

SMAJ series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Voltage: 5~550 Volts

Current: 400 W

Package: SMA

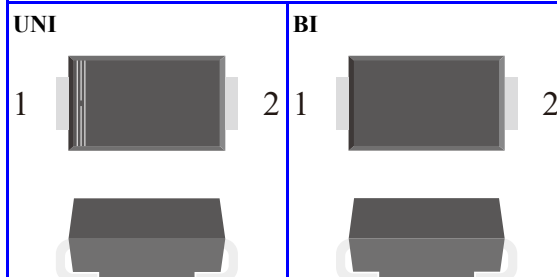
Features

- 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

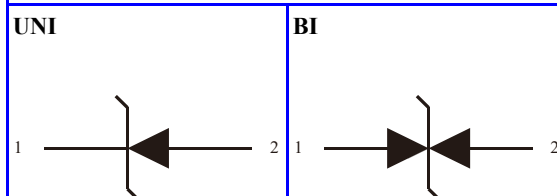
Typical Applications

- 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%

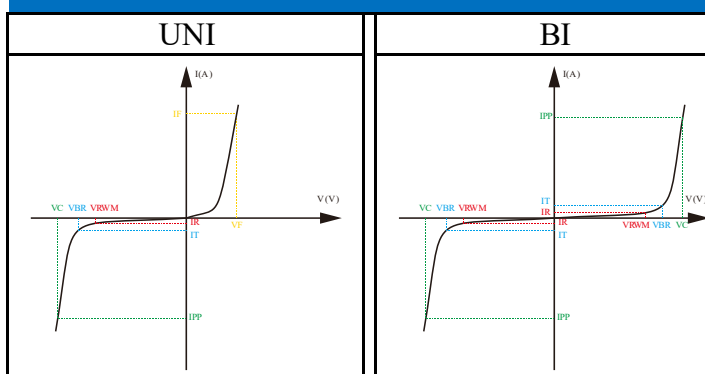
Maximum Ratings (Ta=25°C Unless Otherwise Specified)

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	$T_L = 75.0^\circ\text{C}$	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 $f = 1.0\text{ MHz}$

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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)
SMAJ5.0A	SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	43.48	800
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	38.83	800
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.71	500
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	33.33	200
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.01	100
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	29.41	50
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	9.44	10.40	1	14.4	27.78	20
SMAJ9.0A	SMAJ9.0CA	AV	WV	9.0	10.00	11.10	1	15.4	25.97	10
SMAJ10A	SMAJ10CA	AX	WX	10.0	11.10	12.30	1	17.0	23.53	5
SMAJ11A	SMAJ11CA	AZ	WZ	11.0	12.20	13.50	1	18.2	21.98	1
SMAJ12A	SMAJ12CA	BE	XE	12.0	13.30	14.70	1	19.9	20.10	1
SMAJ13A	SMAJ13CA	BG	XG	13.0	14.40	15.90	1	21.5	18.60	1
SMAJ14A	SMAJ14CA	BK	XK	14.0	15.60	17.20	1	23.2	17.24	1
SMAJ15A	SMAJ15CA	BM	XM	15.0	16.70	18.50	1	24.4	16.39	1
SMAJ16A	SMAJ16CA	BP	XP	16.0	17.80	19.70	1	26.0	15.38	1
SMAJ17A	SMAJ17CA	BR	XR	17.0	18.90	20.90	1	27.6	14.49	1
SMAJ18A	SMAJ18CA	BT	XT	18.0	20.00	22.10	1	29.2	13.70	1
SMAJ20A	SMAJ20CA	BV	XV	20.0	22.20	24.50	1	32.4	12.35	1
SMAJ22A	SMAJ22CA	BX	XX	22.0	24.40	26.90	1	35.5	11.27	1
SMAJ24A	SMAJ24CA	BZ	XZ	24.0	26.70	29.50	1	38.9	10.28	1
SMAJ26A	SMAJ26CA	CE	YE	26.0	28.90	31.90	1	42.1	9.50	1
SMAJ28A	SMAJ28CA	CG	YG	28.0	31.10	34.40	1	45.4	8.81	1
SMAJ30A	SMAJ30CA	CK	YK	30.0	33.50	36.80	1	48.4	8.26	1
SMAJ33A	SMAJ33CA	CM	YM	33.0	36.70	40.60	1	53.3	7.50	1
SMAJ36A	SMAJ36CA	CP	YP	36.0	40.00	44.20	1	58.1	6.88	1
SMAJ40A	SMAJ40CA	CR	YR	40.0	44.40	49.10	1	64.5	6.20	1
SMAJ43A	SMAJ43CA	CT	YT	43.0	47.80	52.80	1	69.4	5.76	1
SMAJ45A	SMAJ45CA	CV	YV	45.0	50.00	55.30	1	72.7	5.50	1
SMAJ48A	SMAJ48CA	CX	YX	48.0	53.30	58.90	1	77.4	5.17	1
SMAJ51A	SMAJ51CA	CZ	YZ	51.0	56.70	62.70	1	82.4	4.85	1
SMAJ54A	SMAJ54CA	RE	ZE	54.0	60.00	66.30	1	87.1	4.59	1
SMAJ58A	SMAJ58CA	RG	ZG	58.0	64.40	71.20	1	93.6	4.27	1
SMAJ60A	SMAJ60CA	RK	ZK	60.0	66.70	73.70	1	96.8	4.13	1
SMAJ64A	SMAJ64CA	RM	ZM	64.0	71.10	78.60	1	103.0	3.88	1
SMAJ70A	SMAJ70CA	RP	ZP	70.0	77.80	86.00	1	113.0	3.54	1
SMAJ75A	SMAJ75CA	RR	ZR	75.0	83.30	92.10	1	121.0	3.31	1
SMAJ78A	SMAJ78CA	RT	ZT	78.0	86.70	95.80	1	126.0	3.17	1
SMAJ85A	SMAJ85CA	RV	ZV	85.0	94.40	104.00	1	137.0	2.92	1
SMAJ90A	SMAJ90CA	RX	ZX	90.0	100.00	111.00	1	146.0	2.74	1
SMAJ100A	SMAJ100CA	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.47	1
SMAJ110A	SMAJ110CA	SE	VE	110.0	122.00	135.00	1	177.0	2.26	1

