

P4SMA series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Voltage: 6.8~600 Volts

Current: 400 W

Package: SMA

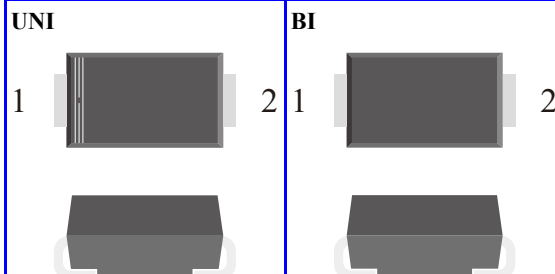
Features

- NH'S Glass Passivated Chip Technology
- Wave And Reflow Solderable
- Low Reverse Leakage
- Very Fast Response Time
- Excellent Clamping Capability
- 10/1000 μ s Waveform, Repetition Rate(Duty Cycle):0.01 %
- ESD Immunity Acc. IEC 61000-4-2

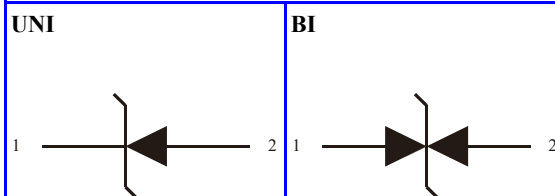
Typical Applications

- Power Port
- Communication And Data Port
- ESD Protection And Automotive Electronics
- Industrial Control and Automation

Diagram:



Polarity:



Single Phase, Half Wave, 60Hz, Resistive Or Inductive Load. For Capacitive Load, Derate Current By 20%

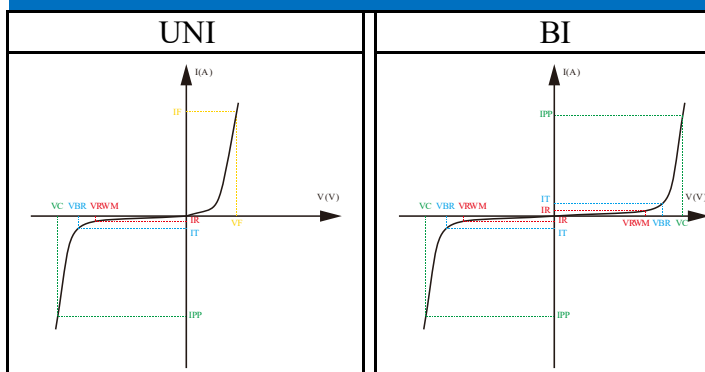
Maximum Ratings (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Non-Repetitive Peak Pulse Power Dissipation	10/1000 μ s Waveform	P_{PP}	400	W
Peak Pulse Current	10/1000 μ s Waveform	I_{PP}	See Table-1	A
Peak Forward Surge Current	8.3ms Single Half Sine-Wave Superimposed On Rate Load	I_{FSM}	40	A
Power Dissipation On Infinite Heatsink	$T_L = 75.0\text{ }^{\circ}\text{C}$	P_D	3.0	W
Maximum Instantaneous Forward Voltage	$I_F = 25.0\text{ A}, V_{BR} < 200\text{ V}$	V_F	3.5	V
	$I_F = 25.0\text{ A}, V_{BR} > 201\text{ V}$		6.5	

Thermal Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Operating Junction Temperature Range		T_J	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ 150	
Thermal Resistance Junction To Ambient With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JA}$	120	$^{\circ}\text{C/W}$

C-V Curve Chart



Symbol Instruction

Symbol	Instruction
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
P_{PP}	Peak Power Dissipation
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Reverse Voltage
I_T	Test Current @ V_{RWM}
I_F	Maximum Average Forward Rectified Current
V_F	Maximum Instantaneous Forward Voltage
C_J	Junction Capacitance @ $V_R = 0$ and $f = 1.0\text{ MHz}$

