

CN20003: Libero SoC v12.4 Updates for PolarFire, SmartFusion2, and IGLOO2

April 17, 2020

This document describes the following six change notifications (CNs) regarding Libero SoC v12.4 updates for PolarFire, SmartFusion2, and IGLOO2 devices.

| Notification | Description | Required Action |
|--------------|--|--|
| CN20003.1 | PolarFire FPGA System Controller/JTAG TRSTB | If System Controller Suspend mode is not used, then no action required. Otherwise, regenerate STAPL file. |
| CN20003.2 | Netlist Generated for LSRAM Asymmetric Two-Port RAMs | If LSRAM W32xR2 and W32xR1 configurations are used, rerun the Synthesize/Compile tool. Configure the P&R Incremental option and complete the entire flow. |
| CN20003.3 | Configure I/O States During JTAG Programming Libero Tool | Read CN20003.3 details. |
| CN20003.4 | PolarFire FPGA PCIE Register | Regeneration of the PCISS module is recommended if BAR register addressing used the default settings prior to Libero SoC v12.4. Review the updated PCIE_BRIDGE section of the PolarFire Register Map documentation. |
| CN20003.5 | Certain Unused I/Os Not Tristated When Programmed | Specific pins mentioned in CN20003.5 will be impacted. Rerun Libero SoC 12.4 "Generate FPGA Programming Data" step. |
| CN20003.6 | PolarFire LSRAM CLK-to-OUT Delays | Re-run Static Timing Analysis. |

CN20003.1: PolarFire FPGA System Controller/JTAG TRSTB

Description

An update to STAPL file generation, FlashPro Express, and Libero programming using FlashPro 4/5/6 has been implemented. This update polls for the de-assertion of the system controller BUSY, which indicates the system controller has completed executing the device initialization step and an additional delay makes sure calibration completes. This update does not significantly impact overall programming time.

Reason for Change

When System Controller Suspend mode is enabled, the system controller may unexpectedly stop and enter suspend mode without completing the proper device initialization. This occurs if TRSTB is prematurely asserted by the programming software (FlashPro Express, Libero, DirectC, or third-party programmer) before the device initialization is complete.

Application Impact

Depending on the initialization time required by a user's FPGA design, some designs may not operate correctly after programming. This behavior will appear after programming, fabric power-up, and when the system controller starts device initialization.

Required Action

No action is required if the user design does not enable System Controller Suspend mode, or if System Controller Suspend mode is enabled and the device initialization completes and device works properly after programming.

Action is required for designs enabling System Controller Suspend mode. The recommendation is to use Libero SoC version 12.4 or later for programming or regenerating STAPL file. The change is applied to the following:

- STAPL file generated
- FlashPro Express and Libero programming (FlashPro 4/5/6)
- DirectC algorithm is not yet updated. If viable, a simple workaround is to reset the device after programming using the DEVRST_N pin or power cycle the device.

Part Numbers Affected

For list of affected part numbers, see Appendix A.

CN20003.2: Netlist Generated for LSRAM Asymmetric Two-Port RAMs

Description

The netlist generated for LSRAM asymmetric two-port RAMs is now correct for W32:R2 and W32:R1 configurations.

Reason for Change

Asymmetric two-port LSRAM configurations of ratio W32:R2 incorrectly write bits 18 and 19. In the W32:R2 configuration, bit 18 is a copy of bit 16 and bit 19 is a copy of bit 17. Asymmetric two-port LSRAM configurations of ratio W32:R1 incorrectly writes bits 17 through 19. In the W32:R1 configuration, bits 17, 18, and 19 are a copy of bit 16.

Application Impact

Usage of these aspect ratios for the LSRAM are very rare. However, if your design is using these two configurations, your simulations will pass but silicon may exhibit a functional failure. This type of fault is generally captured during the development phase.

Required Action

If your design contains either of these two configurations, you must update the project to Libero SoC v12.4. Rerun the Synthesize/Compile tool. Configure the P&R Incremental option and complete the entire flow.

Part Numbers Affected

For list of affected part numbers, see Appendix A.

CN20003.3: Configure I/O States During JTAG Programming Libero Tool

Description

The Libero tool "Configure I/O states during JTAG programming" was modified to provide the intended behavior.

Reason for Change

Using the "Configure I/O states during JTAG programming" Libero tool causes loss of programming configurations in Libero SoC releases 12.0 to 12.3. Specifically using this tool can cause a loss of user programming settings selected via "Configure Programming Options", "Configure Action/Procedure" for the "Run Programming Action" step, and "Generate Bitstream" options.

Application Impact

Depending on the product family used, the following behavior can be observed.

- **SmartFusion2/IGLOO2:** Auto-update and programming recovery settings are lost. Programming the generated bitstream disables both capabilities. In addition, design version is reset to zero, which may prevent field updates if back versioning is used.
- **PolarFire:** Design version and back level version are reset to zero, which may prevent field updates if back versioning is used.

Table 1 • Issue in Libero SoS Versions 12.0–12.3

| Device Family | TCL Flow | GUI Flow |
|---------------------|----------|----------|
| SmartFusion2/IGLOO2 | No | Yes |
| PolarFire | Yes | Yes |

Required Action

If your design uses I/O Setting during JTAG programming, open the Libero SoC pre-v12.4 project into Libero SoC v12.4, and the impacted tools ("Configure Programming Options", "Configure Action/Procedure" for the "Run Programming Action" step, and "Generate Bitstream" options) will be corrected if necessary. The user will be required to regenerate the bitstream.

Part Numbers Affected

For list of affected part numbers, see Appendix A and Appendix B.

CN20003.4: PolarFire FPGA PCIe Register

Description

Incorrect default register values related to PCIE_BRIDGE in the PolarFire Register map documentation have been updated in LiberoSoC v12.4 to correctly match silicon.

For more information, see the [PolarFire Register Map Documentation](#).

Reason for Change

Customers who configured PCIE BAR register using the LiberoSoC default values prior to v12.4 should be aware of this update, as the default values generated prior to the v12.4 release were incorrect and could impact the BAR addressing in their PCIE system.

Application Impact

For some registers in the PCIE_BRIDGE, the hardware reset differs from the silicon default. For example, register ATR4_PCIE_WINO_SRCADDR_PARAM had a hardware default of 0x0 in the public memory map, but the default value read is 0x16. The register map and Libero SoC generator are updated to reflect the correct default values. The default register update includes:

- PCIE_VC_CRED_DW0
- ATR4_PCIE_WINO_SRCADDR_PARAM
- ATR[0:5]_PCIE_WIN1_SRCADDR_PARAM
- ATR[0:5]_AXI4_SLV0_SRCADDR_PARAM
- ATR[0:5]_PCIE_WIN1_TRSL_PARAM

Also, as part of the update, several Address Translation Tables not implemented in the PolarFire PCIESS module have been correctly updated to reflect this update in the register map. These registers include the following prefixed registers:

- ATR*_*_WIN1_*
- ATR6*_*_WINO_*
- ATR7*_*_WINO_*
- ATR6_AXI4_SLV0_*
- ATR7_AXI4_SLV0_*

Required Action

This issue would have been identified early in system validation. These designs prior to Libero SoC 12.4 will have included bad default values based on the user's customization using the PCIe configurator.

