Stratix V Military Temperature Range Support Technical Brief

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As part of the Altera® initiative to provide enhanced commercial off-the-shelf (COTS) devices for military applications, the temperature range for the Stratix® V device family has been extended to enable operation across the military temperature range (–55°C to 125°C). This extension allows military programs to benefit from the new technology and economies of scale by using commercially available Stratix V FPGAs. Stratix V FPGAs are extremely robust and capable of operating across a wide temperature range with excellent reliability.

Military Temperature Support

The switching characteristic for the Stratix V military temperature grade devices are as follows:

- –3 speed grade for transceiver specification
- –4 speed grade for core and periphery performance

Stratix V military temperature grade device supports the following:

- Internal temperature sensing diode (TSD) range from –40°C to 125°C
- Selected transceiver configuration:
  - Gbps Ethernet (Gbe)
  - Interlaken for SerialLite III—up to 6 Gbps
  - JESD204 A/B—up to 6.375 Gbps
  - Serial RapidIO (SRIO)

Military temperature operation requires additional timing margin over industrial temperature operation to compensate for the potentially increased variation of delay across temperature.

Altera recommends that you to use military temperature grade devices for production. However, you may substitute industrial temperature grade for military temperature grade devices during the prototyping phase because of the shorter lead times of the industrial temperature grade devices.

Use the following guidelines to compile your design using industrial or military devices:

- When using military models through industrial devices, select an applicable I4 part code and update the **Operating Settings and Conditions** dialog box to reflect –55°C (Minimum) and 125°C (Maximum) junction temperatures before compiling or recompiling your design.
- When using military models through military devices, select an applicable M4 part code and compile or recompile your design.

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Table 1: Stratix V Industrial and Military Temperature Device Part Numbers

Item	Device Part Number		Package
	Industrial Temperature	Military Temperature	
1	5SGSMD5H3F35I4	5SGSMD5H3F35M4	F1152
2	5SGSMD5K3F40I4	5SGSMD5K3F40M4	F1517
3	5SGXEA7H3F35I4	5SGXEA7H3F35M4	F1152
4	5SGXEA7K3F40I4	5SGXEA7K3F40M4	F1517

Software Support

The Stratix V military temperature grade device models are supported in the following versions of these tools:

- The PowerPlay Early Power Estimator or PowerPlay Power Analyzer software, version 14.1 or later.
- The Quartus® Prime software, version 14.1 or later.

Related Information

- **PowerPlay Early Power Estimators (EPE) and Power Analyzer**
- **Quartus Prime Subscription Edition Software**

Document Revision History

Table 2: Document Revision History

Date	Version	Changes
November 2015	2015.12.02	• Changed instances of Quartus II to Quartus Prime. • Removed the Characterization Report section.
September 2014	2014.09.26	Initial release.