



# Microelectronic Products Catalog



# Table Of Contents

*This document is interactive, click on an item below and it will take you to it's respective page.*

<b>Product Overview</b> .....	<b>3</b>
<b>Commitment</b> .....	<b>4</b>
<b>Extended Temperature Plastics</b> .....	<b>6</b>
<i>DDR3 SDRAM MCPs</i> .....	6
<i>DDR2 SDRAM MCPs</i> .....	6
<i>Registered DDR2 SDRAM MCPs</i> .....	6
<i>DDR SDRAM MCPs</i> .....	6
<i>Registered DDR SDRAM MCPs</i> .....	6
<i>SSRAM MCPs</i> .....	6
<i>NOR Flash MCPs</i> .....	6
<i>SLC NAND SSD BGA</i> .....	7
<i>SDRAM MCPs</i> .....	7
<i>Registered SDRAM MCPs</i> .....	7
<b>Microprocessors</b> .....	<b>8</b>
<b>DSP Specific Memory</b> .....	<b>8</b>
<i>Texas Instruments – TMS320C6000™</i> .....	8
<i>Analog Devices – ADSP-2106x</i> .....	8
<b>SRAM</b> .....	<b>9</b>
<i>SRAM</i> .....	9
<i>SRAM MCPs</i> .....	10
<b>Flash</b> .....	<b>11</b>
<i>Flash</i> .....	11
<i>Flash MCPs</i> .....	11
<b>EEPROM</b> .....	<b>12</b>
<i>EEPROM</i> .....	12
<i>EEPROM MCPs</i> .....	12
<b>Mixed Memory MCPs</b> .....	<b>12</b>
<i>SRAM/Flash</i> .....	12
<i>SRAM/EEPROM</i> .....	12
<b>QML SRAM</b> .....	<b>13</b>
<i>SRAM</i> .....	13
<i>SSRAM MCPs</i> .....	14
<b>QML Flash</b> .....	<b>14</b>
<i>Flash</i> .....	14
<i>Flash MCPs</i> .....	14
<b>QML EEPROM</b> .....	<b>15</b>
<i>EEPROM</i> .....	15
<i>EEPROM MCPs</i> .....	15
<b>QML Mixed Memory MCPs</b> .....	<b>15</b>
<i>SRAM/Flash</i> .....	15
<b>Part Numbering Guide</b> .....	<b>16</b>
<b>Standard Manufacturing Processes</b> .....	<b>26</b>

*AMD® is the registered trademark of Advanced Micro Devices, Inc.  
Intel® is the registered trademark of Intel Corporation.  
PowerPC™ is a trademark of IBM Corp.  
HiTCE is a trademark of Kyocera Corp.  
AltiVec™ and DSP56300™ are trademarks of Motorola, Inc.  
TMS320C6000™ is a trademark of Texas Instruments.  
Thinpack™ is a trademark of White Electronic Designs Corporation.  
All other trademarks are the property of their respective owners.*

# Product Overview

## System in a Package (SiP)

SiP is a functional system or sub-system assembled into a single package. Typically it will contain two or more dissimilar die. For example:

- The combination of a processor, gate array, ASIC, RAM and flash memories.
- These can be combined with other components such as passives, filters, mechanical parts, voltage regulators, etc.
- Or redundancy can be built into one part by placing two FPGA's in a single package.

These are then assembled on an interposer or substrate to create a customized, integrated product for specific applications. Within the SiP, the designer can utilize bare die (wire bond or flip chip), FBGA/CSP packaged devices, stacked die or stacked packages.

Benefits of this technology are:

- Ability to achieve greater functionality in a time-to-market window that cannot be met through silicon integration; increased density and performance and reduced size and weight at the board or system level.
- Reduced board area and routing complexity at the PCB level.
- Design optimization through use of cost-effective silicon solutions and assembling different semiconductor technologies, die geometries, or chips from different fabs in the same package.
- Value added of high-speed designs, assembly processes and material set incorporated into the SiP.
- Allows the OEM to upgrade products by using die-shrinks in the same package.

## Microsemi's Approach to SiP

Microsemi provides a one-stop, on-shore, source for concept analysis, design, assembly, tamper resistance and test of high reliability defense-aerospace SiP semiconductors.

The value you will receive includes:

- Program and vendor management of all elements of the product.
- Die revision control.
- Package and material selection for optimization of electrical and environmental performance, thermal management, PCB second level reliability and cost.

- Plastic encapsulation or hermetic sealing; laminate/plastic or ceramic based packages. QFP, BGA or customer specified packages.
- Complete turnkey assembly; wire bond, flip chip attach, and specialized die processing including redistribution, wafer dicing and die stacking techniques.
- Qualification can be performed by Microsemi including preconditioning, bias life test, temp cycle, 85/85, as well as HAST testing.

Our high reliability products are manufactured and tested in accordance with MIL-PRF-38534 and MIL-PRF-38535.

## Program Review and Documentation

Microsemi's engineering team will work closely with the customers engineering team to define and specify all aspects of the product, including:

- Environmental requirements.
- Electrical test and characterization definitions.
- Package definition.
- Power requirements vs. proposed package.
- Qualification requirements.
- Co-develop Statement-Of-Work.
- Conversion of component schematic to die schematic; netlist reference design; netlist/schematic documentation and review.
- Creation of the initial layout specification.
- Pre and post thermal and mechanical evaluation.
- Initial Design Review, prior to layout; PDR and CDR.

## Design for Electrical Performance

- Controlled impedance differential pairs, low inductance designs with experience in high speed design techniques; timing, signal groups, clock frequencies.
- Pre and post layout electrical simulation for crosstalk, timing and signal integrity; electrical design and simulation to minimize overshoot and undershoot.
- Spice, ELDO, IBIS and EBD modeling.
- Schematic in DX Designer or ORCAD format.
- Power requirements including supply tolerances.
- Software/support includes — Mentor Graphics PADS, HyperLynx; AutoCAD; PakSi Thermal/Mechanical emulation software.

[Return to TOC](#)

# Commitment

## Thermal Management and Cooling of Complex Packages

Microsemi engineers use the following techniques to insure your SiP performs over the thermal environment required:

- Optimized package design, component placement and material selection.
- Package construction; thermal via's and balls, embedded heat sinks, added copper layers, enhanced seal ring and lid placement.
- Pre and post layout thermal modeling to drive die position, material selection and ball arrangement.
- Electrical component characterization over target temperature extremes.
- Die and component selection with low power performance and low power operating features; electrical component characterization over temperature extremes.

## Environmental and Electrical Testing

- Resident test development for hardware and software engineering.
- Military, industrial or customer defined temperature ranges.
- Electrical testing based on leading edge Agilent, Teradyne and Megatest equipment.
- Cold/hot chambers for extended environment testing of processor, logic, DRAM, SRAM and flash.
- Full dynamic or static burn-in.

## Information Assurance

Microsemi has secure resident technology for the protection of sensitive die that can reduce access to and potential reverse engineering of the chip. This technology can protect company IP; help meet DoD critical technology requirements and enable FMS.

- Multiple techniques designed specifically for chip level anti-tamper.
- Coating process compatible with ceramic, laminate, passivation, wires, bond pads.
- Reactive die destruct technology.

## Microsemi's Quality Policy

*We ensure "Customer First - Quality Always" through our procedures, policies and continuous improvement.*

## Representation and Distribution

Microsemi utilizes a worldwide network of representatives and distributors. To obtain current listings refer to [www.whiteedc.com](http://www.whiteedc.com) or call (+1) 602-437-1520.

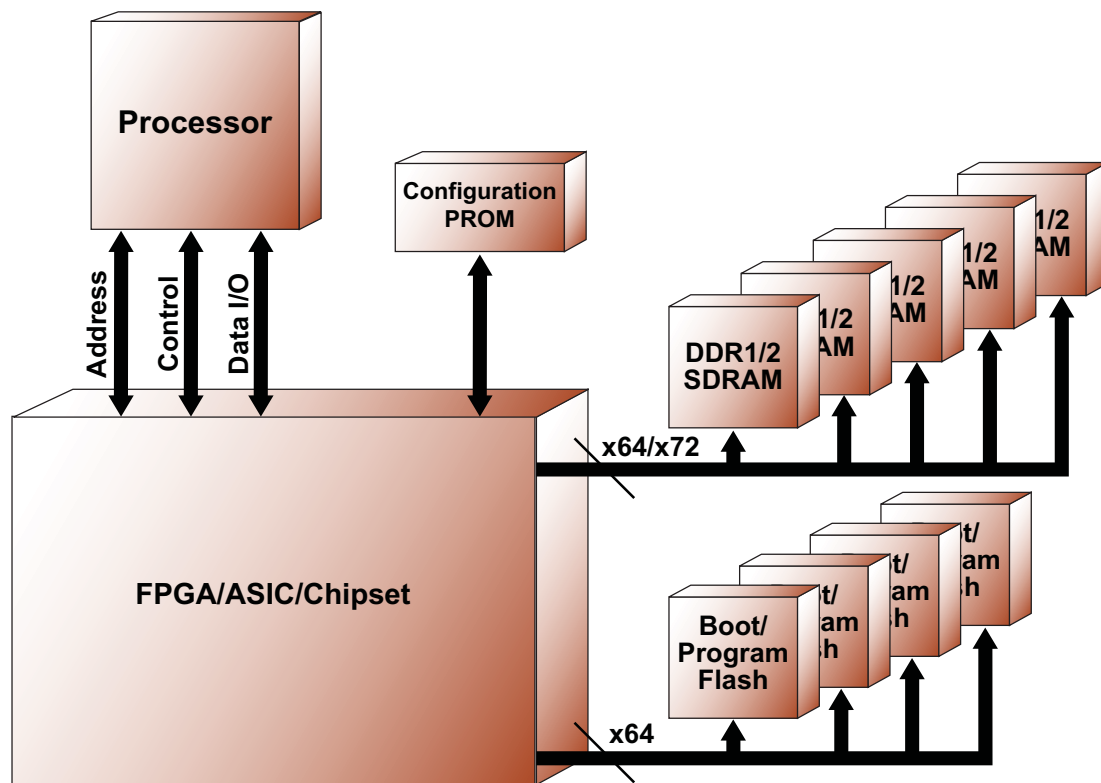
## Contact Information

For additional information on Microsemi's products and services refer to:

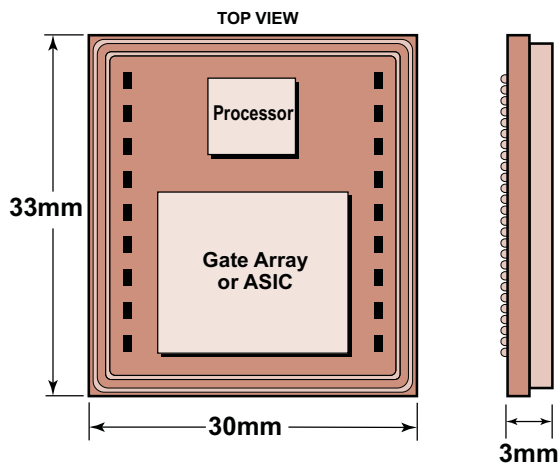
Microsemi Corporation  
3601 East University Drive  
Phoenix, Arizona 85034  
Tel: (+1) 602-437-1520  
Fax: (+1) 602-437-9120  
[info@wedc.com](mailto:info@wedc.com)  
[www.microsemi.com](http://www.microsemi.com)  
[www.whiteedc.com](http://www.whiteedc.com)

[Return to TOC](#)

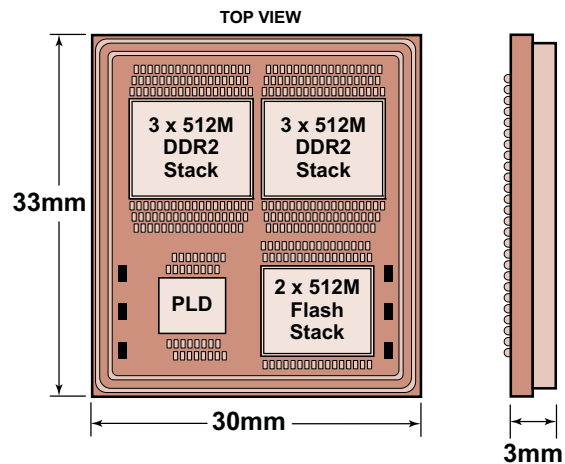
# SiP Capabilities and Typical Applications



**Mechanical Outline • Processor SiP**  
30mm x 33mm 597 CBGA



**Mechanical Outline • Memory SiP**  
30mm x 33mm 597 CBGA



See page 16 for ordering information.