Regeneration of the PCIESS module is recommended with LiberoSoC 12.4. This will generate the core with corrected default configurations. Some users who may have manually modified registers based on the original register map should review, as they may need to make changes to their design-specific embedded software.

Users should download the updated [PolarFire Register Map](#).

Part Numbers Affected

For list of affected part numbers, see Appendix A.

CN20003.5: Certain Unused I/Os Not Tristated When Programmed

Description

Certain I/Os were found to be driving when not used in designs.

Reason for Change

Libero SoC has been updated to correctly program the I/O setting for pins.

Application Impact

Contention on the board or unexpected power consumption will occur.

The following impacted pins are listed in the device PPAT tables.

- CCC_NW_PLL0_OUT[0:1]
- CCC_NW_PLL1_OUT[0:1]
- CCC_NE_PLL0_OUT[0:1]
- CCC_NE_PLL1_OUT[0:1]
- CCC_SE_PLL0_OUT[0:1]
- CCC_SE_PLL1_OUT[0:1]
- CCC_SW_PLL0_OUT[0:1]
- CCC_SW_PLL1_OUT[0:1]

Required Action

Rerun the Libero SoC v12.4 "Generate FPGA programming data" step.

Part Numbers Affected

For list of affected part numbers, see Appendix A.

CN20003.6: PolarFire LSRAM CLK-to-OUT Delays

Description

During timing characterization for high temperatures, an adjustment was made to the timing model of the LSRAM CLK-to-OUT delays that resulted in a minor impact on lower temperatures delays (industrial and extended).

Reason for Change

For max clock-to-out delays, only bit 0 is impacted. Internal regression shows that less than 1% of designs are impacted and, when there is an impact on design performance, it is less than 2%.

For min clock-to-out delays, all bits are impacted. In this case, the delays through the LSRAM are large enough not to show up as min delay critical paths. Internal regression confirmed that no violation was observed due to this change.

Application Impact

There may be timing marginality leading to timing violations that are undetected.

Required Action

While it is unlikely that this change will have any timing violations on existing designs, it is recommended to re-run static timing analysis with SmartTime using Libero SoC v12.4 to ensure your design remains timing-violation clear.

Part Numbers Affected

For list of affected part numbers, see Appendix A.

Appendix A

The following table lists the affected PolarFire part numbers.

| PolarFire Part Numbers | | |
|------------------------|-------------------|-------------------|
| MPF100T-FCG484E | MPF100TL-FCG484E | MPF100T-1FCG484E |
| MPF100T-FCVG484E | MPF100TL-FCVG484E | MPF100T-1FCVG484E |
| MPF100T-FCSG325E | MPF100TL-FCSG325E | MPF100T-1FCSG325E |
| MPF200T-FCG484E | MPF200TL-FCG484E | MPF200T-1FCG484E |
| MPF200T-FCVG484E | MPF200TL-FCVG484E | MPF200T-1FCVG484E |
| MPF200T-FCG784E | MPF200TL-FCG784E | MPF200T-1FCG784E |
| MPF200T-FCSG325E | MPF200TL-FCSG325E | MPF200T-1FCSG325E |
| MPF200T-FCSG536E | MPF200TL-FCSG536E | MPF200T-1FCSG536E |
| MPF300T-FCG484E | MPF300TL-FCG484E | MPF300T-1FCG484E |
| MPF300T-FCVG484E | MPF300TL-FCVG484E | MPF300T-1FCVG484E |
| MPF300T-FCG784E | MPF300TL-FCG784E | MPF300T-1FCG784E |
| MPF300T-FCSG536E | MPF300TL-FCSG536E | MPF300T-1FCSG536E |
| MPF300T-FCG1152E | MPF300TL-FCG1152E | MPF300T-1FCG1152E |
| MPF500T-FCG784E | MPF500TL-FCG784E | MPF500T-1FCG784E |
| MPF500T-FCG1152E | MPF500TL-FCG1152E | MPF500T-1FCG1152E |
| | | |
| MPF100T-FCG484I | MPF100TL-FCG484I | MPF100T-1FCG484I |
| MPF100T-FCVG484I | MPF100TL-FCVG484I | MPF100T-1FCVG484I |
| MPF100T-FCSG325I | MPF100TL-FCSG325I | MPF100T-1FCSG325I |
| MPF200T-FCG484I | MPF200TL-FCG484I | MPF200T-1FCG484I |
| MPF200T-FCVG484I | MPF200TL-FCVG484I | MPF200T-1FCVG484I |
| MPF200T-FCG784I | MPF200TL-FCG784I | MPF200T-1FCG784I |
| MPF200T-FCSG325I | MPF200TL-FCSG325I | MPF200T-1FCSG325I |
| MPF200T-FCSG536I | MPF200TL-FCSG536I | MPF200T-1FCSG536I |
| MPF300T-FCG484I | MPF300TL-FCG484I | MPF300T-1FCG484I |
| MPF300T-FCVG484I | MPF300TL-FCVG484I | MPF300T-1FCVG484I |

| PolarFire Part Numbers | | |
|------------------------|-------------------|--------------------|
| MPF300T-FCG784I | MPF300TL-FCG784I | MPF300T-1FCG784I |
| MPF300T-FCSG536I | MPF300TL-FCSG536I | MPF300T-1FCSG536I |
| MPF300T-FCG1152I | MPF300TL-FCG1152I | MPF300T-1FCG1152I |
| MPF500T-FCG784I | MPF500TL-FCG784I | MPF500T-1FCG784I |
| MPF500T-FCG1152I | MPF500TL-FCG1152I | MPF500T-1FCG1152I |
| | | |
| MPF100TLS-FCG484I | MPF100TS-FCG484I | MPF100TS-1FCG484I |
| MPF100TLS-FCVG484I | MPF100TS-FCVG484I | MPF100TS-1FCVG484I |
| MPF100TLS-FCSG325I | MPF100TS-FCSG325I | MPF100TS-1FCSG325I |
| MPF200TLS-FCG484I | MPF200TS-FCG484I | MPF200TS-1FCG484I |
| MPF200TLS-FCVG484I | MPF200TS-FCVG484I | MPF200TS-1FCVG484I |
| MPF200TLS-FCG784I | MPF200TS-FCG784I | MPF200TS-1FCG784I |
| MPF200TLS-FCSG325I | MPF200TS-FCSG325I | MPF200TS-1FCSG325I |
| MPF200TLS-FCSG536I | MPF200TS-FCSG536I | MPF200TS-1FCSG536I |
| MPF300TLS-FCG484I | MPF300TS-FCG484I | MPF300TS-1FCG484I |
| MPF300TLS-FCVG484I | MPF300TS-FCVG484I | MPF300TS-1FCVG484I |
| MPF300TLS-FCG784I | MPF300TS-FCG784I | MPF300TS-1FCG784I |
| MPF300TLS-FCSG536I | MPF300TS-FCSG536I | MPF300TS-1FCSG536I |
| MPF300TLS-FCG1152I | MPF300TS-FCG1152I | MPF300TS-1FCG1152I |
| MPF500TLS-FCG784I | MPF500TS-FCG784I | MPF500TS-1FCG784I |
| MPF500TLS-FCG1152I | MPF500TS-FCG1152I | MPF500TS-1FCG1152I |

