

P6SMB series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Voltage: 6.8~600 Volts

Current: 600 W

Package: SMB

Features

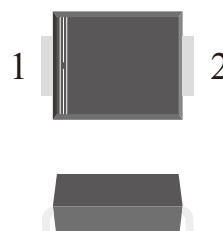
- NH'S Glass Passivated Chip Technology
- Wave And Reflow Solderable
- Low Reverse Leakage
- Very Fast Response Time
- Excellent Clamping Capability
- 10/1000 μ s Waveform, Repetition Rate(Duty Cycle):0.01 %
- ESD Immunity Acc. IEC 61000-4-2

Typical Applications

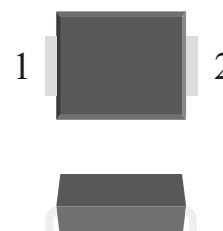
- Power Port
- Communication And Data Port
- ESD Protection And Automotive Electronics
- Industrial Control and Automation

Diagram:

UNI

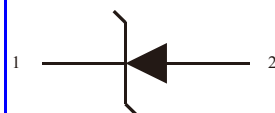


BI

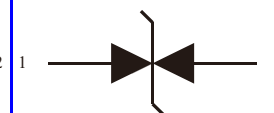


Polarity:

UNI



BI



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

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

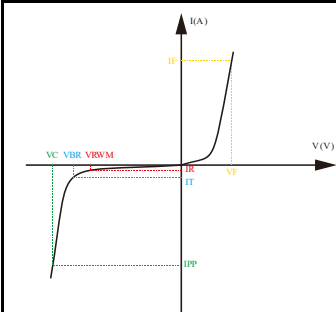
Parameter	Test Conditions	Symbol	Value	Unit
Non-Repetitive Peak Pulse Power Dissipation	10/1000 μ s Waveform	P_{PP}	600	W
Peak Pulse Current	10/1000 μ s Waveform	I_{PP}	See Table-1	A
Peak Forward Surge Current	8.3ms Single Half Sine-Wave Superimposed On Rate Load	I_{FSM}	100	A
Power Dissipation On Infinite Heatsink	$T_L = 75.0\text{ }^{\circ}\text{C}$	P_D	5.0	W
Maximum Instantaneous Forward Voltage	$I_F = 50.0\text{ A}, V_{BR} < 200\text{ V}$	V_F	3.5	V
	$I_F = 50.0\text{ A}, V_{BR} > 201\text{ V}$		6.5	

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

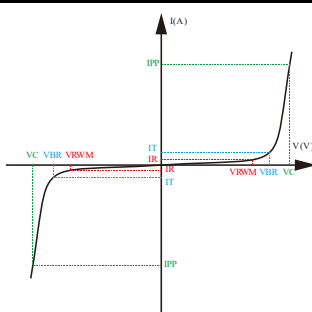
Parameter	Test Conditions	Symbol	Value	Unit
Operating Junction Temperature Range		T_J	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ 150	
Thermal Resistance Junction To Ambient With Steady-State	Device Mounted On 1 in2 FR-4 Board With 2oz. Copper	$R_{\theta JA}$	100	$^{\circ}\text{C/W}$