(f) Preliminary product. This product is developmental, is not fully characterized or qualified and is subject to change without notice.

# Extended Temperature Plastics

## Memories

### DDR3 SDRAM MCPs

Size	Organization	Part Number	Data Rate (Mb/s)	Voltage (V)	Package	Dimensions	Temperature
1GB	128M x 64	W3J128M64G-XPBX/	800-1066	1.5	377 PBGA	21mm x 21mm	C, I, M
1GB	128M x 72	W3J128M72G-XPBX/	800-1066	1.5	377 PBGA	21mm x 21mm	C, I, M
2GB	256M x 72	W3J256M72G-XPBX*	800-1066	1.5	377 PBGA	23mm x 25mm	C, I, M
4GB	512M x 72	W3J2256M72-XPBX*	800-1066	1.5	377 PBGA	23mm x 25mm	C, I, M

### DDR2 SDRAM MCPs

Size	Organization	Part Number	Data Rate (Mb/s)	Voltage (V)	Package	Dimensions	Temperature
256MB	32M x 64	W3H32M64E-XSBX	400-667	1.8	208 PBGA	16mm x 20mm	C, I, M
256MB	32M x 72	W3H32M72E-XSB2X	400-667	1.8	208 PBGA	16mm x 20mm	C, I, M
512MB	64M x 64	W3H64M64E-XSBX	400-667	1.8	208 PBGA	16mm x 22mm	C, I, M
512MB	64M x 72	W3H64M72E-XSBX	400-667	1.8	208 PBGA	16mm x 22mm	C, I, M
1GB	128M x 72	W3H128M72E-XSBX	400-667	1.8	208 PBGA	16mm x 22mm	C, I, M
1GB	128M x 64	W3H128M64E-XSBX	400-667	1.8	208 PBGA	16mm x 22mm	C, I, M

### Registered DDR2 SDRAM MCPs

Size	Organization	Part Number	Data Rate (Mb/s)	Voltage (V)	Package	Dimensions	Temperature
1GB	128M x 72	W3H128M72ER-XNBX/	400-667	1.8	255 PBGA	22mm x 26mm	C, I, M

### DDR SDRAM MCPs

Size	Organization	Part Number	Data Rate (Mb/s)	Voltage (V)	Package	Dimensions	Temperature
128MB	64M x 16	W3E64M16S-XSBX	200-333	2.5	60 PBGA	10mm x 12.5mm	C, I, M
128MB	64M x 16	W3E64M16S-XNBX	200-333	2.5	60 PBGA	10mm x 12.5mm	C, I, M
128MB	16M x 64	W3E16M64S-XBX	200-266	2.5	219 PBGA	21mm x 25mm	C, I, M
128MB	16M x 72	W3E16M72S-XBX	200-333	2.5	219 PBGA	32mm x 25mm	C, I, M
256MB	32M x 64	W3E32M64S-XBX	200-333	2.5	219 PBGA	25mm x 25mm	C, I, M
256MB	32M x 64	W3E32M64SA-XBX	200-333	2.5	219 PBGA	25mm x 25mm	C, I, M
256MB	32M x 64	W3E32M64S-XSBX	200-333	2.5	208 PBGA	13mm x 22mm	C, I, M
256MB	32M x 72	W3E32M72S-XBX	200-333	2.5	219 PBGA	25mm x 32mm	C, I, M
256MB	32M x 72	W3E32M72S-XSBX	200-333	2.5	208 PBGA	16mm x 22mm	C, I, M
512MB	64M x 72	W3E64M72S-XSBX	200-266	2.5	219 PBGA	32mm x 25mm	C, I, M

### Registered DDR SDRAM MCPs

Size	Organization	Part Number	Speed (MHz)	Voltage (V)	Package	Dimensions	Temperature
128MB	16M x 72	W3E16M72SR-XBX	200-250	2.5	219 PBGA	32mm x 25mm	C, I, M
256MB	32M x 72	W3E32M72SR-XSBX	200-266	2.5	208 PBGA	16mm x 25mm	C, I, M

### SSRAM MCPs

Size	Organization	Part Number	Speed (MHz)	Voltage (V)	Package	Dimensions	Temperature
2MB	512K x 32	WED2DL32512V-XBX	133-200	3.3	119 PBGA	14mm x 17mm	C, I, M
2MB	256K x 72	WEDPY256K72V-XBX	100-200	3.3	159 PBGA	14mm x 22mm	C, I, M
4MB	512K x 72 NBL	WEDPZ512K72V-XBX	100-150	3.3	152 PBGA	17mm x 23mm	C, I, M
4MB	512K x 72 NBL	WEDPZ512K72S-XBX	100-150	2.5	152 PBGA	17mm x 23mm	C, I, M

### NOR Flash MCPs

Size	Organization	Part Number	Speed (ns)	Voltage (V)	Package	Dimensions	Temperature
<b>Conventional</b>							
16MB	2M x 64	W72M64VB-XBX	90-150	3.3	159 PBGA	13mm x 22mm	C, I, M
<b>Page Mode</b>							
32MB	8M x 32	W78M32VP-XBX	110, 120	3.3	159 PBGA	13mm x 22mm	C, I, M
64MB	8M x 64	W78M64VP-XSBX	110, 120	3.3	159 PBGA	13mm x 22mm	C, I, M
256MB	64M x 32	W764M32V-XSBX	100, 120	3.3	107 PBGA	14mm x 17mm	C, I, M
512MB	128M x 32	W7128M32V-XSBX*	100, 120	3.3	107 PBGA	14mm x 17mm	C, I, M
128MB	32M x 32	W732M32E-XPBX*	100, 120	1.8	119 PBGA	9mm x 17mm	C, I, M

(f) Preliminary product. This product is developmental, is not fully characterized or qualified and is subject to change without notice. Check with factory for availability.

\* Advanced product. This product is developmental, is not qualified and is subject to change or cancellation without notice.

[Return to TOC](#)

# Embedded Flash — SLC NAND

## SLC NAND SSD BGA

Size	Interface	Part Number	Max Speed (Read/Write)	Voltage (V)	Package	Dimensions	Temperature
4GB	PATA	W7N2G16VHxxBI	45MB/s / 30MB/s	3.3	224 PBGA	27mm x 22mm	C, I
8GB	PATA	W7N4G16VHxxBI/	45MB/s / 30MB/s	3.3	224 PBGA	27mm x 22mm	C, I
16GB	PATA	W7N8G16VHxxBI/	45MB/s / 30MB/s	3.3	224 PBGA	27mm x 22mm	C, I

## Extended Temperature Plastics

## Memories (continued)

### SDRAM MCPs

Size	Organization	Part Number	Speed (MHz)	Voltage (V)	Package	Dimensions	Temperature
32MB	4M x 64	WEDPN4M64V-XBX	100-133	3.3	219 PBGA	21mm x 21mm	C, I, M
32MB	4M x 72	WEDPN4M72V-XB2X	100-133	3.3	219 PBGA	21mm x 21mm	C, I, M
64MB	8M x 64	WEDPN8M64V-XB2X	100-133	3.3	219 PBGA	21mm x 21mm	C, I, M
64MB	8M x 72	WEDPN8M72V-XB2X	100-133	3.3	219 PBGA	21mm x 25mm	C, I, M
128MB	16M x 64	WEDPN16M64V-XB2X	100-133	3.3	219 PBGA	21mm x 21mm	C, I, M
128MB	16M x 72	WEDPN16M72V-XB2X	100-133	3.3	219 PBGA	21mm x 25mm	C, I, M
256MB	32M x 64	W332M64V-XBX	100-133	3.3	219 PBGA	25mm x 25mm	C, I, M
256MB	32M x 64	W332M64V-XSBX	100-133	3.3	208 PBGA	13mm x 22mm	C, I, M
256MB	32M x 72	W332M72V-XBX	100-133	3.3	219 PBGA	32mm x 25mm	C, I, M
256MB	32M x 72	W332M72V-XSBX	100-133	3.3	208 PBGA	16mm x 22mm	C, I, M
512MB	64M x 72	W364M72V-XSBX	100-133	3.3	219 PBGA	32mm x 25mm	C, I, M

### Registered SDRAM MCPs

Size	Organization	Part Number	Speed (MHz)	Voltage (V)	Package	Dimensions	Temperature
128MB	16M x 64	WEDPN16M64VR-XB2X	100-133	3.3	219 PBGA	25mm x 25mm	C, I, M
128MB	16M x 72	WEDPN16M72VR-XB2X	100-133	3.3	219 PBGA	25mm x 25mm	C, I, M

## DDR SDRAM PBGAs

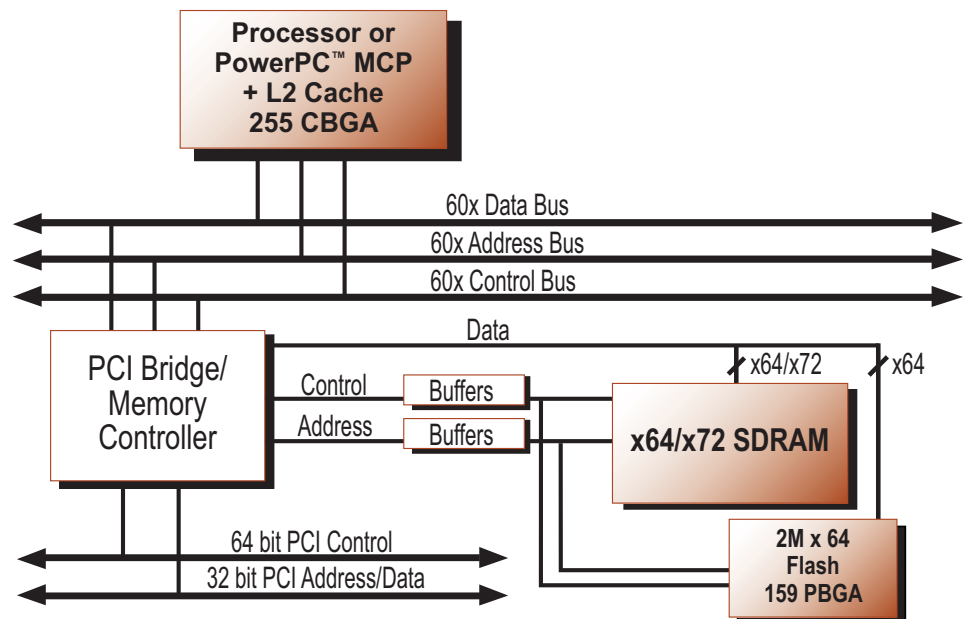
## Typical Application

32M x 64 DDR SDRAM  
208 PBGA, 2.5V  
13mm x 22mm  
W3E32M64S-XSBX  
C, I, M

32M x 72 DDR SDRAM  
208 PBGA, 2.5V  
16mm x 22mm  
W3E32M72S-XSBX  
C, I, M

**73%**  
Space  
Savings

**37%**  
I/O  
Savings



(f) Preliminary product. This product is developmental, is not fully characterized or qualified and is subject to change without notice. Check with factory for availability.

