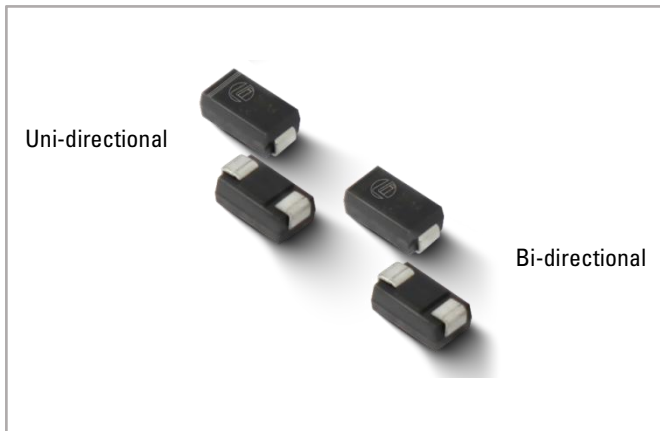


P4SMA-Q Series

Surface Mount – 400W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

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

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 μs Waveform(Fig.1)(Note1)(Note2) -Single Die Parts)	P_{PPM}	400	W
Power Dissipation on Infinite Heat Sink at $T_L=50^\circ\text{C}$	P_D	3.3	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	60	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 4)	V_F	3.5/5.0	V
Operating Temperature Range	T_J	-55 to 150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	30	$^\circ\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	120	$^\circ\text{C}/\text{W}$

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) $=25^\circ\text{C}$ per Fig.2.
2. Mounted on 5.0x5.0mm copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.
4. $V_F < 3.5\text{V}$ for single die parts and $V_F < 5.0\text{V}$ for stacked-die parts.

Description

The P4SMA-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

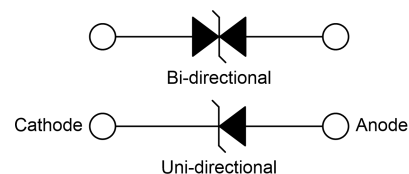
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 400W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical I_R less than 1 μA when $V_B \text{ min} > 12\text{V}$
- Surface mount footprint for compact PCB layout
- Low profile package
- Typical failure mode due to exceeding maximum ratings is a short circuit condition
- Whisker test conducted based on Table 4a and 4c of JEDECJESD201A
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC61000-4-4
- Built-in strain relief
- Fast response time: typically less than 1.0ps from 0V to V_B min
- High temperature to reflow soldering guaranteed: 260 $^\circ\text{C}/20\sim 40\text{sec}$.
- $V_B @ T_J = V_B @ 25^\circ\text{C} \times (1 + \alpha T)$ (α T:Temperature Coefficient, typical value is 0.1%)
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^\circ\text{C}$
- Matte tin, lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD 609A.01)

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.