Appendix B

The following table lists the affected SmartFusion2 and IGLOO2 part numbers.

| SmartFusion2 | | IGLOO2 | |
|---------------|-----------------|----------------|-----------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S005-TQ144 | M2S005-TQG144 | M2GL005-TQ144 | M2GL005-TQG144 |
| M2S010-TQ144 | M2S010-TQG144 | M2GL010-TQ144 | M2GL010-TQG144 |
| M2S005-VF256 | M2S005-VFG256 | M2GL005-VF256 | M2GL005-VFG256 |
| M2S010-VF256 | M2S010-VFG256 | M2GL010-VF256 | M2GL010-VFG256 |
| M2S025-VF256 | M2S025-VFG256 | M2GL025-VF256 | M2GL025-VFG256 |
| M2S025-FCS325 | M2S025-FCSG325 | M2GL025-FCS325 | M2GL025-FCSG325 |
| M2S050-FCS325 | M2S050-FCSG325 | M2GL050-FCS325 | M2GL050-FCSG325 |
| M2S060-FCS325 | M2S060-FCSG325 | M2GL060-FCS325 | M2GL060-FCSG325 |
| M2S090-FCS325 | M2S090-FCSG325 | M2GL090-FCS325 | M2GL090-FCSG325 |
| M2S005-VF400 | M2S005-VFG400 | M2GL005-VF400 | M2GL005-VFG400 |
| M2S010-VF400 | M2S010-VFG400 | M2GL010-VF400 | M2GL010-VFG400 |
| M2S025-VF400 | M2S025-VFG400 | M2GL025-VF400 | M2GL025-VFG400 |
| M2S050-VF400 | M2S050-VFG400 | M2GL050-VF400 | M2GL050-VFG400 |
| M2S060-VF400 | M2S060-VFG400 | M2GL060-VF400 | M2GL060-VFG400 |
| M2S150-FCV484 | M2S150-FCVG484 | M2GL150-FCV484 | M2GL150-FCVG484 |
| M2S005-FG484 | M2S005-FGG484 | M2GL005-FG484 | M2GL005-FGG484 |
| M2S010-FG484 | M2S010-FGG484 | M2GL010-FG484 | M2GL010-FGG484 |
| M2S025-FG484 | M2S025-FGG484 | M2GL025-FG484 | M2GL025-FGG484 |
| M2S050-FG484 | M2S050-FGG484 | M2GL050-FG484 | M2GL050-FGG484 |
| M2S060-FG484 | M2S060-FGG484 | M2GL060-FG484 | M2GL060-FGG484 |
| M2S090-FG484 | M2S090-FGG484 | M2GL090-FG484 | M2GL090-FGG484 |
| M2S150-FCS536 | M2S150-FCSG536 | M2GL150-FCS536 | M2GL150-FCSG536 |
| M2S060-FG676 | M2S060-FGG676 | M2GL060-FG676 | M2GL060-FGG676 |
| M2S090-FG676 | M2S090-FGG676 | M2GL090-FG676 | M2GL090-FGG676 |
| M2S050-FG896 | M2S050-FGG896 | M2GL050-FG896 | M2GL050-FGG896 |
| M2S150-FC1152 | M2S150-FCG1152 | M2GL150-FC1152 | M2GL150-FCG1152 |
| M2S010T-VF256 | M2S010T-VFG256 | M2GL010T-VF256 | M2GL010T-VFG256 |
| M2S025T-VF256 | M2S025T-VFG256 | M2GL025T-VF256 | M2GL025T-VFG256 |

| SmartFusion2 | | IGLOO2 | |
|-----------------|------------------|------------------|-------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S025T-FCS325 | M2S025T-FCSG325 | M2GL025T-FCS325 | M2GL025T-FCSG325 |
| M2S050T-FCS325 | M2S050T-FCSG325 | M2GL050T-FCS325 | M2GL050T-FCSG325 |
| M2S060T-FCS325 | M2S060T-FCSG325 | M2GL060T-FCS325 | M2GL060T-FCSG325 |
| M2S090T-FCS325 | M2S090T-FCSG325 | M2GL090T-FCS325 | M2GL090T-FCSG325 |
| M2S010T-VF400 | M2S010T-VFG400 | M2GL010T-VF400 | M2GL010T-VFG400 |
| M2S025T-VF400 | M2S025T-VFG400 | M2GL025T-VF400 | M2GL025T-VFG400 |
| M2S050T-VF400 | M2S050T-VFG400 | M2GL050T-VF400 | M2GL050T-VFG400 |
| M2S060T-VF400 | M2S060T-VFG400 | M2GL060T-VF400 | M2GL060T-VFG400 |
| M2S150T-FCV484 | M2S150T-FCVG484 | M2GL150T-FCV484 | M2GL150T-FCVG484 |
| M2S010T-FG484 | M2S010T-FGG484 | M2GL010T-FG484 | M2GL010T-FGG484 |
| M2S025T-FG484 | M2S025T-FGG484 | M2GL025T-FG484 | M2GL025T-FGG484 |
| M2S050T-FG484 | M2S050T-FGG484 | M2GL050T-FG484 | M2GL050T-FGG484 |
| M2S060T-FG484 | M2S060T-FGG484 | M2GL060T-FG484 | M2GL060T-FGG484 |
| M2S090T-FG484 | M2S090T-FGG484 | M2GL090T-FG484 | M2GL090T-FGG484 |
| M2S150T-FCS536 | M2S150T-FCSG536 | M2GL150T-FCS536 | M2GL150T-FCSG536 |
| M2S060T-FG676 | M2S060T-FGG676 | M2GL060T-FG676 | M2GL060T-FGG676 |
| M2S090T-FG676 | M2S090T-FGG676 | M2GL090T-FG676 | M2GL090T-FGG676 |
| M2S050T-FG896 | M2S050T-FGG896 | M2GL050T-FG896 | M2GL050T-FGG896 |
| M2S150T-FC1152 | M2S150T-FCG1152 | M2GL150T-FC1152 | M2GL150T-FCG1152 |
| M2S005S-TQ144 | M2S005S-TQG144 | M2GL005S-TQ144 | M2GL005S-TQG144 |
| M2S010S-TQ144 | M2S010S-TQG144 | M2GL010S-TQ144 | M2GL010S-TQG144 |
| M2S005S-VF256 | M2S005S-VFG256 | M2GL005S-VF256 | M2GL005S-VFG256 |
| M2S005S-VF400 | M2S005S-VFG400 | M2GL005S-VF400 | M2GL005S-VFG400 |
| M2S005S-FG484 | M2S005S-FGG484 | M2GL005S-FG484 | M2GL005S-FGG484 |
| M2S010TS-VF256 | M2S010TS-VFG256 | M2GL010TS-VF256 | M2GL010TS-VFG256 |
| M2S025TS-VF256 | M2S025TS-VFG256 | M2GL025TS-VF256 | M2GL025TS-VFG256 |
| M2S025TS-FCS325 | M2S025TS-FCSG325 | M2GL025TS-FCS325 | M2GL025TS-FCSG325 |
| M2S050TS-FCS325 | M2S050TS-FCSG325 | M2GL050TS-FCS325 | M2GL050TS-FCSG325 |
| M2S060TS-FCS325 | M2S060TS-FCSG325 | M2GL060TS-FCS325 | M2GL060TS-FCSG325 |
| M2S090TS-FCS325 | M2S090TS-FCSG325 | M2GL090TS-FCS325 | M2GL090TS-FCSG325 |
| M2S010TS-VF400 | M2S010TS-VFG400 | M2GL010TS-VF400 | M2GL010TS-VFG400 |
| M2S025TS-VF400 | M2S025TS-VFG400 | M2GL025TS-VF400 | M2GL025TS-VFG400 |