P4SMA series

TRANSIENT VOLTAGE SUPPRESSOR DIODES
Table-1.ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Part Number		Device Marking Code		Reverse Stand-off Voltage	Breakdown Voltage VBR @ IT		Test Current	Max. Clamping Voltage @ IPP	Max. Peak Pulse Current	Max. Reverse Leakage @ VRWM
UNI-POLAR	BI-POLAR	UNI	BI	VRWM(V)	Min.(V)	Max.(V)	IT(mA)	VC Max.(V)	IPP(A)	IR(uA)
P4SMA6.8A	P4SMA6.8CA	6V8A	6V8C	5.8	6.45	7.14	10	10.5	38.10	1000
P4SMA7.5A	P4SMA7.5CA	7V5A	7V5C	6.4	7.13	7.88	10	11.3	35.40	500
P4SMA8.2A	P4SMA8.2CA	8V2A	8V2C	7.0	7.79	8.61	10	12.1	33.06	200
P4SMA9.1A	P4SMA9.1CA	9V1A	9V1C	7.8	8.65	9.55	1	13.4	29.85	50
P4SMA10A	P4SMA10CA	10A	10C	8.6	9.50	10.50	1	14.5	27.59	10
P4SMA11A	P4SMA11CA	11A	11C	9.4	10.50	11.60	1	15.6	25.64	5
P4SMA12A	P4SMA12CA	12A	12C	10.2	11.40	12.60	1	16.7	23.95	5
P4SMA13A	P4SMA13CA	13A	13C	11.1	12.40	13.70	1	18.2	21.98	1
P4SMA15A	P4SMA15CA	15A	15C	12.8	14.30	15.80	1	21.2	18.87	1
P4SMA16A	P4SMA16CA	16A	16C	13.6	15.20	16.80	1	22.5	17.78	1
P4SMA18A	P4SMA18CA	18A	18C	15.3	17.10	18.90	1	25.5	15.69	1
P4SMA20A	P4SMA20CA	20A	20C	17.1	19.00	21.00	1	27.7	14.44	1
P4SMA22A	P4SMA22CA	22A	22C	18.8	20.90	23.10	1	30.6	13.07	1
P4SMA24A	P4SMA24CA	24A	24C	20.5	22.80	25.20	1	33.2	12.05	1
P4SMA27A	P4SMA27CA	27A	27C	23.1	25.70	28.40	1	37.5	10.67	1
P4SMA30A	P4SMA30CA	30A	30C	25.6	28.50	31.50	1	41.4	9.66	1
P4SMA33A	P4SMA33CA	33A	33C	28.2	31.40	34.70	1	45.7	8.75	1
P4SMA36A	P4SMA36CA	36A	36C	30.8	34.20	37.80	1	49.9	8.02	1
P4SMA39A	P4SMA39CA	39A	39C	33.3	37.10	41.00	1	53.9	7.42	1
P4SMA43A	P4SMA43CA	43A	43C	36.8	40.90	45.20	1	59.3	6.75	1
P4SMA47A	P4SMA47CA	47A	47C	40.2	44.70	49.40	1	64.8	6.17	1
P4SMA51A	P4SMA51CA	51A	51C	43.6	48.50	53.60	1	70.1	5.71	1
P4SMA56A	P4SMA56CA	56A	56C	47.8	53.20	58.80	1	77.0	5.19	1
P4SMA62A	P4SMA62CA	62A	62C	53.0	58.90	65.10	1	85.0	4.71	1
P4SMA68A	P4SMA68CA	68A	68C	58.1	64.60	71.40	1	92.0	4.35	1
P4SMA75A	P4SMA75CA	75A	75C	64.1	71.30	78.80	1	103.0	3.88	1
P4SMA82A	P4SMA82CA	82A	82C	70.1	77.90	86.10	1	113.0	3.54	1
P4SMA91A	P4SMA91CA	91A	91C	77.8	86.50	95.50	1	125.0	3.20	1
P4SMA100A	P4SMA100CA	100A	100C	85.5	95.00	105.00	1	137.0	2.92	1
P4SMA110A	P4SMA110CA	110A	110C	94.0	105.00	116.00	1	152.0	2.63	1
P4SMA120A	P4SMA120CA	120A	120C	102.0	114.00	126.00	1	165.0	2.42	1
P4SMA130A	P4SMA130CA	130A	130C	111.0	124.00	137.00	1	179.0	2.23	1
P4SMA150A	P4SMA150CA	150A	150C	128.0	143.00	158.00	1	207.0	1.93	1
P4SMA160A	P4SMA160CA	160A	160C	136.0	152.00	168.00	1	219.0	1.83	1
P4SMA170A	P4SMA170CA	170A	170C	145.0	162.00	179.00	1	234.0	1.71	1
P4SMA180A	P4SMA180CA	180A	180C	154.0	171.00	189.00	1	246.0	1.63	1
P4SMA200A	P4SMA200CA	200A	200C	171.0	190.00	210.00	1	274.0	1.46	1
P4SMA220A	P4SMA220CA	220A	220C	185.0	209.00	231.00	1	328.0	1.22	1
P4SMA250A	P4SMA250CA	250A	250C	214.0	237.00	263.00	1	344.0	1.16	1
P4SMA300A	P4SMA300CA	300A	300C	256.0	285.00	315.00	1	414.0	0.97	1
P4SMA350A	P4SMA350CA	350A	350C	300.0	332.00	368.00	1	482.0	0.83	1