Functional Diagram



P4SMA-Q Series

Surface Mount – 400W

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage $V_R(V)$	Breakdown Voltage @ I_T		Test Current $I_T(mA)$	Maximum Clamping Voltage @ I_{PP} $V_C(V)$	Peak Pulse Current $I_{PP}(A)$	Reverse Leakage @ V_R $I_R(\mu A)$
Uni.	Bi.		Uni.	Bi.		$V_{B Min.}(V)$	$V_{B Max.}(V)$				
P4SMA6.8A	P4SMA6.8CA	Q	6V8A	6V8C	5.80	6.45	7.14	10	10.5	39.0	1000
P4SMA7.5A	P4SMA7.5CA	Q	7V5A	7V5C	6.40	7.13	7.88	10	11.3	36.3	500
P4SMA8.2A	P4SMA8.2CA	Q	8V2A	8V2C	7.02	7.79	8.61	10	12.1	33.9	200
P4SMA9.1A	P4SMA9.1CA	Q	9V1A	9V1C	7.78	8.65	9.55	1	13.4	30.6	50
P4SMA10A	P4SMA10CA	Q	10A	10C	8.55	9.50	10.50	1	14.5	28.3	10
P4SMA11A	P4SMA11CA	Q	11A	11C	9.40	10.50	11.60	1	15.6	26.3	5
P4SMA12A	P4SMA12CA	Q	12A	12C	10.20	11.40	12.60	1	16.7	24.6	5
P4SMA13A	P4SMA13CA	Q	13A	13C	11.10	12.40	13.70	1	18.2	22.5	1
P4SMA15A	P4SMA15CA	Q	15A	15C	12.80	14.30	15.80	1	21.2	19.3	1
P4SMA16A	P4SMA16CA	Q	16A	16C	13.60	15.20	16.80	1	22.5	18.2	1
P4SMA18A	P4SMA18CA	Q	18A	18C	15.30	17.10	18.90	1	25.2	16.1	1
P4SMA20A	P4SMA20CA	Q	20A	20C	17.10	19.00	21.00	1	27.7	14.8	1
P4SMA22A	P4SMA22CA	Q	22A	22C	18.80	20.90	23.10	1	30.6	13.4	1
P4SMA24A	P4SMA24CA	Q	24A	24C	20.50	22.80	25.20	1	33.2	12.3	1
P4SMA27A	P4SMA27CA	Q	27A	27C	23.10	25.70	28.40	1	37.5	10.9	1
P4SMA30A	P4SMA30CA	Q	30A	30C	25.60	28.50	31.50	1	41.4	9.9	1
P4SMA33A	P4SMA33CA	Q	33A	33C	28.20	31.40	34.70	1	45.7	9.0	1
P4SMA36A	P4SMA36CA	Q	36A	36C	30.80	34.20	37.80	1	49.9	8.2	1
P4SMA39A	P4SMA39CA	Q	39A	39C	33.30	37.10	41.00	1	53.9	7.6	1
P4SMA43A	P4SMA43CA	Q	43A	43C	36.80	40.90	45.20	1	59.3	6.9	1
P4SMA47A	P4SMA47CA	Q	47A	47C	40.20	44.70	49.40	1	64.8	6.3	1
P4SMA51A	P4SMA51CA	Q	51A	51C	43.60	48.50	53.60	1	70.1	5.8	1
P4SMA56A	P4SMA56CA	Q	56A	56C	47.80	53.20	58.80	1	77.0	5.3	1
P4SMA62A	P4SMA62CA	Q	62A	62C	53.00	58.90	65.10	1	85.0	4.8	1
P4SMA68A	P4SMA68CA	Q	68A	68C	58.10	64.60	71.40	1	92.0	4.5	1
P4SMA75A	P4SMA75CA	Q	75A	75C	64.10	71.30	78.80	1	103.0	4.0	1
P4SMA82A	P4SMA82CA	Q	82A	82C	70.10	77.90	86.10	1	113.0	3.6	1
P4SMA91A	P4SMA91CA	Q	91A	91C	77.80	86.50	95.50	1	125.0	3.3	1
P4SMA100A	P4SMA100CA	Q	100A	100C	85.50	95.00	105.00	1	137.0	3.0	1
P4SMA110A	P4SMA110CA	Q	110A	110C	94.00	105.00	116.00	1	152.0	2.7	1
P4SMA120A	P4SMA120CA	Q	120A	120C	102.00	114.00	126.00	1	165.0	2.5	1
P4SMA130A	P4SMA130CA	Q	130A	130C	111.00	124.00	137.00	1	179.0	2.3	1
P4SMA150A	P4SMA150CA	Q	150A	150C	128.00	143.00	158.00	1	207.0	2.0	1
P4SMA160A	P4SMA160CA	Q	160A	160C	136.00	152.00	168.00	1	219.0	1.9	1
P4SMA170A	P4SMA170CA	Q	170A	170C	145.00	162.00	179.00	1	234.0	1.8	1
P4SMA180A	P4SMA180CA	Q	180A	180C	154.00	171.00	189.00	1	246.0	1.7	1
P4SMA200A	P4SMA200CA	Q	200A	200C	171.00	190.00	210.00	1	274.0	1.5	1
P4SMA220A	P4SMA220CA	Q	220A	220C	185.00	209.00	231.00	1	328.0	1.3	1
P4SMA250A	P4SMA250CA	Q	250A	250C	214.00	237.00	263.00	1	344.0	1.2	1
P4SMA300A	P4SMA300CA	Q	300A	300C	256.00	285.00	315.00	1	414.0	1.0	1