C-V Curve Chart

UNI



BI



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 $f = 1.0\text{ MHz}$

P6SMB 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)
P6SMB6.8A	P6SMB6.8CA	6V8A	6V8CA	5.8	6.45	7.14	10	10.5	57.14	1000
P6SMB7.5A	P6SMB7.5CA	7V5A	7V5CA	6.4	7.13	7.88	10	11.3	53.10	500
P6SMB8.2A	P6SMB8.2CA	8V2A	8V2CA	7.0	7.79	8.61	10	12.1	49.59	200
P6SMB9.1A	P6SMB9.1CA	9V1A	9V1CA	7.8	8.65	9.55	1	13.4	44.78	50
P6SMB10A	P6SMB10CA	10A	10CA	8.6	9.50	10.50	1	14.5	41.38	10
P6SMB11A	P6SMB11CA	11A	11CA	9.4	10.50	11.60	1	15.6	38.46	5
P6SMB12A	P6SMB12CA	12A	12CA	10.2	11.40	12.60	1	16.7	35.93	5
P6SMB13A	P6SMB13CA	13A	13CA	11.1	12.40	13.70	1	18.2	32.97	1
P6SMB15A	P6SMB15CA	15A	15CA	12.8	14.30	15.80	1	21.2	28.30	1
P6SMB16A	P6SMB16CA	16A	16CA	13.6	15.20	16.80	1	22.5	26.67	1
P6SMB18A	P6SMB18CA	18A	18CA	15.3	17.10	18.90	1	25.5	23.53	1
P6SMB20A	P6SMB20CA	20A	20CA	17.1	19.00	21.00	1	27.7	21.66	1
P6SMB22A	P6SMB22CA	22A	22CA	18.8	20.90	23.10	1	30.6	19.61	1
P6SMB24A	P6SMB24CA	24A	24CA	20.5	22.80	25.20	1	33.2	18.07	1
P6SMB27A	P6SMB27CA	27A	27CA	23.1	25.70	28.40	1	37.5	16.00	1
P6SMB30A	P6SMB30CA	30A	30CA	25.6	28.50	31.50	1	41.4	14.49	1
P6SMB33A	P6SMB33CA	33A	33CA	28.2	31.40	34.70	1	45.7	13.13	1
P6SMB36A	P6SMB36CA	36A	36CA	30.8	34.20	37.80	1	49.9	12.02	1
P6SMB39A	P6SMB39CA	39A	39CA	33.3	37.10	41.00	1	53.9	11.13	1
P6SMB43A	P6SMB43CA	43A	43CA	36.8	40.90	45.20	1	59.3	10.12	1
P6SMB47A	P6SMB47CA	47A	47CA	40.2	44.70	49.40	1	64.8	9.26	1
P6SMB51A	P6SMB51CA	51A	51CA	43.6	48.50	53.60	1	70.1	8.56	1
P6SMB56A	P6SMB56CA	56A	56CA	47.8	53.20	58.80	1	77.0	7.79	1
P6SMB62A	P6SMB62CA	62A	62CA	53.0	58.90	65.10	1	85.0	7.06	1
P6SMB68A	P6SMB68CA	68A	68CA	58.1	64.60	71.40	1	92.0	6.52	1
P6SMB75A	P6SMB75CA	75A	75CA	64.1	71.30	78.80	1	103.0	5.83	1
P6SMB82A	P6SMB82CA	82A	82CA	70.1	77.90	86.10	1	113.0	5.31	1
P6SMB91A	P6SMB91CA	91A	91CA	77.8	86.50	95.50	1	125.0	4.80	1
P6SMB100A	P6SMB100CA	100A	100CA	85.5	95.00	105.00	1	137.0	4.38	1
P6SMB110A	P6SMB110CA	110A	110CA	94.0	105.00	116.00	1	152.0	3.95	1
P6SMB120A	P6SMB120CA	120A	120CA	102.0	114.00	126.00	1	165.0	3.64	1
P6SMB130A	P6SMB130CA	130A	130CA	111.0	124.00	137.00	1	179.0	3.35	1
P6SMB150A	P6SMB150CA	150A	150CA	128.0	143.00	158.00	1	207.0	2.90	1
P6SMB160A	P6SMB160CA	160A	160CA	136.0	152.00	168.00	1	219.0	2.74	1
P6SMB170A	P6SMB170CA	170A	170CA	145.0	162.00	179.00	1	234.0	2.56	1
P6SMB180A	P6SMB180CA	180A	180CA	154.0	171.00	189.00	1	246.0	2.44	1
P6SMB200A	P6SMB200CA	200A	200CA	171.0	190.00	210.00	1	274.0	2.19	1
P6SMB220A	P6SMB220CA	220A	220CA	185.0	209.00	231.00	1	328.0	1.83	1
P6SMB250A	P6SMB250CA	250A	250CA	214.0	237.00	263.00	1	344.0	1.74	1
P6SMB300A	P6SMB300CA	300A	300CA	256.0	285.00	315.00	1	414.0	1.45	1
P6SMB350A	P6SMB350CA	350A	350CA	300.0	332.00	368.00	1	482.0	1.24	1

P6SMB 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)
P6SMB400A	P6SMB400CA	400A	400CA	342.0	380.00	420.00	1	548.0	1.09	1
P6SMB440A	P6SMB440CA	440A	440CA	376.0	418.00	462.00	1	602.0	1.00	1
P6SMB480A	P6SMB480CA	480A	480CA	408.0	456.00	504.00	1	658.0	0.91	1
P6SMB510A	P6SMB510CA	510A	510CA	434.0	485.00	535.00	1	698.0	0.86	1
P6SMB530A	P6SMB530CA	530A	530CA	450.0	503.00	556.00	1	725.0	0.83	1
P6SMB540A	P6SMB540CA	540A	540CA	459.0	513.00	567.00	1	740.0	0.81	1
P6SMB550A	P6SMB550CA	550A	550CA	467.0	522.50	577.50	1	760.0	0.79	1
P6SMB600A	P6SMB600CA	600A	600CA	509.0	570.00	630.00	1	820.0	0.73	1