[Return to TOC](#)

# Microprocessors

## Processors/Plastics

### Processors

Organization	Part Number	Speed (MHz)	Package	Temperature
PowerPC™ 755 MCP w/128K x 72 L2 Cache	WED3C755E8MC-XBX	300, 350	255 CBGA	C, I, M
PowerPC™ 7410 AltiVec™ MCP w/256K x 72 L2 Cache	WED3C7410E16M-XBX	400, 450	255 CBGA	C, I, M
	WED3C7410E16M-XBHX	400, 450	255 HCBGA	C, I, M
68332	WC16-P332-16GX	16	132 CQFP	C, I, M

# DSP Specific Memory

## Processors/Plastics

### Texas Instruments – TMS320C6000™

	Memory Solution	Memory Technology	Memory Configuration	Speed	Package	Temperature
TMS320C6701	WED9LC6816V-BC	SSRAM/SDRAM	256K x 32/4M x 32	200MHz/125MHz	153 BGA	C, I, M <sup>1</sup>

### Analog Devices – ADSP-2106x

	Memory Solution	Memory Technology	Memory Configuration	Speed	Package	Temperature
ADSP-2106x/xL	EDI8L32128C/V-AC	SRAM	128K x 32	10ns - 20ns	68 PLCC	C, I
	EDI8L32512C/V-AC	SRAM	512K x 32	10ns - 20ns	68 PLCC	C, I

[Return to TOC](#)



# SRAM

# Ceramics

## SRAM

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature	
128K x 8	EDI88128CS/LPS-Z	15-55	5	32 ZIP	C, I, M, B	
	EDI88128CS/LPS-T	15-55	5	32 DIP, 0.4"	C, I, M, B	
	WMS128K8-XCX	<b>EDI88128CS/LPS-C</b>	15-55	5	32 DIP, 0.6"	C, I, M, Q, B
	WMS128K8-XDEX	<b>EDI88128CS/LPS-N</b>	15-55	5	32 CSOJ (Evol)	C, I, M, Q, B
	WMS128K8-XDRX		15-55	5	32 CSOJ (Revol)	C, I, M, Q
	WMS128K8-XFEX	<b>EDI88128CS/LPS-F</b>	15-55	5	32 Flatpack	C, I, M, B
	WMS128K8-XFX		15-55	5	36 Flatpack	C, I, M
	WMS128K8-XCLX		15-55	5	32 CLCC, Quad	C, I, M
		EDI88128CS/LPS-L	15-55	5	32 CLCC	C, I, M, B
		EDI88130CS/LPS-C	15-55	5	32 DIP, 0.6"	C, I, M, B
		EDI88130CS/LPS-T	15-55	5	32 DIP, 0.4"	C, I, M, B
		EDI88130CS/LPS-N	15-55	5	32 CSOJ (Evol)	C, I, M, B
		EDI88130CS/LPS-F	15-55	5	32 Flatpack	C, I, M, B
		EDI88130CS/LPS-L	15-55	5	32 CLCC	C, I, M, B
	256K x 8	EDI88257CA/LPA-C	17-55	5	32 DIP, 0.6"	C, I, M, B
	512K x 8	WMS512K8V-XCX	15-20	3.3	32 DIP, 0.6"	C, I, M
		WMS512K8V-XDEX	15-20	3.3	32 CSOJ (Evol)	C, I, M
WMS512K8V-XDJX		15-20	3.3	36 CSOJ	C, I, M	
WMS512K8V-XFFX		15-20	3.3	32 Thinpack™ Flatpack	C, I, M	
WMS512K8V-XFX		15-20	3.3	36 Flatpack	C, I, M	
WMS512K8V-XCLX		15-20	3.3	32 CLCC, Quad	C, I, M	
		EDI88512CA/LPA-T	17-55	5	32 DIP, 0.4"	C, I, M, B
WMS512K8-XCX		<b>EDI88512CA/LPA-C</b>	15-55	5	32 DIP, 0.6"	C, I, M, Q, B
WMS512K8-XCLX			15-55	5	32 CLCC, Quad	C, I, M
WMS512K8-XDEX		<b>EDI88512CA/LPA-N</b>	15-55	5	32 CSOJ (Evol)	C, I, M, Q, B
WMS512K8-XDJX		<b>EDI88512CA/LPA-N36</b>	15-55	5	36 CSOJ	C, I, M, Q, B
WMS512K8-XFFX		<b>EDI88512CA/LPA-F32</b>	15-55	5	32 Flatpack	C, I, M, B
WMS512K8-XFX		<b>EDI88512CA/LPA-F36</b>	15-55	5	36 Flatpack	C, I, M, Q, B
	EDI88512CA/LPA-K	17-55	5	36 CLCC	C, I, M	
256K x 16	WMS256K16-XDLX	<b>EDI816256CA/LPA-N44</b>	17-35	5	44 CSOJ	C, I, M, Q, B
	WMS256K16-XFLX	<b>EDI816256CA/LPA-F44</b>	17-35	5	44 Flatpack	C, I, M, Q, B
	WMS256K16-XFGX*		17-35	5	44 Flatpack	C, I, M, Q

Note: For products with two part numbers, use the number in bold type for new designs.

\* Advanced product. This product is developmental, is not qualified and is subject to change or cancellation without notice.

[Return to TOC](#)

## SRAM MCPs

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
512K x 8	WS512K8-XCX	25-55	5	32 DIP, 0.6"	C, I, M, Q
2 x 512K x 8	WS1M8V-XCX*	17-55	3.3	32 DIP, 0.6"	C, I, M
	WS1M8-XCX	17-55	5	32 DIP, 0.6"	C, I, M
	WS1M8-XDJX*	17-55	5	36 CSOJ	C, I, M
	WS1M8-XFX	17-55	5	36 Flatpack	C, I, M
512K x 16	WS512K16-XDLX	17-35	5	44 CSOJ	C, I, M
	WS512K16-XFLX	17-35	5	44 Flatpack	C, I, M
128K x 32	WS128K32NV-XH1X	15-35	3.3	66 HIP (PGA) 1.075" sq.	C, I, M
	WS128K32V-XG2TX	15-35	3.3	68 CQFP (0.88" sq., 0.180" high)	C, I, M
	WS128K32N-XH1X	15-55	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WS128K32-XG2LX	15-55	5	68 CQFP (0.88" sq., 0.200" high)	C, I, M, Q
	WS128K32-XG2UX	15-55	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M, Q
	WS128K32-XG2TXE*	35-55	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M
512K x 32	WS512K32NV-XH1X	15-20	3.3	66 HIP (PGA) 1.075" sq.	C, I, M
	WS512K32V-XG2TX	15-20	3.3	68 CQFP (0.88" sq., 0.180" high)	C, I, M
	WS512K32N-XH1X	17-55	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WS512K32-XG2LX	17-55	5	68 CQFP (0.88" sq., 0.200" high)	C, I, M, Q
	WS512K32-XG2UX	17-55	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M, Q
1M x 32	WS1M32V-XG3X	17-25	3.3	84 CQFP	C, I, M
	WS1M32-XG3X	17-25	5	84 CQFP	C, I, M
	WS1M32-XH2X*	17-25	5	66 HIP (PGA) 1.385" sq.	C, I, M

\* Advanced product. This product is developmental, is not qualified and is subject to change or cancellation without notice.

[Return to TOC](#)

# Flash

# Ceramics

## Flash

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
128K x 8	WMF128K8-XCX5	60-150	5	32 DIP, 0.6"	C, I, M, Q
	WMF128K8-XCLX5	60-150	5	32 CLCC	C, I, M
	WMF128K8-XDEX5	60-150	5	32 CSOJ (Evol)	C, I, M, Q
	WMF128K8-XFFX5	60-150	5	32 Flatpack Formed Leads	C, I, M, Q
	WMF128K8-XFEX5	60-150	5	32 Flatpack	C, I, M, Q
512K x 8	WMF512K8-XCX5	70-150	5	32 DIP, 0.6"	C, I, M, Q
	WMF512K8-XCLX5	70-150	5	32 CLCC	C, I, M
	WMF512K8-XDEX5	70-150	5	32 CSOJ (Evol)	C, I, M, Q
	WMF512K8-XFEX5	70-150	5	32 Flatpack	C, I, M, Q
2M x 8	WMF2M8-XDAX5	90-150	5	56 CSOP	C, I, M, Q

## Flash MCPs

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
2M x 16	WF2M16-XDAX5	90-150	5	56 CSOP	C, I, M, Q
128K x 32	WF128K32-XH1X5	60-150	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WF128K32-XG2UX5	60-150	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M, Q
	WF128K32-XG2LX5	60-150	5	68 CQFP (0.88" sq., 0.200" high)	C, I, M, Q
512K x 32	WF128K32-XG4TX5	60-150	5	68 CQFP (1.56" sq., 0.140" high)	C, I, M, Q
	WF512K32-XH1X5	70-150	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WF512K32-XG2UX5	70-150	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M, Q
1M x 32	WF512K32-XG2LX5	70-150	5	68 CQFP (0.88" sq., 0.200" high)	C, I, M, Q
	WF1M32B-XHX3	100-150	3.3	66 HIP (PGA) 1.185" sq.	C, I, M
	WF1M32B-XG2TX3	100-150	3.3	68 CQFP (0.88" sq., 0.180" high)	C, I, M
2M x 32	WF2M32-XHX5	90-150	5	66 HIP (PGA) 1.185" sq.	C, I, M
	WF2M32-XG2UX5	90-150	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M
	WF2M32-XG4TX5	90-150	5	68 CQFP (1.56" sq., 0.140" high)	C, I, M
4M x 32	WF4M32-XH2X5	100-150	5	66 HIP (PGA) 1.385" sq.	C, I, M
	WF4M32-XG2TX5	100-150	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M
8M x 32	WF8M32-XG4DX5*	100-150	5	68 CQFP (1.56" sq., 0.205" high)	C, I, M

\* Advanced product. This product is developmental, is not qualified and is subject to change or cancellation without notice.

