core, I/O (V) | Internal Memory  | Peripherals  | Applications  |
|---------|-----|-------------------|---|---|-----------------------|--|--|---|
| MSC7120 | 24  | 456-ball TEPBGAII | DSP: 178 MHz<br>712 MMACS<br>e300: 266 MHz<br>511 Dhrystone 2.1 MIPS<br>66 MHz System Bus | —                                       | 1.0,<br>1.8/2.5       | e300: 16 KB L1 ICACHE<br>16 KB L1 DCACHE<br>DSP: 16 KB L1 ICACHE<br>128 KB M1<br>8 KB M2 | DSP core, e300 core, dedicated packet forwarding engine, DDR memory controller (266 MHz data rate), two 10/100/1000 Ethernet controllers with MGMI, RGMII, MII, and FIFO8 interfaces, Gigabit passive optical network media access controller, optical module interface local bus controller, DUART, I <sup>2</sup> C, SPI, TDM, JTAG, and up to 48 GPIOs. | Broadband passive optical network termination applications. |



# MSC8100 FAMILY

Based on StarCore® Architecture

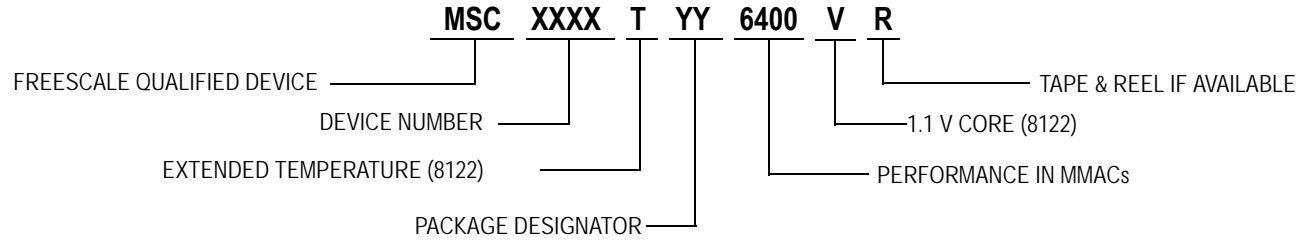
| Product  | MOQ | Packaging   | Performance   | Sample Part Number (2-Unit Sample Pack) | Voltage Core, I/O (V) | Internal Memory                          | Peripherals   | Applications   |
|--|-----|---|---|---|-----------------------|--|---|--|
| MSC8112TVT2400V<br>MSC8112TMP2400V                       | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 300 MHz<br>2400 MMACS<br>100 MHz System Bus                 | KMSC8112TVT2200<br>KMSC8112TMP2400      | 1.1, 3.3              | 1.436 MB unified program and data memory | 2 cores, 8 ALUs, System Integration Unit, 32-channel DMA, 32/64-bit system bus, 32/64-bit Direct Slave Interface, 1024 channel TDM Interface, UART, 32 timers, hardware semaphores, 32 GPIOs, I <sup>2</sup> C interface for boot from Serial-EEPROM, Ethernet support for MII, RMI, and SMII.  | The MSC8112 is targeted specifically at packet telephony media gateways, multichannel modem banks and third-generation wireless systems, as well as video security servers, video surveillance systems, image processing, and military applications.   |
| MSC8113TVT3600V<br>MSC8113TMP3600V                       | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 300 MHz,<br>100 MHz System Bus                              | KMSC8113TVT3600<br>KMSC8113TMP3600      | 1.1, 3.3              |  | 3 cores, 12 ALUs, System Integration Unit, 32-channel DMA, 32/64-bit system bus, 32/64-bit Direct Slave Interface, 1024 channel TDM Interface, UART, 32 timers, hardware semaphores, 32 GPIOs, I <sup>2</sup> C interface for boot from Serial-EEPROM, Ethernet support for MII, RMI, and SMII.   | The MSC8113 is targeted specifically at packet telephony media gateways, multichannel modem banks and third-generation wireless systems, as well as video security servers, video surveillance systems, image processing, and military applications.   |
| MSC8113TVT4800V<br>MSC8113TMP4800V                       | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 400 MHz,<br>4800 MMACS<br>133.3 MHz System Bus              | KMSC8113TVT4800<br>KMSC8113TMP4800      | 1.1, 3.3              |  | 32 timers, hardware semaphores, 32 GPIOs, I <sup>2</sup> C interface for boot from Serial-EEPROM, Ethernet support for MII, RMI, and SMII.  |  |
| MSC8122TVT4800V<br>MSC8122TMP4800V                       | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 300 MHz<br>4800 MMACS<br>100 MHz System Bus                 | KMSC8122TVT4800<br>KMSC8122TMP4800      | 1.1, 3.3              |  | 4 cores, 16 ALUs, System Integration Unit, 32-channel DMA, 32/64-bit system bus, 32/64-bit Direct Slave Interface, 1024 channel TDM Interface, UART, 32 timers, hardware semaphores, 32 GPIOs, I <sup>2</sup> C interface for boot from Serial-EEPROM, Ethernet support for MII, RMI, and SMII.   | The MSC8122 is targeted specifically at packet telephony media gateways, multichannel modem banks and third-generation wireless systems, as well as video security servers, video surveillance systems, image processing, and military applications.   |
| MSC8122TVT6400V<br>MSC8122TMP6400V                       | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 400 MHz,<br>6400 MMACS<br>133.3 MHz System Bus              | KMSC8122TVT6400V<br>KMSC8122TMP6400V    | 1.1, 3.3              |  |   |  |
| MSC8122TVT6400<br>MSC8122TMP6400                         | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 400 MHz,<br>6400 MMACS<br>133.3 MHz System Bus              | KMSC8122TVT6400<br>KMSC8122TMP6400      | 1.2, 3.3              |  |   |  |
| MSC8122VT8000 <sup>1</sup><br>MSC8122MP8000 <sup>1</sup> | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 500 MHz<br>8000 MMACS<br>166.6 MHz System Bus               | KMSC8122VT8000<br>KMSC8122MP8000        | 1.2, 3.3              |  |   |  |
| MSC8126TVT6400<br>MSC8126TMP6400                         | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 400 MHz<br>6400 MMACS<br>TCOP, VCOP<br>133.3 MHz System Bus | KMSC8126TVT6400<br>KMSC8126TMP6400      | 1.2, 3.3              |  | 4 cores, 16 ALUs, System Integration Unit, 32-channel DMA, 32/64-bit system bus, 32/64-bit Direct Slave Interface, 1024 channel TDM interface, UART, 32 timers, hardware semaphores, 32 GPIOs, I <sup>2</sup> C interface for boot from Serial-EEPROM, Ethernet support for MII, RMI, and SMII, Viterbi Coprocessor, Turbo Coprocessor.   | The MSC8126 is targeted specifically towards 3G wireless basestations. In addition to baseband applications, applications include video security servers, video surveillance systems, image processing, military and packet telephony.   |
| MSC8126VT8000<br>MSC8126MP8000                           | 60  | 431-ball PBGA (Lead-Free Package)<br>(Lead-bearing Package) | 500 MHz<br>8000 MMACS<br>TCOP, VCOP<br>166.6 MHz System Bus | KMSC8126VT8000<br>KMSC8126MP8000        | 1.2, 3.3              |  |   |  |
| MSC8144SVT800A<br>MSC8144VT800A                          | 60  | 783-ball FC PBGA (Lead-Free Package)                        | 800 MHz<br>12800 MMACS                                      | KMSC8144SVT800A<br>KMSC8144VT800A       | 1, 1.8, 2.5, 3.3      |  | 10.96 MB  | 4 SC3400 DSP core subsystems, CLASS non-blocking interconnect fabric, DDR controller (400 MHz data rate), 32-channel DMA controller, 8 TDMs (2048 send and 2048 receive channels), dual-RISC QUICC Engine™ subsystem with 2 Gbit Ethernet controllers/ 1 ATM controller/SPI, PCI, serial RapidIO® subsystem with dedicated 4-channel DMA controller, UART, 8 16-bit timers, I <sup>2</sup> C, 8 hardware semaphores, GPIOs/external hardware interrupts, and virtual interrupt system. |
| MSC8144SVT1000A<br>MSC8144VT1000A                        | 60  | 783-ball FC PBGA (Lead-Free Package)                        | 1000 MHz<br>16000 MMACS                                     | KMSC8144SVT1000A<br>KMSC8144VT1000A     | 1, 1.8, 2.5, 3.3      | 10.96 MB                                 |   |  |
| MSC8144ESVT800A<br>MSC8144EVT800A                        | —   | 783-ball FC PBGA (Lead-Free Package)                        | 800 MHz<br>12800 MMACS                                      | —                                       | 1, 1.8, 2.5, 3.3      | 10.96 MB                                 | 4 SC3400 DSP core subsystems, CLASS non-blocking interconnect fabric, DDR controller (400 MHz data rate), 32-channel DMA controller, 8 TDMs (2048 send and 2048 receive channels), dual-RISC QUICC Engine™ subsystem with 2 Gbit Ethernet controllers/ 1 ATM controller/SPI, PCI, serial RapidIO® subsystem with dedicated 4-channel DMA controller, UART, 8 16-bit timers, I <sup>2</sup> C, 8 hardware semaphores, GPIOs/external hardware interrupts, and virtual interrupt system, security block for data encryption/decryption during processing. |  |
| MSC8144ESVT1000A<br>MSC8144EVT1000A                      | —   | 783-ball FC PBGA (Lead-Free Package)                        | 1000 MHz<br>16000 MMACS                                     | —                                       | 1, 1.8, 2.5, 3.3      | 10.96 MB                                 |   |  |

