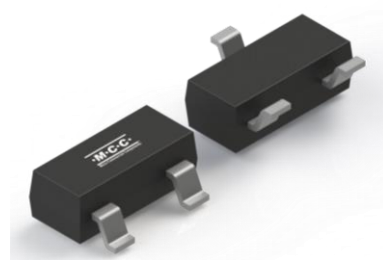


2-Line Uni-directional Standard Capacitance ESD

Features

- Transient protection:
 - IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air), $\pm 30\text{kV}$ (Contact)
 - IEC 61643-321(Surge) 0.74~3A (10/1000 μs)
- Uni-directional ESD protection of two lines
- Reverse working voltage, V_{RWM} : 5.6V~47V
- Standard capacitance: 36~315pF
- Low clamping voltage: 8~54V
- Low reverse leakage current: 0.05~5 μA
- Solid-state silicon-avalanche



SOT-23



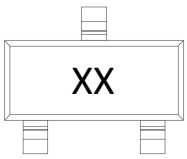
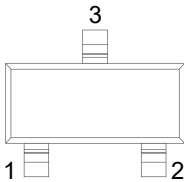
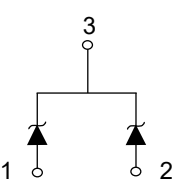
Applications

- Netbooks and Handhelds
- Portable Instrumentation
- Set Top Box
- Industrial Controls

Mechanical Data

- Package: SOT-23
- Moisture Sensitivity Level 1, per J-STD-020
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Body Marking and Pin Layout

Marking Code	Simplified Outline	Internal Structure																												
 <table border="1" data-bbox="371 1339 761 1731"> <thead> <tr> <th>MCC Part No.</th> <th>Device Marking</th> </tr> </thead> <tbody> <tr><td>MMBZ5V6C</td><td>5.6M</td></tr> <tr><td>MMBZ6V2C</td><td>6.2M</td></tr> <tr><td>MMBZ6V8C</td><td>6.8M</td></tr> <tr><td>MMBZ9V1C</td><td>9.1M</td></tr> <tr><td>MMBZ12VC</td><td>12M</td></tr> <tr><td>MMBZ15VC</td><td>15M</td></tr> <tr><td>MMBZ16VC</td><td>16M</td></tr> <tr><td>MMBZ18VC</td><td>18M</td></tr> <tr><td>MMBZ20VC</td><td>20M</td></tr> <tr><td>MMBZ27VC</td><td>27M</td></tr> <tr><td>MMBZ33VC</td><td>33M</td></tr> <tr><td>MMBZ39VC</td><td>39M</td></tr> <tr><td>MMBZ47VC</td><td>47M</td></tr> </tbody> </table>	MCC Part No.	Device Marking	MMBZ5V6C	5.6M	MMBZ6V2C	6.2M	MMBZ6V8C	6.8M	MMBZ9V1C	9.1M	MMBZ12VC	12M	MMBZ15VC	15M	MMBZ16VC	16M	MMBZ18VC	18M	MMBZ20VC	20M	MMBZ27VC	27M	MMBZ33VC	33M	MMBZ39VC	39M	MMBZ47VC	47M	 <p>Transparent top view</p>	
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MMBZ27VC	27M																													
MMBZ33VC	33M																													
MMBZ39VC	39M																													
MMBZ47VC	47M																													

Ordering Information

Product Name	Packing info
MMBZ5V6C-TP THRU MMBZ47VC-TP	3K pcs/reel

For packaging details, visit our website at <https://www.mccsemi.com/Package/List>

