Vishay General Semiconductor

Surface Mount TRANSZORB[®] **Transient Voltage Suppressors**



SMB (DO-214AA)

PRIMARY CHARACTERISTICS					
V _{BR} (bi-directional)	6.4 V to 231 V				
V _{BR} (uni-directional)	6.4 V to 231 V				
V _{WM}	5.0 V to 188 V				
P _{PPM}	600 W				
I _{FSM} (uni-directional only)	100 A				
T _J max.	150 °C				
Polarity	Uni-directional, bi-directional				
Package	SMB (DO-214AA)				

DEVICES FOR BI-DIRECTION APPLICATIONS

For bi-directional devices use CA suffix (e.g. SMBJ10CA). Electrical characteristics apply in both directions.

FEATURES

- Low profile package
- · Ideal for automated placement
- Glass passivated chip junction
- · Available in uni-directional and bi-directional
- . 600 W peak pulse power capability with a 10/1000 µs waveform, repetitive rate (duty cycle): 0.01 %
- Excellent clamping capability
- Very fast response time
- Low incremental surge resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, and telecommunication.

MECHANICAL DATA

Case: SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial arade

Base P/NHE3_X - RoHS-compliant and AEC-Q101 gualified Base P/NHM3_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("_X" denotes revision code e.g. A, B, ...)

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3, M3, HE3, and HM3 suffix meets JESD 201 class 2 whisker test

Polarity: for uni-directional types the band denotes cathode end, no marking on bi-directional types

MAXIMUM RATINGS (T _A = 25 °C unless otherwise noted)						
PARAMETER	SYMBOL	VALUE	UNIT			
Peak pulse power dissipation with a 10/1000 μs waveform $^{(1)(2)}$ (fig. 1)	P _{PPM}	600	W			
Peak pulse current with a 10/1000 μ s waveform ⁽¹⁾	I _{PPM}	See next table	А			
Peak forward surge current 8.3 ms single half sine-wave uni-directional only ⁽²⁾	I _{FSM}	100	A			
Operating junction and storage temperature range	T _J , T _{STG}	-55 to +150	°C			

Notes

 $^{(1)}$ Non-repetitive current pulse, per fig. 3 and derated above T_A = 25 °C per fig. 2

⁽²⁾ Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

Revision: 24-Jan-2019 Document Number: 88392 For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT

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COMPLIANT HALOGEN

FREE





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Device trype MODIFIED "BBD1260 Device trype (D) BREAKDOWN (P) TEST (URREN) (mA) STAND-OFF Volt AGE (MA) MAXIMUM PA MAXIMUMA KI KI <th colspan="8">ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)</th>	ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)									
UNI BI MIN. MAX. Composition Page May Proc May <th>MODIFIED</th> <th>co</th> <th>DE</th> <th>VOLT V_{BR} A (</th> <th>TAGE T I_T ⁽¹⁾ V)</th> <th></th> <th>VOLTAGE V_{WM}</th> <th>REVERSE LEAKAGE AT V_{WM}</th> <th>PEAK PULSE SURGE CURRENT</th> <th>CLAMPING VOLTAGEAT I_{PPM}</th>	MODIFIED	co	DE	VOLT V _{BR} A (TAGE T I _T ⁽¹⁾ V)		VOLTAGE V _{WM}	REVERSE LEAKAGE AT V _{WM}	PEAK PULSE SURGE CURRENT	CLAMPING VOLTAGEAT I _{PPM}
(*)SMB.06.A KG KG KG KG AF 7.27 10 6.0 800 58.3 11.2 (*)SMB.05.A KK AK X.22 7.98 10 6.5 500 53.6 11.2 (*)SMB.30.A KP AP 8.39 9.21 1.0 7.5 100 46.5 12.9 (*)SMB.30.A KR AR 8.69 9.83 1.0 8.0 50 44.1 13.6 (*)SMB.30.A KT AT 9.44 10.4 1.0 8.5 20 41.7 14.4 (*)SMB.31A KX AX 11.1 1.0 9.0 15.4 (*)SMB.31A KX AX 11.1 1.0 1.0 1.0 2.0 3.0 18.2 (*)SMB.31A LK CLG 1.44 1.0 1.0 1.0 2.1 2.6.0 (*)SMB.31A LK BM 16.7 1.8.5 1.0 16 1.0 2.3.1	()									
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(*)SMBJ7.6A KM KM RM 7.76 8.60 10 7.0 200 50.0 12.0 (*)SMBJ7.6A KP AP 8.33 9.21 1.0 7.5 100 46.5 12.9 (*)SMBJ8.6A KT AT 9.44 10.4 1.0 8.5 20 41.7 14.4 (*)SMBJ10A KX AX 11.0 10 39.0 15.4 (*)SMBJ11A KZ KZ 12.2 13.5 1.0 11 5.0 33.3 17.0 (*)SMBJ11A KZ KZ 12.2 1.3 1.0 12 5.0 30.2 19.9 (*)SMBJ16A LG LG 1.44 15.9 1.0 13 1.0 27.9 21.5 (*)SMBJ16A LM BK 16.7 1.0 15 1.0 24.6 24.4 (*)SMBJ16A LM BK 10.7 10.1 16 10.2 27.6 (*)SMBJ2A										
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(PSMBJ11A KZ KZ 122 13.5 1.0 11 5.0 33.0 18.2 (PSMBJ12A LE BE 13.3 14.7 1.0 12 5.0 30.2 19.9 (PSMBJ13A LG LG IG 14.4 15.6 1.0 13 1.0 27.9 21.5 (PSMBJ13A LK BK 15.6 17.2 1.0 14 1.0 25.9 23.2 (PSMBJ13A LF LR BK 15.7 1.0 16 1.0 23.1 26.0 (PSMBJ13A LF LR LR 18.9 20.0 21.1 1.0 18 1.0 20.5 29.2 (PSMBJ2AA LV LV 22.0 24.5 1.0 24 1.0 18.5 32.4 (PSMBJ2AA LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (PSMBJ2AA LZ BZ 26.7			AV	10.0	11.1	1.0	9.0	10	39.0	15.4
(+)SMBJ12A LE BE 13.3 14.7 1.0 12 5.0 30.2 19.9 (+)SMBJ13A LG LG 14.4 15.9 1.0 13 1.0 27.9 21.5 (+)SMBJ15A LM BK 15.6 1.7.2 1.0 14 1.0 25.9 23.2 (+)SMBJ15A LM BK 16.7 18.5 1.0 15 1.0 24.6 24.4 (+)SMBJ17A LR LR IR 18.9 20.9 1.0 17 1.0 21.7 27.6 (+)SMBJ2A LT BT 20.0 22.1 1.0 18 1.0 20.5 29.2 (+)SMBJ2A LX BX 24.4 26.9 1.0 26 1.0 16.9 35.5 (+)SMBJ3A MK CK 33.3 36.8 1.0 24 1.0 14.3 42.1 (+)SMBJ3A MK CK 33.3 36.8 <t< td=""><td>⁽⁺⁾SMBJ10A</td><td></td><td></td><td>11.1</td><td></td><td>1.0</td><td>10</td><td>5.0</td><td>35.3</td><td>17.0</td></t<>	⁽⁺⁾ SMBJ10A			11.1		1.0	10	5.0	35.3	17.0