1. Not available in extended temperatures. (-40°C to +105°C)

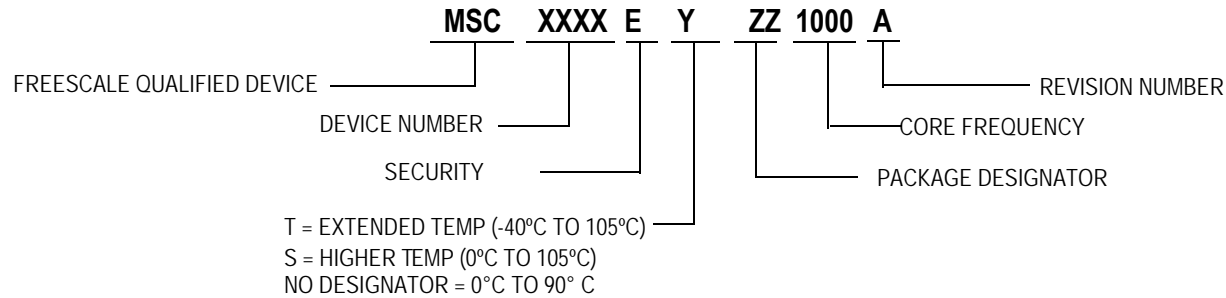


## MSC8100 FAMILY (continued)

### Family Product Numbering for the MSC7000, MSC8122, and MSC8126



### Family Product Numbering for the MSC8144



## MSBA8100 FAMILY

### Multi-Standard Baseband Accelerator for MSC8144

| Product | MOQ | Packaging       | Performance  | Sample Part Number (2-Unit Sample Pack) | Voltage Core, I/O (V) | Internal Memory  | Peripherals   | Applications  |
|---------|-----|-----------------|--|---|-----------------------|------------------|---|---|
| PC8100  | —   | 783-ball FCPBGA | Turbo/Viterbi Decoder up to 115/133 Mbps respectively, Up to 165 Msps FFT and 145 Msps DFT | —                                       | 1.0, 1.8, 2.5, 3.3    | 512 KB Shared M2 | MAPLE-B Accelerator, 512 Kbyte M2 memory (SRAM), DDR2 SDRAM 333MHz, 32 bit, CLASS – Chip-Level Arbitration & Switching Fabric, Dual 4x/1x Serial RapidIO™ interfaces at 1.25/2.5/3.125 Gbaud, PCI 32b/66MHz, hardware semaphores, 4 GPIOs | The MSBA8100 baseband accelerator together with the existing MSC8144 is designed to bolster the new wireless standards and enable cellular infrastructure manufacturers to create low-cost and differentiated channel cards for next generation standalone or unified 3G-LTE, WiMAX, HSPA, 3GPP2 and TD-SCDMA, TDD-LTE base stations. |



# DSP56300

## 24-Bit

| Product  | Core Performance (16-bit MMACS) | Core Speed (MHz)   | # of DSP Cores | I-Cache (per core) (kByte) | D-Cache (per core) (kByte) | Total On-Chip SRAM (kByte) | On-Chip SRAM (kByte x words) | M2 Memory | External Memory Interface | DMA Channels | CPM/QUICC Engine | ESSI | SCI1 | GPIO | Timers | Bus Frequency (MHz) | Bus Width (internal) (bit) | Bus Width (external) (bit) | Core Voltage (V) | I/O Voltage (V) | Host Port Interface (bit) | Low Power Modes | Accelerators | Package         |
|----------|---------------------------------|--------------------|----------------|----------------------------|----------------------------|----------------------------|------------------------------|-----------|---------------------------|--------------|------------------|------|------|------|--------|---------------------|----------------------------|----------------------------|------------------|-----------------|---------------------------|-----------------|--------------|-----------------|
| DSP56311 | 300 w/ EFCOP                    | 150                | 1              | —                          | —                          | 384                        | 128 x 24                     | —         | DRAM, SRAM                | 6            | —                | 2    | 1    | 34   | 3      | 150                 | 24                         | 24                         | 1.8              | 3.3             | 8                         | STOP            | EFCOP        | 196-ball MAPBGA |
| DSP56321 | 550 w/ EFCOP                    | 200, 220, 240, 275 | 1              | —                          | —                          | 576                        | 196 x 24                     | —         | SRAM                      | 6            | —                | 2    | 1    | 34   | 3      | 200, 220, 240, 275  | 24                         | 24                         | 1.6              | 3.3             | 8                         | STOP            | EFCOP        | 196-ball MAPBGA |

# STARCORE®

## StarCore® Multi-Core

| Product  | Core Performance (16-bit MMACS) | Core Speed (MHz) | # of DSP Cores | I-Cache (per core) (kByte) | D-Cache (per core) (kByte) | L2-Cache (kByte) | Boot ROM (kByte) | M1 Memory (per core) | Shared M2 Memory | Shared M3 Memory | External Memory Interface     | DMA Channels | CPM/QUICC Engine        | # of 10/100 BT | Gigabit Ethernet (RGMII, SGMII) | I <sup>2</sup> C | UART | UTOPIA L2 | PCI | sRIO  | SPI   | TDM | GPIO | Timers | Ext. Mem Bus Frequency (MHz) | Bus Width (internal) (bit) | Bus Width (external) (bit) | Core Voltage (V) | I/O Voltage (V) | Host Port Interface (bit) | Low Power Modes | Accelerators                      | Package         |
|----------|---------------------------------|------------------|----------------|----------------------------|----------------------------|------------------|------------------|----------------------|------------------|------------------|-------------------------------|--------------|-------------------------|----------------|---------------------------------|------------------|------|-----------|-----|-------|-------|-----|------|--------|------------------------------|----------------------------|----------------------------|------------------|-----------------|---------------------------|-----------------|-----------------------------------|-----------------|
| MSC8112  | 2400                            | 300              | 2              | 16                         | —                          | —                | 4                | 224                  | 476              | —                | SIU/60x-Compatible System Bus | 16           | —                       | 1              | —                               | yes              | yes  | —         | —   | —     | —     | 4   | 32   | 32     | 100                          | 64, 128                    | 32, 64                     | 1.1              | 3.3             | 32, 64                    | STOP, WAIT      | —                                 | 431 pin FC-PBGA |
| MSC8113  | 3600, 4800                      | 300, 400         | 3              | 16                         | —                          | —                | 4                | 224                  | 476              | —                | SIU/60x-Compatible System Bus | 16           | —                       | 1              | —                               | yes              | yes  | —         | —   | —     | —     | 4   | 32   | 32     | 100, 133                     | 64, 128                    | 32, 64                     | 1.1              | 3.3             | 32, 64                    | STOP, WAIT      | —                                 | 431 pin FC-PBGA |
| MSC8122  | 4800, 6400, 8000                | 300, 400, 500    | 4              | 16                         | —                          | —                | 4                | 224                  | 476              | —                | SIU/60x-Compatible System Bus | 16           | —                       | 1              | —                               | yes              | yes  | —         | —   | —     | —     | 4   | 32   | 32     | 100, 133, 166                | 64, 128                    | 32, 64                     | 1.1, 1.2         | 3.3             | 32, 64                    | STOP, WAIT      | —                                 | 431 pin FC-PBGA |
| MSC8126  | 6400, 8000                      | 400, 500         | 4              | 16                         | —                          | —                | 4                | 224                  | 476              | —                | SIU/60x-Compatible System Bus | 16           | —                       | 1              | —                               | yes              | yes  | —         | —   | —     | —     | 4   | 32   | 32     | 133, 166                     | 64, 128                    | 32, 64                     | 1.2              | 3.3             | 32, 64                    | STOP, WAIT      | TCOP, VCOP                        | 431 pin FC-PBGA |
| MSC8144  | 12800, 16000                    | 800, 1000        | 4              | 16                         | 32                         | 128              | 96               | —                    | 512              | 10 MByte         | DDR 1 & 2-400MHz              | 32           | Dual RISC cores 400 MHz | 2              | 2                               | yes              | yes  | yes       | yes | 4X/1X | yes   | 8   | 32   | 24     | 400                          | 64, 128                    | 16, 32                     | 1                | 1.8/2.5 / 3.3   | PCI 2.2                   | STOP, WAIT      | —                                 | 783 pin FC-PBGA |
| MSC8144E | 12800, 16000                    | 800, 1000        | 4              | 16                         | 32                         | 128              | 96               | —                    | 512              | 10 MByte         | DDR 1 & 2-400MHz              | 32           | Dual RISC cores 400 MHz | 2              | 2                               | yes              | yes  | yes       | yes | 4X/1X | yes   | 8   | 32   | 24     | 400                          | 64, 128                    | 16, 32                     | 1                | 1.8/2.5 / 3.3   | PCI 2.2                   | STOP, WAIT      | Data Encryption                   | 783 pin FC-PBGA |
| MSBA8100 | —                               | —                | —              | —                          | —                          | —                | —                | —                    | 512              | —                | DDR 1 & 2-333MHz              | 8            | —                       | —              | —                               | —                | —    | —         | —   | yes   | 4x/1x | —   | 4    | —      | 333MHz                       | 64                         | 16, 32                     | 1                | 1.8/2.5/3.3     | PCI 2.2                   | —               | Turbo/Viterbi, FFT/IFFT, DFT/IDFT | 783 pin FC-PBGA |