| SmartFusion2 | | IGLOO2 | |
|-----------------|------------------|------------------|-------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S050TS-VF400 | M2S050TS-VFG400 | M2GL050TS-VF400 | M2GL050TS-VFG400 |
| M2S060TS-VF400 | M2S060TS-VFG400 | M2GL060TS-VF400 | M2GL060TS-VFG400 |
| M2S150TS-FCV484 | M2S150TS-FCVG484 | M2GL150TS-FCV484 | M2GL150TS-FCVG484 |
| M2S010TS-FG484 | M2S010TS-FGG484 | M2GL010TS-FG484 | M2GL010TS-FGG484 |
| M2S025TS-FG484 | M2S025TS-FGG484 | M2GL025TS-FG484 | M2GL025TS-FGG484 |
| M2S050TS-FG484 | M2S050TS-FGG484 | M2GL050TS-FG484 | M2GL050TS-FGG484 |
| M2S060TS-FG484 | M2S060TS-FGG484 | M2GL060TS-FG484 | M2GL060TS-FGG484 |
| M2S090TS-FG484 | M2S090TS-FGG484 | M2GL090TS-FG484 | M2GL090TS-FGG484 |
| M2S150TS-FCS536 | M2S150TS-FCSG536 | M2GL150TS-FCS536 | M2GL150TS-FCSG536 |
| M2S060TS-FG676 | M2S060TS-FGG676 | M2GL060TS-FG676 | M2GL060TS-FGG676 |
| M2S090TS-FG676 | M2S090TS-FGG676 | M2GL090TS-FG676 | M2GL090TS-FGG676 |
| M2S050TS-FG896 | M2S050TS-FGG896 | M2GL050TS-FG896 | M2GL050TS-FGG896 |
| M2S150TS-FC1152 | M2S150TS-FCG1152 | M2GL150TS-FC1152 | M2GL150TS-FCG1152 |
| M2S005-1TQ144 | M2S005-1TQG144 | M2GL005-1TQ144 | M2GL005-1TQG144 |
| M2S010-1TQ144 | M2S010-1TQG144 | M2GL010-1TQ144 | M2GL010-1TQG144 |
| M2S005-1VF256 | M2S005-1VFG256 | M2GL005-1VF256 | M2GL005-1VFG256 |
| M2S010-1VF256 | M2S010-1VFG256 | M2GL010-1VF256 | M2GL010-1VFG256 |
| M2S025-1VF256 | M2S025-1VFG256 | M2GL025-1VF256 | M2GL025-1VFG256 |
| M2S025-1FCS325 | M2S025-1FCSG325 | M2GL025-1FCS325 | M2GL025-1FCSG325 |
| M2S050-1FCS325 | M2S050-1FCSG325 | M2GL050-1FCS325 | M2GL050-1FCSG325 |
| M2S060-1FCS325 | M2S060-1FCSG325 | M2GL060-1FCS325 | M2GL060-1FCSG325 |
| M2S090-1FCS325 | M2S090-1FCSG325 | M2GL090-1FCS325 | M2GL090-1FCSG325 |
| M2S005-1VF400 | M2S005-1VFG400 | M2GL005-1VF400 | M2GL005-1VFG400 |
| M2S010-1VF400 | M2S010-1VFG400 | M2GL010-1VF400 | M2GL010-1VFG400 |
| M2S025-1VF400 | M2S025-1VFG400 | M2GL025-1VF400 | M2GL025-1VFG400 |
| M2S050-1VF400 | M2S050-1VFG400 | M2GL050-1VF400 | M2GL050-1VFG400 |
| M2S060-1VF400 | M2S060-1VFG400 | M2GL060-1VF400 | M2GL060-1VFG400 |
| M2S150-1FCV484 | M2S150-1FCVG484 | M2GL150-1FCV484 | M2GL150-1FCVG484 |
| M2S005-1FG484 | M2S005-1FGG484 | M2GL005-1FG484 | M2GL005-1FGG484 |
| M2S010-1FG484 | M2S010-1FGG484 | M2GL010-1FG484 | M2GL010-1FGG484 |
| M2S025-1FG484 | M2S025-1FGG484 | M2GL025-1FG484 | M2GL025-1FGG484 |
| M2S050-1FG484 | M2S050-1FGG484 | M2GL050-1FG484 | M2GL050-1FGG484 |

| SmartFusion2 | | IGLOO2 | |
|-----------------|------------------|------------------|-------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S060-1FG484 | M2S060-1FGG484 | M2GL060-1FG484 | M2GL060-1FGG484 |
| M2S090-1FG484 | M2S090-1FGG484 | M2GL090-1FG484 | M2GL090-1FGG484 |
| M2S150-1FCS536 | M2S150-1FCSG536 | M2GL150-1FCS536 | M2GL150-1FCSG536 |
| M2S060-1FG676 | M2S060-1FGG676 | M2GL060-1FG676 | M2GL060-1FGG676 |
| M2S090-1FG676 | M2S090-1FGG676 | M2GL090-1FG676 | M2GL090-1FGG676 |
| M2S050-1FG896 | M2S050-1FGG896 | M2GL050-1FG896 | M2GL050-1FGG896 |
| M2S150-1FC1152 | M2S150-1FCG1152 | M2GL150-1FC1152 | M2GL150-1FCG1152 |
| M2S010T-1VF256 | M2S010T-1VFG256 | M2GL010T-1VF256 | M2GL010T-1VFG256 |
| M2S025T-1VF256 | M2S025T-1VFG256 | M2GL025T-1VF256 | M2GL025T-1VFG256 |
| M2S025T-1FCS325 | M2S025T-1FCSG325 | M2GL025T-1FCS325 | M2GL025T-1FCSG325 |
| M2S050T-1FCS325 | M2S050T-1FCSG325 | M2GL050T-1FCS325 | M2GL050T-1FCSG325 |
| M2S060T-1FCS325 | M2S060T-1FCSG325 | M2GL060T-1FCS325 | M2GL060T-1FCSG325 |
| M2S090T-1FCS325 | M2S090T-1FCSG325 | M2GL090T-1FCS325 | M2GL090T-1FCSG325 |
| M2S010T-1VF400 | M2S010T-1VFG400 | M2GL010T-1VF400 | M2GL010T-1VFG400 |
| M2S025T-1VF400 | M2S025T-1VFG400 | M2GL025T-1VF400 | M2GL025T-1VFG400 |
| M2S050T-1VF400 | M2S050T-1VFG400 | M2GL050T-1VF400 | M2GL050T-1VFG400 |
| M2S060T-1VF400 | M2S060T-1VFG400 | M2GL060T-1VF400 | M2GL060T-1VFG400 |
| M2S150T-1FCV484 | M2S150T-1FCVG484 | M2GL150T-1FCV484 | M2GL150T-1FCVG484 |
| M2S010T-1FG484 | M2S010T-1FGG484 | M2GL010T-1FG484 | M2GL010T-1FGG484 |
| M2S025T-1FG484 | M2S025T-1FGG484 | M2GL025T-1FG484 | M2GL025T-1FGG484 |
| M2S050T-1FG484 | M2S050T-1FGG484 | M2GL050T-1FG484 | M2GL050T-1FGG484 |
| M2S060T-1FG484 | M2S060T-1FGG484 | M2GL060T-1FG484 | M2GL060T-1FGG484 |
| M2S090T-1FG484 | M2S090T-1FGG484 | M2GL090T-1FG484 | M2GL090T-1FGG484 |
| M2S150T-1FCS536 | M2S150T-1FCSG536 | M2GL150T-1FCS536 | M2GL150T-1FCSG536 |
| M2S060T-1FG676 | M2S060T-1FGG676 | M2GL060T-1FG676 | M2GL060T-1FGG676 |
| M2S090T-1FG676 | M2S090T-1FGG676 | M2GL090T-1FG676 | M2GL090T-1FGG676 |
| M2S050T-1FG896 | M2S050T-1FGG896 | M2GL050T-1FG896 | M2GL050T-1FGG896 |
| M2S150T-1FC1152 | M2S150T-1FCG1152 | M2GL150T-1FC1152 | M2GL150T-1FCG1152 |
| M2S005S-1TQ144 | M2S005S-1TQG144 | M2GL005S-1TQ144 | M2GL005S-1TQG144 |
| M2S010S-1TQ144 | M2S010S-1TQG144 | M2GL010S-1TQ144 | M2GL010S-1TQG144 |
| M2S005S-1VF256 | M2S005S-1VFG256 | M2GL005S-1VF256 | M2GL005S-1VFG256 |
| M2S005S-1VF400 | M2S005S-1VFG400 | M2GL005S-1VF400 | M2GL005S-1VFG400 |