H9MBJ13A LG LG 14.4 15.9 1.0 13 1.0 27.9 21.5 (hSMBJ14A LK BK 15.6 17.2 1.0 14 1.0 25.9 23.2 (hSMBJ15A LM BM 16.5 1.0 15 1.0 24.6 24.4 (hSMBJ16A LP LM 17.8 19.7 1.0 16 1.0 23.1 26.0 (hSMBJ17A LR LR 18.9 20.9 1.0 17 1.0 21.7 27.6 (hSMBJ2A LV UV 22.2 24.5 1.0 20 1.0 18.5 32.4 (hSMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (hSMBJ3A ME CE 28.9 31.9 1.0 28 1.0 13.2 45.4 (hSMBJ3A MM CK 33.3 36.8 1.0 33 1.0	⁽⁺⁾ SMBJ11A	KZ	KZ	12.2	13.5	1.0	11	5.0	33.0	18.2
(+)SMBJ14A LK BK 15.6 17.2 1.0 14 1.0 25.9 23.2 (+)SMBJ15A LM BM 16.7 18.5 1.0 15 1.0 24.6 24.4 (+)SMBJ15A LP LM 18.9 20.9 1.0 16 1.0 23.1 26.0 (+)SMBJ17A LR LR 18.9 20.9 1.0 17 1.0 21.7 27.6 (+)SMBJ17A LR LR 18.9 20.9 1.0 18 1.0 21.7 27.6 (+)SMBJ2A LT BX 24.4 26.9 1.0 22 1.0 18.5 32.4 (+)SMBJ2A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ3A MG MG 36.7 40.6 1.0 33 1.0 11.3 53.3 (+)SMBJ3A MM CM 36.7 40.6 1.0 <t< td=""><td>⁽⁺⁾SMBJ12A</td><td>LE</td><td>BE</td><td>13.3</td><td>14.7</td><td>1.0</td><td>12</td><td>5.0</td><td>30.2</td><td>19.9</td></t<>	⁽⁺⁾ SMBJ12A	LE	BE	13.3	14.7	1.0	12	5.0	30.2	19.9
(H)SMBJ15A LM BM 16.7 18.5 1.0 15 1.0 24.6 24.4 (H)SMBJ16A LP LM 17.8 19.7 1.0 16 1.0 23.1 26.0 (H)SMBJ17A LR LR 18.9 20.9 1.0 17 1.0 21.7 27.6 (H)SMBJ2A LV LV 22.2 24.5 1.0 20 1.0 18 1.0 20.5 29.2 (H)SMBJ2A LV BX 24.4 26.9 1.0 22 1.0 16.9 35.5 (H)SMBJ2A ME CE 28.9 31.9 1.0 26 1.0 13.2 45.4 (H)SMBJ3A ME CE 28.9 31.3 36.8 1.0 30 1.0 13.2 45.4 (H)SMBJ3A ME CK 33.3 36.8 1.0 33 1.0 11.3 53.3 (H)SMBJ3A MP CP 40		LG	LG	14.4	15.9	1.0	13	1.0	27.9	21.5
(H)SMBJ16A LP LM 17.8 19.7 1.0 16 1.0 23.1 26.0 (H)SMBJ17A LR LR 18.9 20.9 1.0 17 1.0 21.7 27.6 (H)SMBJ18A LT BT 20.0 22.1 1.0 18 1.0 20.5 29.2 (H)SMBJ2A LV LV 22.2 24.5 1.0 20 1.0 18.5 32.4 (H)SMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (H)SMBJ2A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (H)SMBJ3A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (H)SMBJ3A MR CK 33.3 1.0 11.3 53.3 (H)SMBJ3A MR CR 44.4 49.1 1.0 46 1.0 9.3 6	⁽⁺⁾ SMBJ14A	LK	BK	15.6	17.2	1.0	14	1.0	25.9	23.2
(H)SMBJ17A LR LR 18 20.9 1.0 17 1.0 21.7 27.6 (H)SMBJ18A LT BT 20.0 22.1 1.0 18 1.0 20.5 29.2 (H)SMBJ20A LV LV 22.2 24.5 1.0 20 1.0 18.5 32.4 (H)SMBJ2A LX BX 24.4 26.9 1.0 22 1.0 16.9 35.5 (H)SMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (H)SMBJ3A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (H)SMBJ3A MM CK 33.3 36.8 1.0 33 1.0 11.3 55.3 (H)SMBJ3A MR CR 44.4 49.1 1.0 40 1.0 83.3 72.7 (H)SMBJ3A MV MV 50.0 55.3 1.0 43	(+)SMBJ15A	LM	BM	16.7	18.5	1.0	15	1.0	24.6	24.4