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UNI-POLAR	BI-POLAR	UNI	BI	VRWM(V)	Min.(V)	Max.(V)	IT(mA)	VC Max.(V)	IPP(A)	IR(uA)
SMAJ120A	SMAJ120CA	SG	VG	120.0	133.00	147.00	1	193.0	2.07	1
SMAJ130A	SMAJ130CA	SK	VK	130.0	144.00	159.00	1	209.0	1.91	1
SMAJ150A	SMAJ150CA	SM	VM	150.0	167.00	185.00	1	243.0	1.65	1
SMAJ160A	SMAJ160CA	SP	VP	160.0	178.00	197.00	1	259.0	1.54	1
SMAJ170A	SMAJ170CA	SR	VR	170.0	189.00	209.00	1	275.0	1.45	1
SMAJ180A	SMAJ180CA	ST	VT	180.0	201.00	222.00	1	292.0	1.37	1
SMAJ190A	SMAJ190CA	SU	YU	190.0	209.00	243.00	1	308.0	1.30	1
SMAJ200A	SMAJ200CA	SV	VV	200.0	224.00	247.00	1	324.0	1.23	1
SMAJ210A	SMAJ210CA	SW	YW	210.0	231.00	268.00	1	340.0	1.18	1
SMAJ220A	SMAJ220CA	SX	VX	220.0	246.00	272.00	1	356.0	1.12	1
SMAJ250A	SMAJ250CA	SZ	VZ	250.0	279.00	309.00	1	405.0	0.99	1
SMAJ300A	SMAJ300CA	TE	UE	300.0	335.00	371.00	1	486.0	0.82	1
SMAJ350A	SMAJ350CA	TG	UG	350.0	391.00	432.00	1	567.0	0.71	1
SMAJ400A	SMAJ400CA	TK	UK	400.0	447.00	494.00	1	648.0	0.62	1
SMAJ440A	SMAJ440CA	TM	UM	440.0	492.00	543.00	1	713.0	0.56	1
SMAJ480A	SMAJ480CA	TP	UP	480.0	536.00	593.00	1	750.0	0.53	1
SMAJ520A	SMAJ520CA	TR	UR	520.0	578.00	640.00	1	762.0	0.52	1
SMAJ550A	SMAJ550CA	TT	UT	550.0	615.00	680.00	1	860.0	0.47	1

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Typical Characteristics Curves