| SmartFusion2 | | IGLOO2 | |
|------------------|-------------------|-------------------|--------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S005S-1FG484 | M2S005S-1FGG484 | M2GL005S-1FG484 | M2GL005S-1FGG484 |
| M2S010TS-1VF256 | M2S010TS-1VFG256 | M2GL010TS-1VF256 | M2GL010TS-1VFG256 |
| M2S025TS-1VF256 | M2S025TS-1VFG256 | M2GL025TS-1VF256 | M2GL025TS-1VFG256 |
| M2S025TS-1FCS325 | M2S025TS-1FCSG325 | M2GL025TS-1FCS325 | M2GL025TS-1FCSG325 |
| M2S050TS-1FCS325 | M2S050TS-1FCSG325 | M2GL050TS-1FCS325 | M2GL050TS-1FCSG325 |
| M2S060TS-1FCS325 | M2S060TS-1FCSG325 | M2GL060TS-1FCS325 | M2GL060TS-1FCSG325 |
| M2S090TS-1FCS325 | M2S090TS-1FCSG325 | M2GL090TS-1FCS325 | M2GL090TS-1FCSG325 |
| M2S010TS-1VF400 | M2S010TS-1VFG400 | M2GL010TS-1VF400 | M2GL010TS-1VFG400 |
| M2S025TS-1VF400 | M2S025TS-1VFG400 | M2GL025TS-1VF400 | M2GL025TS-1VFG400 |
| M2S050TS-1VF400 | M2S050TS-1VFG400 | M2GL050TS-1VF400 | M2GL050TS-1VFG400 |
| M2S060TS-1VF400 | M2S060TS-1VFG400 | M2GL060TS-1VF400 | M2GL060TS-1VFG400 |
| M2S150TS-1FCV484 | M2S150TS-1FCVG484 | M2GL150TS-1FCV484 | M2GL150TS-1FCVG484 |
| M2S010TS-1FG484 | M2S010TS-1FGG484 | M2GL010TS-1FG484 | M2GL010TS-1FGG484 |
| M2S025TS-1FG484 | M2S025TS-1FGG484 | M2GL025TS-1FG484 | M2GL025TS-1FGG484 |
| M2S050TS-1FG484 | M2S050TS-1FGG484 | M2GL050TS-1FG484 | M2GL050TS-1FGG484 |
| M2S060TS-1FG484 | M2S060TS-1FGG484 | M2GL060TS-1FG484 | M2GL060TS-1FGG484 |
| M2S090TS-1FG484 | M2S090TS-1FGG484 | M2GL090TS-1FG484 | M2GL090TS-1FGG484 |
| M2S150TS-1FCS536 | M2S150TS-1FCSG536 | M2GL150TS-1FCS536 | M2GL150TS-1FCSG536 |
| M2S060TS-1FG676 | M2S060TS-1FGG676 | M2GL060TS-1FG676 | M2GL060TS-1FGG676 |
| M2S090TS-1FG676 | M2S090TS-1FGG676 | M2GL090TS-1FG676 | M2GL090TS-1FGG676 |
| M2S050TS-1FG896 | M2S050TS-1FGG896 | M2GL050TS-1FG896 | M2GL050TS-1FGG896 |
| M2S150TS-1FC1152 | M2S150TS-1FCG1152 | M2GL150TS-1FC1152 | M2GL150TS-1FCG1152 |
| M2S005-TQ144I | M2S005-TQG144I | M2GL005-TQ144I | M2GL005-TQG144I |
| M2S010-TQ144I | M2S010-TQG144I | M2GL010-TQ144I | M2GL010-TQG144I |
| M2S005-VF256I | M2S005-VFG256I | M2GL005-VF256I | M2GL005-VFG256I |
| M2S010-VF256I | M2S010-VFG256I | M2GL010-VF256I | M2GL010-VFG256I |
| M2S025-VF256I | M2S025-VFG256I | M2GL025-VF256I | M2GL025-VFG256I |
| M2S025-FCS325I | M2S025-FCSG325I | M2GL025-FCS325I | M2GL025-FCSG325I |
| M2S050-FCS325I | M2S050-FCSG325I | M2GL050-FCS325I | M2GL050-FCSG325I |
| M2S060-FCS325I | M2S060-FCSG325I | M2GL060-FCS325I | M2GL060-FCSG325I |
| M2S090-FCS325I | M2S090-FCSG325I | M2GL090-FCS325I | M2GL090-FCSG325I |
| M2S005-VF400I | M2S005-VFG400I | M2GL005-VF400I | M2GL005-VFG400I |