P6SMB series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Typical Characteristics Curves

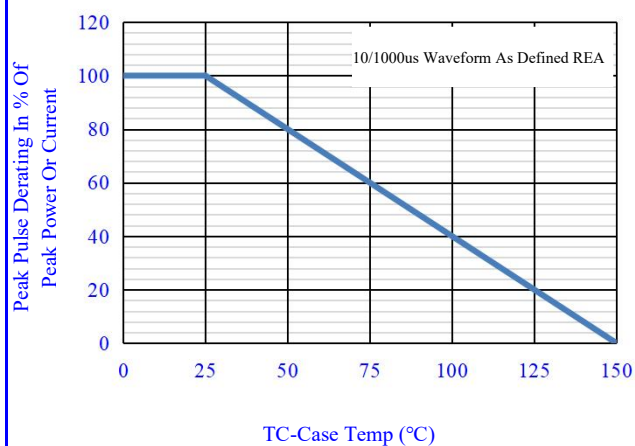


Fig.1-Peak Power Or Current vs.Tc

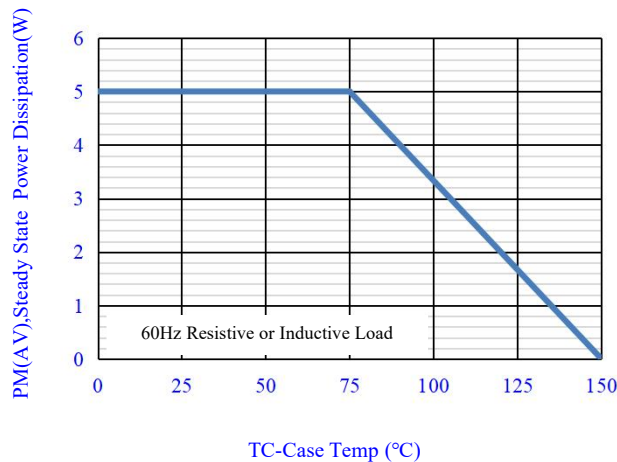


Fig.2-Steady State Power Derating Curve

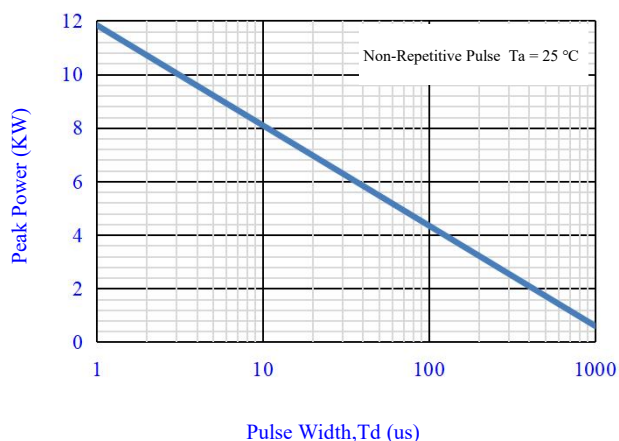


Fig.3-Peak Pulse Power Rating Curve

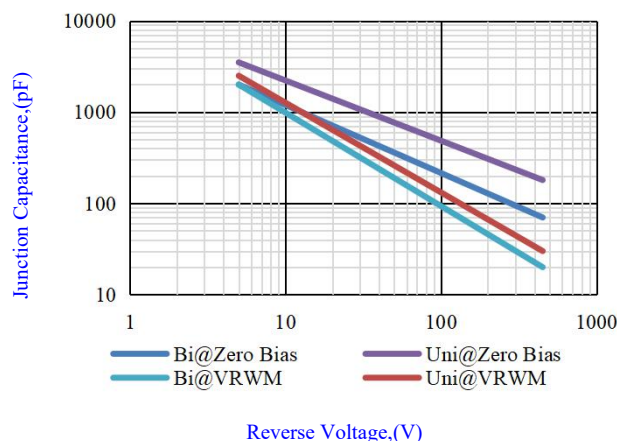


Fig.4-Typical Junction Capacitance

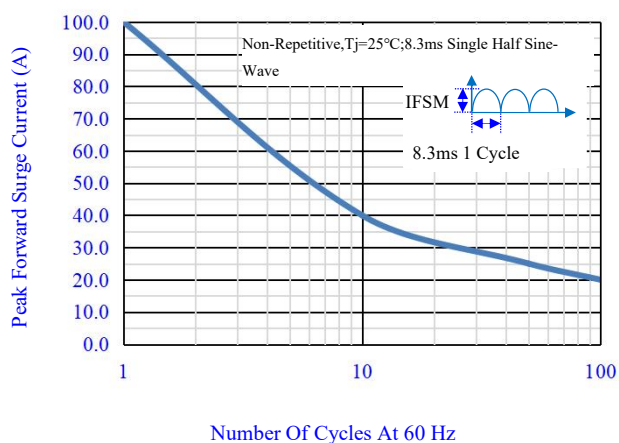