2-Line Uni-directional Standard Capacitance ESD

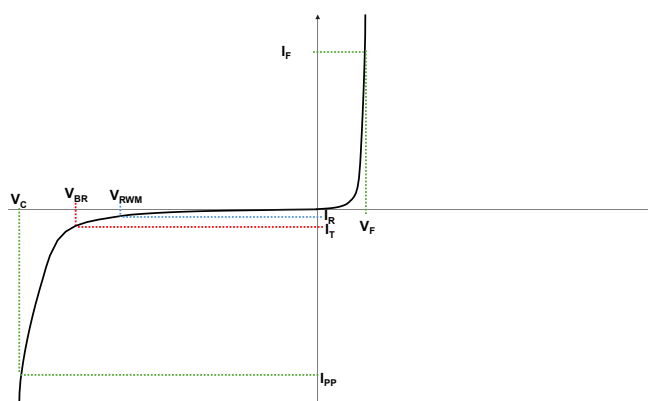
Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter		Symbol	Rating	Unit
IEC61000-4-2(ESD)	Air	V _{ESD}	±30	kV
	Contact	V _{ESD}	±30	kV
Operating Temperature Range		T _J	-55 to +150	°C
Storage Temperature Range		T _{STG}	-55 to +150	°C

Note:
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and 1000ppm antimony compounds.

Parameter Definition

Symbol	Parameter
V _{RWM}	Peak Reverse Working Voltage
I _R	Reverse Leakage Current @ V _{RWM}
V _{BR}	Breakdown Voltage @ I _T
I _T	Test Current
I _{PP}	Maximum Reverse Peak Pulse Current
V _C	Clamping Voltage @ I _{PP}
P _{PK}	Peak Pulse Power
C _J	Junction Capacitance
I _F	Forward Current
V _F	Forward Voltage @ I _F



Electrical Characteristics (T_A=25°C unless otherwise specified)

MMBZ5V6C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}				3	V
Reverse Breakdown Voltage	V _{BR}	I _T = 1mA	5.32		5.88	V
Reverse Leakage Current	I _R	V _{RWM} = 3V			5	µA
Peak Pulse Power (10/1000µs) (Note 2)	P _{PK}				24	W
Clamping Voltage (Note2)	V _C	I _{PP} = 3A, t _p = 10/1000µs			8	V
Junction Capacitance	C _J	V _R = 0V, f = 1MHz		315		pF

2-Line Uni-directional Standard Capacitance ESD

MMBZ6V2C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				3	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	5.89		6.51	V
Reverse Leakage Current	I_R	$V_{RWM} = 3V$			0.5	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				24	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 2.76A, t_P = 10/1000\mu s$			8.7	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		275		pF

MMBZ6V8C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				4.5	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	6.46		7.14	V
Reverse Leakage Current	I_R	$V_{RWM} = 4.5V$			0.5	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				24	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 2.5A, t_P = 10/1000\mu s$			9.6	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		250		pF

MMBZ9V1C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				6	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	8.65		9.56	V
Reverse Leakage Current	I_R	$V_{RWM} = 6V$			0.3	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				24	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 1.7A, t_P = 10/1000\mu s$			14	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		185		pF

MMBZ12VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				8.5	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	11.3		13	V
Reverse Leakage Current	I_R	$V_{RWM} = 8.5V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 2.35A, t_P = 10/1000\mu s$			17	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		114		pF

2-Line Uni-directional Standard Capacitance ESD

MMBZ15VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				12	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	14.25		15.75	V
Reverse Leakage Current	I_R	$V_{RWM} = 12V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 1.9A, t_P = 10/1000\mu s$			21	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		95		pF

MMBZ16VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				13	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	15.2		16.8	V
Reverse Leakage Current	I_R	$V_{RWM} = 13V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 1.7A, t_P = 10/1000\mu s$			23	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		90		pF

MMBZ18VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				14.5	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	17		18.9	V
Reverse Leakage Current	I_R	$V_{RWM} = 14.5V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 1.6A, t_P = 10/1000\mu s$			25	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		80		pF

MMBZ20VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				17	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	19		21	V
Reverse Leakage Current	I_R	$V_{RWM} = 17V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP} = 1.4A, t_P = 10/1000\mu s$			28	V
Junction Capacitance	C_J	$V_R = 0V, f = 1MHz$		77		pF

