


HF P4SMA Automotive Series



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E230531

Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation at T _A =25°C by 10x1000µs waveform (Fig.1)(Note 1), (Note 2)	P _{PPM}	400	W
Power Dissipation on infinite heat sink at T _A =50°C	P _{M(AV)}	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I _{FSM}	40	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional only	V _F	3.5V	V
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-65 to 150	°C
Typical Thermal Resistance Junction to Lead	R _{θJL}	30	°C/W
Typical Thermal Resistance Junction to Ambient	R _{θJA}	120	°C/W

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25°C per Fig. 2.
2. Mounted on 0.2x0.2" (5.0 x 5.0mm) copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

Description

The P4SMA Automotive series is designed specifically to protect sensitive automotive equipment from voltage transients.


Features

- Halogen-Free
- RoHS compliant
- For surface mounted applications to optimize board space
- Low profile package
- Built-in strain relief
- Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR} @ 25^\circ\text{C} \times \Delta T$
- Glass passivated chip junction
- 400W peak pulse power capability at 10x1000µs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0V to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1µA above 12V
- High Temperature soldering guaranteed: 260°C/40 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability 94V-O
- Matte Tin Lead-free Plated

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Electrical Characteristics

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Agency Approval 
		UNI	BI		MIN	MAX					
P4SMA12AAUTO	P4SMA12CAAUTO	12AA	12CA	10.20	11.40	12.60	1	16.7	24.6	5	X
P4SMA13AAUTO	P4SMA13CAAUTO	13AA	13CA	11.10	12.40	13.70	1	18.2	22.5	1	X
P4SMA15AAUTO	P4SMA15CAAUTO	15AA	15CA	12.80	14.30	15.80	1	21.2	19.3	1	X
P4SMA16AAUTO	P4SMA16CAAUTO	16AA	16CA	13.60	15.20	16.80	1	22.5	18.2	1	X
P4SMA18AAUTO	P4SMA18CAAUTO	18AA	18CA	15.30	17.10	18.90	1	25.5	16.1	1	X
P4SMA20AAUTO	P4SMA20CAAUTO	20AA	20CA	17.10	19.00	21.00	1	27.7	14.8	1	X
P4SMA22AAUTO	P4SMA22CAAUTO	22AA	22CA	18.80	20.90	23.10	1	30.6	13.4	1	X
P4SMA24AAUTO	P4SMA24CAAUTO	24AA	24CA	20.50	22.80	25.20	1	33.2	12.3	1	X
P4SMA27AAUTO	P4SMA27CAAUTO	27AA	27CA	23.10	25.70	28.40	1	37.5	10.9	1	X
P4SMA30AAUTO	P4SMA30CAAUTO	30AA	30CA	25.60	28.50	31.50	1	41.4	9.9	1	X
P4SMA33AAUTO	P4SMA33CAAUTO	33AA	33CA	28.20	31.40	34.70	1	45.7	9.0	1	X
P4SMA36AAUTO	P4SMA36CAAUTO	36AA	36CA	30.80	34.20	37.80	1	49.9	8.2	1	X
P4SMA39AAUTO	P4SMA39CAAUTO	39AA	39CA	33.30	37.10	41.00	1	53.9	7.6	1	X
P4SMA43AAUTO	P4SMA43CAAUTO	43AA	43CA	36.80	40.90	45.20	1	59.3	6.9	1	X
P4SMA47AAUTO	P4SMA47CAAUTO	47AA	47CA	40.20	44.70	49.40	1	64.8	6.3	1	X

The available parts are "A" type only, the parts without A (V_{BR} is $\pm 10\%$) is not available.

