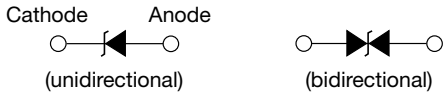
Surface-Mount TRANSZORB® Transient Voltage Suppressors



SMA (DO-214AC)



FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated chip junction
- Available in unidirectional and bidirectional
- 400 W peak pulse power capability with a 10/1000 µs waveform, repetitive rate (duty cycle): 0.01 % (300 W above 91 V)
- 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: P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE Available

RoHS COMPLIANT

HALOGEN FREE Available

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
V_{WM} (unidirectional)	5.8 V to 459 V
V_{WM} (bidirectional)	5.8 V to 185 V
V_{BR} (unidirectional)	6.8 V to 540 V
V_{BR} (bidirectional)	6.8 V to 220 V
P_{PPM}	400 W, 300 W
P_D	3.3 W
I_{FSM} (uni-directional only)	40 A
T_J max.	150 °C
Polarity	Unidirectional, bidirectional
Package	SMA (DO-214AC)

DEVICES FOR BIDIRECTION APPLICATIONS

For bidirectional devices use CA suffix (e.g. P4SMA10CA). Electrical characteristics apply in both directions.

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: SMA (DO-214AC)
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 grade
Base P/NHE3_X - RoHS-compliant and AEC-Q101 qualified
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 unidirectional types the band denotes cathode end, no marking on bidirectional types

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Peak power dissipation with a 10/1000 µs waveform [1][2] (fig. 1)	P_{PPM}	400	W
Peak pulse current with a 10/1000 µs waveform [1] (fig. 3)	I_{PPM}	See next table	A
Power dissipation on infinite heatsink at T_A = 50 °C	P_D	3.3	W
Peak forward surge current 8.3 ms single half sine-wave unidirectional only [2]	I_{FSM}	40	A
Operating junction and storage temperature range	T_J, T_{STG}	-65 to +150	°C

Notes

(1) Non-repetitive current pulse, per fig. 3 and derated above T_A = 25 °C per fig. 2. Rating is 300 W above 91 V
(2) Mounted on 0.2" x 0.2" (5.0 mm x 5.0 mm) copper pads to each terminal