[Return to TOC](#)

# EEPROM

Ceramics

## EEPROM

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
128K x 8	WME128K8-XCX	140-300	5	32 DIP, 0.6"	C, I, M, Q
	WME128K8-XDEX	140-300	5	32 CSOJ (Evol)	C, I, M

## EEPROM MCPs

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
128K x 8	WE128K8-XCX	150-300	5	32 DIP, 0.6"	C, I, M
256K x 8	WE256K8-XCX	150-300	5	32 DIP, 0.6"	C, I, M
512K x 8	WE512K8-XCX	150-300	5	32 DIP, 0.6"	C, I, M
512K x 16	WE512K16-XG4X	150-300	5	68 CQFP (1.56" sq., 0.200" high)	C, I, M
32K x 32	WE32K32-XH1X	80-150	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WE32K32-XG2UX	80-150	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M, Q
128K x 32	WE128K32-XH1X	140-300	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WE128K32-XG2TX	140-300	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M, Q

# Mixed Memory MCPs

Ceramics

## SRAM/Flash

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
128K x 16	WSF128K16-XH1X	35/70, 70/120	5	66 HIP (PGA) 1.075" sq.	C, I, M, Q
	WSF128K16-XG1TX	35/70, 70/120	5	68 CQFP (0.94" sq., 0.160" high)	C, I, M
128K x 16/512 x 16	WSF2816-39H1X	35/90	5	66 HIP (PGA) 1.075" sq.	C, I, M
	WSF2816-39G2UX	35/90	5	68 CQFP (0.88" sq., 0.140" high)	C, I, M
128K x 32	WSF128K32-XH2X	25/90, 25/120	5	66 HIP (PGA) 1.385" sq.	C, I, M
128K x 32/512K x 32	WSF41632-22H2X	25/120	5	66 HIP (PGA) 1.385" sq.	C, I, M
	WSF41632-22G2TX	25/120	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M
512K x 32	WSF512K32-29H2X	25/70, 25/90	5	66 HIP (PGA) 1.385" sq.	C, I, M
	WSF512K32-XG2TX	25/70, 25/90	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M

## SRAM/EEPROM

Organization	Part Number	Speed (ns)	Voltage (V)	Package	Temperature
128K x 16	WSE128K16-XHIX	35/150, 70/300	5	66 HIP (PGA) 1.075" sq.	C, I, M
	WSE128K16-XG2TX	35/150, 70/300	5	68 CQFP (0.88" sq., 0.180" high)	C, I, M

[Return to TOC](#)

# QML SRAM

# Ceramic QML

## SRAM

Organization	SMD Number (mil-prf-38534)	SMD Number (mil-prf-38535)	Speed (ns)	Voltage (V)	Package		
128K x 8	5962-	89598 xx MZA <sup>α</sup>	20-120	5	32 DIP, 0.4"		
		89598 xx MUA <sup>α</sup>	20-120	5	32 CLCC		
		89598 xx MXA <sup>α</sup>	20-120	5	32 DIP, 0.6"		
		89598 xx M8A <sup>α</sup>	20-120	5	32 ZIP		
		89598 xx MYA <sup>α</sup>	20-120	5	32 CSOJ		
		89598 xx MTA <sup>α</sup>	20-120	5	32 Flatpack		
		89598 xx MZA <sup>α</sup>	15	5	32 DIP, 0.4"		
		89598 xx MXA <sup>α</sup>	70	5	32 DIP, 0.6"		
		89598 xx MYA <sup>α</sup>	70	5	32 CSOJ		
		89598 xx MZA <sup>β</sup>	20-120	5	32 DIP, 0.4"		
		89598 xx MUA <sup>β</sup>	20-120	5	32 CLCC		
		89598 xx MXA <sup>β</sup>	20-120	5	32 DIP, 0.6"		
		89598 xx MYA <sup>β</sup>	20-120	5	32 CSOJ		
		89598 xx MTA <sup>β</sup>	20-120	5	32 Flatpack		
		89598 xx MMA <sup>β</sup>	20-120	5	32 CLCC		
		89598 xx MZA <sup>β</sup>	15	5	32 DIP, 0.4"		
		89598 xx MMA <sup>β</sup>	15	5	32 CLCC,QUAD		
			96691 xx HTC <sup>α</sup>		15-120	5	32 CSOJ (Evol)
			96691 xx HUC <sup>α</sup>		15-120	5	32 CSOJ (Revol)
			96691 xx HXC <sup>α</sup>		15-55	5	36 Flatpack
	96691 xx HYC <sup>α</sup>		15-120	5	32 DIP, 0.6"		
	96691 xx HZC <sup>α</sup>		15-55	5	36 CSOJ (Revol)		
	96691 xx HNC <sup>α</sup>		70-120	5	32 Flatpack		
512K x 8	5962-	95600 xx MXA	20-45	5	32 DIP, 0.6"		
		95600 xx MUA	20-45	5	32 CSOJ		
		95600 xx MTA	20-45	5	36 Flatpack		
		95600 xx M9A	20-45	5	32 Flatpack		
		95613 xx HTC	17-120	5	32 CSOJ (Evol)		
		95613 xx HYC	17-120	5	32 DIP, 0.6"		
		95613 xx HUC	17-55	5	36 Flatpack, Trimmed leads		
		95613 xx HXC	17-55	5	36 Flatpack		
	95613 xx HZC		17-55	5	36 CSOJ (Revol)		
256K x 16	5962-	96795 xx MXA	20-25	5	44 Flatpack		

<sup>α</sup> = Single CS#, <sup>β</sup> = Dual CS#

[Return to TOC](#)

### SSRAM MCPs

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
128K x 8	5962- 93156 xx HYC	20-120	5	32 DIP, 0.6", Single Cavity
256K x 8	5962- 93157 xx HYC	20-120	5	32 DIP, 0.6", Single Cavity
512K x 8	5962- 92078 xx HTC	20-120	5	32 DIP, 0.6", Single Cavity
128K x 32	5962- 93187 xx H4C	15-120	5	66 HIP (PGA) 1.075" sq. w/standoffs, No-Connect
	93187 xx H5C	17-120	5	66 HIP (PGA) 1.075" sq. w/standoffs, Grounded
	95595 xx HMC	17-120	5	68 CQFP (0.88" sq., 0.140" high)
	95595 xx HAC	17-120	5	68 CQFP (0.88" sq., 0.200" high)
512K x 32	5962- 94611 xx HUC	70-120	5	66 HIP (PGA) 1.185" sq.
	94611 xx HTC	17-55	5	66 HIP (PGA) 1.075" sq.
	94611 xx HMX	17-120	5	68 CQFP (0.88" sq., 0.180" high)
	94611 xx HAX	17-120	5	68 CQFP (0.88" sq., 0.200" high)

# QML Flash

## Ceramic QML

### Flash

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
128K x 8	5962- 96690 xx HTC	60-150	5	32 Flatpack
	96690 xx HUC	60-150	5	32 Flatpack, Formed Leads
	96690 xx HXC	60-150	5	32 CSOJ (Evol)
	96690 xx HYC	60-150	5	32 DIP, 0.6"
512K x 8	5962- 96692 xx HUC	70-150	5	32 Flatpack
	96692 xx HTC	70-150	5	32 Flatpack, Formed Leads
	96692 xx HYC	70-150	5	32 CSOJ (Evol)
	96692 xx HXC	70-150	5	32 DIP, 0.6"
2M x 8	5962- 97609 xx HXC	90-150	5	56 CSOP

### Flash MCPs

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
2M x 16	5962- 97610 xx HXC	90-150	5	56 CSOP, Dual Cavity
128K x 32	5962- 94716 xx HNC	60-150	5	68 CQFP (0.88" sq., 0.140" high)
	94716 xx HAC	60-150	5	68 CQFP (0.88" sq., 0.200" high)
	94716 xx H8C	60-150	5	66 HIP (PGA) 1.075" sq.
512K x 32	5962- 94612 xx HZC	70-150	5	68 CQFP (0.88" sq., 0.140" high)
	94612 xx H4C	70-150	5	66 HIP (PGA) 1.075" sq.
	94612 xx HAC	70-150	5	68 CQFP (0.88" sq., 0.200" high)

[Return to TOC](#)

## EEPROM

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
128K x 8	5962- 96796 xx HXC**	140-300	5	32 CSOJ (Evol)
	96796 xx HYC**	140-300	5	32 DIP, 0.6", Single Cavity

## EEPROM MCPs

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
256K x 8	5962- 93155 xx HYC**	150-200	5	32 DIP, 0.6", New Dual Cavity
512K x 8	5962- 93091 xx HYC**	150-300	5	32 DIP, 0.6", Single Cavity
32K x 32	5962- 94614 xx HUC	90-150	5	68 HIP (PGA) 1.075" sq. w/standoffs, No Connect
	94614 xx H9C**	90-150	5	68 CQFP (0.94" sq., 0.200" high)
	94614 xx HZC**	90-150	5	68 CQFP (0.88" sq., 0.140" high)
128K x 32	5962- 94585 xx H4C	150-300	5	66 HIP (PGA) 1.075" sq. w/standoffs, No Connect
	94585 xx H5C	150-300	5	66 HIP (PGA) 1.075" sq. w/standoffs, Grounded
	94585 xx H6C	150-300	5	66 HIP (PGA) 1.075" sq. w/standoffs, No Connect
	94585 xx HMC	150-300	5	68 CQFP (0.88" sq., 0.180" high)