## StarCore® Low Cost

| Product | Core Performance (16-bit MMACS) | Core Speed (MHz) | # of DSP Cores | I-Cache (per core) (kByte) | D-Cache (per core) (kByte) | L2-Cache (kByte) | Boot ROM (kByte) | M1 Memory (per core) | Shared M2 Memory | Shared M3 Memory | External Memory Interface | DMA Channels | CPM/QUICC Engine | # of 10/100 BT | Gigabit Ethernet (RGMII, SGMII) | I <sup>2</sup> C | UART | UTOPIA L2 | PCI | sRIO | SPI      | TDM | GPIO | Timers | Ext. Mem Bus Frequency (MHz) | Bus Width (internal) (bit) | Bus Width (external) (bit) | Core Voltage (V) | I/O Voltage (V) | Host Port Interface (bit) | Low Power Modes | Accelerators | Package         |
|---------|---------------------------------|------------------|----------------|----------------------------|----------------------------|------------------|------------------|----------------------|------------------|------------------|---------------------------|--------------|------------------|----------------|---------------------------------|------------------|------|-----------|-----|------|----------|-----|------|--------|------------------------------|----------------------------|----------------------------|------------------|-----------------|---------------------------|-----------------|--------------|-----------------|
| MSC7116 | 800                             | 200              | 1              | 16                         | —                          | —                | 8                | 192                  | 192              | —                | DDR                       | 32           | —                | 1              | —                               | yes              | yes  | —         | —   | —    | software | 2   | 46   | 8      | 133                          | 128                        | 16, 32                     | 1.2              | 3.3             | 8, 16                     | WAIT, STOP      | —            | 400-ball MAPBGA |
| MSC7118 | 1200                            | 300              | 1              | 16                         | —                          | —                | 8                | 256                  | 192              | —                | DDR                       | 32           | —                | —              | —                               | yes              | yes  | —         | —   | —    | software | 3   | 46   | 8      | 150                          | 128                        | 16, 32                     | 1.2              | 3.3             | 8, 16                     | WAIT, STOP      | —            | 400-ball MAPBGA |
| MSC7119 | 1200                            | 300              | 1              | 16                         | —                          | —                | 8                | 256                  | 192              | —                | DDR                       | 32           | —                | 1              | —                               | yes              | yes  | —         | —   | —    | software | 2   | 46   | 8      | 150                          | 128                        | 16, 32                     | 1.2              | 3.3             | 8, 16                     | WAIT, STOP      | —            | 400-ball MAPBGA |



## STARCORE (continued)

### StarCore® GPON

| Product | Core Performance (16-bit MMACS)            | Core Speed (MHz)       | # of DSP Cores | I-Cache (per core) (kByte) | D-Cache (per core) (kByte) | L2-Cache (kByte) | Boot ROM (kByte) | M1 Memory (per core) | Shared M2 Memory | Shared M3 Memory | External Memory Interface         | DMA Channels | CPM/QUICC Engine | # of 10/100 BT | Gigabit Ethernet (RGMII, SGMII) | I <sup>2</sup> C | UART | UTOPIA | PCI | sRIO | SPI | TDM | GPIO | Timers | Ext. Mem Bus Frequency (MHz)   | Bus Width (internal) (bit) | Bus Width (external) (bit)      | Core Voltage (V) | I/O Voltage (V) | Host Port Interface (bit) | Low Power Modes | Accelerators                       | Package           |
|---------|--|------------------------|----------------|----------------------------|----------------------------|------------------|------------------|----------------------|------------------|------------------|-----------------------------------|--------------|------------------|----------------|---------------------------------|------------------|------|--------|-----|------|-----|-----|------|--------|--------------------------------|----------------------------|---------------------------------|------------------|-----------------|---------------------------|-----------------|------------------------------------|-------------------|
| MSC7120 | 712 DSP MMACS<br>511 Dhrystone<br>2.1 MIPS | DSP 178<br>e300<br>266 | 1              | DSP 16<br>e300<br>16       | e300<br>16                 | —                | —                | —                    | —                | —                | DDR 1 & 2<br>Local bus controller | —            | —                | 2              | 2                               | yes              | yes  | —      | —   | —    | —   | 1   | 48   | —      | 133<br>(DDR)/66<br>(Local Bus) | —                          | 32 (DDR)<br>8/16<br>(Local Bus) | 1.0              | 1.8/2.5         | —                         | —               | Dedicated packet forwarding engine | 456-ball TEPBGAII |

## EVALUATION BOARDS AND DEVELOPMENT KITS

| Product      | Description                                       | Location   |
|--------------|---|--|
| MSC8122ADSE  | Application development system for MSC8122        | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC8126ADSE  | Application development system for MSC8126        | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC8144ADS   | Application development system for MSC8144        | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC8144AMC-S | Advanced mezzanine card for MSC8144               | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC711xEVM   | Evaluation system for MSC711x family              | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC711xADS   | Application development system for MSC711x family | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSC8144EADS  | Application development system for MSC8144E       | <a href="http://www.freescale.com">www.freescale.com</a> |
| MSBA8100ADS  | Application development system for MSBA8100       | <a href="http://www.freescale.com">www.freescale.com</a> |

## REFERENCE DESIGNS

| Product      | Description             | Location   |
|--------------|-------------------------|--|
| MSC8144AMC-S | Advanced mezzanine card | <a href="http://www.freescale.com">www.freescale.com</a> |

A change bar appears in the left margin to mark the location of new or revised information.



## DEVELOPMENT TOOLS

### 56800/56800E/56F8300/56F8100/56F8000 Development Tools — Software

| Product         | Description  | Status    |
|-----------------|--|-----------|
| DSPOSRTOS       | DSP OS Real-Time Operating System (RTOS)   | Available |
| DSPOSNET        | DSP OS Network Software  | Available |
| RTXC            | RTXC Real-Time Operating System (RTOS)   | Available |
| RTXCNET         | RTXC Networking Protocol Suite   | Available |
| DSP56858SFP     | DSP56858 with Feature Phone Application  | Available |
| CWS-568X-SE     | CodeWarrior® Development Studio for 56800/E with Processor Expert (limited to 16 KB of program RAM)  | Available |
| CWS-568-C32K-CX | CodeWarrior® Development Studio for 56800/E with Processor Expert (limited to 64 KB of program RAM)  | Available |
| CWS-568-C64K-CX | CodeWarrior® Development Studio for 56800/E with Processor Expert (limited to 128 KB of program RAM) | Available |
| CWS-568-CX      | CodeWarrior® Development Studio for 56800/E with Processor Expert                                    | Available |
| CWH-UTP-ONCE-HX | CodeWarrior® USB TAP for 56800/E Digital Signal Controllers  | Available |

### 56800 Development Tools — Hardware

| Product         | Description  | Status   |
|-----------------|--|--|
| DSP56800TDC1    | Daughter Card for DSP56F826EVM and DSP56F827EVM                              | Available  |
| DSP56F800DEMO   | 56F800 Demonstration Kit with US power supply                                | Available  |
| DSP56F800DEMO-E | 56F800 Demonstration Kit with US power supply                                | Available  |
| DSP56F801EVM    | Evaluation kit for the DSP56F801 and DSP56F802 processor (DevTech)           | Available  |
| DSP56F803EVM    | Evaluation kit for the DSP56F803 processor (DevTech)                         | Available  |
| DSP56F805EVM    | Evaluation kit for the DSP56F805 processor (DevTech)                         | Available  |
| DSP56F807EVM    | Evaluation kit for the DSP56F807 processor (DevTech)                         | Available  |
| DSP56F826EVM    | Evaluation kit for the DSP56F826 processor (DevTech)                         | Available  |
| DSP56F827EVM    | Evaluation kit for the DSP56F827 processor                                   | Available  |
| DSPCOMMANDPCI   | Emulation support for DSP56F80X processors. Requires PCI slot (DevTech)      | Consult Web or DevTech for availability of CodeWarrior® software support |
| DSPCOMMETHERNET | Emulation support for DSP56F80X processors. Requires Ethernet network        | Consult Web or DevTech for availability of CodeWarrior® software support |
| DSPCOMMPARALLEL | Emulation support for DSP56F80X processors. Requires parallel port (DevTech) | Available  |
| DSPOSRTOS       | DSP OS Real-Time Operating System (RTOS)                                     | Available  |
| ECCTR908MR32    | MC68HC908MR32 Control Board  | Available  |
| ECINLHIVSR      | Three-Phase Switched Reluctance High-Voltage Power Stage                     | Available  |
| ECLOVACBLDC     | Three-Phase BLDC Low-Voltage Power Stage                                     | Available  |
| ECLOVSR         | Three-Phase Switched Reluctance Low-Voltage Power Stage                      | Available  |
| ECMTREVAL       | Evaluation Motor Board   | Available  |
| ECOPT           | Optoisolation Board  | Available  |
| ECOPTHIVACBLDC  | Three-Phase AC BLDC High-Voltage Power Stage                                 | Available  |
| ECOPTINL        | In-Line Optoisolation Box  | Available  |