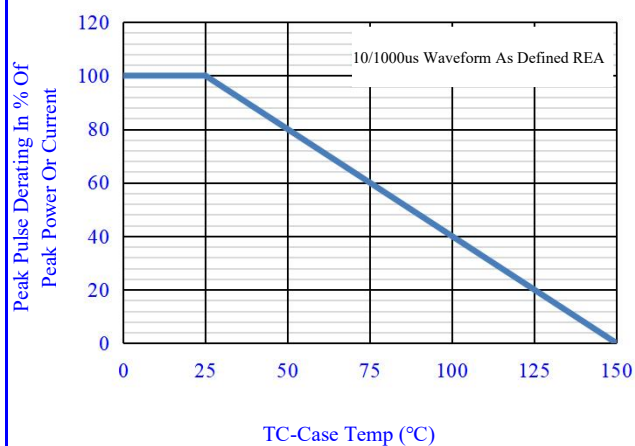


Fig.1-Peak Power Or Current vs.Tc

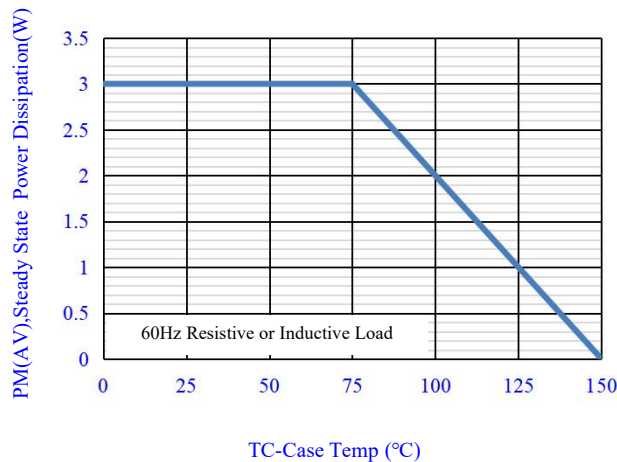


Fig.2-Steady State Power Derating Curve



Fig.3-Peak Pulse Power Rating Curve

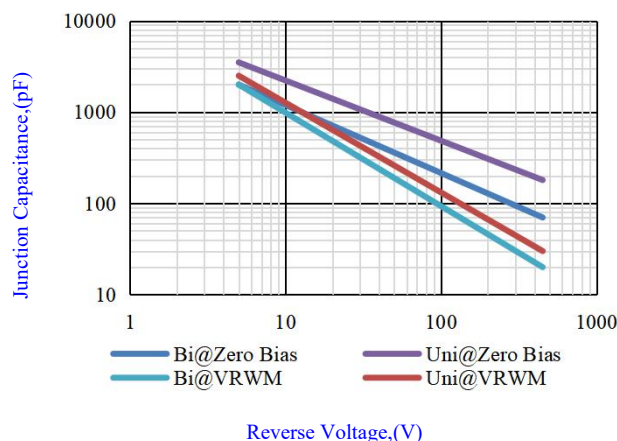


Fig.4-Typical Junction Capacitance

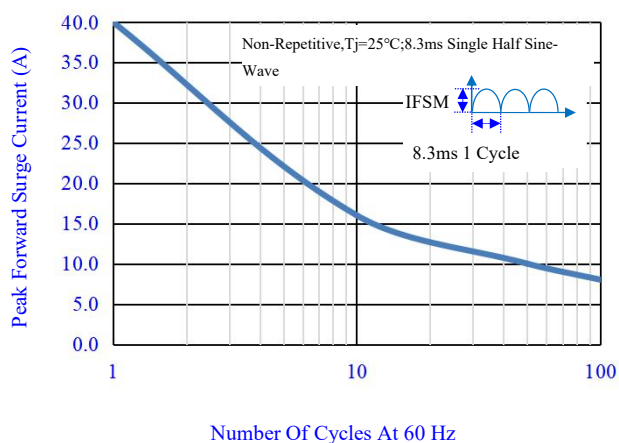


Fig.5-Max. Non-Repetitive Surge Current

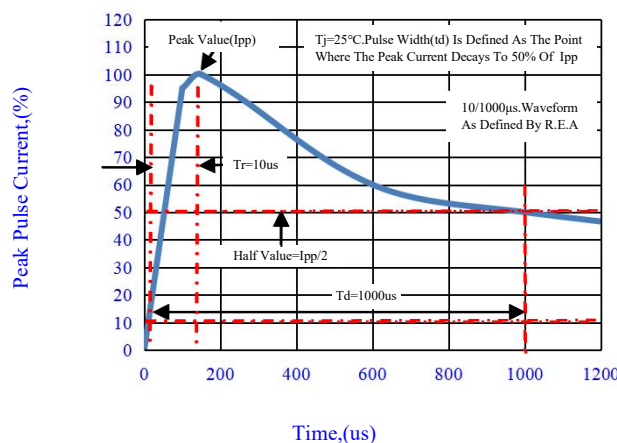


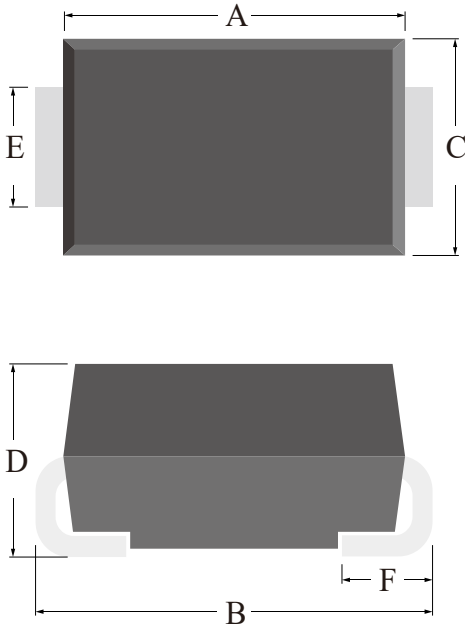
Fig.6-Pulse Waveform

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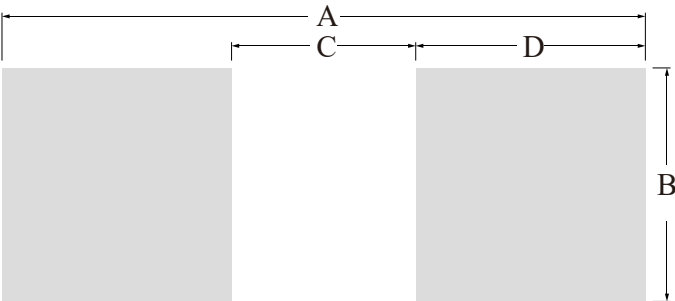
OUTLINE DRAWINGS



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