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

PART NUMBER	DEVICE MARKING CODE		BREAKDOWN VOLTAGE V_{BR} AT I_T (1) (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE AT V_{WM} I_D (4) (µA)	MAXIMUM PEAK PULSE CURRENT I_{PPM} (2) (A)	MAXIMUM CLAMPING VOLTAGE AT I_{PPM} V_C (V)	MAXIMUM TEMPERATURE COEFFICIENT OF V_{BR} (%/°C)
	UNI	BI	MIN.	MAX.						
(+)P4SMA6.8A	6V8A	6V8C	6.45	7.14	10	5.80	1000	38.1	10.5	0.057
(+)P4SMA7.5A	7V5A	7V5C	7.13	7.88	10	6.40	500	35.4	11.3	0.061
(+)P4SMA8.2A	8V2A	8V2C	7.79	8.61	10	7.02	200	33.1	12.1	0.065
(+)P4SMA9.1A	9V1A	9V1C	8.65	9.55	1.0	7.78	50	29.9	13.4	0.068
(+)P4SMA10A	10A	10C	9.5	10.5	1.0	8.55	10	27.6	14.5	0.073
(+)P4SMA11A	11A	11C	10.5	11.6	1.0	9.40	5.0	25.6	15.6	0.075
(+)P4SMA12A	12A	12C	11.4	12.6	1.0	10.2	1.0	24.0	16.7	0.078
(+)P4SMA13A	13A	13C	12.4	13.7	1.0	11.1	1.0	22.0	18.2	0.081
(+)P4SMA15A	15A	15C	14.3	15.8	1.0	12.8	1.0	18.9	21.2	0.084
(+)P4SMA16A	16A	16C	15.2	16.8	1.0	13.6	1.0	17.8	22.5	0.086
(+)P4SMA18A	18A	18C	17.1	18.9	1.0	15.3	1.0	15.9	25.2	0.089
(+)P4SMA20A	20A	20C	19.0	21.0	1.0	17.1	1.0	14.4	27.7	0.090
(+)P4SMA22A	22A	22C	20.9	23.1	1.0	18.8	1.0	13.1	30.6	0.092
(+)P4SMA24A	24A	24C	22.8	25.2	1.0	20.5	1.0	12.0	33.2	0.094
(+)P4SMA27A	27A	27C	25.7	28.4	1.0	23.1	1.0	10.7	37.5	0.096
(+)P4SMA30A	30A	30C	28.5	31.5	1.0	25.6	1.0	9.7	41.4	0.097
(+)P4SMA33A	33A	33C	31.4	34.7	1.0	28.2	1.0	8.8	45.7	0.098
(+)P4SMA36A	36A	36C	34.2	37.8	1.0	30.8	1.0	8.0	49.9	0.099
(+)P4SMA39A	39A	39C	37.1	41.0	1.0	33.3	1.0	7.4	53.9	0.100
(+)P4SMA43A	43A	43C	40.9	45.2	1.0	36.8	1.0	6.7	59.3	0.101
(+)P4SMA47A	47A	47C	44.7	49.4	1.0	40.2	1.0	6.2	64.8	0.101
(+)P4SMA51A	51A	51C	48.5	53.6	1.0	43.6	1.0	5.7	70.1	0.102
(+)P4SMA56A	56A	56C	53.2	58.8	1.0	47.8	1.0	5.2	77.0	0.103
(+)P4SMA62A	62A	62C	58.9	65.1	1.0	53.0	1.0	4.7	85.0	0.104
(+)P4SMA68A	68A	68C	64.6	71.4	1.0	58.1	1.0	4.3	92.0	0.104
(+)P4SMA75A	75A	75C	71.3	78.8	1.0	64.1	1.0	3.9	104	0.105
(+)P4SMA82A	82A	82C	77.9	86.1	1.0	70.1	1.0	3.5	113	0.105
(+)P4SMA91A	91A	91C	86.5	95.5	1.0	77.8	1.0	3.2	125	0.106
(+)P4SMA100A	100A	100C	95.0	105	1.0	85.5	1.0	2.2	137	0.106
(+)P4SMA110A	110A	110C	105	116	1.0	94.0	1.0	2.0	152	0.107
(+)P4SMA120A	120A	120C	114	126	1.0	102	1.0	1.8	165	0.107
(+)P4SMA130A	130A	130C	124	137	1.0	111	1.0	1.7	179	0.107
(+)P4SMA150A	150A	150C	143	158	1.0	128	1.0	1.4	207	0.108
(+)P4SMA160A	160A	160C	152	168	1.0	136	1.0	1.4	219	0.108
(+)P4SMA170A	170A	170C	162	179	1.0	145	1.0	1.3	234	0.108
(+)P4SMA180A	180A	180C	171	189	1.0	154	1.0	1.2	246	0.108
(+)P4SMA200A	200A	200C	190	210	1.0	171	1.0	1.1	274	0.108
(+)P4SMA220A	220A	220C	209	231	1.0	185	1.0	0.91	328	0.108
P4SMA250A	250A	-	237	263	1.0	214	1.0	0.87	344	0.110
P4SMA300A	300A	-	285	315	1.0	256	1.0	0.73	414	0.110
P4SMA350A	350A	-	333	368	1.0	300	1.0	0.62	482	0.110
P4SMA400A	400A	-	380	420	1.0	342	1.0	0.55	548	0.110
P4SMA440A	440A	-	418	462	1.0	376	1.0	0.50	602	0.110
P4SMA480A	480A	-	456	504	1.0	408	1.0	0.46	658	0.110
P4SMA510A	510A	-	485	535	1.0	434	1.0	0.43	698	0.110
P4SMA540A	540A	-	513	567	1.0	459	1.0	0.41	740	0.110

Notes

(1) Pulse test: $t_p \leq 50$ ms

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

(3) All terms and symbols are consistent with ANSI/IEEE CA62.35

(4) For bidirectional types with V_R of 10 V and less, the I_D limit is doubled

(5) V_F = 3.5 V at I_F = 25 A (unidirectional only)

(+) Underwriters Laboratory Recognition for the classification of protectors (QVGQ2) under the UL standard for safety 497B and file number E136766 for both unidirectional and bidirectional device

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THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	**SYMBOL**	**VALUE**	**UNIT**
Typical thermal resistance, junction to ambient air (1)	$R_{\theta JA}$	120	°C/ W
Typical thermal resistance, junction to lead	$R_{\theta JL}$	30	

