

5000 WATT TVS SUPPRESSORS – 11.0V ~ 170V

DESCRIPTION:



The 5.0ALPSMCJXXA/CA (UNI/BI) Series are designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

The 5.0ALPSMCJXXA/CA Series has a peak pulse power rating of 5000 Watts for an 10/1000 μ s waveshape.



Bi-directional



Uni-directional

FEATURES:

- 5000W peak pulse power capacity with a 10/1000 μ s waveform, repetition rate (duty cycle): 0.01%
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to V_{BR} , typically less than 1 ps for uni-directional & 5 ns for bi-directional types.
- Glass passivated chip junction in DO-214AB(SMC) package.
- Lead-free parts meet RoHS requirements.
- Suffix “-H” indicates Halogen-free part, ex. 5.0ALPSMCJ11A-H.

APPLICATIONS:

- TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, DO-214AB / SMC-F.
- Terminals: Solder Plated, Solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any.
- Approximate Weight: 0.23 grams.

TYPICAL DEVICE CHARACTERISTICS

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Operating Junction Temperature range	T_J	-55 to +150	$^\circ\text{C}$
Storage Temperature range	T_{STG}	-55 to 150	$^\circ\text{C}$
Maximum instantaneous forward voltage at 100A for uni-directional types only, Note 4	V_F	3.5/5.0	V
Peak Pulse Power Dissipation with 10/1000 μs waveform, (Fig.1) (Note 1, 2)	P_{PPM}	5000	W
Peak Pulse current with a 10/1000 μs Waveform	I_{PPM}	See Table 1	A
Steady State Power Dissipation at $T_L=75^\circ\text{C}$, Note 2	$P_{M(AV)}$	6.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	300	A

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 copper pad area of 0.31"x0.31" (8,0x8.0mm) per Fig 5
3. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 pulses per minute maximum.
4. $V_F < 3.5\text{V}$ for devices of $V_{BR} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR} > 201\text{V}$.

TYPICAL ELECTRICAL CHARACTERISTICS

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified							
PART NUMBER (Notes 1-2)	REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)}$ @ I_T VOLTS		TEST CURRENT @ I_T mA	MAXIMUM CLAMPING VOLTAGE @ I_{PP}		MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA
		MIN	MAX		V_C VOLTS	@ I_{PP} AMPS	
5.0ALPSMCJ11A / CA	11.0	12.20	13.50	1	18.2	274.7	800
5.0ALPSMCJ12A / CA	12.0	13.30	14.70	1	19.9	251.2	800
5.0ALPSMCJ13A / CA	13.0	14.40	15.90	1	21.5	232.5	500
5.0ALPSMCJ14A / CA	14.0	15.60	17.20	1	23.2	215.5	200
5.0ALPSMCJ15A / CA	15.0	16.70	18.50	1	24.4	204.9	100
5.0ALPSMCJ16A / CA	16.0	17.80	19.70	1	26.0	192.9	50
5.0ALPSMCJ17A / CA	17.0	18.90	20.90	1	27.6	181.0	20
5.0ALPSMCJ18A / CA	18.0	20.00	22.10	1	29.2	171.2	10
5.0ALPSMCJ20A / CA	20.0	22.20	24.50	1	32.4	154.3	5
5.0ALPSMCJ22A / CA	22.0	24.40	26.90	1	35.5	140.8	5
5.0ALPSMCJ24A / CA	24.0	26.70	29.50	1	38.9	128.5	5
5.0ALPSMCJ26A / CA	26.0	28.90	31.90	1	42.1	118.7	5
5.0ALPSMCJ28A / CA	28.0	31.10	34.40	1	45.4	110.0	5
5.0ALPSMCJ30A / CA	30.0	33.30	36.80	1	48.4	103.0	5
5.0ALPSMCJ33A / CA	33.0	36.70	40.60	1	53.3	93.8	5
5.0ALPSMCJ36A / CA	36.0	40.00	44.20	1	58.1	86.0	5
5.0ALPSMCJ40A / CA	40.0	44.40	49.10	1	64.5	77.5	5
5.0ALPSMCJ43A / CA	43.0	47.80	52.80	1	69.4	72.0	5
5.0ALPSMCJ45A / CA	45.0	50.0	55.30	1	72.7	68.7	5
5.0ALPSMCJ48A / CA	48.0	53.30	58.90	1	77.4	64.5	5
5.0ALPSMCJ51A / CA	51.0	56.70	62.70	1	82.4	60.6	5
5.0ALPSMCJ54A / CA	54.0	60.00	66.30	1	87.1	57.4	5
5.0ALPSMCJ58A / CA	58.0	64.40	71.20	1	93.6	53.4	5