| SmartFusion2 | | IGLOO2 | |
|-----------------|------------------|------------------|-------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S010-VF400I | M2S010-VFG400I | M2GL010-VF400I | M2GL010-VFG400I |
| M2S025-VF400I | M2S025-VFG400I | M2GL025-VF400I | M2GL025-VFG400I |
| M2S050-VF400I | M2S050-VFG400I | M2GL050-VF400I | M2GL050-VFG400I |
| M2S060-VF400I | M2S060-VFG400I | M2GL060-VF400I | M2GL060-VFG400I |
| M2S150-FCV484I | M2S150-FCVG484I | M2GL150-FCV484I | M2GL150-FCVG484I |
| M2S005-FG484I | M2S005-FGG484I | M2GL005-FG484I | M2GL005-FGG484I |
| M2S010-FG484I | M2S010-FGG484I | M2GL010-FG484I | M2GL010-FGG484I |
| M2S025-FG484I | M2S025-FGG484I | M2GL025-FG484I | M2GL025-FGG484I |
| M2S050-FG484I | M2S050-FGG484I | M2GL050-FG484I | M2GL050-FGG484I |
| M2S060-FG484I | M2S060-FGG484I | M2GL060-FG484I | M2GL060-FGG484I |
| M2S090-FG484I | M2S090-FGG484I | M2GL090-FG484I | M2GL090-FGG484I |
| M2S150-FCS536I | M2S150-FCSG536I | M2GL150-FCS536I | M2GL150-FCSG536I |
| M2S060-FG676I | M2S060-FGG676I | M2GL060-FG676I | M2GL060-FGG676I |
| M2S090-FG676I | M2S090-FGG676I | M2GL090-FG676I | M2GL090-FGG676I |
| M2S050-FG896I | M2S050-FGG896I | M2GL050-FG896I | M2GL050-FGG896I |
| M2S150-FC1152I | M2S150-FCG1152I | M2GL150-FC1152I | M2GL150-FCG1152I |
| M2S010T-VF256I | M2S010T-VFG256I | M2GL010T-VF256I | M2GL010T-VFG256I |
| M2S025T-VF256I | M2S025T-VFG256I | M2GL025T-VF256I | M2GL025T-VFG256I |
| M2S025T-FCS325I | M2S025T-FCSG325I | M2GL025T-FCS325I | M2GL025T-FCSG325I |
| M2S050T-FCS325I | M2S050T-FCSG325I | M2GL050T-FCS325I | M2GL050T-FCSG325I |
| M2S060T-FCS325I | M2S060T-FCSG325I | M2GL060T-FCS325I | M2GL060T-FCSG325I |
| M2S090T-FCS325I | M2S090T-FCSG325I | M2GL090T-FCS325I | M2GL090T-FCSG325I |
| M2S010T-VF400I | M2S010T-VFG400I | M2GL010T-VF400I | M2GL010T-VFG400I |
| M2S025T-VF400I | M2S025T-VFG400I | M2GL025T-VF400I | M2GL025T-VFG400I |
| M2S050T-VF400I | M2S050T-VFG400I | M2GL050T-VF400I | M2GL050T-VFG400I |
| M2S060T-VF400I | M2S060T-VFG400I | M2GL060T-VF400I | M2GL060T-VFG400I |
| M2S150T-FCV484I | M2S150T-FCVG484I | M2GL150T-FCV484I | M2GL150T-FCVG484I |
| M2S010T-FG484I | M2S010T-FGG484I | M2GL010T-FG484I | M2GL010T-FGG484I |
| M2S025T-FG484I | M2S025T-FGG484I | M2GL025T-FG484I | M2GL025T-FGG484I |
| M2S050T-FG484I | M2S050T-FGG484I | M2GL050T-FG484I | M2GL050T-FGG484I |
| M2S060T-FG484I | M2S060T-FGG484I | M2GL060T-FG484I | M2GL060T-FGG484I |
| M2S090T-FG484I | M2S090T-FGG484I | M2GL090T-FG484I | M2GL090T-FGG484I |

| SmartFusion2 | | IGLOO2 | |
|------------------|-------------------|-------------------|--------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S150T-FCS536I | M2S150T-FCSG536I | M2GL150T-FCS536I | M2GL150T-FCSG536I |
| M2S060T-FG676I | M2S060T-FGG676I | M2GL060T-FG676I | M2GL060T-FGG676I |
| M2S090T-FG676I | M2S090T-FGG676I | M2GL090T-FG676I | M2GL090T-FGG676I |
| M2S050T-FG896I | M2S050T-FGG896I | M2GL050T-FG896I | M2GL050T-FGG896I |
| M2S150T-FC1152I | M2S150T-FCG1152I | M2GL150T-FC1152I | M2GL150T-FCG1152I |
| M2S005S-TQ144I | M2S005S-TQG144I | M2GL005S-TQ144I | M2GL005S-TQG144I |
| M2S010S-TQ144I | M2S010S-TQG144I | M2GL010S-TQ144I | M2GL010S-TQG144I |
| M2S005S-VF256I | M2S005S-VFG256I | M2GL005S-VF256I | M2GL005S-VFG256I |
| M2S005S-VF400I | M2S005S-VFG400I | M2GL005S-VF400I | M2GL005S-VFG400I |
| M2S005S-FG484I | M2S005S-FGG484I | M2GL005S-FG484I | M2GL005S-FGG484I |
| M2S010TS-VF256I | M2S010TS-VFG256I | M2GL010TS-VF256I | M2GL010TS-VFG256I |
| M2S025TS-VF256I | M2S025TS-VFG256I | M2GL025TS-VF256I | M2GL025TS-VFG256I |
| M2S025TS-FCS325I | M2S025TS-FCSG325I | M2GL025TS-FCS325I | M2GL025TS-FCSG325I |
| M2S050TS-FCS325I | M2S050TS-FCSG325I | M2GL050TS-FCS325I | M2GL050TS-FCSG325I |
| M2S060TS-FCS325I | M2S060TS-FCSG325I | M2GL060TS-FCS325I | M2GL060TS-FCSG325I |
| M2S090TS-FCS325I | M2S090TS-FCSG325I | M2GL090TS-FCS325I | M2GL090TS-FCSG325I |
| M2S010TS-VF400I | M2S010TS-VFG400I | M2GL010TS-VF400I | M2GL010TS-VFG400I |
| M2S025TS-VF400I | M2S025TS-VFG400I | M2GL025TS-VF400I | M2GL025TS-VFG400I |
| M2S050TS-VF400I | M2S050TS-VFG400I | M2GL050TS-VF400I | M2GL050TS-VFG400I |
| M2S060TS-VF400I | M2S060TS-VFG400I | M2GL060TS-VF400I | M2GL060TS-VFG400I |
| M2S150TS-FCV484I | M2S150TS-FCVG484I | M2GL150TS-FCV484I | M2GL150TS-FCVG484I |
| M2S010TS-FG484I | M2S010TS-FGG484I | M2GL010TS-FG484I | M2GL010TS-FGG484I |
| M2S025TS-FG484I | M2S025TS-FGG484I | M2GL025TS-FG484I | M2GL025TS-FGG484I |
| M2S050TS-FG484I | M2S050TS-FGG484I | M2GL050TS-FG484I | M2GL050TS-FGG484I |
| M2S060TS-FG484I | M2S060TS-FGG484I | M2GL060TS-FG484I | M2GL060TS-FGG484I |
| M2S090TS-FG484I | M2S090TS-FGG484I | M2GL090TS-FG484I | M2GL090TS-FGG484I |
| M2S150TS-FCS536I | M2S150TS-FCSG536I | M2GL150TS-FCS536I | M2GL150TS-FCSG536I |
| M2S060TS-FG676I | M2S060TS-FGG676I | M2GL060TS-FG676I | M2GL060TS-FGG676I |
| M2S090TS-FG676I | M2S090TS-FGG676I | M2GL090TS-FG676I | M2GL090TS-FGG676I |
| M2S050TS-FG896I | M2S050TS-FGG896I | M2GL050TS-FG896I | M2GL050TS-FGG896I |
| M2S150TS-FC1152I | M2S150TS-FCG1152I | M2GL150TS-FC1152I | M2GL150TS-FCG1152I |
| M2S005-1TQ144I | M2S005-1TQG144I | M2GL005-1TQ144I | M2GL005-1TQG144I |