Notes:

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.
 $V_R @ T_A = V_R @ 25^\circ\text{C} \times (1 + \alpha T \times (T_A - 25))$ (αT : Temperature Coefficient)

P4SMA-Q Series

Surface Mount – 400W

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

Figure 1:
Peak Pulse Power Rating Curve

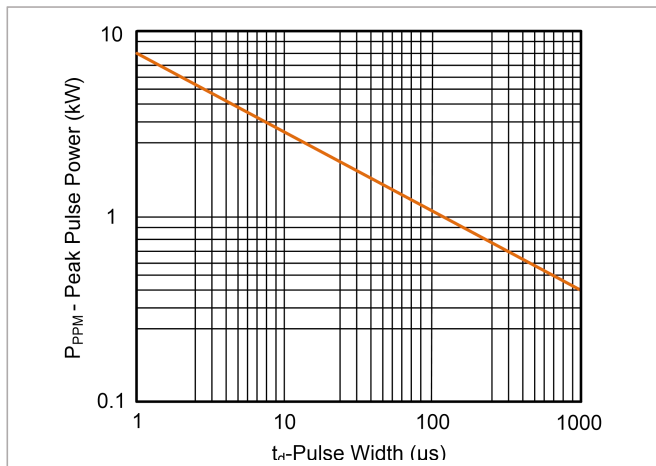


Figure 2:
Pulse Derating Curve

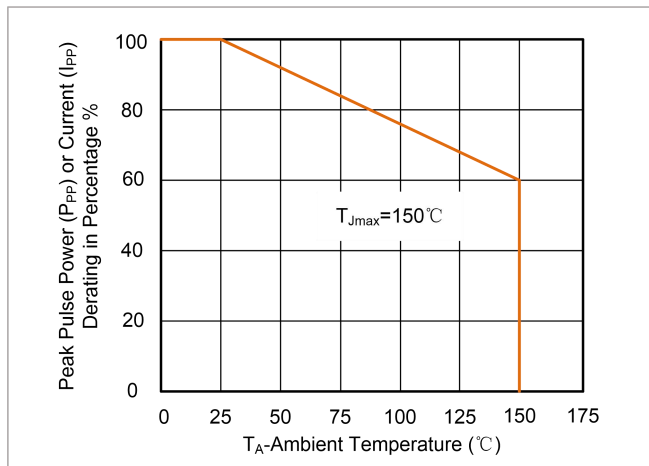


Figure 3:
Pulse Waveform

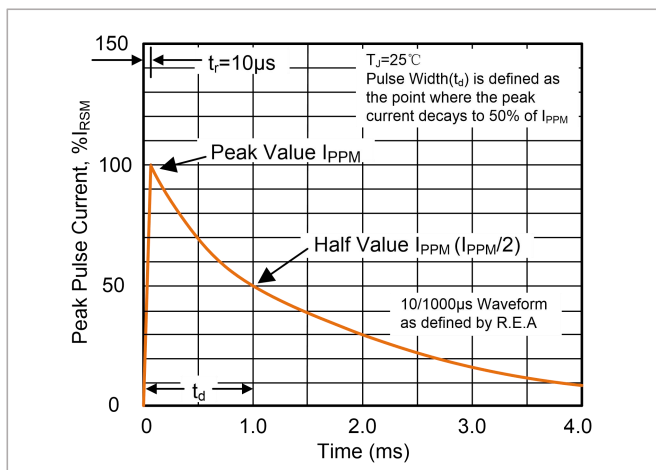


Figure 4:
Typical Junction Capacitance

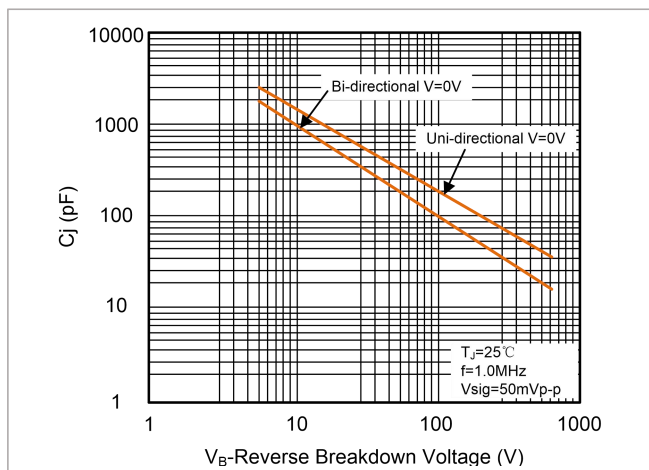


Figure 5:
Steady State Power Dissipation Derating Curve

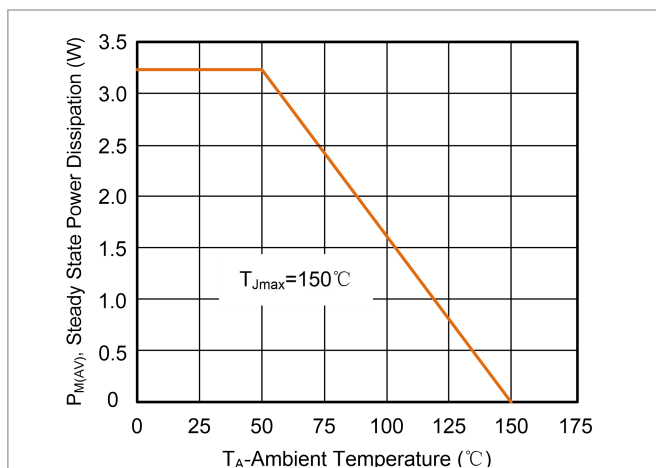
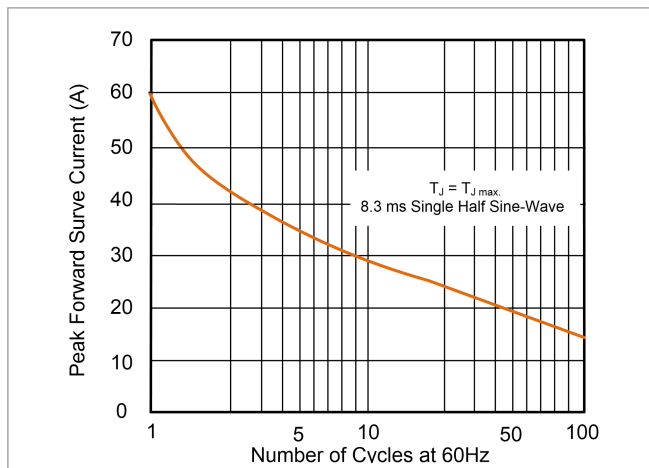