PART NUMBER (Notes 1-2)	REVERSE STAND-OFF VOLTAGE V_{RWM} VOLTS	BREAKDOWN VOLTAGE $V_{(BR)}$ @ I_T VOLTS		TEST CURRENT @ I_T mA	MAXIMUM CLAMPING VOLTAGE @ I_{pp}		MAXIMUM REVERSE LEAKAGE CURRENT @ V_{RWM} I_R μA
		MIN	MAX		V_C VOLTS	@ I_{pp} AMPS	
5.0ALPSMCJ60A / CA	60.0	66.70	73.70	1	96.8	51.6	5
5.0ALPSMCJ64A / CA	64.0	71.10	78.60	1	103.0	48.5	5
5.0ALPSMCJ70A / CA	70.0	77.80	86.00	1	113.0	44.2	5
5.0ALPSMCJ75A / CA	75.0	83.30	92.10	1	121.0	41.3	5
5.0ALPSMCJ78A / CA	78.0	86.70	95.80	1	126.0	39.6	5
5.0ALPSMCJ85A / CA	85.0	94.40	104.00	1	137.0	36.4	5
5.0ALPSMCJ90A / CA	90.0	100.00	111.00	1	146.0	34.2	5
5.0ALPSMCJ100A / CA	100.0	111.00	123.00	1	162.0	30.8	5
5.0ALPSMCJ110A / CA	110.0	122.00	135.00	1	177.0	28.2	5
5.0ALPSMCJ120A / CA	120.0	133.00	147.00	1	193.0	25.9	5
5.0ALPSMCJ130A / CA	130.0	144.00	159.00	1	209.0	23.9	5
5.0ALPSMCJ150A / CA	150.0	167.00	185.00	1	243.0	20.5	5
5.0ALPSMCJ160A / CA	160.0	178.00	197.00	1	259.0	19.3	5
5.0ALPSMCJ170A / CA	170.0	189.00	209.00	1	275.0	18.1	5

NOTE:

1. V_{BR} measured after I_T applied for 300 μs , I_T =square wave pulse or equivalent.
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. For bidirectional type having V_{RWM} of 10 volts and less, the I_R limit is double.
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. Part numbers with "CA" suffix are bidirectional devices, i.e., 5.0ALPSMCJ170CA
6. All term and symbols are consistent with ANS/IEEE C62.35
7. Transient Voltage Suppressors (TVS) are devices used to protect vulnerable circuits from electrical overstress such as electrostatic discharge, inductive load switching and induced lightning. Within the TVS, damaging voltage pikes are limited by clamping or avalanche action of a rugged silicon pn junction which reduces the amplitude of the transient to a nondestructive level. See Fig. 7 & Fig. 8