Note

(1) Mounted on minimum recommended pad layout

ORDERING INFORMATION (Example)						
PREFERRED P/N	**UNIT WEIGHT (g)**	**VOLTAGE RANGE (V)**		**PACKAGE CODE**	**BASE QUANTITY**	**DELIVERY MODE**
		UNI -	**BI -**			
P4SMA6.8A-E3/61	0.064	6.8 to 220	6.8 to 220	61	1800	7" diameter plastic tape and reel
P4SMA6.8A-M3/61	0.064	6.8 to 540	6.8 to 220	61	1800	7" diameter plastic tape and reel
P4SMA6.8A-E3/5A	0.064	6.8 to 220	6.8 to 220	5A	7500	13" diameter plastic tape and reel
P4SMA6.8A-M3/5A	0.064	6.8 to 540	6.8 to 220	5A	7500	13" diameter plastic tape and reel
P4SMA6.8AHE3_A/H (1)	0.064	6.8 to 220	6.8 to 220	H	1800	7" diameter plastic tape and reel
P4SMA6.8AHM3_A/H (1)						
P4SMA6.8AHE3_A/I (1)	0.064	6.8 to 220	6.8 to 220	I	7500	13" diameter plastic tape and reel
P4SMA6.8AHM3_A/I (1)						
P4SMA250AHM3_B/H (2)	0.064	250 to 540	-	H	1800	7" diameter plastic tape and reel
P4SMA250AHM3_B/I (2)	0.064	250 to 540	-	I	7500	13" diameter plastic tape and reel