# QML Mixed Memory MCPs

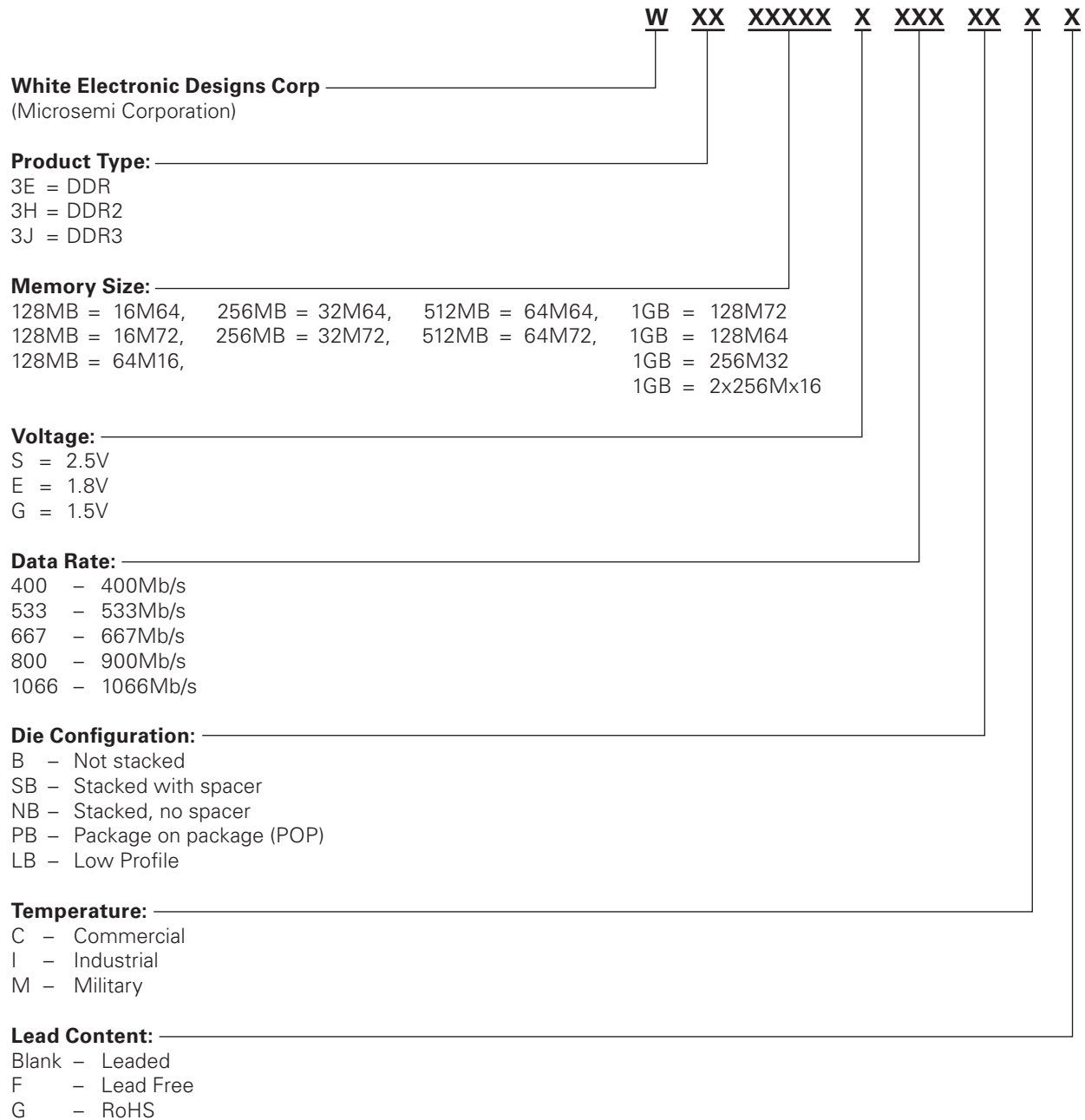
## SRAM/Flash

Organization	SMD Number (mil-prf-38534)	Speed (ns)	Voltage (V)	Package
128K x 16	5962- 96900 xx HXC**	35/70, 70/120	5	66 HIP (PGA) 1.185" sq.
	96900 xx HYC	35/70, 70/120	5	66 HIP (PGA) 1.075" sq.
512K x 16	5962- 96901 xx HXC**	35/70, 70/120	5	66 HIP (PGA) 1.385" sq.
	96901 xx HMC	35/70, 70/120	5	68 CQFP (0.88" sq., 0.200" high)

\*\* Not recommended for new designs.

# DDR/DDR2/DDR3

## Part Numbering Guide



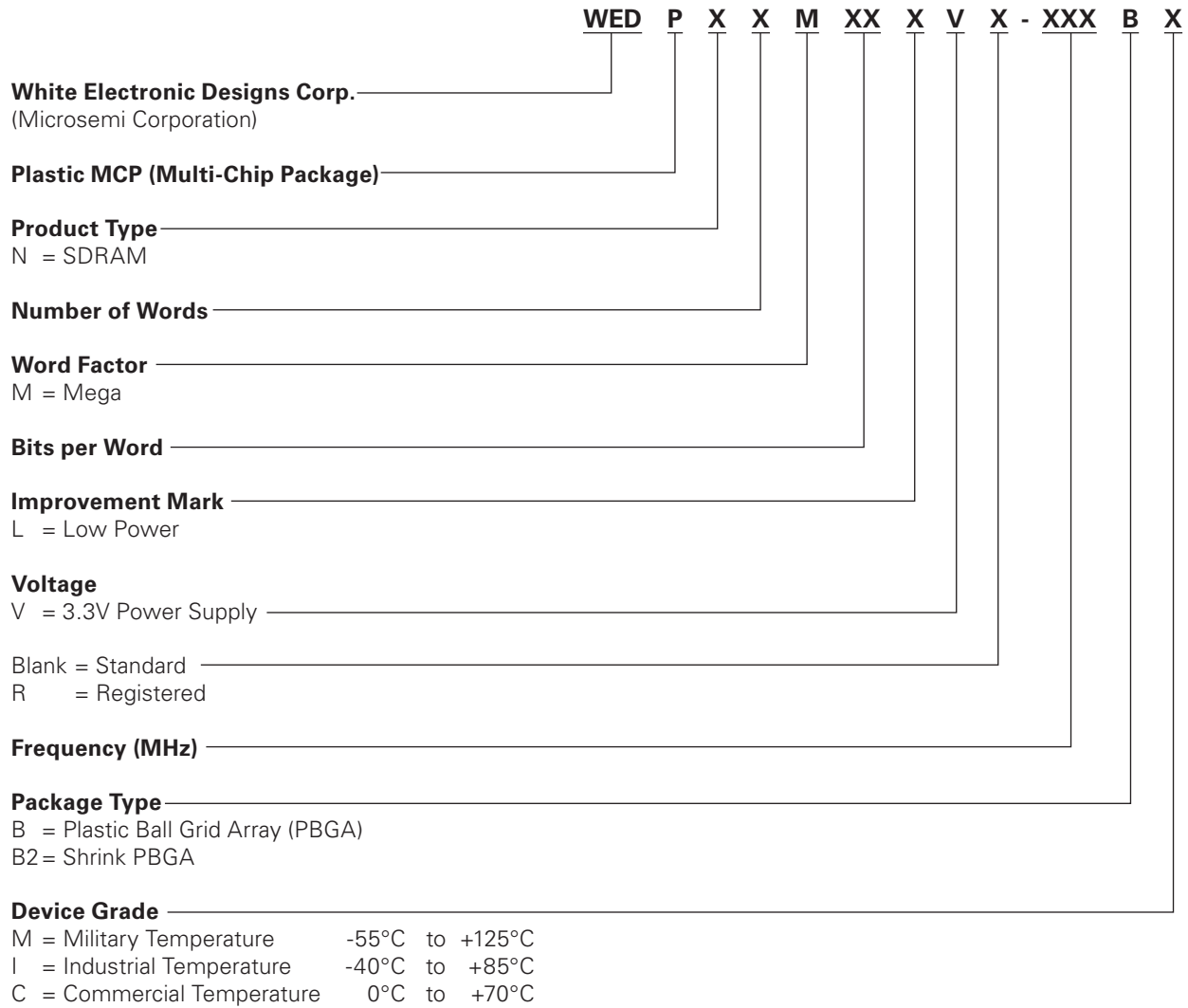
Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.

[Return to TOC](#)



# Hi-Rel SDRAM MCPs

## Part Numbering Guide



*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)

# Hi-Rel Flash (beginning w/ "W")

## Part Numbering Guide

W X F XXX X XXX X - XXX XXX X X X

**White Electronic Designs Corp.**

(Microsemi Corporation)

Blank = Multi-Chip Package

M = Monolithic

**Flash**

**Number of Words**

**Word Factor**

K = Kilo

M = Mega

**Bits per Word**

**Improvement Mark**

B = Boot Block

F = Special Process Low Capacitance

N = No Connect for HIP only

A = Alternate Pinout

**Access Times (ns)**

**Package Type/Pin Configuration**

C = DIP (32 pin/x8 devices),  
(40 pin/x16 devices)

CL = 32 CLCC

DA = 56 CSOP

DE = 32 SOJ (Evol.)

DL = 44 SOJ

DT = 56 CSOP Dual Cavity

FE = 32 Flatpack (Evol.)

FF = 32 Flatpack, Lead Formed

FL = 44 Flatpack

G2L = 68 CQFP (0.88" sq., 0.200" high)

G2T = 68 CQFP (0.88" sq., 0.180" high)

G2U = 68 CQFP (0.88" sq., 0.140" high)

G4 = 68 CQFP (1.56" sq., 0.200" high)

G4D = 68 CQFP (1.56" sq., 0.205" high)

G4T = 68 CQFP (1.56" sq., 0.140" high)

G4W = 116 CQFP (1.56" sq., 0.200" high)

H = 66 PGB (HIP), 1.185" sq.

H1 = 68 PGA (HIP), 1.075" sq.

H2 = 66 PGA (HIP), 1.385" sq.

**Device Grade**

Q = MIL-PRF-38534 Compliant

M = Military Screened

I = Industrial

C = Commercial

E = Extended

-55°C to +125°C

-40°C to +85°C

0°C to +70°C

-55°C to +100°C

**Vpp Voltage**

5 = 5V

3 = 3.3V

**Lead Finish**

Blank = Gold Plated Leads

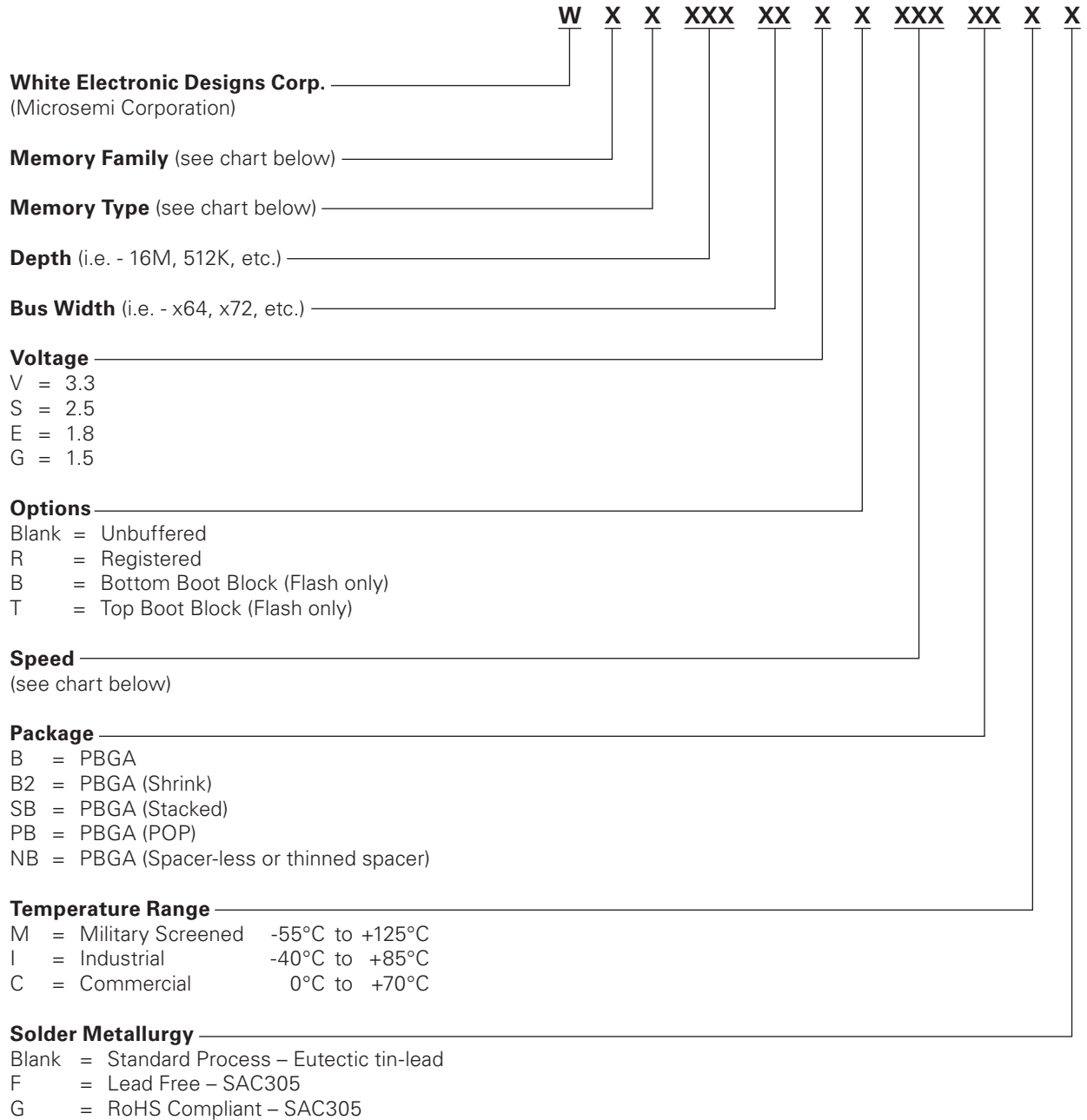
A = Solder Dip Leads

*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)