## DEVELOPMENT TOOLS (continued)

### 56850 Development Tools — Hardware

| Product         | Description                                   | Status    |
|-----------------|---|-----------|
| DSP56852EVM     | Evaluation Kit for DSP56852 Processor         | Available |
| DSPCOMMPARALLEL | Parallel Port Command Converter for DSP       | Available |
| DSPCOMMETHERNET | Ethernet Command Converter for DSP            | Available |
| DSPCOMMANDPCI   | PCI Command Converter for DSP                 | Available |
| DSPCOMMAND      | Universal Command Converter for DSP           | Available |
| DSP56858EVM     | Evaluation Kit for DSP56858 Embedded Systems  | Available |
| DSP56800TDC1    | Daughter Card for DSP56852EVM and DSP56858EVM | Available |

### 56F8000 Development Tools — Hardware

| Product        | Description   | Status    |
|----------------|---|-----------|
| APMOTOR56F8000 | 56F8000 Motor Control Kit                                   | Available |
| CPA56F8013     | CPA56F8013 Socket Board for 56F8013 Flash Programming       | Available |
| CPA56F8014     | CPA56F8014 Socket Board for 56F8014 Flash Programming       | Available |
| DEMO56F8013    | Demonstration Board for 56F8013 with US Power Supply        | Available |
| DEMO56F8014    | Demonstration Board for 56F8014 with US Power Supply        | Available |
| DEMO56F8013-E  | Demonstration Board for 56F8013 with Universal Power Supply | Available |
| DEMO56F8014-E  | Demonstration Board for 56F8014 with Universal Power Supply | Available |

### 56F8300/56F8100 Development Tools — Hardware

| Product         | Description  | Status    |
|-----------------|--|-----------|
| MC56F8300DSK    | 56F8300 Demonstration Kit with US power supply                             | Available |
| MC56F8323EVM    | Evaluation kit for the 56F8322 and 56F8323 processor (DevTech)             | Available |
| MC56F8367EVM    | Evaluation kit for 56F8345-56F8367 processors (DevTech)                    | Available |
| DSPCOMMANDPCI   | Emulation support for 56F8300 processors. Requires PCI slot (DevTech)      | Available |
| DSPCOMMETHERNET | Emulation support for 56F8300 processors. Requires Ethernet network        | Available |
| DSPCOMMPARALLEL | Emulation support for 56F8300 processors. Requires parallel port (DevTech) | Available |
| DSPOSRTOS       | DSP OS Real-Time Operating System (RTOS)                                   | Available |
| ECCTR908MR32    | MC68HC908MR32 Control Board  | Available |
| ECINLHIVSR      | Three-Phase Switched Reluctance High-Voltage Power Stage                   | Available |
| ECLOVACBLDC     | Three-Phase BLDC Low-Voltage Power Stage                                   | Available |
| ECLOVSR         | Three-Phase Switched Reluctance Low-Voltage Power Stage                    | Available |
| ECMTREVAL       | Evaluation Motor Board   | Available |
| ECOPT           | Optoisolation Board  | Available |
| ECOPTHIVACBLDC  | Three-Phase AC BLDC High-Voltage Power Stage                               | Available |
| ECOPTINL        | In-Line Optoisolation Box  | Available |





## DEVELOPMENT TOOLS (continued)

### *DSP56300, MSC8100 and MSC7100 Development Tools — Hardware* <sup>Note</sup>

| Product          | Description   | Status    |
|------------------|---|-----------|
| DSP563xxEVME     | DSP563xx Evaluation Module  | Available |
| DSPAUDIOEVMMB1   | DSP563xx Evaluation Module (Daughter Cards listed separately)             | Available |
| DSPB362DB1       | DSPB362 Evaluation Module Daughter Card                                   | Available |
| DSPB364DB1       | DSPB364 Evaluation Module Daughter Card                                   | Available |
| DSPB366DB1       | DSPB366 Evaluation Module Daughter Card                                   | Available |
| DSPB367DB1       | DSPB367 Evaluation Module Daughter Card                                   | Available |
| DSPD367DB1       | DSPD367 Evaluation Module Daughter Card; Dolby and DTS Licensing Required | Available |
| DSPA371DB1       | DSPA371 Evaluation Module Daughter Card; Dolby and DTS Licensing Required | Available |
| DSPB371DB1       | DSPB371 Evaluation Module Daughter Card                                   | Available |
| DSPC371DB1       | DSPC371 Evaluation Module Daughter Card, Dolby and DTS Licensing Required | Available |
| DSPD371DB1       | DSPD371 Evaluation Module Daughter Card, Dolby and DTS Licensing Required | Available |
| DSPB374DB1       | DSPB374 Evaluation Module Daughter Card                                   | Available |
| DSPD374DB1       | DSPB374 Evaluation Module Daughter Card                                   | Available |
| DSPCOMMPARALLELE | Command Converter with Parallel Port Host Interface                       | Available |
| MSC711xADS       | MSC711x Family and MPC8272 Application Development System                 | Available |
| MSC711xEVM       | Evaluation System for MSC711x Family                                      | Available |
| MSC8122ADSE      | MSC8122 Application Development System Board                              | Available |
| MSC8126ADSE      | MSC8126 Application Development System Board                              | Available |
| MSC8144ADS       | MSC8144 Application Development System Board                              | Available |
| MSC8144AMC-S     | Advanced mezzanine card for MSC8144                                       | Available |
| MSC8144EADS      | MSC8144E Application Development System Board                             | Available |
| MSBA8100ADS      | MSBA8100 Application Development System Board                             | Available |

Note: [www.freescale.com](http://www.freescale.com)

A change bar appears in the left margin to mark the location of new or revised information.



## DEVELOPMENT TOOLS (continued)

### DSP56300, MSC8100 and MSC7100 Development Tools — Software

| Tools Description                     | Partner   | Contact  |
|---------------------------------------|---|--|
| Real-Time Operating System            | Quadros Systems, Inc.<br>OSE Systems<br>Express Logic | www.quadros.com<br>www.ose.com<br>www.expresslogic.com       |
| Integrated Development Environment    | DevTech   | www.freescale.com<br>www.tasking.com                         |
| Optimizing Compilers/Assembler/Linker | DevTech   | www.freescale.com<br>www.tasking.com                         |
| Debugger                              | DevTech   | www.freescale.com<br>www.tasking.com                         |
| Simulator                             | DevTech   | www.freescale.com<br>www.tasking.com                         |
| DSP Software/Libraries                | Global IP Sound Inc                                   | www.globalipsound.com  |
| Hardware Debug Connections/Analyzers  | Macraigor Systems<br>DevTech<br>Lauterbach            | www.macraigor.com<br>www.freescale.com<br>www.lauterbach.com |
| Hardware Development Tools            | Quantic-EMC   | www.quantific-emc.com  |
| Device Driver Software                | Freescale Semiconductor SmartDSP OS<br>OSE Systems    | www.freescale.com<br>www.ose.com                             |
| Training                              | Arnewsh Inc<br>DSP Systems Inc                        | http://www.arnewsh.com<br>http://www.dsp-sys.com             |

## MSC7100 AND MSC8100 APPLICATION SOFTWARE

### MSC7100, MSC8100 Software Modules

| Application/Module              | MSC7116 | MSC7118 | MSC7119 | MSC7120 | MSC8112 | MSC8113 | MSC8122 | MSC8126 | MSC8144 | MSC8144E | MSC8144EC |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|
| <b>Video Codecs</b>             |         |         |         |         |         |         |         |         |         |          |           |
| H.261                           |         |         |         |         |         |         |         |         | •       | •        | •         |
| H.263                           |         |         |         |         |         |         |         |         | •       | •        | •         |
| H.264                           |         |         |         |         |         |         |         |         | •       | •        | •         |
| MPEG4                           |         |         |         |         |         |         |         |         | •       | •        | •         |
| <b>Voice Codecs</b>             |         |         |         |         |         |         |         |         |         |          |           |
| G.711                           | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.711 App 1 & 2 (PLC & VAD/CNG) | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.722                           | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.723.1                         | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.726                           | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.726A                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.728                           | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.729B                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.729AB                         | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| G.729E                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| GSM-FR                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| GSM-HR                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |

• = Available



## MSC7100 AND MSC8100 APPLICATION SOFTWARE (continued)

### MSC7100, MSC8100 Software Modules (continued)

| Application/Module              | MSC7116 | MSC7118 | MSC7119 | MSC7120 | MSC8112 | MSC8113 | MSC8122 | MSC8126 | MSC8144 | MSC8144E | MSC8144EC |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|
| GSM-AMR/EFR                     | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| 3GPP-AMR-WB                     | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| IS 127 EVRC-A                   | •       | •       | •       | •       | •       | •       | •       | •       | *       | *        | *         |
| IS 127 EVRC-B                   | •       | •       | •       | •       | •       | •       | •       | •       | *       | *        | *         |
| G722.1C (Siren 14)              |         |         |         |         |         |         |         |         | *       | *        | *         |
| iLBC                            | •       | •       | •       | •       | •       | •       | •       | •       | *       | *        | *         |
| <b>Modems (Pumps)</b>           |         |         |         |         |         |         |         |         |         |          |           |
| - V.23 CallerID                 | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| - V.34                          | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| - V.90                          | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| - V.92                          | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| V.42 MNP4 (Error Correction)    | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| V.44 V.42bis MNP5 (Compression) | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| V.8 V.8bis (Negotiation)        | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| HDLC                            | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| Relay: V.150.1 (MoIP)           | •       | •       | •       | •       | •       | •       | •       | •       |         |          |           |
| <b>Fax (Pumps)</b>              |         |         |         |         |         |         |         |         |         |          |           |
| - V.17                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| - V.21                          |         |         |         | *       |         |         |         |         |         |          |           |
| - V.27ter                       | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| - V.29                          | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |
| Relay: T.38/T.30 (FoIP)         | •       | •       | •       | •       | •       | •       | •       | •       | •       | •        | •         |

• = Available



# MSC7100 AND MSC8100 APPLICATION SOFTWARE (continued)

## MSC7100, MSC8100 Software Modules (continued)

| Application/Module            | MSC7116 | MSC7118 | MSC7119 | MSC7120 | MSC8112 | MSC8113 | MSC8122 | MSC8126 | MSC8144 | MSC8144E | MSC8144EC |
|-------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|
| <b>Echo Cancellation</b>      |         |         |         |         |         |         |         |         |         |          |           |
| G.165/G.168 (24 ms)           | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| G.168 2002 (128 ms, windowed) | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| G.168 (32 ms)                 |         |         |         | *       |         |         |         |         |         |          |           |
| G.169 Acoustic Level Control  | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| Noise Reduction               | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| <b>Telephony Support</b>      |         |         |         |         |         |         |         |         |         |          |           |
| DTMF Detect                   | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| Universal Tone Generation     | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| Special Tone Generation       | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| Special Tone Event Detect     | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| VAD/CNG                       | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| PLC                           | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| RTP packetization             | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| <b>Security</b>               |         |         |         |         |         |         |         |         |         |          |           |
| AES                           | *       | *       | *       | *       | *       | *       | *       | *       |         |          |           |
| <b>RTOS</b>                   |         |         |         |         |         |         |         |         |         |          |           |
| DMA Handler                   | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| TDM Drivers                   | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| DSI Host Port Drivers         | *       | *       | *       |         | *       | *       | *       | *       |         |          |           |
| HDI16/DSI Host Port Drivers   | *       | *       | *       |         | *       | *       | *       | *       |         |          |           |
| Smart DSP OS Scheduler        | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| Memory Allocation             | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| Interrupt Handling            | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| UDP                           | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| DHCP Client                   | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| RTP                           | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| DSI Slave Driver              |         |         |         |         | *       | *       | *       | *       |         |          |           |
| HDI16 Slave Port Drivers      |         |         |         |         | *       | *       | *       | *       |         |          |           |
| Ethernet Driver               | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| UART                          | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| <b>Drivers</b>                |         |         |         |         |         |         |         |         |         |          |           |
| Ethernet Drivers              | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| TDM Drivers                   | *       | *       | *       | *       | *       | *       | *       | *       | *       | *        | *         |
| ATM AAL 1, 2, 5 Drivers       |         |         |         |         | *       | *       | *       | *       |         |          |           |
| HDI16/DSI Port Drivers        |         |         |         |         | *       | *       | *       | *       |         |          |           |
| Bridge Drivers                |         |         |         | *       |         |         |         |         |         |          |           |

\* = Available



## MSC7100 AND MSC8100 APPLICATION SOFTWARE (continued)

### MSC7100, MSC8100 Software Modules (continued)

| Application/Module         | MSC7116 | MSC7118 | MSC7119 | MSC7120 | MSC8112 | MSC8113 | MSC8122 | MSC8126 | MSC8144 | MSC8144E | MSC8144EC |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|
| <b>Drivers (continued)</b> |         |         |         |         |         |         |         |         |         |          |           |
| LAN Drivers                |         |         |         | .       |         |         |         |         |         |          |           |
| PON Drivers                |         |         |         | .       |         |         |         |         |         |          |           |

. = Available

## 56F800/56F820 APPLICATION SOFTWARE

### 56F800/56F820 Software Modules

| Beans                       | 56F801 <sup>1</sup> | 56F802 <sup>1</sup> | 56F803 | 56F805 | 56F807 | 56F826 | 56F827 | 56F800 Demo |
|-----------------------------|---------------------|---------------------|--------|--------|--------|--------|--------|-------------|
| <b>Vocoders</b>             |                     |                     |        |        |        |        |        |             |
| G.711                       | .                   | .                   | .      | .      | .      | .      | .      | .           |
| G.726                       | .                   | .                   | .      | .      | .      | .      | .      | .           |
| <b>Modem Algorithms</b>     |                     |                     |        |        |        |        |        |             |
| V.8bis                      |                     |                     | .      | .      | .      | .      | .      |             |
| V.21                        |                     |                     | .      | .      | .      | .      | .      |             |
| V.22bis                     |                     |                     | .      | .      | .      | .      | .      |             |
| V.42bis                     |                     |                     | .      | .      | .      | .      | .      |             |
| <b>Telephony</b>            |                     |                     |        |        |        |        |        |             |
| G.165                       | .                   | .                   | .      | .      | .      | .      | .      | .           |
| G.168                       | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Caller ID                   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| DTMF Generate               | .                   | .                   | .      | .      | .      | .      | .      | .           |
| DTMF Detect                 | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Caller ID                   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Call Progress Tones (CPT)   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Voice Activity Detect (VAD) | .                   | .                   | .      | .      | .      | .      | .      | .           |
| CAS Detection               | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Acoustic Echo Canceller     |                     |                     | .      | .      | .      | .      | .      |             |
| Common Tone Generation      | .                   | .                   | .      | .      | .      | .      | .      | .           |
| MFC - R2                    | .                   | .                   | .      | .      | .      | .      | .      | .           |
| <b>DSP Functions</b>        |                     |                     |        |        |        |        |        |             |
| Fractional Math             | .                   | .                   | .      | .      | .      | .      | .      | .           |
| FFT                         | .                   | .                   | .      | .      | .      | .      | .      | .           |
| FIR                         | .                   | .                   | .      | .      | .      | .      | .      | .           |
| IIR                         | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Trigonometric               | .                   | .                   | .      | .      | .      | .      | .      | .           |

. = Available

1. 60 MHz 56F801 and 56F802 parts are also supported.

2. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F800/56F820 APPLICATION SOFTWARE (continued)

### 56F800/56F820 Software Modules (continued)

| Beans   | 56F801 <sup>1</sup> | 56F802 <sup>1</sup> | 56F803 | 56F805 | 56F807 | 56F826 | 56F827 | 56F800 Demo |
|---|---------------------|---------------------|--------|--------|--------|--------|--------|-------------|
| <b>DSP Functions (continued)</b>                |                     |                     |        |        |        |        |        |             |
| Matrix  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Vector  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Correlation                                     | .                   | .                   | .      | .      | .      | .      | .      | .           |
| <b>Voice Recognition</b>                        |                     |                     |        |        |        |        |        |             |
| VRLite-1 <sup>2</sup>                           |                     |                     | .      | .      | .      | .      | .      |             |
| <b>Security</b>                                 |                     |                     |        |        |        |        |        |             |
| DES   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| 3DES  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| RSA   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| <b>Drivers for On-Chip Peripherals</b>          |                     |                     |        |        |        |        |        |             |
| ADC   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Quadrature Decoder                              |                     |                     | .      | .      | .      |        |        |             |
| Flash   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| GPIO  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Interrupt Controller                            | .                   | .                   | .      | .      | .      | .      | .      | .           |
| MSCAN <sup>2</sup>                              |                     |                     | .      | .      | .      |        |        |             |
| PLL   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Posix Timer                                     | .                   | .                   | .      | .      | .      | .      | .      | .           |
| PWM   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Quad Timer                                      | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Serial/SCI                                      | .                   | .                   | .      | .      | .      | .      | .      | .           |
| SIM   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| SPI   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| SSI   |                     |                     |        |        |        | .      | .      |             |
| TOD   |                     |                     |        |        |        | .      | .      |             |
| <b>Drivers for Off-Chip Peripherals on EVMs</b> |                     |                     |        |        |        |        |        |             |
| I <sup>2</sup> C                                | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Terminal  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| BLDC  | .                   | .                   | .      | .      | .      |        |        | .           |
| Brake   | .                   | .                   | .      | .      | .      |        |        | .           |
| Button  | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Codec   |                     |                     |        |        |        | .      | .      |             |
| EEPROM/Flash (SPI Bus Serial)                   |                     |                     |        |        |        | .      | .      |             |
| LED   | .                   | .                   | .      | .      | .      | .      | .      | .           |
| Switch  | .                   | .                   | .      | .      | .      | .      | .      | .           |

. = Available

1. 60 MHz 56F801 and 56F802 parts are also supported.

2. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F800/56F820 APPLICATION SOFTWARE (continued)

### 56F800/56F820 Software Modules (continued)

| Beans  | 56F801 <sup>1</sup> | 56F802 <sup>1</sup> | 56F803 | 56F805 | 56F807 | 56F826 | 56F827 | 56F800 Demo |
|--|---------------------|---------------------|--------|--------|--------|--------|--------|-------------|
| <b>Tools</b>                                     |                     |                     |        |        |        |        |        |             |
| PC Master  | •                   | •                   | •      | •      | •      | •      | •      | •           |
| File I/O   | •                   | •                   | •      | •      | •      | •      | •      | •           |
| JTAG Flash Loader                                | •                   | •                   | •      | •      | •      | •      | •      | •           |
| <b>RTOS Support</b>                              |                     |                     |        |        |        |        |        |             |
| MicroC/OS-II                                     |                     |                     | •      | •      | •      | •      | •      |             |
| <b>Miscellaneous</b>                             |                     |                     |        |        |        |        |        |             |
| Serial Bootloader                                | •                   | •                   | •      | •      | •      | •      | •      | •           |
| Data Structures (FIFO)                           | •                   | •                   | •      | •      | •      | •      | •      | •           |
| Cycle Count                                      |                     |                     |        | •      | •      | •      | •      |             |
| Stack Check                                      | •                   | •                   | •      | •      | •      | •      | •      | •           |
| Test   | •                   | •                   | •      | •      | •      | •      | •      | •           |
| <b>Motor Control Applications</b>                |                     |                     |        |        |        |        |        |             |
| AC Induction Motors (ACIM) V/Hz Closed Loop      |                     |                     |        | •      |        |        |        |             |
| Brushless DC Motors w/Encoder                    |                     |                     |        | •      |        |        |        |             |
| Digital Power Factor Correction                  |                     |                     |        | •      |        |        |        |             |
| <b>Motor Control Algorithms</b>                  |                     |                     |        |        |        |        |        |             |
| Three-Phase Sine Waveform Generation             | •                   | •                   | •      | •      | •      |        |        | •           |
| Clarke/Park Transformation                       | •                   | •                   | •      | •      | •      |        |        | •           |
| Space Vector Modulation                          | •                   | •                   | •      | •      | •      |        |        | •           |
| Ramp   | •                   | •                   | •      | •      | •      |        |        | •           |
| D-Q System (Two-Phase)                           | •                   | •                   | •      | •      | •      |        |        | •           |
| FOC Decoupling                                   | •                   | •                   | •      | •      | •      |        |        | •           |
| BLDC Commutation Handler w/Sensors               | •                   | •                   | •      | •      | •      |        |        | •           |
| BLDC Commutation Handler Sensorless – Zero Cross | •                   | •                   | •      | •      | •      |        |        | •           |
| SR Commutation Handler                           | •                   | •                   | •      | •      | •      |        |        | •           |
| PI/PID Controllers                               | •                   | •                   | •      | •      | •      |        |        | •           |
| Velocity Calculation and Estimation              | •                   | •                   | •      | •      | •      |        |        | •           |
| Look-up Table                                    | •                   | •                   | •      | •      | •      |        |        | •           |
| Brake Control                                    | •                   | •                   | •      | •      | •      |        |        | •           |
| Switch Control                                   | •                   | •                   | •      | •      | •      |        |        | •           |

• = Available

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2. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



# 56F800/56F820 APPLICATION SOFTWARE (continued)

## 56F800/56F820 Software Modules (continued)

| Beans                            | 56F801 <sup>1</sup> | 56F802 <sup>1</sup> | 56F803 | 56F805 | 56F807 | 56F826 | 56F827 | 56F800 Demo |
|----------------------------------|---------------------|---------------------|--------|--------|--------|--------|--------|-------------|
| <b>Example/Test Applications</b> |                     |                     |        |        |        |        |        |             |
| CODEC                            |                     |                     |        |        |        |        | •      |             |
| DTMF Generation                  |                     |                     |        |        |        |        | •      |             |
| DTMF Detection                   |                     |                     |        |        |        |        | •      |             |
| G.165                            |                     |                     |        |        |        |        | •      |             |
| G.711                            |                     |                     |        |        |        |        | •      |             |
| G.726                            |                     |                     |        |        |        |        | •      |             |
| VRLite-1 <sup>2</sup>            |                     |                     |        |        |        |        | •      |             |
| DES                              |                     |                     |        | •      |        |        | •      |             |
| 3DES                             |                     |                     |        | •      |        |        | •      |             |
| RSA                              |                     |                     |        | •      |        |        | •      |             |
| Frequency Detector               |                     |                     |        |        |        |        |        | •           |
| Frequency Spectrum               |                     |                     |        |        |        |        |        | •           |
| Pot Controlled LED               |                     |                     |        |        |        |        |        | •           |
| V42                              |                     |                     |        | •      |        |        | •      |             |
| vad                              |                     |                     |        |        |        |        | •      |             |
| CTG                              |                     |                     |        |        |        |        | •      |             |
| Acoustic Echo Canceller          |                     |                     |        | •      |        |        |        |             |
| CAS Detect                       |                     |                     |        | •      |        |        |        |             |
| Call ProgressTone                |                     |                     |        | •      |        |        |        |             |
| Common Tone Generation           |                     |                     |        | •      |        |        |        |             |
| Brake Control                    |                     |                     |        | •      |        |        |        |             |
| Clark Park                       |                     |                     |        | •      |        |        |        |             |
| Decoupling                       |                     |                     |        | •      |        |        |        |             |
| Dqestabl                         |                     |                     |        | •      |        |        |        |             |
| Flux Model                       |                     |                     |        | •      |        |        |        |             |
| Wave Generate                    |                     |                     |        | •      |        |        |        |             |
| Phase Flux Estimation            |                     |                     |        | •      |        |        |        |             |
| Space Vector Modulation          |                     |                     |        | •      |        |        |        |             |
| <b>DSP Functions</b>             |                     |                     |        |        |        |        |        |             |
| Fractional Math                  |                     |                     |        | •      |        |        |        |             |
| FFT                              |                     |                     |        | •      |        |        |        |             |
| FIR                              |                     |                     |        | •      |        |        |        |             |
| IIR                              |                     |                     |        | •      |        |        |        |             |
| Trigonometric                    |                     |                     |        | •      |        |        |        |             |
| Matrix                           |                     |                     |        | •      |        |        |        |             |
| Vector                           |                     |                     |        | •      |        |        |        |             |
| Correlation                      |                     |                     |        | •      |        |        |        |             |

• = Available

1. 60 MHz 56F801 and 56F802 parts are also supported.

2. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.