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Peak Pulse Power Rating

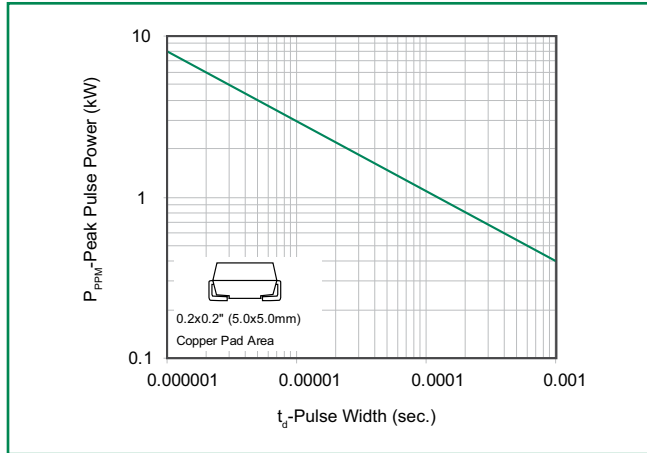


Figure 2 - Pulse Derating Curve

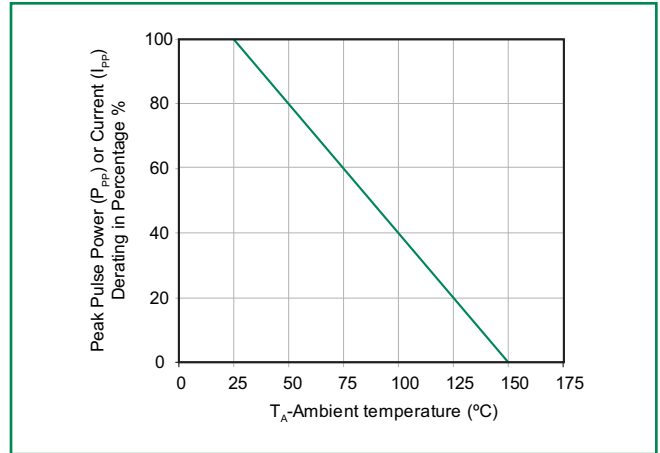


Figure 3 - Pulse Waveform

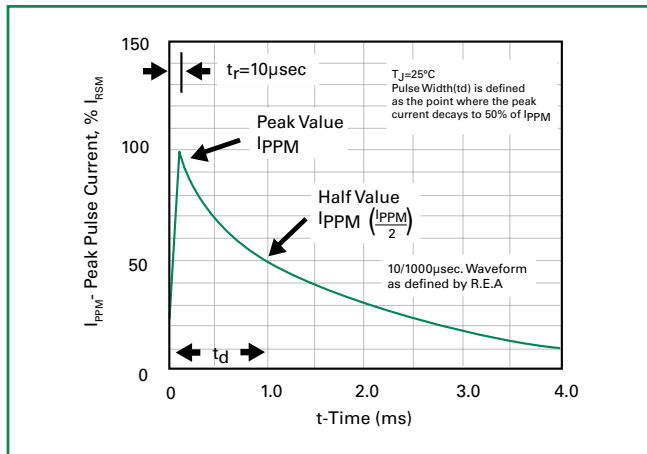


Figure 4 - Typical Junction Capacitance

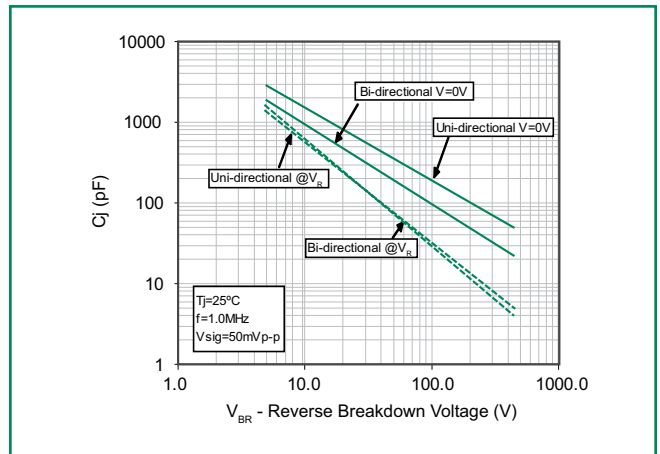


Figure 5 - Steady State Power Dissipation Derating Curve

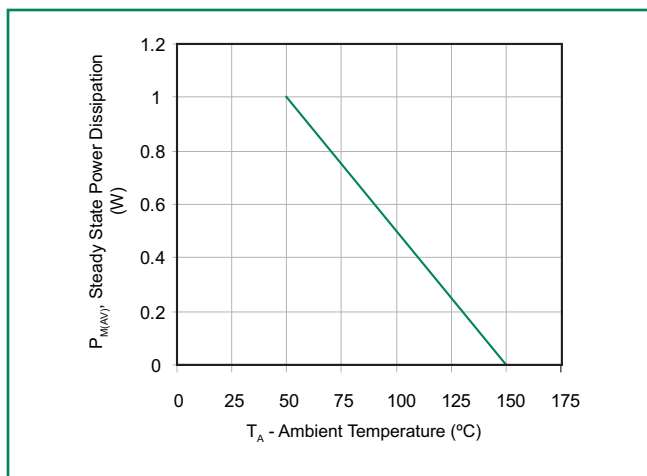
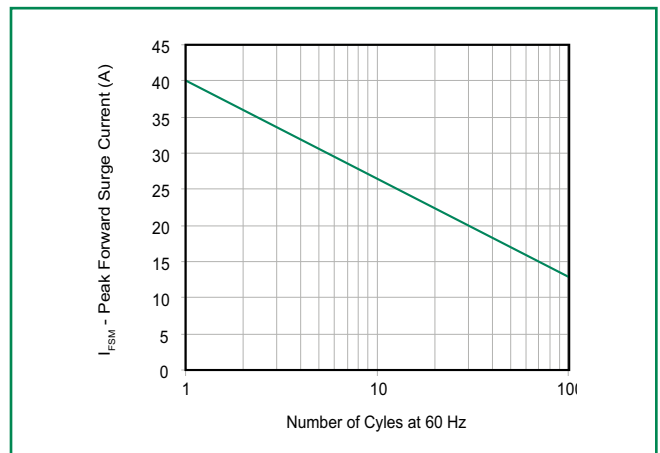
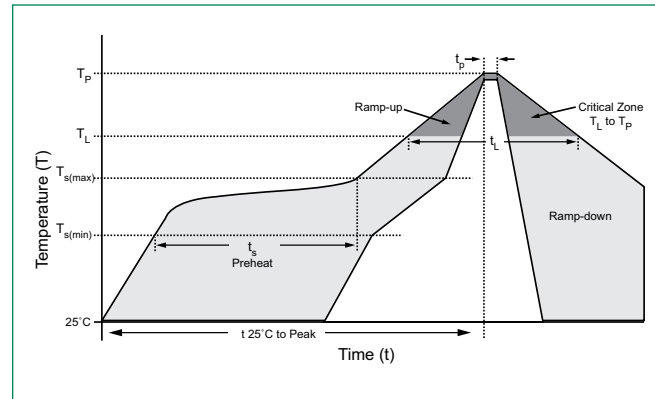


Figure 6 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		280°C



Physical Specifications

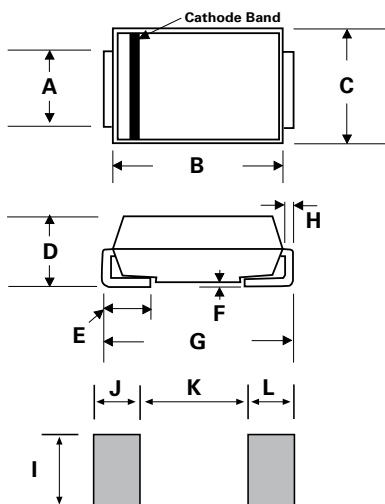
Weight	0.002 ounce, 0.061 gram
Case	JEDEC DO-214AC. Molded plastic body over glass passivated junction
Polarity	Color band denotes positive end (cathode) except bidirectional
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102D

Environmental Specifications

Temperature Cycle	JESD22-A104
Pressure Cooker	JESD 22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

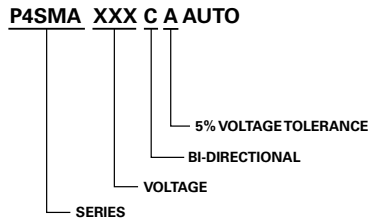
Dimensions

DO-214AC (SMA)

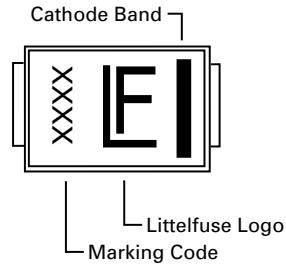


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.250	1.650
B	0.157	0.177	3.990	4.500
C	0.100	0.110	2.540	2.790
D	0.078	0.090	1.980	2.290
E	0.030	0.060	0.780	1.520
F	-	0.008	-	0.203
G	0.194	0.208	4.930	5.280
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-

Part Numbering System



Part Marking System



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
P4SMAxxxXXAUTO	DO-214AC	5000	Tape & Reel – 12mm/13" tape	EIA STD RS-481

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