TYPICAL DEVICE CHARACTERISTICS CURVES

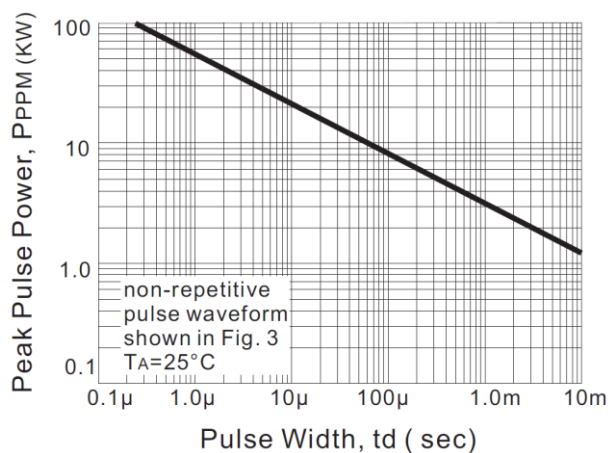


Fig1. PEAK PULSE POWER RATING CURVE

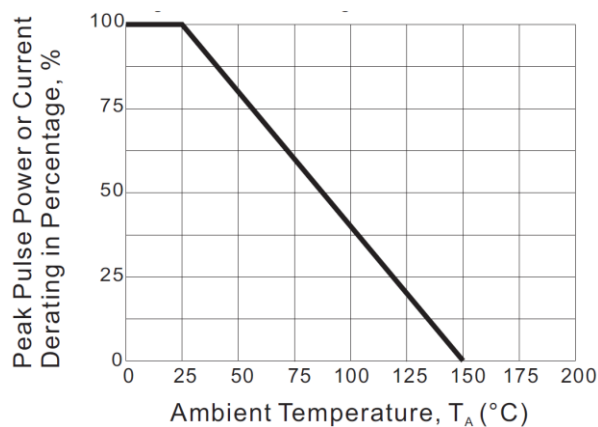


Fig2. PULSE DERATING CURVE

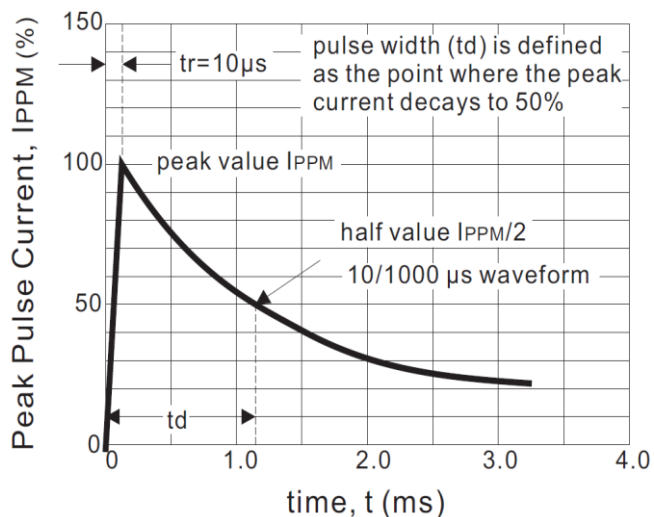


Fig3. PULSE WAVEFORM

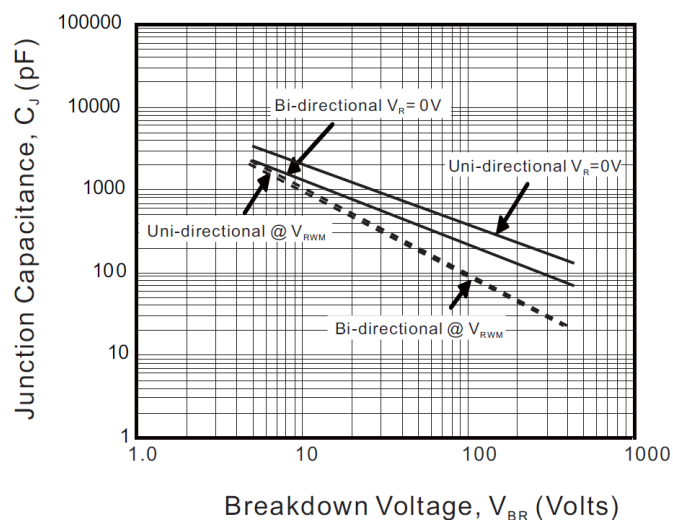


Fig4. TYPICAL JUNCTION CAPACITANCE

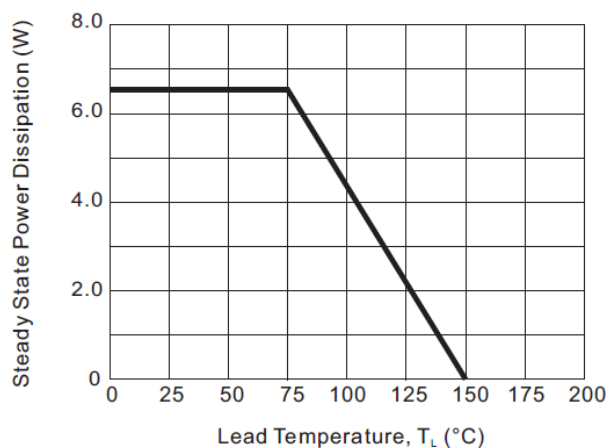


Fig5. STEADY STATE POWER DERATING CURVE

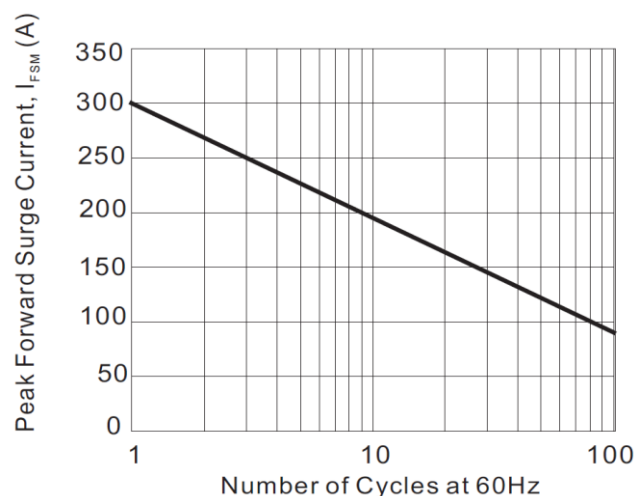