# Merged

# Part Numbering Guide



## Memory Family

- 2 = SSRAM
- 3 = SDRAM
- 4 = DRAM
- 5 = EEPROM
- 7 = Flash
- 8 = SRAM
- 9 = Combo (Mixed)

## Memory Type

- E = Double Data Rate SDRAM DDR -1
- F = Fast Cycle DRAM
- H = Double Data Rate SDRAM DDR - 2
- J = Double Data Rate SDRAM DDR - 3
- M = Mirror-bit Flash
- Z = NBL SSRAM

## Speed

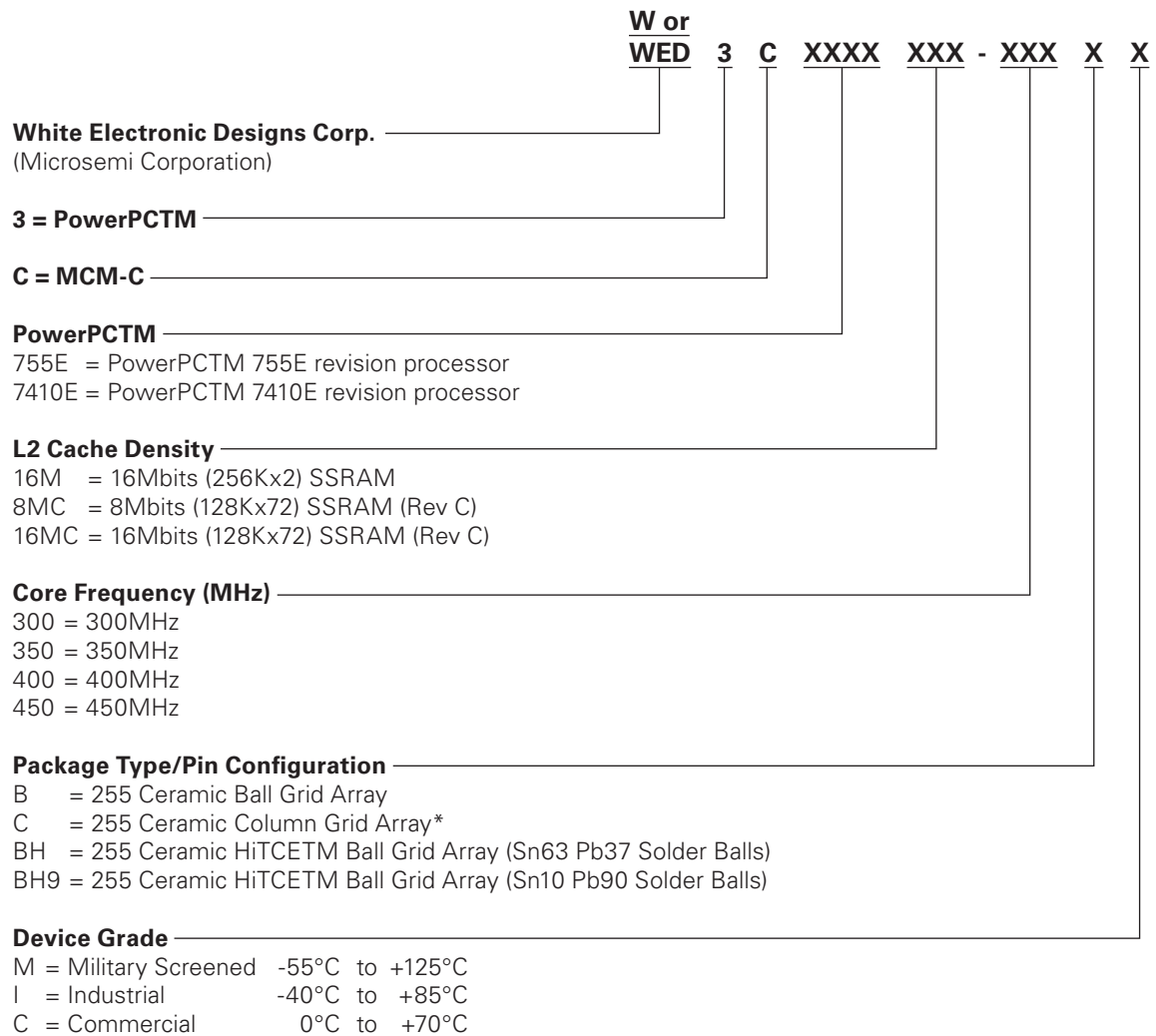
- Frequency - SDRAM
- 66 = 66MHz
  - 100 = 100MHz
  - 125 = 125MHz
  - 133 = 133MHz
- Data Rate - DDR SDRAM
- 200 = 200Mb/s    667 = 667Mb/s
  - 250 = 250Mb/s    800 = 800Mb/s
  - 266 = 266Mb/s    1066 = 1066Mb/s
  - 333 = 333Mb/s    1333 = 1333Mb/s
  - 400 = 400Mb/s    1600 = 1600Mb/s
  - 533 = 533Mb/s

*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)

# PowerPC™ and Cache Microprocessor MCPs

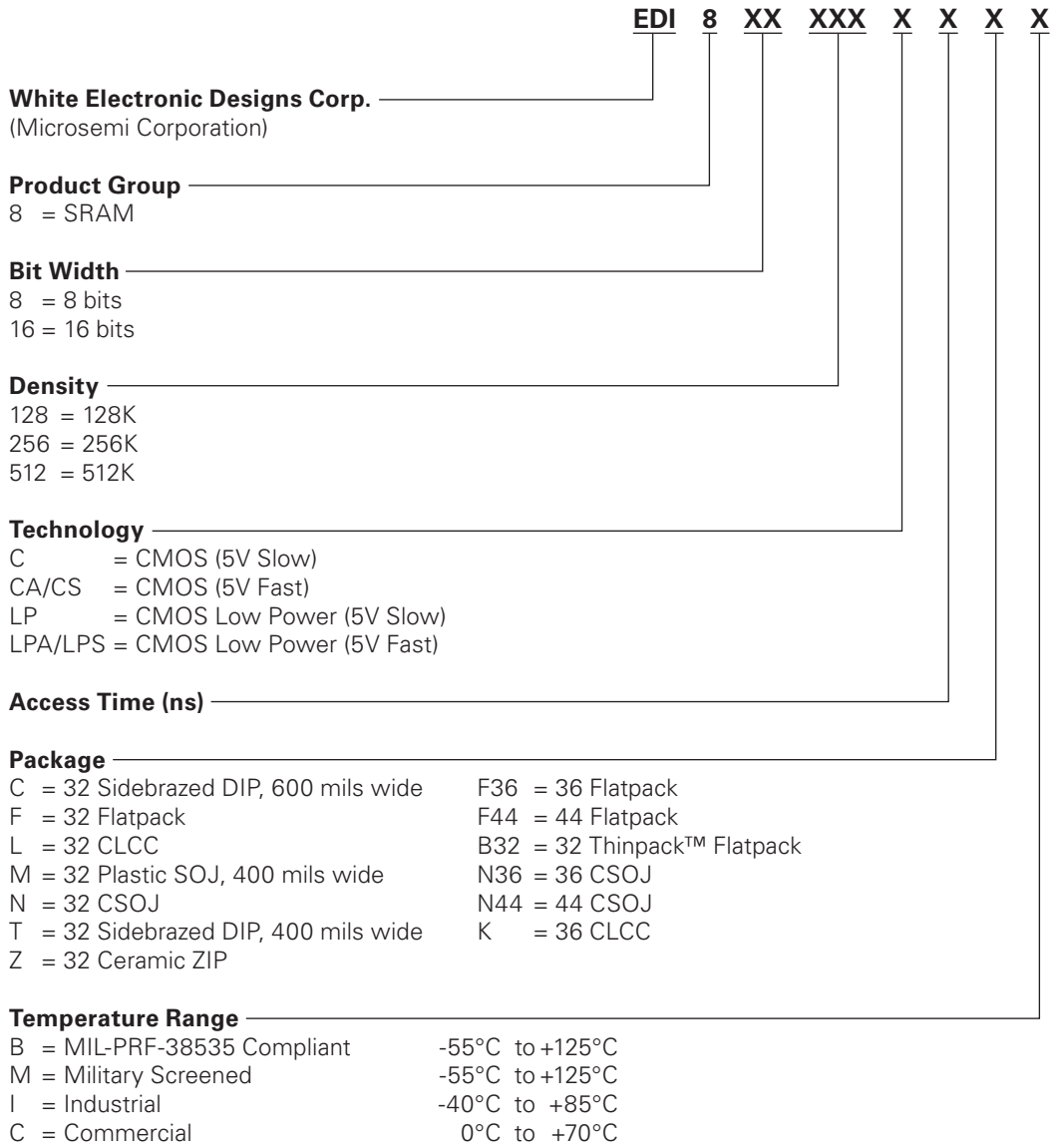
## Part Numbering Guide



\*CCGA package is developmental, contact factory for information.

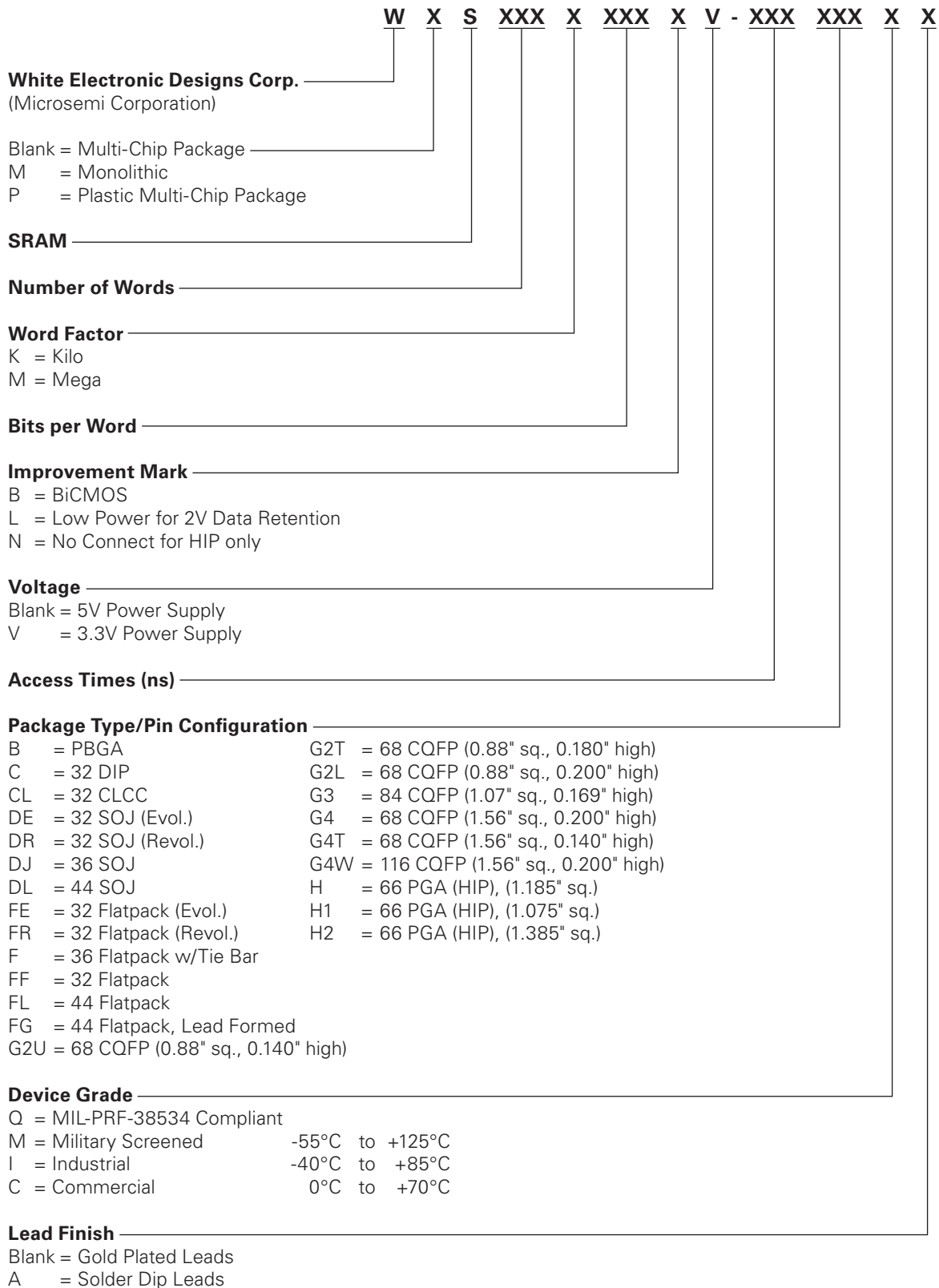
Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.