RECOMMEDND 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	-

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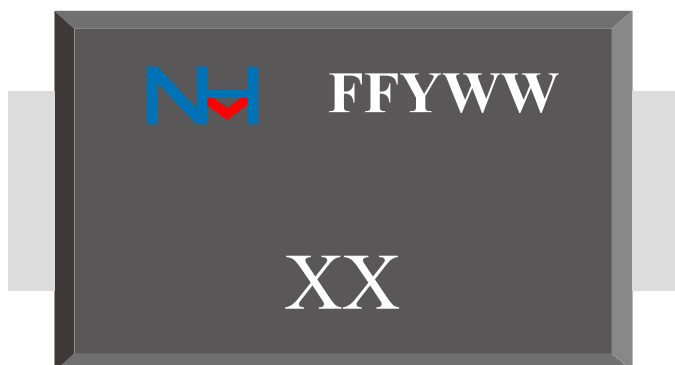
MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
YWW=Date Code,According To Actual Changes
XX=Make,XX=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
XX=Make,XX=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

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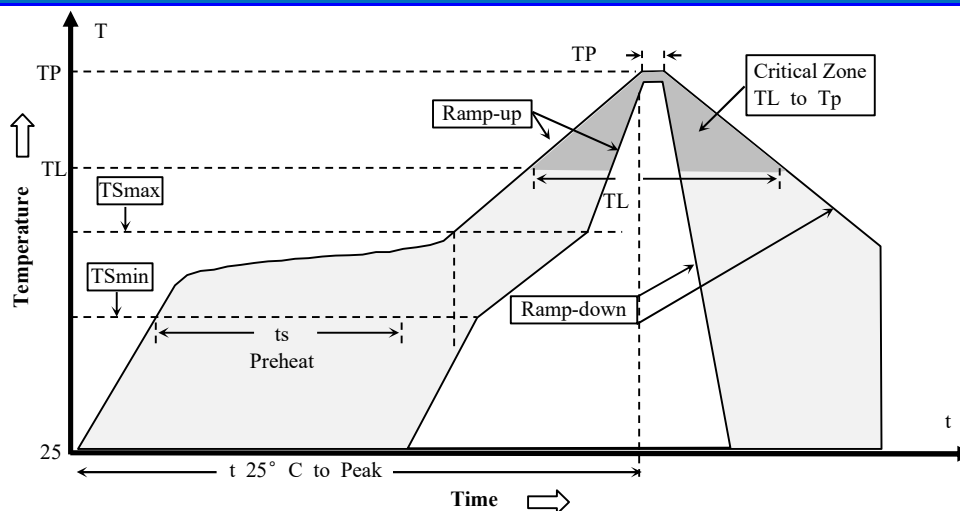


TRANSIENT VOLTAGE SUPPRESSOR DIODES

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.

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