# 56F850 APPLICATION SOFTWARE

## 56F850 Software Modules

| Beans  | 56F852 | 56F853 | 56F854 | 56F855 | 56F857 | 56F858 |
|--|--------|--------|--------|--------|--------|--------|
| <b>Vocoders</b>                              |        |        |        |        |        |        |
| G.711  | .      | .      | .      | .      | .      | .      |
| G.723.1a <sup>1</sup>                        | .      | .      | .      | .      | .      | .      |
| G.726  | .      | .      | .      | .      | .      | .      |
| G.729A/B <sup>1</sup>                        | .      | .      | .      | .      | .      | .      |
| <b>Modem Algorithms</b>                      |        |        |        |        |        |        |
| V.8bis                                       | .      | .      | .      | .      | .      | .      |
| V.21   | .      | .      | .      | .      | .      | .      |
| V.22bis                                      | .      | .      | .      | .      | .      | .      |
| V.42bis <sup>1</sup>                         | .      | .      | .      | .      | .      | .      |
| <b>Telephony</b>                             |        |        |        |        |        |        |
| G.165  | .      | .      | .      | .      | .      | .      |
| G.168  | .      | .      | .      | .      | .      | .      |
| DTMF Generate                                | .      | .      | .      | .      | .      | .      |
| DTMF Detect                                  | .      | .      | .      | .      | .      | .      |
| Caller ID                                    | .      | .      | .      | .      | .      | .      |
| Call Progress Tones (CPT)                    | .      | .      | .      | .      | .      | .      |
| Voice Activity Detect (VAD)                  | .      | .      | .      | .      | .      | .      |
| CAS Detection                                | .      | .      | .      | .      | .      | .      |
| Acoustic Echo Canceller                      | .      | .      | .      | .      | .      | .      |
| Common Tone Generation                       | .      | .      | .      | .      | .      | .      |
| Noise Suppression Library                    | .      | .      | .      | .      | .      | .      |
| Automatic Gain Control                       | .      | .      | .      | .      | .      | .      |
| MFC - R2                                     | .      | .      | .      | .      | .      | .      |
| VAD/CNG/DTX                                  | .      | .      | .      | .      | .      | .      |
| <b>Voice Recognition</b>                     |        |        |        |        |        |        |
| VRLite-1 <sup>1</sup>                        | .      | .      | .      | .      | .      | .      |
| <b>Feature Phone Application</b>             |        |        |        |        |        |        |
| Type 1 and 2 Telephony Features <sup>1</sup> | .      | .      | .      | .      | .      | .      |
| Generic Echo Canceller <sup>1</sup>          | .      | .      | .      | .      | .      | .      |
| Full Duplex Speakerphone <sup>1</sup>        | .      | .      | .      | .      | .      | .      |
| Type 1 and 2 Telephony Parser <sup>1</sup>   | .      | .      | .      | .      | .      | .      |

• = Present in PE.

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F850 APPLICATION SOFTWARE (continued)

### 56F850 Software Modules (continued)

| Beans                                   | 56F852 | 56F853 | 56F854 | 56F855 | 56F857 | 56F858 |
|---|--------|--------|--------|--------|--------|--------|
| <b>Security</b>                         |        |        |        |        |        |        |
| DES                                     | .      | .      | .      | .      | .      | .      |
| 3DES                                    | .      | .      | .      | .      | .      | .      |
| RSA                                     | .      | .      | .      | .      | .      | .      |
| <b>DSP Functions</b>                    |        |        |        |        |        |        |
| Fractional Math                         | .      | .      | .      | .      | .      | .      |
| FFT                                     | .      | .      | .      | .      | .      | .      |
| FIR                                     | .      | .      | .      | .      | .      | .      |
| IIR                                     | .      | .      | .      | .      | .      | .      |
| Trigonometric                           | .      | .      | .      | .      | .      | .      |
| Matrix                                  | .      | .      | .      | .      | .      | .      |
| Vector                                  | .      | .      | .      | .      | .      | .      |
| Correlation                             | .      | .      | .      | .      | .      | .      |
| <b>Drivers for On-Chip Peripherals</b>  |        |        |        |        |        |        |
| GPIO                                    | .      | .      | .      | .      | .      | .      |
| Interrupt Controller                    | .      | .      | .      | .      | .      | .      |
| PLL                                     | .      | .      | .      | .      | .      | .      |
| Posix Timer                             | .      | .      | .      | .      | .      | .      |
| Quad Timer                              | .      | .      | .      | .      | .      | .      |
| SCI                                     | .      | .      | .      | .      | .      | .      |
| SPI                                     | .      | .      | .      | .      | .      | .      |
| ESSI/SSI                                | .      | .      | .      | .      | .      | .      |
| ESSI DMA                                | .      | .      | .      | .      | .      | .      |
| EMI (PCS)                               | .      | .      | .      | .      | .      | .      |
| Host Port Interface                     | .      | .      | .      | .      | .      | .      |
| TOD                                     | .      | .      | .      | .      | .      | .      |
| <b>Drivers for Off-Chip Peripherals</b> |        |        |        |        |        |        |
| I <sup>2</sup> C                        | .      | .      | .      | .      | .      | .      |
| Terminal                                | .      | .      | .      | .      | .      | .      |
| CODEC                                   | .      | .      | .      | .      | .      | .      |
| LED                                     | .      | .      | .      | .      | .      | .      |
| Button                                  | .      | .      | .      | .      | .      | .      |
| <b>RTOS Support</b>                     |        |        |        |        |        |        |
| MicroC/OS-II (Port Files Only)          | .      | .      | .      | .      | .      | .      |

. = Present in PE.

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F850 APPLICATION SOFTWARE (continued)

### 56F850 Software Modules (continued)

| Beans                                  | 56F852 | 56F853 | 56F854 | 56F855 | 56F857 | 56F858 |
|--|--------|--------|--------|--------|--------|--------|
| <b>Miscellaneous</b>                   |        |        |        |        |        |        |
| Testing and Stack Services             | .      | .      | .      | .      | .      | .      |
| Data Structures (FIFO)                 | .      | .      | .      | .      | .      | .      |
| Second Stage SPI Boot Loader           | .      | .      | .      | .      | .      | .      |
| Cycle Count Tool                       | .      | .      | .      | .      | .      | .      |
| <b>Example/Test Applications</b>       |        |        |        |        |        |        |
| CODEC                                  |        |        |        |        |        | .      |
| DTMF Generation                        |        |        |        |        |        | .      |
| DTMF Detection                         |        |        |        |        |        | .      |
| G.165                                  |        |        |        |        |        | .      |
| G.168                                  |        |        |        |        |        | .      |
| G.711                                  |        |        |        |        |        | .      |
| G.723.1a <sup>1</sup>                  |        |        |        |        |        | .      |
| G.726                                  |        |        |        |        |        | .      |
| G.729A/B <sup>1</sup>                  |        |        |        |        |        | .      |
| VRLite-1 <sup>1</sup>                  |        |        |        |        |        | .      |
| DES                                    |        |        |        |        |        | .      |
| 3DES                                   |        |        |        |        |        | .      |
| RSA                                    |        |        |        |        |        | .      |
| Second Stage SPI Boot Loader           | .      | .      | .      | .      | .      | .      |
| <b>Host Interface Demo</b>             |        |        |        |        |        |        |
| V.22bis                                |        |        |        |        |        | .      |
| V.42bis                                |        |        |        |        |        | .      |
| VAD                                    |        |        |        |        |        | .      |
| CPT                                    |        |        |        |        |        | .      |
| AGC                                    |        |        |        |        |        | .      |
| Noise Suppression                      |        |        |        |        |        | .      |
| CTG                                    |        |        |        |        |        | .      |
| V8                                     |        |        |        |        |        | .      |
| <b>Tools</b>                           |        |        |        |        |        |        |
| Serial Data Flash Programmer           | .      | .      | .      | .      | .      | .      |
| PC Master Software                     | .      | .      | .      | .      | .      | .      |
| File I/O                               | .      | .      | .      | .      | .      | .      |
| <b>Reference Applications</b>          |        |        |        |        |        |        |
| Feature Phone Application <sup>1</sup> |        |        |        |        |        | .      |

. = Present in PE.

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F850 APPLICATION SOFTWARE (continued)

### 56F850 Software Modules (continued)

| Beans                | 56F852 | 56F853 | 56F854 | 56F855 | 56F857 | 56F858 |
|----------------------|--------|--------|--------|--------|--------|--------|
| <b>DSP Functions</b> |        |        |        |        |        |        |
| Fractional Math      |        |        |        |        |        | .      |
| FFT                  |        |        |        |        |        | .      |
| FIR                  |        |        |        |        |        | .      |
| IIR                  |        |        |        |        |        | .      |
| Trigonometric        |        |        |        |        |        | .      |
| Matrix               |        |        |        |        |        | .      |
| Vector               |        |        |        |        |        | .      |
| Correlation          |        |        |        |        |        | .      |

. = Present in PE.

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.