[Return to TOC](#)



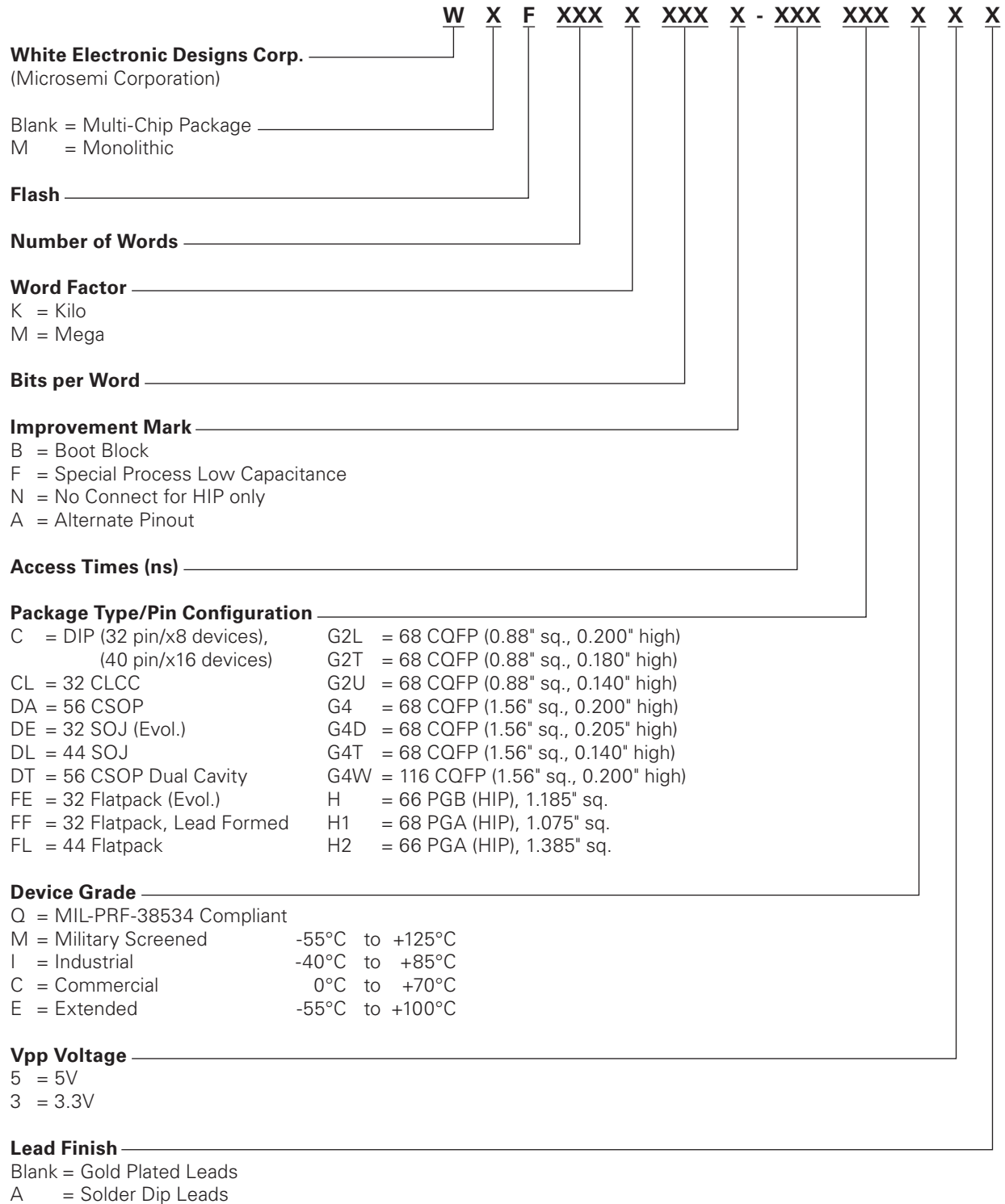
*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)



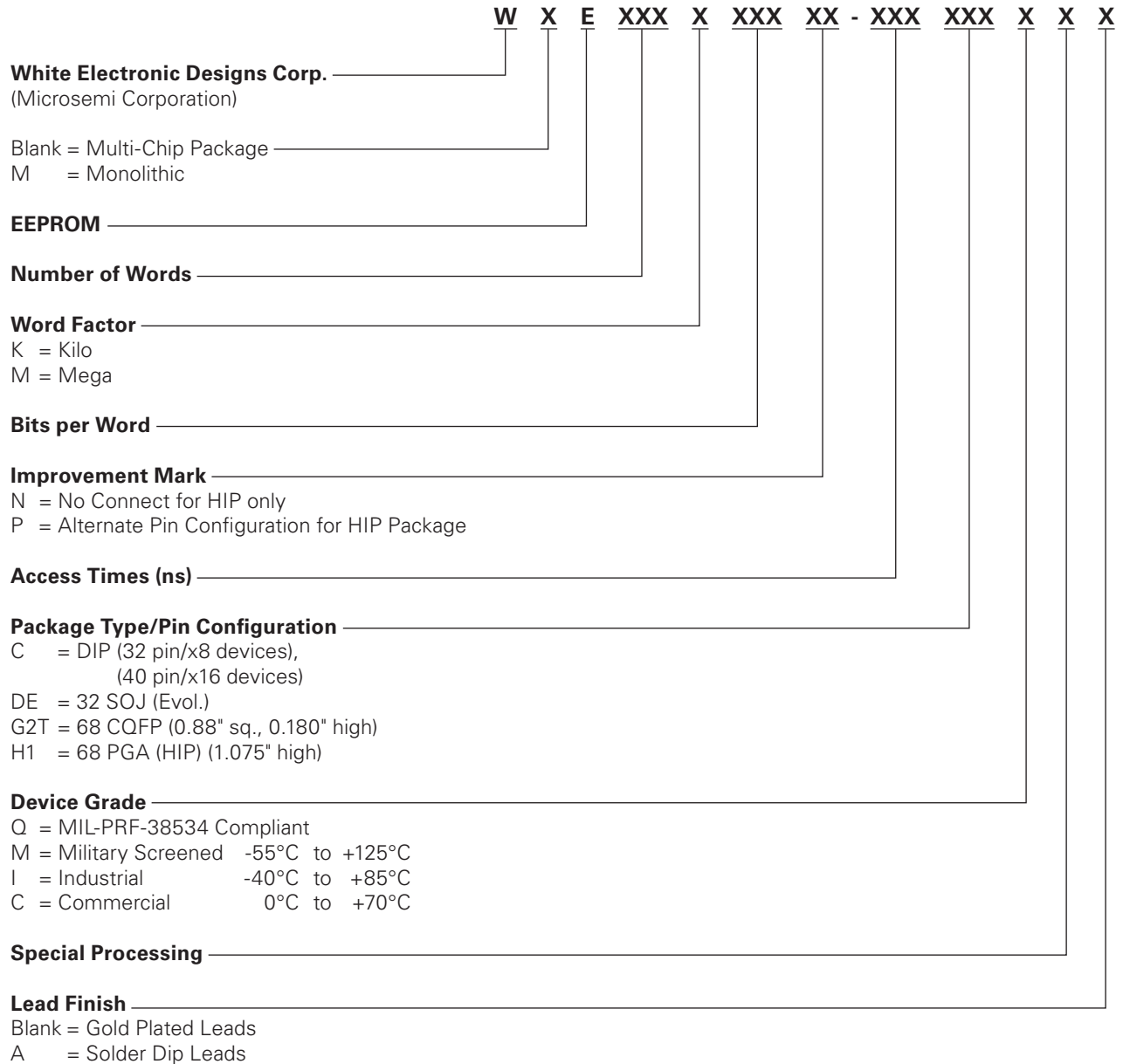
*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)



*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

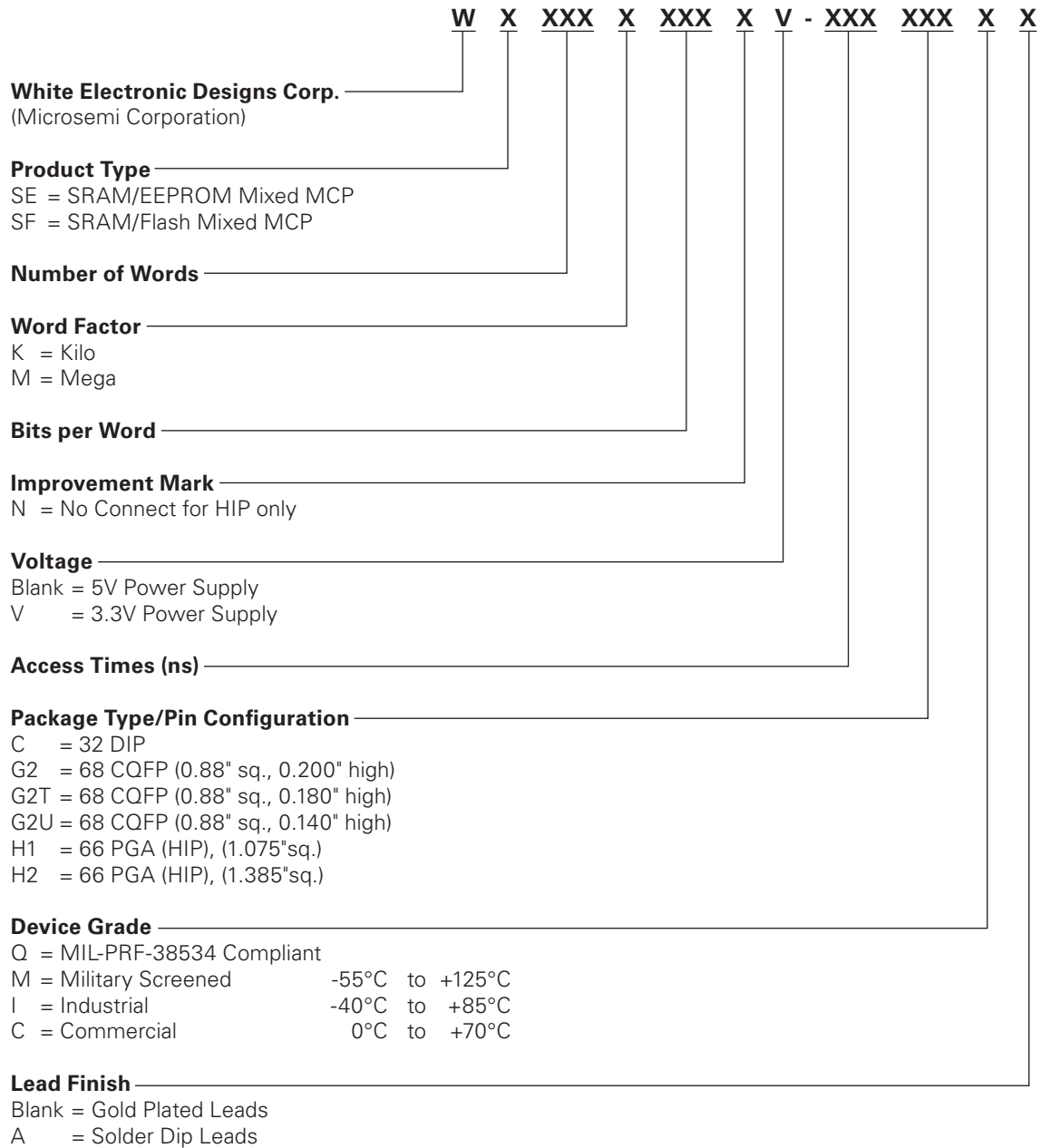
[Return to TOC](#)