(H)SMBJ17A LR LR 18 20.9 1.0 17 1.0 21.7 27.6 (H)SMBJ18A LT BT 20.0 22.1 1.0 18 1.0 20.5 29.2 (H)SMBJ20A LV LV 22.2 24.5 1.0 20 1.0 18.5 32.4 (H)SMBJ2A LX BX 24.4 26.9 1.0 22 1.0 16.9 35.5 (H)SMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (H)SMBJ3A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (H)SMBJ3A MM CK 33.3 36.8 1.0 33 1.0 11.3 55.3 (H)SMBJ3A MR CR 44.4 49.1 1.0 40 1.0 83.3 72.7 (H)SMBJ3A MV MV 50.0 55.3 1.0 43	⁽⁺⁾ SMBJ16A	LP	LM	17.8	19.7	1.0	16	1.0	23.1	26.0
(+)SMBJ20A LV LV 22.2 24.5 1.0 20 1.0 18.5 32.4 (+)SMBJ2A LX BX 24.4 26.9 1.0 22 1.0 16.9 35.5 (+)SMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (+)SMBJ26A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 11.3 53.3 (+)SMBJ3A MM CM 36.7 40.6 1.0 33 1.0 10.3 58.1 (+)SMBJ3A MT CT 47.8 52.8 1.0 43 1.0 8.6 69.4 (+)SMBJ4A MZ MZ 56.7 62.7 1.0		LR	LR	18.9	20.9	1.0	17	1.0	21.7	27.6
(+)SMBJ20A LV LV 22.2 24.5 1.0 20 1.0 18.5 32.4 (+)SMBJ2A LX BX 24.4 26.9 1.0 22 1.0 16.9 35.5 (+)SMBJ2A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (+)SMBJ26A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 11.3 53.3 (+)SMBJ3A MM CM 36.7 40.6 1.0 33 1.0 10.3 58.1 (+)SMBJ3A MT CT 47.8 52.8 1.0 43 1.0 8.6 69.4 (+)SMBJ4A MZ MZ 56.7 62.7 1.0	⁽⁺⁾ SMBJ18A	LT	BT	20.0	22.1	1.0	18	1.0	20.5	29.2
(+)SMBJ24A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (+)SMBJ26A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ28A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (+)SMBJ30A MM CM 36.7 40.6 1.0 33 1.0 11.3 53.3 (+)SMBJ40A MR CR 44.4 49.1 1.0 40 1.0 9.3 64.5 (+)SMBJ43A MT CT 47.8 52.8 1.0 43 1.0 8.6 69.4 (+)SMBJ4AA MX MX 53.3 58.9 1.0 48 1.0 7.3 7.7 (+)SMBJ51A MZ 56.7 62.7 1.0 51 <t< td=""><td></td><td>LV</td><td>LV</td><td></td><td></td><td>1.0</td><td>20</td><td>1.0</td><td></td><td>32.4</td></t<>		LV	LV			1.0	20	1.0		32.4
(+)SMBJ24A LZ BZ 26.7 29.5 1.0 24 1.0 15.4 38.9 (+)SMBJ26A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ28A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (+)SMBJ30A MM CM 36.7 40.6 1.0 33 1.0 11.3 53.3 (+)SMBJ40A MR CR 44.4 49.1 1.0 40 1.0 9.3 64.5 (+)SMBJ43A MT CT 47.8 52.8 1.0 43 1.0 8.6 69.4 (+)SMBJ4AA MX MX 53.3 58.9 1.0 48 1.0 7.3 7.7 (+)SMBJ51A MZ 56.7 62.7 1.0 51 <t< td=""><td>(+)SMBJ22A</td><td>LX</td><td>BX</td><td>24.4</td><td>26.9</td><td>1.0</td><td>22</td><td>1.0</td><td>16.9</td><td>35.5</td></t<>	(+)SMBJ22A	LX	BX	24.4	26.9	1.0	22	1.0	16.9	35.5
(+)SMBJ26A ME CE 28.9 31.9 1.0 26 1.0 14.3 42.1 (+)SMBJ28A MG MG 31.1 34.4 1.0 28 1.0 13.2 45.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 30 1.0 12.4 48.4 (+)SMBJ30A MK CK 33.3 36.8 1.0 33 1.0 11.3 53.3 (+)SMBJ30A MM CR 44.4 49.1 1.0 40 1.0 9.3 64.5 (+)SMBJ43A MT CT 47.8 52.8 1.0 43 1.0 8.6 69.4 (+)SMBJ43A MV MV 50.0 55.3 1.0 45 1.0 8.3 72.7 (+)SMBJ5A MZ MZ 56.7 62.7 1.0 54 1.0 6.9 87.1 (+)SMBJ5A NE NE 60.0 66.3 1.0		LZ	BZ	26.7			24	1.0		
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	SMBJ188A	PS	PS	209	209	1.0	188	1.0	2.0	328