P4SMA series

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Part Number		Device Marking Code		Reverse Stand-off Voltage	Breakdown Voltage VBR @ IT		Test Current	Max. Clamping Voltage @ IPP	Max. Peak Pulse Current	Max. Reverse Leakage @ VRWM
UNI-POLAR	BI-POLAR	UNI	BI	VRWM(V)	Min.(V)	Max.(V)	IT(mA)	VC Max.(V)	IPP(A)	IR(uA)
P4SMA400A	P4SMA400CA	400A	400C	342.0	380.00	420.00	1	548.0	0.73	1
P4SMA440A	P4SMA440CA	440A	440C	376.0	418.00	462.00	1	602.0	0.66	1
P4SMA480A	P4SMA480CA	480A	480C	408.0	456.00	504.00	1	658.0	0.61	1
P4SMA510A	P4SMA510CA	510A	510C	434.0	485.00	535.00	1	698.0	0.57	1
P4SMA530A	P4SMA530CA	530A	530C	450.0	503.00	556.00	1	725.0	0.55	1
P4SMA540A	P4SMA540CA	540A	540C	459.0	513.00	567.00	1	740.0	0.54	1
P4SMA550A	P4SMA550CA	550A	550C	467.0	522.50	577.50	1	760.0	0.53	1
P4SMA600A	P4SMA600CA	600A	600C	509.0	570.00	630.00	1	780.0	0.51	1