Fig6. MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT

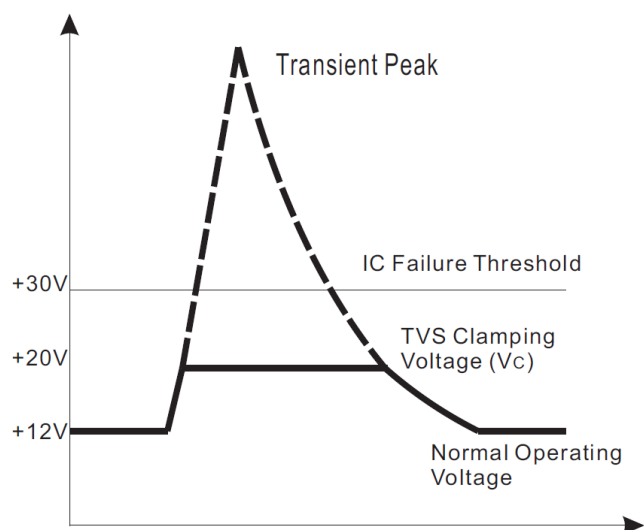


Fig.7 TRANSIENTS OF SEVERAL THOUSAND VOLTS CAN BE CLAMPED TO A SAFE LEVEL BY THE TVS

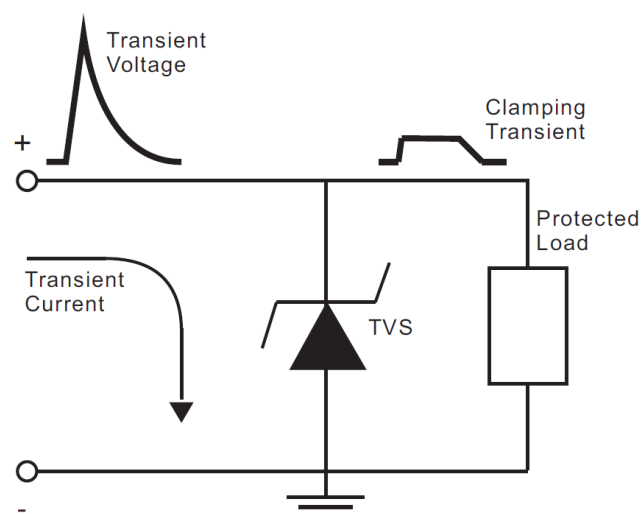
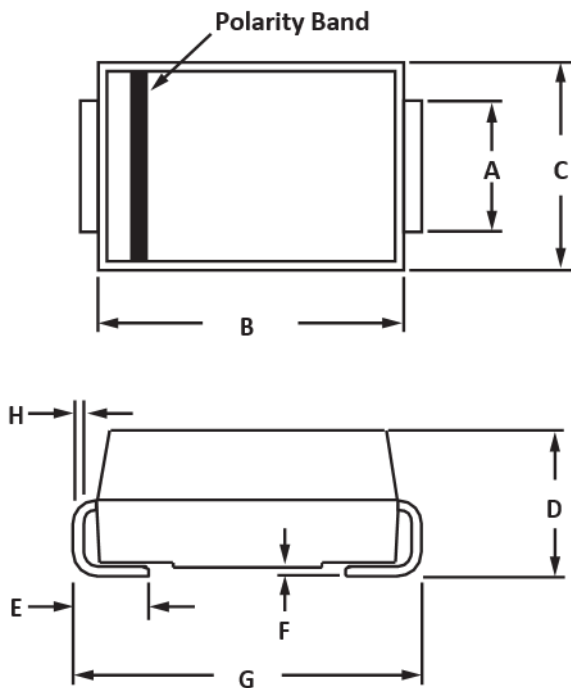
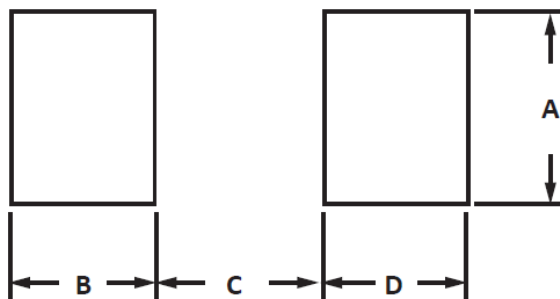


Fig.8 TRANSIENT CURRENT IS DIVERGED TO GROUND THRU TVS; THE VOLTAGE SEEN BY THE PROTECTED LOAD IS LIMITED TO THE CLAMPING VOLTAGE LEVEL

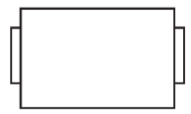
PACKAGE INFORMATION


OUTLINE DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.20	0.114	0.126
B	6.60	7.11	0.260	0.280
C	5.59	6.22	0.220	0.245
D	2.06	2.82	0.081	0.111
E	0.78	1.52	0.030	0.060
F	0.051	0.203	0.002	0.008
G	7.75	8.13	0.305	0.320
H	0.152	0.305	0.006	0.012
NOTES 1. Dimensions are exclusive of mold flash and metal burrs.				



PAD LAYOUT DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.30	-	0.132	-
B	2.50	-	0.100	-
C	-	4.40	-	0.176
D	2.50	-	0.100	-

