



Process / Product Change Notification

PCN No: 2012-006
Date: 6th June 2012
Subject: PCN announces change of die source and device assembly of the M Series of , SM|BG part family and its derivatives.

Description of Change:

This correspondence is official notification of the change of die source and assembly process for the Microsemi SMBG part family. These parts now have the same die source and assembly process as the range of devices listed in PCN 2011-005. The part specifications are available on the Microsemi website at www.microsemi.com

Qualification and Reliability data is enclosed in the Appendix section. Further technical information is available from your local Sales office or Felim Downey at felim.downey@microsemi.com

Open Orders:

All currently scheduled orders shall be delivered per the dates reflected in the Order Acknowledgement from Microsemi.

Part Numbers Affected:

All M/MA/MXL/MX level parts in the following Transient Voltage Suppressor series:

SMBG5.0A to SMBG170A
SMBG5.0CA to SMBG170CA

Date Code Implementation of SMBG families: 1223

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To be completed by the customer:

Please indicate your acknowledgement and approval or approval with comments by signing below and add any comments you may want Microsemi to consider.

Remarks:

Name Title Date

This PCN is intended to communicate Microsemi's intention to implement the change described above. Approval is requested within 30 days. The absence of a response is considered by Microsemi as approval. Should you wish your comments to be considered please ensure response is received and acknowledged within the allowed 30 days.

Appendix I

Qualification Data Summary

Table 1 details the qualification tests performed on the device range

Qualification Data Summary							
Screening Level	Test Performed	Condition	Duration or Qty	Standard / Reference	Sample size per Lot	No. of Lots	Failures
M	Temperature Cycle	-55 °C to +150 °C	1000 cycles	MIL-STD-750E Method 1051	77	3	0
M	HTRB	125 °C	1000 hours	MIL-STD-750E Method 1038	77	3	0
M	Autoclave	121 °C, 100 % RH, 15 psig	96 hours	JESD22-A102	77	5	0
MX	Visual and Mechanical Review			MIL-STD-750E Method 2071	45	2	0
MX	Solderability			MIL-STD-750E Method 2026	4	4	0
MX	Surge Tests	100 % I _{PP}	100 times	10/1000 µS waveform	22	2	0
MX	HTRB	125 °C	1000 hours	MIL-STD-750E Method 1038	22	2	0
MX	Physical Dimensions			MIL-STD-750E Method 2066	15	5	0
MX	Terminal Strength			MIL-STD-750E Method 2036	22	5	0
MX	Moisture Resistance			MIL-STD-750E Method 1021	22	4	0

Table 1: Qualification Data

Reliability Data

The results in Table 2 below have been accumulated from High Temperature Reverse Bias (HTRB) testing performed on the M level devices.

Reliability Data	
Term	M Level
Cumulative Device Hours	> 350,000
Equivalent Device Hours	>29.5 million
# of Failures	0
Failure Rate	3.09E-08
FIT (per billion hours)	31
MTTF (in years)	3,690

Table 2: Reliability Results

NOTE: There have been zero failures to date. The reliability data will be updated as more data is accumulated.

Definitions

Cumulative device hours: Number of devices tested (n) * test hours per device
Equivalent devices hours (EDH): Acceleration factor (Af) * cumulative device hours

where the acceleration factor (Af) using the Arrhenius model is expressed as:

$$A_F = e^{-E_a/k(1/T_{TEST} - 1/T_{USE})} \quad \text{where:}$$

- Ea = thermal activation energy (eV) which, for semiconductors is typically 0.7eV
- k = Boltzmann's constant = 8.617 x10⁻⁵ eV/°K
- T_{TEST} = Test junction temperature of 125°C (398 °K)
- T_{USE} = Typical usage junction temperature of 55°C (328 °K)

Failure Rate: Number of failures / hour @ 60% confidence level
FIT: Failure rate x 10⁹ hours (Failures in time)
MTTF: 1 / failure rate (Mean time to failure)