TRANSIENT VOLTAGE SUPPRESSOR DIODES

Typical Characteristics Curves

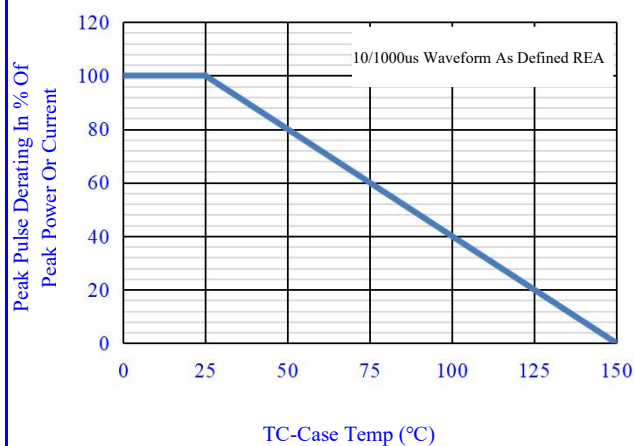


Fig.1-Peak Power Or Current vs.Tc

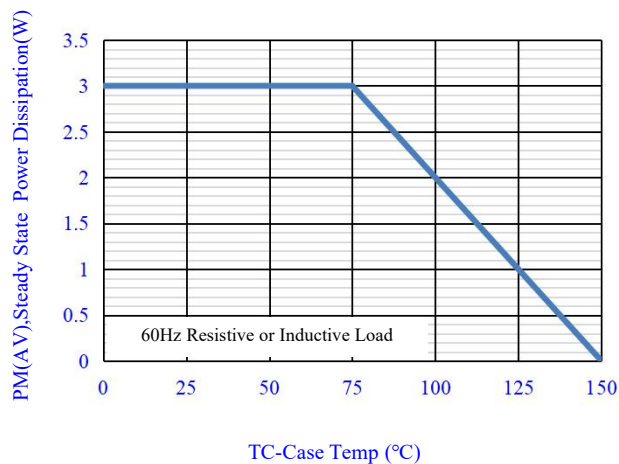


Fig.2-Steady State Power Derating Curve



Fig.3-Peak Pulse Power Rating Curve

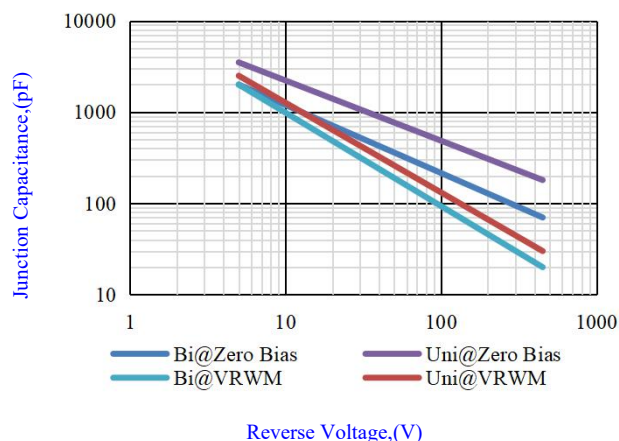


Fig.4-Typical Junction Capacitance

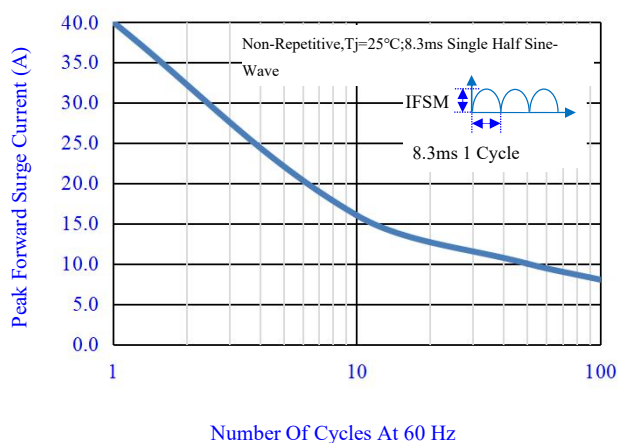


Fig.5-Max. Non-Repetitive Surge Current

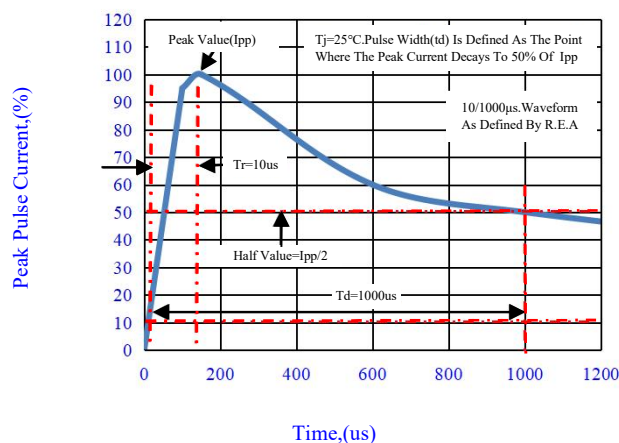
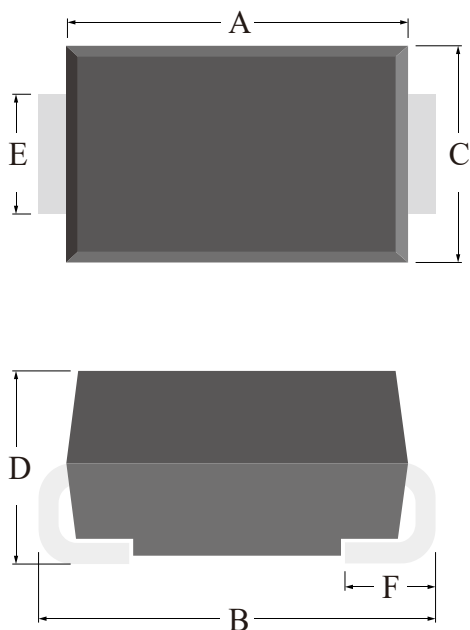