Fig.5-Max. Non-Repetitive Surge Current

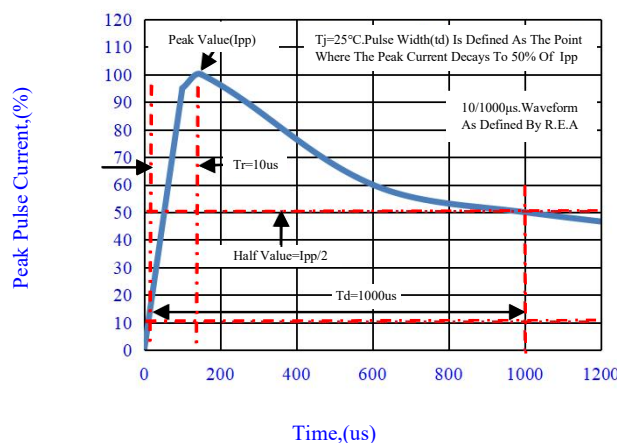


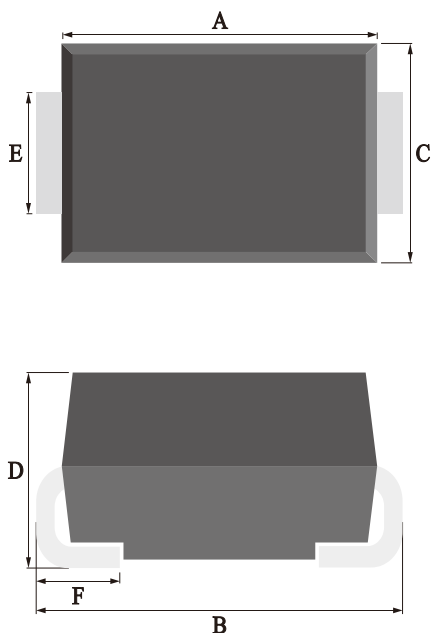
Fig.6-Pulse Waveform

P6SMB series

TRANSIENT VOLTAGE SUPPRESSOR DIODES



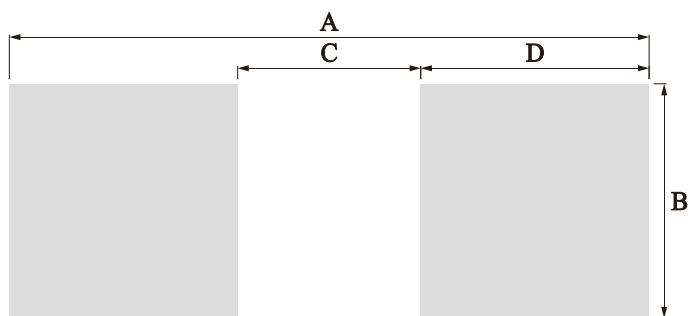
OUTLINE DRAWINGS



SMB

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.00	-	4.70	0.1575	-	1.8504
B	5.00	-	5.59	1.9685	-	2.2008
C	3.30	-	3.94	1.2992	-	1.5512
D	2.10	-	2.45	0.8268	-	0.9646
E	1.90	-	2.11	0.7480	-	0.8307
F	0.76	-	1.50	0.2992	-	0.5906