*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)





*Note: Not all packages, speeds and other options are available on every product. Please refer to the individual data sheet for option selection.*

[Return to TOC](#)

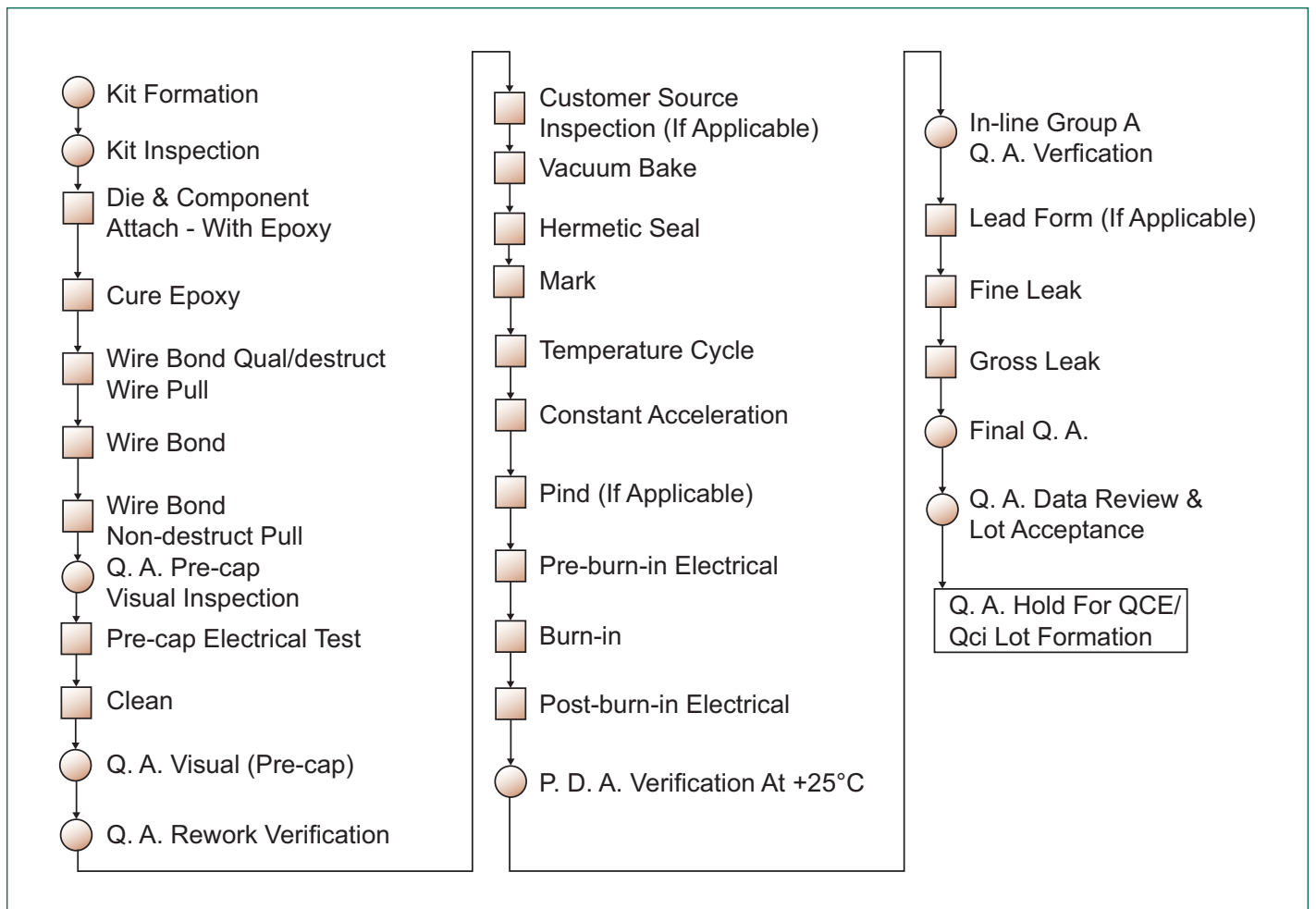
# Standard Manufacturing Processes

# Ceramic Products

	(C) Commercial	(I) Industrial	(M) Military	(SMD) MIL-PRF-38534/ MIL-PRF-38535
Die Element Evaluation	No	No	No	Yes
Test - Pre Cap	+25°C	+25°C	+25°C	+25°C
Temp Cycle	No	Yes	Yes	Yes
Centrifuge	No	Yes	Yes	Yes
Burn-in	None	48 Hrs.	160 Hrs.	160 Hrs.
Test - Final	+70°C	-40°C, +85°C	-55°C, +125°C	-55°C, +125°C
PDA	No	No	No	Yes
Fine Leak	No	No	Yes	Yes
Gross Leak	Bubble Test Only	Bubble Test Only	Yes	Yes

## Manufacturing Flow

## MIL-PRF-38534/38535 Compliant Products



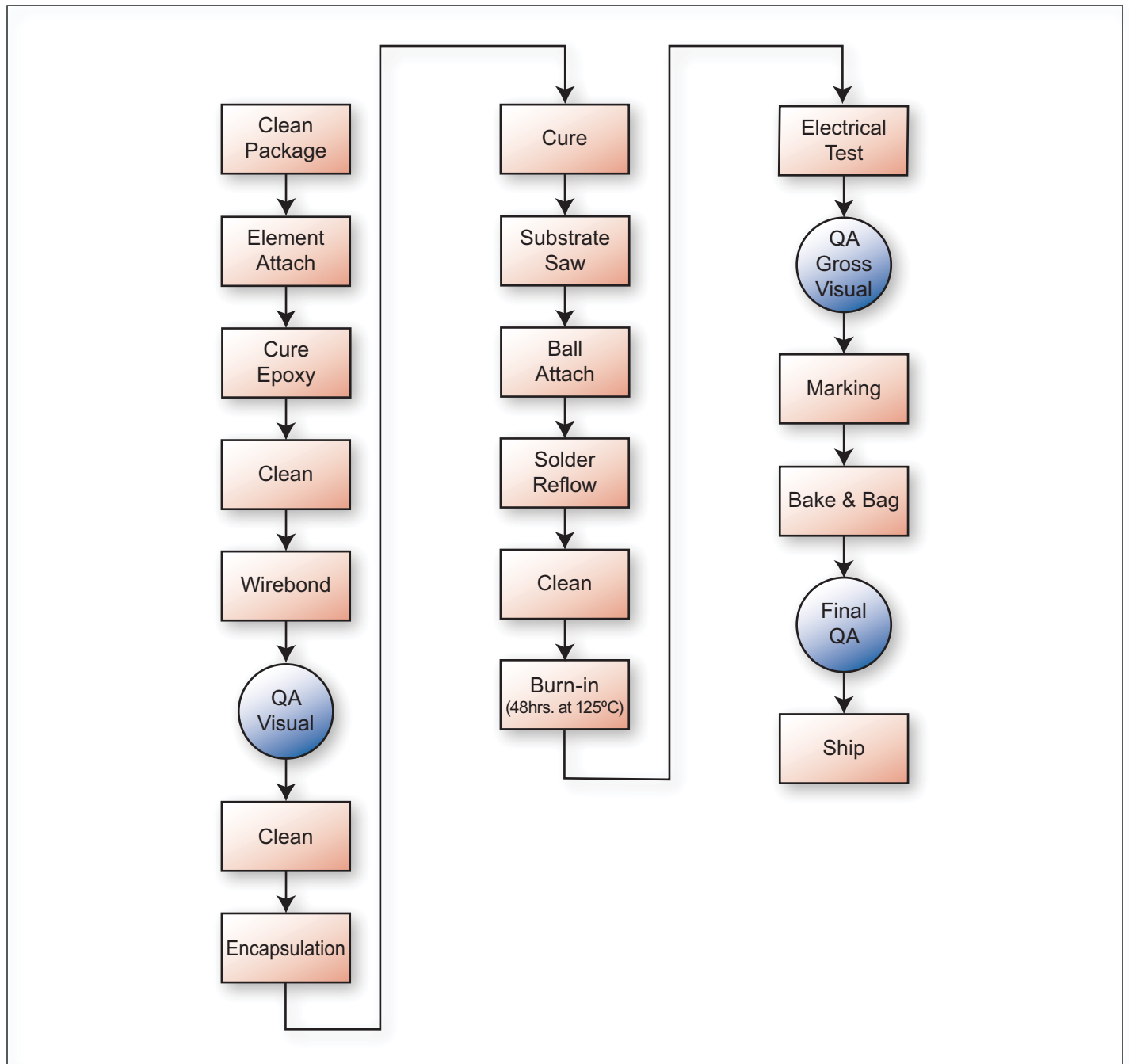
# Standard Manufacturing Processes

# Extended Temperature Plastic

	Monolithics		MCPs	
	(I) Industrial	(M) Military	(I) Industrial	(M) Military
Test - Final	-40°C, +85°C	-55°C, +125°C	-40°C, +85°C	-55°C, +125°C
External Visual	Yes	Yes	Yes	Yes
Temp Cycle	Yes (optional)	Yes (optional)	No	No
Burn-in	48 Hrs. (optional)	160 Hrs. (optional)	(100%) 48 Hrs.	(100%) 48 Hrs.

# Manufacturing Flow

# PBGA Products





3601 E. University Drive ■ Phoenix, AZ 85034 ■ Tel: +1.602.437.1520 ■ Fax: +1.602.437.9120  
[www.whiteedc.com](http://www.whiteedc.com) ■ [www.microsemi.com/pmgp](http://www.microsemi.com/pmgp)