Notes

(1) _A is available for P4SMA6.8(C)A to P4SMA220(C)A, AEC-Q101 qualified

(2) _B is available for P4SMA250A to P4SMA540A, AEC-Q101 qualified

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

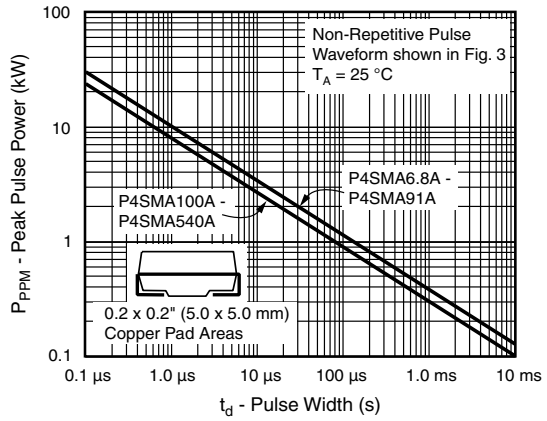


Fig. 1 - Peak Pulse Power Rating Curve

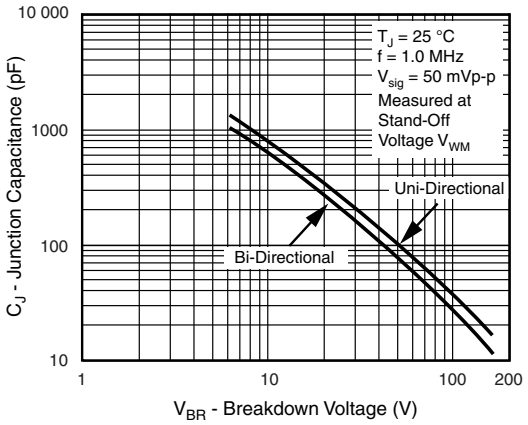


Fig. 4 - Typical Junction Capacitance

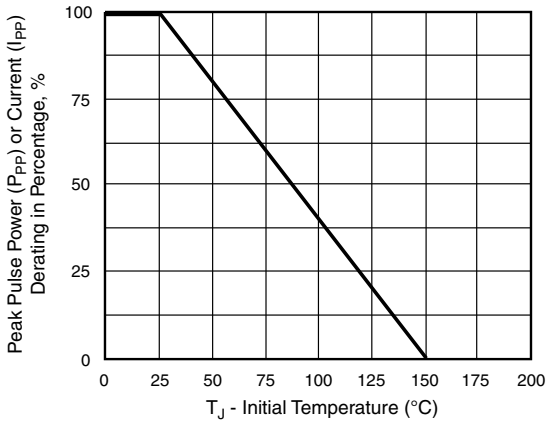


Fig. 2 - Pulse Power or Current vs. Initial Junction Temperature

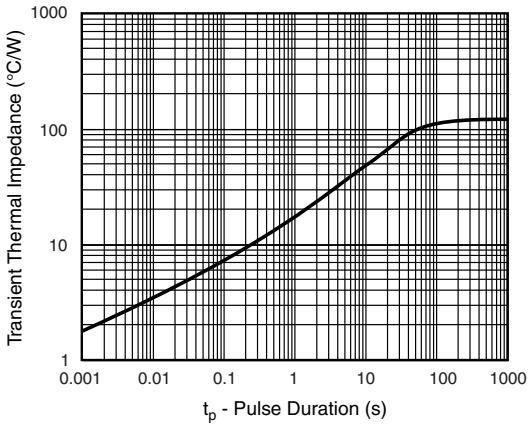


Fig. 5 - Typical Transient Thermal Impedance

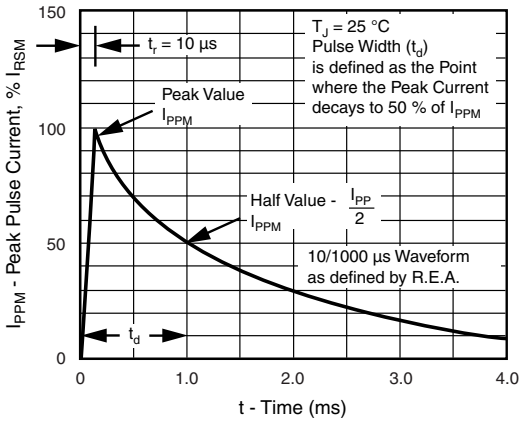


Fig. 3 - Pulse Waveform

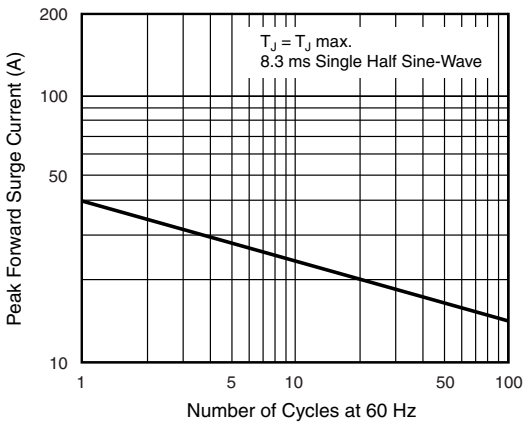
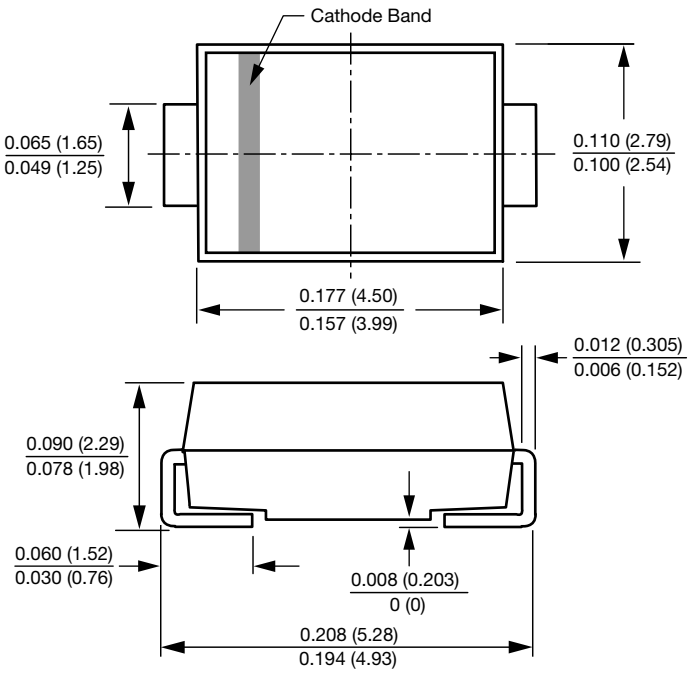


Fig. 6 - Maximum Non-Repetitive Forward Surge Current
Uni-Directional Use Only

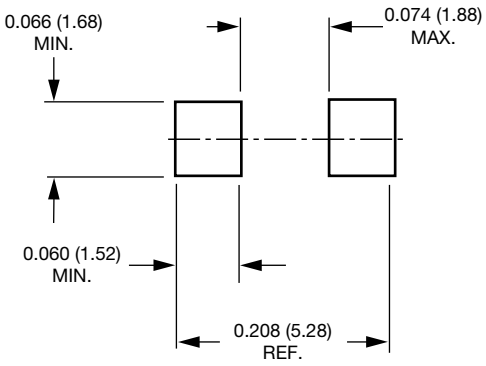
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PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SMA (DO-214AC)



Mounting Pad Layout



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