RECOMMENDED LAYOUT DRAWINGS



SMB

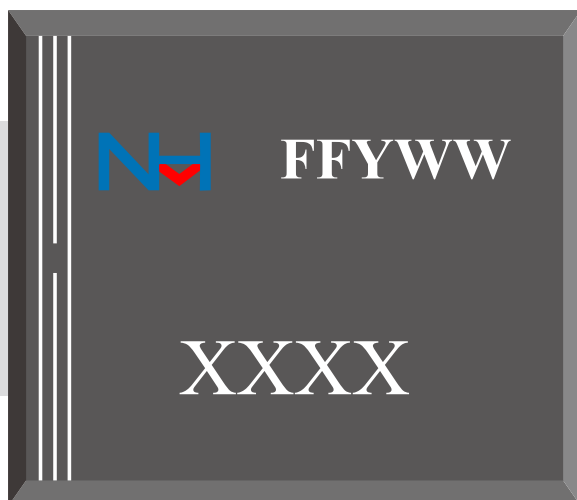
OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	6.34	-	-	2.4961	-
B	-	2.72	-	-	1.0709	-
C	-	1.76	-	-	0.6929	-
D	-	2.29	-	-	0.9016	-

P6SMB series

TRANSIENT VOLTAGE SUPPRESSOR DIODES



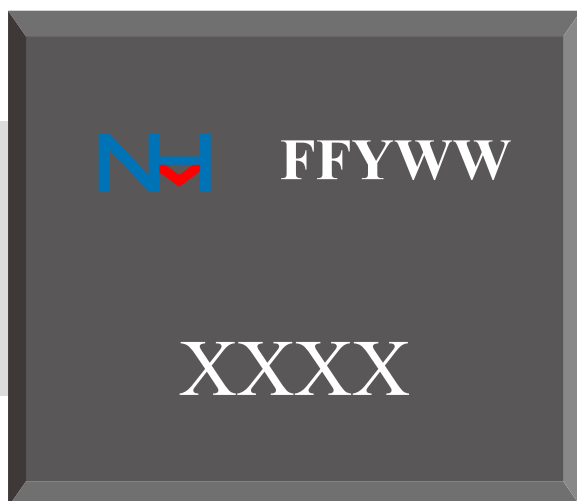
MARKING



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)
SMB	P1	0.095	13" Reel	3000	6000	48000
SMB	P2	0.095	13" Reel	3000	6000	60000

P6SMB series

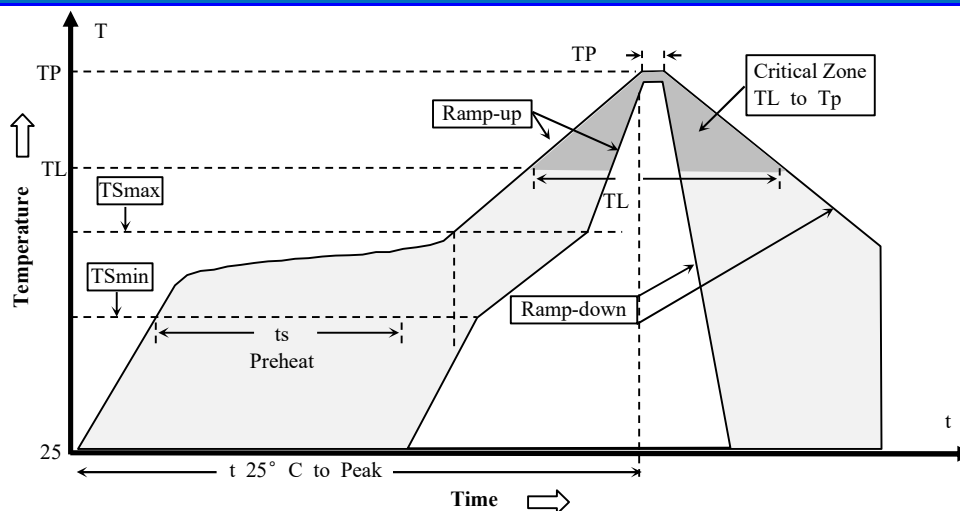


TRANSIENT VOLTAGE SUPPRESSOR DIODES

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.

P6SMB series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Niuhan Electronics Technology Co., LTD
- Niuhan Electronics Technology Co., LTD. reserves the rights to make changes of the content herein the document anytime without notification.
- Niuhan Electronics Technology Co., LTD. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Niuhan Electronics Technology Co., LTD. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Niuhan Electronics Technology Co., LTD. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments requiring high level of reliability or relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, transportation equipment, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Niuhan Electronics Technology Co., LTD. for any damages resulting from such improper use or sale.
- When the appearance of the product and chip size does not change, in order to produce the customer's quality, change the internal structure and the production process Niuhan can not notify