## 56F8300/56F8100 APPLICATION SOFTWARE

### 56F8300/8100 Software Modules

| Beans                       | F8322/<br>F8122 | F8323/<br>F8123 | F8335/<br>F8135 | F8345/<br>F8145 | F8346/<br>F8146 | F8347/<br>F8147 | F8355/<br>F8155 | F8356/<br>F8156 | F8357/<br>F8157 | F8365/<br>F8165 | F8366/<br>F8166 | F8367/<br>F8167 | 56F8300<br>Demo |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Vocoders</b>             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| G.711                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| G.726                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Modem Algorithms</b>     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| V.8bis                      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| V.21                        | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| V.22bis                     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| V.42bis                     | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Telephony</b>            |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| G.165                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| G.168                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| DTMF Generate               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| DTMF Detect                 | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Caller ID                   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Call Progress Tones (CPT)   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Voice Activity Detect (VAD) | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| CAS Detection               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Acoustic Echo Canceller     | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Common Tone Generation      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |

. = Available

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F8300/56F8100 APPLICATION SOFTWARE (continued)

### 56F8300/8100 Software Modules (continued)

| Beans   | F8322/<br>F8122 | F8323/<br>F8123 | F8335/<br>F8135 | F8345/<br>F8145 | F8346/<br>F8146 | F8347/<br>F8147 | F8355/<br>F8155 | F8356/<br>F8156 | F8357/<br>F8157 | F8365/<br>F8165 | F8366/<br>F8166 | F8367/<br>F8167 | 56F8300<br>Demo |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>DSP Functions</b>                            |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Fractional Math                                 | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| FFT   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| FIR   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| IIR   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Trigonometric                                   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Matrix  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Vector  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Correlation                                     | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Voice Recognition</b>                        |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| VRLite-1 <sup>1</sup>                           | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Security</b>                                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| DES   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| 3DES  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| RSA   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Drivers for On-Chip Peripherals</b>          |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| ADC   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Quadrature Decoder                              | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Flash   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| GPIO  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Interrupt Controller                            | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| FlexCAN <sup>1</sup>                            | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| PLL   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Posix Timer                                     | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| PWM   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Quad Timer                                      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Serial/SCI                                      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| SPI   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| TOD (Time OF Day)                               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Drivers for Off-Chip Peripherals on EVMs</b> |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| I <sup>2</sup> C                                | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Terminal  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Button  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| PC Master                                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| File I/O  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| LED   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Switch  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |

. = Available

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F8300/56F8100 APPLICATION SOFTWARE (continued)

### 56F8300/8100 Software Modules (continued)

| Beans  | F8322/<br>F8122 | F8323/<br>F8123 | F8335/<br>F8135 | F8345/<br>F8145 | F8346/<br>F8146 | F8347/<br>F8147 | F8355/<br>F8155 | F8356/<br>F8156 | F8357/<br>F8157 | F8365/<br>F8165 | F8366/<br>F8166 | F8367/<br>F8167 | 56F8300<br>Demo |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>Tools</b>                                     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| PC Master  | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| File I/O   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| JTAG Flash Loader                                | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>RTOS Support</b>                              |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| MicroC/OS-II                                     | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Miscellaneous</b>                             |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Serial Bootloader                                | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Data Structures (FIFO)                           | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Cycle Count                                      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Stack Check                                      | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Test   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Motor Control Applications</b>                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| Brushless DC Motors w/Encoder                    |                 |                 |                 |                 | .               |                 |                 |                 | .               |                 |                 | .               |                 |
| AC Induction Motors (ACIM) V/Hz Closed Loop      |                 |                 |                 |                 | .               |                 |                 |                 |                 |                 |                 |                 |                 |
| Digital Power Factor Correction                  |                 |                 |                 |                 | .               |                 |                 |                 |                 |                 |                 |                 |                 |
| <b>Motor Control Algorithms</b>                  |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| 3-phase Sine Waveform Generation                 | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Clarke/Park Transformation                       | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Space Vector Modulation                          | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Ramp   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| D-Q System (2 Phase)                             | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| FOC Decoupling                                   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| BLDC Commutation Handler w/Sensors               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| BLDC Commutation Handler Sensorless – Zero Cross | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| SR Commutation Handler                           | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| PI/PID Controllers                               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Velocity Calculation and Estimation              | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Look-up Table                                    | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Brake Control                                    | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| Switch Control                                   | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               | .               |
| <b>Example Applications</b>                      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
| efield   |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | .               |
| Voice Recording and Playback                     |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | .               |
| Temp Sensor                                      |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | .               |

. = Available

1. Component is priced separately, contact your local Freescale Semiconductor Sales Office or authorized Freescale Semiconductor distributor for more information.



## 56F8000 APPLICATION SOFTWARE

### 56F8000 Software Modules

| Beans   | 56F8013 | 56F8014 |
|---|---------|---------|
| <b>DSP Functions</b>                            |         |         |
| Fractional Math                                 | ▪       | ▪       |
| FFT   | ▪       | ▪       |
| FIR   | ▪       | ▪       |
| IIR   | ▪       | ▪       |
| Trigonometric                                   | ▪       | ▪       |
| Matrix  | ▪       | ▪       |
| Vector  | ▪       | ▪       |
| Correlation                                     | ▪       | ▪       |
| <b>Drivers for On-Chip Peripherals</b>          |         |         |
| ADC   | ▪       | ▪       |
| Flash   | ▪       | ▪       |
| GPIO  | ▪       | ▪       |
| Interrupt Controller                            | ▪       | ▪       |
| PLL   | ▪       | ▪       |
| PWM   | ▪       | ▪       |
| Quad Timer                                      | ▪       | ▪       |
| Serial/SCI with LIN                             | ▪       | ▪       |
| SPI   | ▪       | ▪       |
| I <sup>2</sup> C                                | ▪       | ▪       |
| <b>Drivers for Off-Chip Peripherals on EVMs</b> |         |         |
| Terminal  | ▪       | ▪       |
| Button  | ▪       | ▪       |
| PC Master                                       | ▪       | ▪       |
| LED   | ▪       | ▪       |
| <b>Tools</b>                                    |         |         |
| PC Master                                       | ▪       | ▪       |

▪ = Available

| Beans  | 56F8013 | 56F8014 |
|--|---------|---------|
| <b>Miscellaneous</b>                           |         |         |
| Serial Bootloader                              | ▪       | ▪       |
| Data Structures (FIFO)                         | ▪       | ▪       |
| Cycle Count                                    | ▪       | ▪       |
| Stack Check                                    | ▪       | ▪       |
| Test   | ▪       | ▪       |
| <b>Motor Control Applications</b>              |         |         |
| Brushless DC Motors w/Hall Sensor              | ▪       |         |
| <b>Motor Control Algorithms</b>                |         |         |
| 3-Phase Sine Waveform Generation               | ▪       | ▪       |
| Clarke/Park Transformation                     | ▪       | ▪       |
| Space Vector Modulation                        | ▪       | ▪       |
| Ramp   | ▪       | ▪       |
| D-Q System (2-Phase)                           | ▪       | ▪       |
| FOC Decoupling                                 | ▪       | ▪       |
| BLDC Commutation Handler w/Sensors             | ▪       | ▪       |
| BLDC Commutation Handler Sensorless-Zero Cross | ▪       | ▪       |
| SR Commutation Handler                         | ▪       | ▪       |
| PI/PID Controllers                             | ▪       | ▪       |
| Velocity Calculation and Estimation            | ▪       | ▪       |
| Look-up Table                                  | ▪       | ▪       |
| Brake Control                                  | ▪       | ▪       |
| Switch Control                                 | ▪       | ▪       |

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## PRODUCT ABBREVIATIONS

|       |   |      |   |
|-------|---|------|---|
| AC    | Alternating Current                           | ITU  | International Telecommunications Union              |
| AC3   | Project name for Dolby Digital Decoder        | LDC  | Literature Distribution Center                      |
| ADC   | Analog to Digital Converter                   | LQFP | Low-Profile Quad Flat Package                       |
| ALU   | Arithmetic Logic Unit                         | MFT  | Multi-Function Timer                                |
| ATM   | Asynchronous Transfer Mode                    | MIPS | Million Instructions per Second                     |
| BLDC  | Brushless DC                                  | MOQ  | Minimum Order Quantity                              |
| CAN   | Controller Area Network                       | MPEG | Motion Picture Experts Group (compression standard) |
| CDMA  | Code Division Multiple Access                 | OnCE | On-Chip Emulation Port/Module                       |
| Ch    | Channel                                       | P    | In Production                                       |
| Codec | Compression/Decompression (algorithm)         | PBGA | Plastic Ball Grid Array                             |
| COP   | Computer Operating Properly (Watch Dog Timer) | PCM  | Pulse Code Modulation                               |
| DAX   | Digital Audio Transmitter                     | PLL  | Phase-Lock Loop                                     |
| DC    | Direct Current                                | PPP  | Post Processing Phase                               |
| DES   | Data Encryption Standard (USA)                | PQFP | Plastic Quad Flat Package                           |
| DTS   | Digital Theater Systems                       | PWM  | Pulse Width Modulator                               |
| DTV   | Digital Television                            | S    | Samples available                                   |
| DVD   | Digital Versatile Disk                        | SCI  | Serial Communications Interface (asynchronous)      |
| EFCOP | Enhanced Filter Co-Processor                  | SHI  | Serial Host Interface                               |
| EMI   | External Memory Interface                     | SPI  | Serial Peripheral Interface                         |
| ESAI  | Enhanced Serial Audio Interface               | SR   | Switched Reluctance                                 |
| FFT   | Fast Fourier Transform                        | SSI  | Single-Step Instruction                             |
| Freq  | Frequency in megahertz                        | THX  | Lucasfilm sound processing algorithm                |
| GPIO  | General-Purpose I/O                           | TOD  | Time of Day   |
| GSM   | Ground Station Mobile                         | TQFP | Thin Quad Flat Package                              |
| HI08  | 8-bit Host Interface                          | USB  | Universal Serial Bus                                |
| I/O   | Bidirectional Input and Output Port Pins      | www  | World Wide Web                                      |
| IP    | Internet Protocol                             |      |   |



## **NOTES**

## **NOTES**

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