| SmartFusion2 | | IGLOO2 | |
|------------------|-------------------|-------------------|--------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S010-1TQ144I | M2S010-1TQG144I | M2GL010-1TQ144I | M2GL010-1TQG144I |
| M2S005-1VF256I | M2S005-1VFG256I | M2GL005-1VF256I | M2GL005-1VFG256I |
| M2S010-1VF256I | M2S010-1VFG256I | M2GL010-1VF256I | M2GL010-1VFG256I |
| M2S025-1VF256I | M2S025-1VFG256I | M2GL025-1VF256I | M2GL025-1VFG256I |
| M2S025-1FCS325I | M2S025-1FCSG325I | M2GL025-1FCS325I | M2GL025-1FCSG325I |
| M2S050-1FCS325I | M2S050-1FCSG325I | M2GL050-1FCS325I | M2GL050-1FCSG325I |
| M2S060-1FCS325I | M2S060-1FCSG325I | M2GL060-1FCS325I | M2GL060-1FCSG325I |
| M2S090-1FCS325I | M2S090-1FCSG325I | M2GL090-1FCS325I | M2GL090-1FCSG325I |
| M2S005-1VF400I | M2S005-1VFG400I | M2GL005-1VF400I | M2GL005-1VFG400I |
| M2S010-1VF400I | M2S010-1VFG400I | M2GL010-1VF400I | M2GL010-1VFG400I |
| M2S025-1VF400I | M2S025-1VFG400I | M2GL025-1VF400I | M2GL025-1VFG400I |
| M2S050-1VF400I | M2S050-1VFG400I | M2GL050-1VF400I | M2GL050-1VFG400I |
| M2S060-1VF400I | M2S060-1VFG400I | M2GL060-1VF400I | M2GL060-1VFG400I |
| M2S150-1FCV484I | M2S150-1FCVG484I | M2GL150-1FCV484I | M2GL150-1FCVG484I |
| M2S005-1FG484I | M2S005-1FGG484I | M2GL005-1FG484I | M2GL005-1FGG484I |
| M2S010-1FG484I | M2S010-1FGG484I | M2GL010-1FG484I | M2GL010-1FGG484I |
| M2S025-1FG484I | M2S025-1FGG484I | M2GL025-1FG484I | M2GL025-1FGG484I |
| M2S050-1FG484I | M2S050-1FGG484I | M2GL050-1FG484I | M2GL050-1FGG484I |
| M2S060-1FG484I | M2S060-1FGG484I | M2GL060-1FG484I | M2GL060-1FGG484I |
| M2S090-1FG484I | M2S090-1FGG484I | M2GL090-1FG484I | M2GL090-1FGG484I |
| M2S150-1FCS536I | M2S150-1FCSG536I | M2GL150-1FCS536I | M2GL150-1FCSG536I |
| M2S060-1FG676I | M2S060-1FGG676I | M2GL060-1FG676I | M2GL060-1FGG676I |
| M2S090-1FG676I | M2S090-1FGG676I | M2GL090-1FG676I | M2GL090-1FGG676I |
| M2S050-1FG896I | M2S050-1FGG896I | M2GL050-1FG896I | M2GL050-1FGG896I |
| M2S150-1FC1152I | M2S150-1FCG1152I | M2GL150-1FC1152I | M2GL150-1FCG1152I |
| M2S010T-1VF256I | M2S010T-1VFG256I | M2GL010T-1VF256I | M2GL010T-1VFG256I |
| M2S025T-1VF256I | M2S025T-1VFG256I | M2GL025T-1VF256I | M2GL025T-1VFG256I |
| M2S025T-1FCS325I | M2S025T-1FCSG325I | M2GL025T-1FCS325I | M2GL025T-1FCSG325I |
| M2S050T-1FCS325I | M2S050T-1FCSG325I | M2GL050T-1FCS325I | M2GL050T-1FCSG325I |
| M2S060T-1FCS325I | M2S060T-1FCSG325I | M2GL060T-1FCS325I | M2GL060T-1FCSG325I |
| M2S090T-1FCS325I | M2S090T-1FCSG325I | M2GL090T-1FCS325I | M2GL090T-1FCSG325I |
| M2S010T-1VF400I | M2S010T-1VFG400I | M2GL010T-1VF400I | M2GL010T-1VFG400I |