Fig.6-Pulse Waveform

TRANSIENT VOLTAGE SUPPRESSOR DIODES

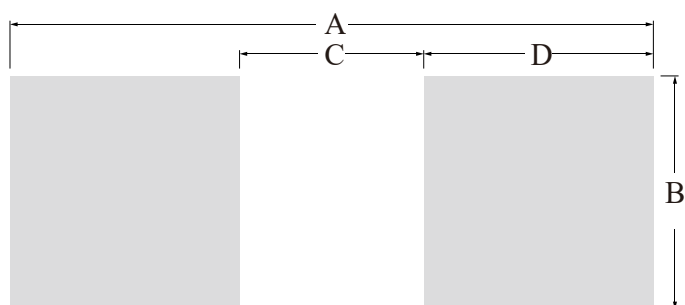
OUTLINE DRAWINGS



SMA

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.00	-	4.60	0.1575	-	1.8110
B	4.70	-	5.28	1.8504	-	2.0787
C	2.40	-	2.85	0.9449	-	1.1220
D	1.90	-	2.58	0.7480	-	1.0157
E	1.30	-	1.60	0.5118	-	0.6299
F	0.76	-	1.52	0.2992	-	0.5984

RECOMMENDED LAYOUT DRAWINGS



SMA

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	5.80	-	-	2.2835	-
B	-	2.06	-	-	0.8110	-
C	-	1.66	-	-	0.6535	-
D	-	2.07	-	-	0.8150	-

P4SMA series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
XXXX=Make,XXXX=See Table-1
White band denotes cathode

MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
XXXX=Make,XXXX=See Table-1

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
SMA	P1	0.063	13" Reel	5000	10000	80000
SMA	P2	0.063	13" Reel	5000	10000	100000

P4SMA series

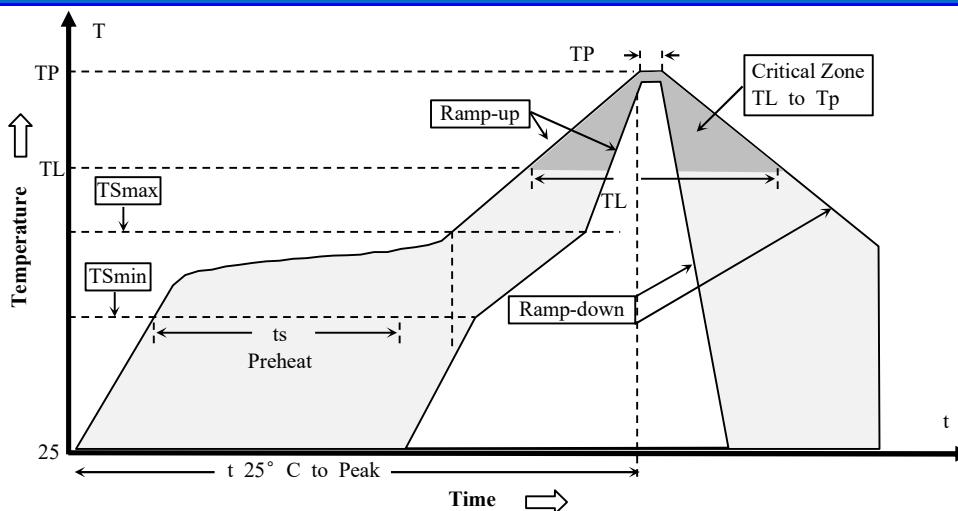


TRANSIENT VOLTAGE SUPPRESSOR DIODES

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (TL) - Time (tL)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

TRANSIENT VOLTAGE SUPPRESSOR DIODES

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