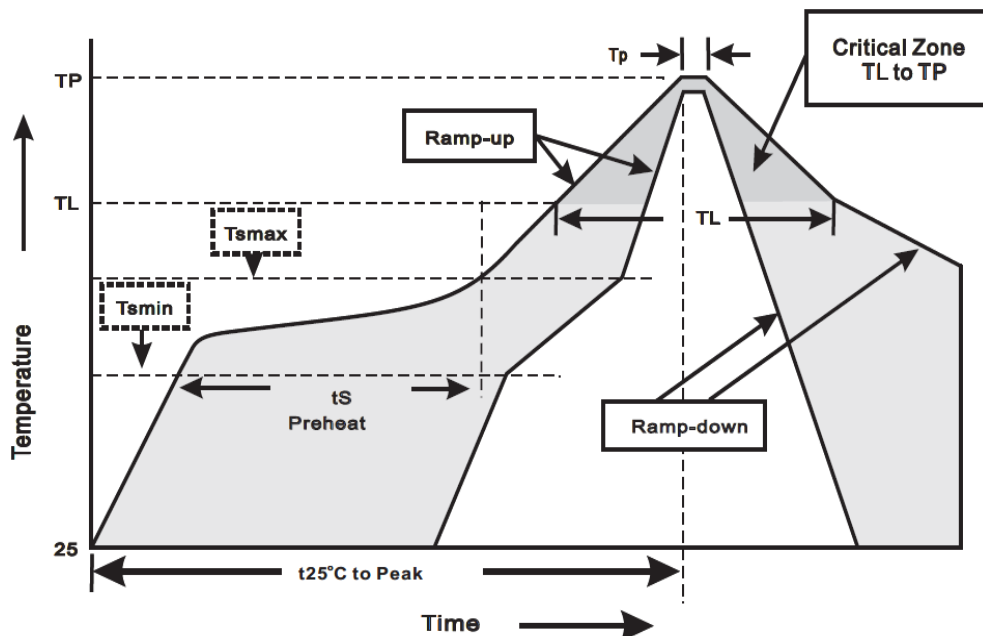
PINNING INFORMATION

PIN	SIMPLIFIED OUTLINE	SYMBOL
Uni-Directional Pin1 Cathode Pin2 Anode		
Bi-Directional		

SOLDERING PARAMETERS

SUGGESTED THERMAL PROFILES FOR SOLDERING PROCESSES

1. Storage environment: Temperature=5 °C~40 °C Humidity=55% ±25%
2. Reflow soldering of surface-mount devices



3. Reflow soldering

PROFILE FEATURE	SOLDERING CONDITION
Average ramp-up rate (T_L to T_P)	<3 °C/sec
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (t_s)	150 °C 200 °C 60 ~ 120 sec
T_{smax} to T_L - Ramp-upRate	<3 °C/sec
Time maintained above: - Temperature (T_L) - Time(t_L)	217 °C 60 ~ 260 sec
Peak Temperature (T_P)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(t_P)	10 ~ 30 sec
Ramp-down Rate	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

5.0ALPSMCJXXA/CA Series

DO-214AB(SMC)

PRODUCT HIGH RELIABILITY TEST CAPABILITIES

ITEM	TEST CONDITIONS	STANDARD
Solder Resistance	At 260±5°C for 10±Sec.	MIL-STD-750D METHOD-2031
Solderability	At 245±5°C for 5 sec.	MIL-STD-202F METHOD-208
High Temperature Reverse Bias	$V_{BR} = V_{BR\ NOM} * 80\%$ at $T_J = 150^\circ$ for 168 hrs.	MIL-STD-750D METHOD-1038
Pressure Cooker	15P _{SIG} at $T_A = 121^\circ\text{C}$ for 4Hrs	JESD22-A102
Temperature Cycling	-55°C to +125°C dwelled for 30min and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
Humidity	At $T_A = 85^\circ\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
High Temperature Storage Life	At 175°C for 1000hrs.	MIL-STD-750D METHOD-1031



beyond boundaries...

5.0ALPSMCJXXA/CA Series

DO-214AB(SMC)

CUSTOMER NOTE:

DISCLAIMER

The product information and the selection guide facilitates the selection of the ALPINESEMI™'s Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review the Data sheet(s) so as to confirm that the Device(s) meets functionality parameters for your application. The information furnished on the Data Sheet and the ALPINESEMI™'s Web Site is believed to be accurate and reliable at the time of preparation of this document. ALPINESEMI™ however, does not assume any inaccuracies that may arise when the components are mounted and removed. Furthermore, ALPINESEMI™ does not assume liability whatsoever, arising out of the application or the use of any of ALPINESEMI™'s product(s). Neither, does it convey any license under its patent rights nor the rights of others. These products are not guaranteed for use in life saving/support appliances or systems. ALPINESEMI™'s customers using these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and ALPINESEMI™ will not be responsible in any way(s) for any damage(s) resulting from such use.

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1. ALPINESEMI™ Semiconductor Devices are RoHS compliant and hence customers are requested to dispose as per the prevailing Environmental Legislation put forth in their specific country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).



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