| SmartFusion2 | | IGLOO2 | |
|-------------------|--------------------|--------------------|---------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S025T-1VF400I | M2S025T-1VFG400I | M2GL025T-1VF400I | M2GL025T-1VFG400I |
| M2S050T-1VF400I | M2S050T-1VFG400I | M2GL050T-1VF400I | M2GL050T-1VFG400I |
| M2S060T-1VF400I | M2S060T-1VFG400I | M2GL060T-1VF400I | M2GL060T-1VFG400I |
| M2S150T-1FCV484I | M2S150T-1FCVG484I | M2GL150T-1FCV484I | M2GL150T-1FCVG484I |
| M2S010T-1FG484I | M2S010T-1FGG484I | M2GL010T-1FG484I | M2GL010T-1FGG484I |
| M2S025T-1FG484I | M2S025T-1FGG484I | M2GL025T-1FG484I | M2GL025T-1FGG484I |
| M2S050T-1FG484I | M2S050T-1FGG484I | M2GL050T-1FG484I | M2GL050T-1FGG484I |
| M2S060T-1FG484I | M2S060T-1FGG484I | M2GL060T-1FG484I | M2GL060T-1FGG484I |
| M2S090T-1FG484I | M2S090T-1FGG484I | M2GL090T-1FG484I | M2GL090T-1FGG484I |
| M2S150T-1FCS536I | M2S150T-1FCSG536I | M2GL150T-1FCS536I | M2GL150T-1FCSG536I |
| M2S060T-1FG676I | M2S060T-1FGG676I | M2GL060T-1FG676I | M2GL060T-1FGG676I |
| M2S090T-1FG676I | M2S090T-1FGG676I | M2GL090T-1FG676I | M2GL090T-1FGG676I |
| M2S050T-1FG896I | M2S050T-1FGG896I | M2GL050T-1FG896I | M2GL050T-1FGG896I |
| M2S150T-1FC1152I | M2S150T-1FCG1152I | M2GL150T-1FC1152I | M2GL150T-1FCG1152I |
| M2S005S-1TQ144I | M2S005S-1TQG144I | M2GL005S-1TQ144I | M2GL005S-1TQG144I |
| M2S010S-1TQ144I | M2S010S-1TQG144I | M2GL010S-1TQ144I | M2GL010S-1TQG144I |
| M2S005S-1VF256I | M2S005S-1VFG256I | M2GL005S-1VF256I | M2GL005S-1VFG256I |
| M2S005S-1VF400I | M2S005S-1VFG400I | M2GL005S-1VF400I | M2GL005S-1VFG400I |
| M2S005S-1FG484I | M2S005S-1FGG484I | M2GL005S-1FG484I | M2GL005S-1FGG484I |
| M2S010TS-1VF256I | M2S010TS-1VFG256I | M2GL010TS-1VF256I | M2GL010TS-1VFG256I |
| M2S025TS-1VF256I | M2S025TS-1VFG256I | M2GL025TS-1VF256I | M2GL025TS-1VFG256I |
| M2S025TS-1FCS325I | M2S025TS-1FCSG325I | M2GL025TS-1FCS325I | M2GL025TS-1FCSG325I |
| M2S050TS-1FCS325I | M2S050TS-1FCSG325I | M2GL050TS-1FCS325I | M2GL050TS-1FCSG325I |
| M2S060TS-1FCS325I | M2S060TS-1FCSG325I | M2GL060TS-1FCS325I | M2GL060TS-1FCSG325I |
| M2S090TS-1FCS325I | M2S090TS-1FCSG325I | M2GL090TS-1FCS325I | M2GL090TS-1FCSG325I |
| M2S010TS-1VF400I | M2S010TS-1VFG400I | M2GL010TS-1VF400I | M2GL010TS-1VFG400I |
| M2S025TS-1VF400I | M2S025TS-1VFG400I | M2GL025TS-1VF400I | M2GL025TS-1VFG400I |
| M2S050TS-1VF400I | M2S050TS-1VFG400I | M2GL050TS-1VF400I | M2GL050TS-1VFG400I |
| M2S060TS-1VF400I | M2S060TS-1VFG400I | M2GL060TS-1VF400I | M2GL060TS-1VFG400I |
| M2S150TS-1FCV484I | M2S150TS-1FCVG484I | M2GL150TS-1FCV484I | M2GL150TS-1FCVG484I |
| M2S010TS-1FG484I | M2S010TS-1FGG484I | M2GL010TS-1FG484I | M2GL010TS-1FGG484I |
| M2S025TS-1FG484I | M2S025TS-1FGG484I | M2GL025TS-1FG484I | M2GL025TS-1FGG484I |

| SmartFusion2 | | IGLOO2 | |
|-------------------|--------------------|--------------------|---------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| M2S050TS-1FG484I | M2S050TS-1FGG484I | M2GL050TS-1FG484I | M2GL050TS-1FGG484I |
| M2S060TS-1FG484I | M2S060TS-1FGG484I | M2GL060TS-1FG484I | M2GL060TS-1FGG484I |
| M2S090TS-1FG484I | M2S090TS-1FGG484I | M2GL090TS-1FG484I | M2GL090TS-1FGG484I |
| M2S150TS-1FCS536I | M2S150TS-1FCSG536I | M2GL150TS-1FCS536I | M2GL150TS-1FCSG536I |
| M2S060TS-1FG676I | M2S060TS-1FGG676I | M2GL060TS-1FG676I | M2GL060TS-1FGG676I |
| M2S090TS-1FG676I | M2S090TS-1FGG676I | M2GL090TS-1FG676I | M2GL090TS-1FGG676I |
| M2S050TS-1FG896I | M2S050TS-1FGG896I | M2GL050TS-1FG896I | M2GL050TS-1FGG896I |
| M2S150TS-1FC1152I | M2S150TS-1FCG1152I | M2GL150TS-1FC1152I | M2GL150TS-1FCG1152I |
| M2S010T-1FG484M | M2S010T-1FGG484M | M2GL010T-1FG484M | M2GL010T-1FGG484M |
| M2S025T-1FG484M | M2S025T-1FGG484M | M2GL025T-1FG484M | M2GL025T-1FGG484M |
| M2S050T-1FG484M | M2S050T-1FGG484M | M2GL050T-1FG484M | M2GL050T-1FGG484M |
| M2S060T-1FG484M | M2S060T-1FGG484M | M2GL060T-1FG484M | M2GL060T-1FGG484M |
| M2S090T-1FG484M | M2S090T-1FGG484M | M2GL090T-1FG484M | M2GL090T-1FGG484M |
| M2S150T-1FC1152M | M2S150T-1FCG1152M | M2GL150T-1FC1152M | M2GL150T-1FCG1152M |
| M2S010TS-1FG484M | M2S010TS-1FGG484M | M2GL010TS-1FG484M | M2GL010TS-1FGG484M |
| M2S025TS-1FG484M | M2S025TS-1FGG484M | M2GL025TS-1FG484M | M2GL025TS-1FGG484M |
| M2S050TS-1FG484M | M2S050TS-1FGG484M | M2GL050TS-1FG484M | M2GL050TS-1FGG484M |
| M2S060TS-1FG484M | M2S060TS-1FGG484M | M2GL060TS-1FG484M | M2GL060TS-1FGG484M |
| M2S090TS-1FG484M | M2S090TS-1FGG484M | M2GL090TS-1FG484M | M2GL090TS-1FGG484M |
| M2S150TS-1FC1152M | M2S150TS-1FCG1152M | M2GL150TS-1FC1152M | M2GL150TS-1FCG1152M |
| | M2S005S-1FGG484T2 | | M2GL005S-1FGG484T1 |
| | M2S010TS-1FGG484T2 | | M2GL010S-1FGG484T1 |
| | M2S025TS-1FGG484T2 | | M2GL025S-1FGG484T1 |
| | M2S060TS-1FGG484T2 | | M2GL060S-1FGG484T1 |
| | M2S090TS-1FGG484T2 | | M2GL090S-1FGG484T1 |
| | M2S005S-1VFG256T2 | | M2GL005S-1FGG484T2 |
| | M2S010TS-1VFG256T2 | | M2GL010TS-1FGG484T2 |
| | M2S025TS-1VFG256T2 | | M2GL025TS-1FGG484T2 |
| | M2S005S-1VFG400T2 | | M2GL060TS-1FGG484T2 |
| | M2S010TS-1VFG400T2 | | M2GL090TS-1FGG484T2 |
| | M2S025TS-1VFG400T2 | | M2GL005S-1VFG256T2 |
| | M2S060TS-1VFG400T2 | | M2GL010TS-1VFG256T2 |

| SmartFusion2 | | IGLOO2 | |
|--------------|--------------------|-------------|---------------------|
| Leaded Part | Lead-Free Parts | Leaded Part | Lead-Free Part |
| | M2S060TS-1FGG676T2 | | M2GL025TS-1VFG256T2 |
| | M2S090TS-1FGG676T2 | | M2GL005S-1VFG400T2 |
| | | | M2GL010TS-1VFG400T2 |
| | | | M2GL025TS-1VFG400T2 |
| | | | M2GL060TS-1VFG400T2 |
| | | | M2GL060TS-1FGG676T2 |
| | | | M2GL090TS-1FGG676T2 |

Contact Information

If you have any questions about this subject, contact Microsemi Technical Support department by using the support portal at <https://soc.microsemi.com/Portal/Default.aspx>.

Regards,

Microsemi Corporation

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