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

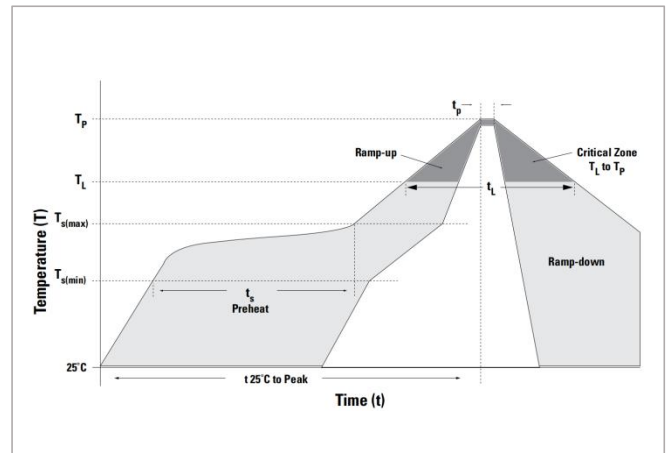


P4SMA-Q Series

Surface Mount – 400W

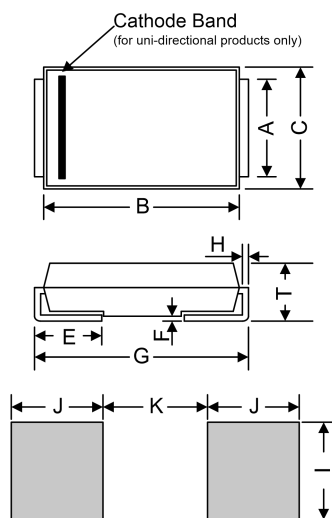
Soldering Parameters

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_L)	60-150 seconds
Peak Temperature (T_P)		260°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		8 minutes max.
Do not exceed		260°C



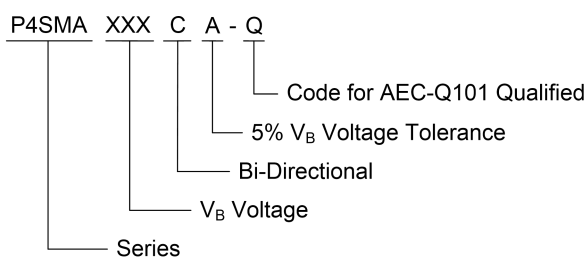
Dimensions

DO-214AC (SMA)

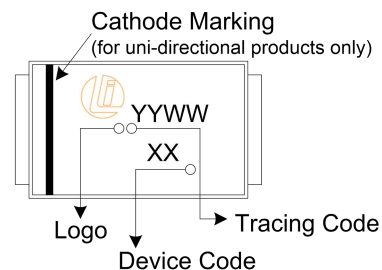


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.250	1.650	0.049	0.065
B	3.990	4.600	0.157	0.181
C	2.400	2.790	0.095	0.110
E	0.780	1.520	0.030	0.060
F	-	0.203	-	0.008
G	4.800	5.280	0.189	0.208
H	0.152	0.305	0.006	0.012
T	1.900	2.290	0.075	0.090
I	1.800	-	0.070	-
J	2.100	-	0.082	-
K	-	2.300	-	0.090

Part Numbering System



Part Marking System



P4SMA-Q Series

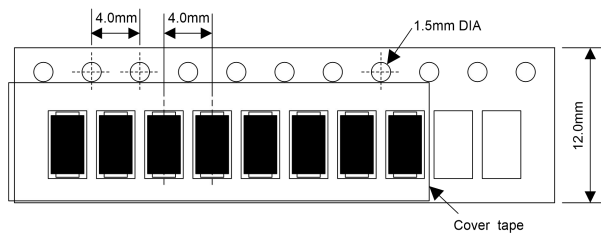
Surface Mount – 400W

Packaging

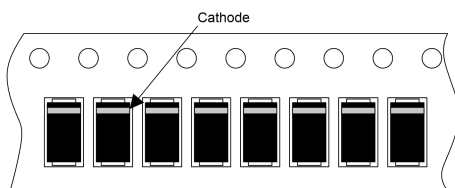
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
P4SMAxxxXX-Q	DO-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

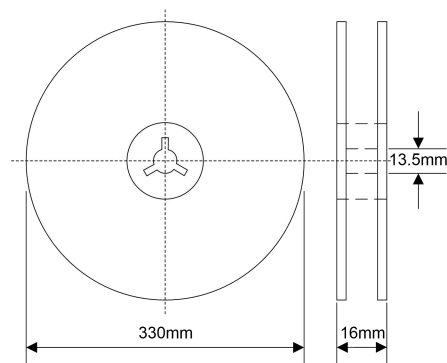
Tape



For Uni-Devices



13 Inches Reel



Quantity: 5000pcs/reel

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