Notes

⁽¹⁾ Pulse test: $t_p \le 50 \text{ ms}$

⁽²⁾ Surge current waveform per fig. 3 and derate per fig. 2

 $^{(3)}$ For bi-directional types having V_{WM} of 10 V and less, the I_{D} limit is doubled

⁽⁴⁾ All terms and symbols are consistent with ANSI/IEEE C62.35

 $^{(5)}\,$ For the bi-directional SMBJ5.0CA, the maximum V_{BR} is 7.25 V

⁽⁶⁾ $V_F = 3.5 V \text{ max.}$ at $I_F = 50 \text{ A}$ (uni-directional only)

(+) Underwriters laboratory recognition for the classification of protectors (QVGQ2) under the UL standard for safety 497B and file number E136766 for both uni-directional and bi-directional devices

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THERMAL CHARACTERISTICS ($T_A = 25 \text{ °C}$ unless otherwise noted)						
PARAMETER	SYMBOL	VALUE	UNIT			
Typical thermal resistance, junction to ambient ⁽¹⁾	$R_{ ext{ heta}JA}$	100	°C/W			
Typical thermal resistance, junction to lead	R _{θJL} 20					

Note

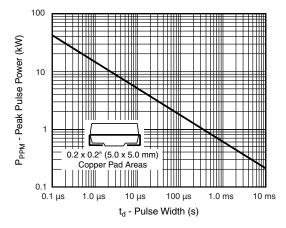
⁽¹⁾ Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)						
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE		
SMBJ5.0A-E3/52	0.096	0.096 52		7" diameter plastic tape and reel		
SMBJ5.0A-M3/52	0.090	52	750	7 diameter plastic tape and reel		
SMBJ5.0A-E3/5B	0.096 5B	3200	13" diameter plastic tape and reel			
SMBJ5.0A-M3/5B	0.090	38	3200	15 diameter plastic tape and reel		
SMBJ5.0AHE3_A/H ⁽¹⁾	0.096	Н	750	7" diameter plastic tape and reel		
SMBJ5.0AHM3_A/H ⁽¹⁾	0.090	П	750	7 diameter plastic tape and reel		
SMBJ5.0AHE3_A/I ⁽¹⁾	0.096	Ι	3200	13" diameter plastic tape and reel		
SMBJ5.0AHM3_A/I ⁽¹⁾	0.090			15 diameter plastic tape and reel		

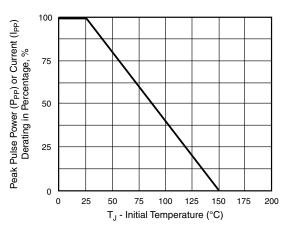
Note

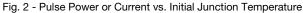
⁽¹⁾ AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)









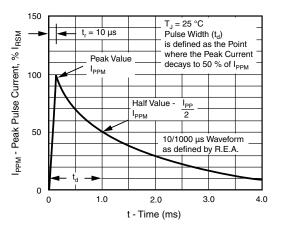


Fig. 3 - Pulse Waveform

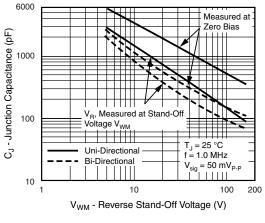


Fig. 4 - Typical Junction Capacitance

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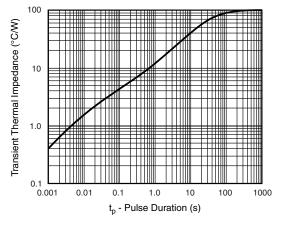


Fig. 5 - Typical Transient Thermal Impedance

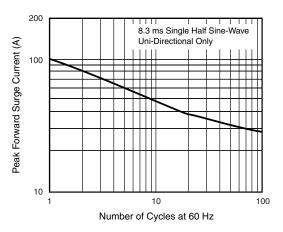
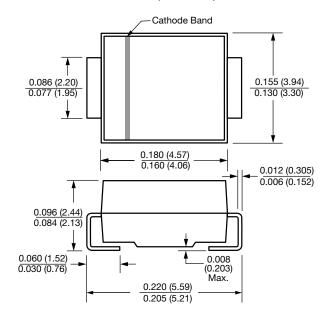
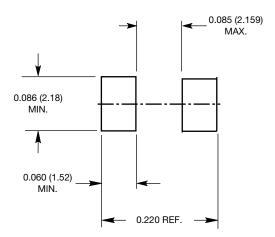


Fig. 6 - Maximum Non-Repetitive Peak Forward Surge Current

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



SMB (DO-214AA)



Mounting Pad Layout



Vishay

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