2-Line Uni-directional Standard Capacitance ESD

MMBZ27VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				22	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	25.65		28.35	V
Reverse Leakage Current	I_R	$V_{RWM}=22V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP}=1 A, t_p=10/1000\mu s$			40	V
Junction Capacitance	C_J	$V_R=0V, f=1MHz$		70		pF

MMBZ33VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				26	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	31.35		34.55	V
Reverse Leakage Current	I_R	$V_{RWM}=26V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP}=0.87A, t_p=10/1000\mu s$			46	V
Junction Capacitance	C_J	$V_R=0V, f=1MHz$		50		pF

MMBZ39VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				31.2	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	36		42	V
Reverse Leakage Current	I_R	$V_{RWM}=31.2V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				38	W
Clamping Voltage (Note2)	V_C	$I_{PP}=0.76A, t_p=10/1000\mu s$			53	V
Junction Capacitance	C_J	$V_R=0V, f=1MHz$		42		pF

MMBZ47VC

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				38	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1mA$	44.65		49.35	V
Reverse Leakage Current	I_R	$V_{RWM}=38V$			0.05	μA
Peak Pulse Power (10/1000 μs) (Note 2)	P_{PK}				40	W
Clamping Voltage (Note2)	V_C	$I_{PP}=0.74A, t_p=10/1000\mu s$			54	V
Junction Capacitance	C_J	$V_R=0V, f=1MHz$		36		pF

Note:

 2. In accordance with IEC 61643-321 (10/1000 μs current waveform)

2-Line Uni-directional Standard Capacitance ESD

Curve Characteristics

Fig. 1- Pulse Waveform

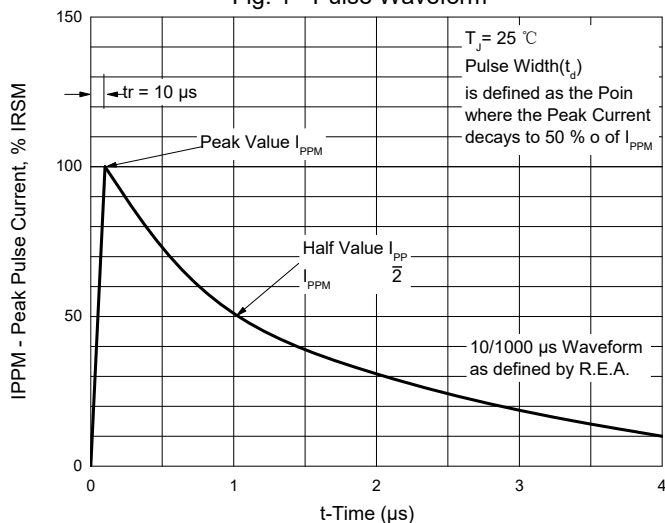


Fig. 2 - Non-Repetitive Peak Pulse Power

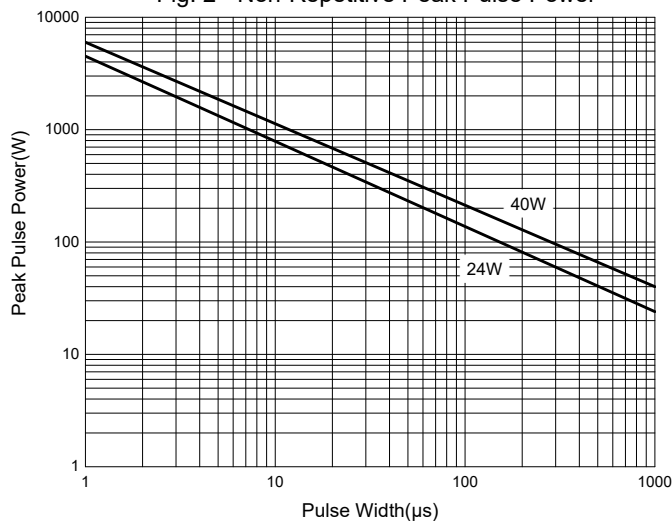


Fig. 3 - Capacitance Characteristics

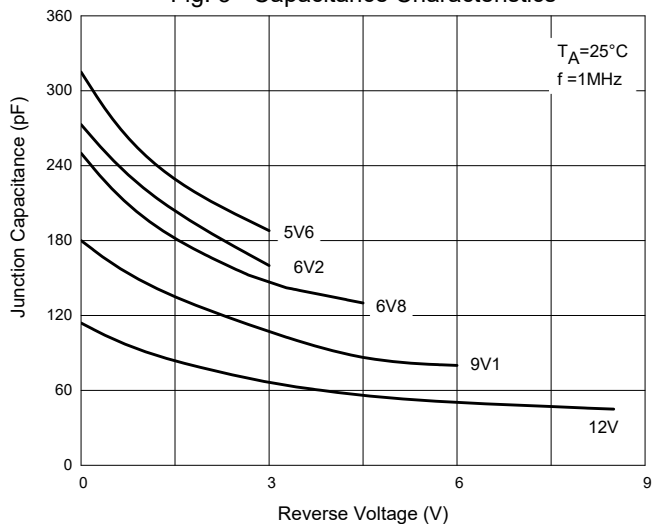


Fig. 4 - Capacitance Characteristics

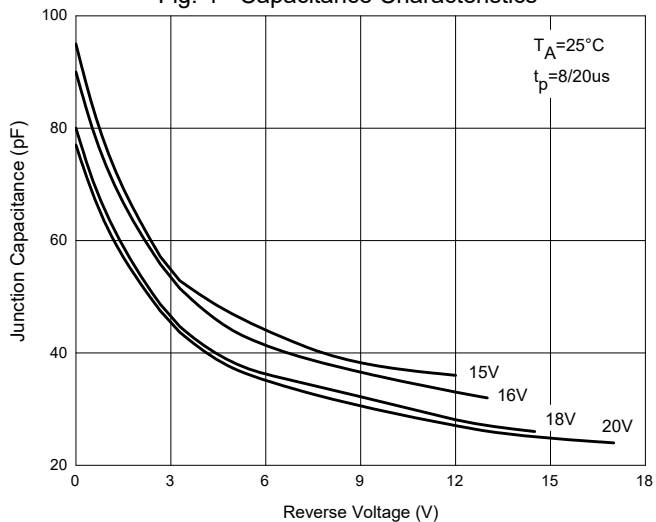


Fig. 5 - Capacitance Characteristics

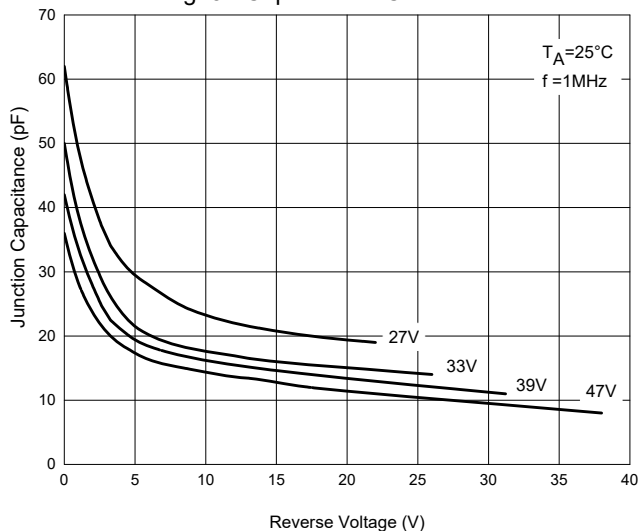
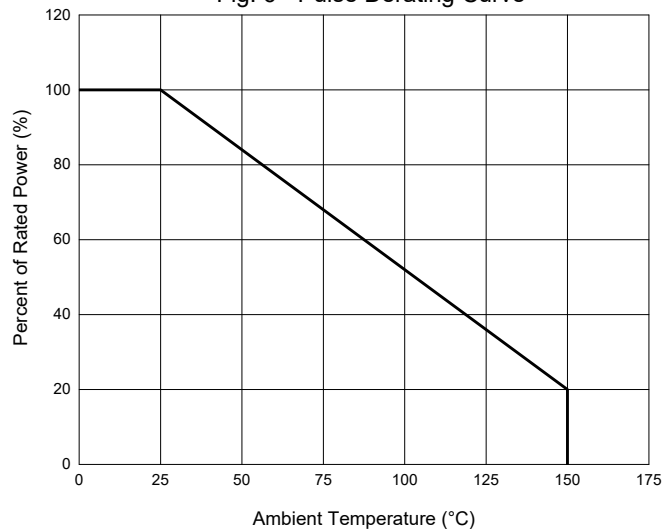
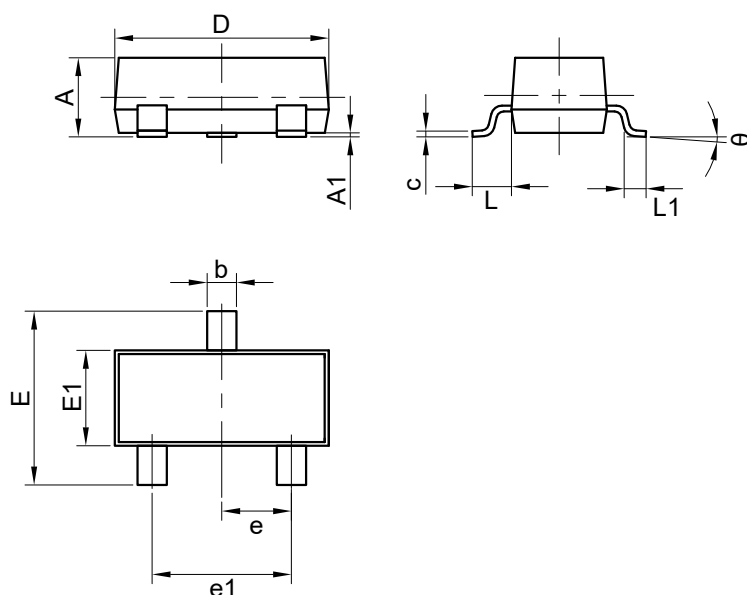


Fig. 6 - Pulse Derating Curve



Package Outline

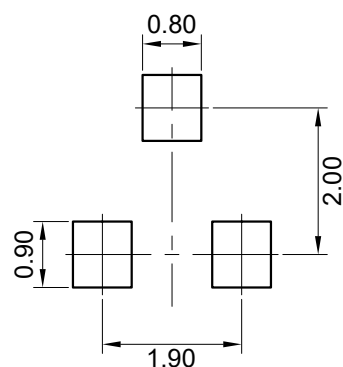


DIM	INCH		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.035	0.045*	0.90	1.15*	Note 1
A1	0.000	0.004	0.01	0.10	
b	0.012	0.020	0.30	0.50	
c	0.003	0.007	0.08	0.18	
D	0.110	0.120	2.80	3.04	
E	0.047	0.055	2.10	2.64	
E1	0.083	0.104	1.20	1.40	
e	0.037		0.95		TYP
e1	0.075		1.90		TYP
L	0.017	0.026	0.45	0.65	
L1	0.011	0.020	0.30	0.50	
theta	0°	8°	0°	8°	

Notes:

1. Dimension A for products from manufacturing site VN is controlled at maximum 1.10 mm.

Suggested Pad Layout (Unit:mm)



Notes:

1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please refer to document IPC-7351A.

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