



# ACE01508U

## Low Capacitance Bidirectional Single Line TVS Protection Diode

### Description

The ACE01508U TVS protection diode is designed to replace multilayer varistors (MLVs) in portable applications such as cell phones, notebook computers, and PDA's. The device features large cross-sectional area junctions for conducting high transient currents, offer desirable electrical characteristics for board level protection, such as fast response time, lower operating voltage, lower clamping voltage and no device degradation when compared to MLVs. The ACE01508U TVS protection diode protects sensitive semiconductor components from damage or upset due to electrostatic discharge (ESD) and other voltage induced transient events. The ACE01508U is available in DFN2 1.0x0.6 package with working voltages of 5 volt. It gives designer the flexibility to protect bidirectional single line in applications where arrays are not practical. Additionally, it may be "sprinkled" around the board in applications where board space is at a premium. It may be used to meet the ESD immunity requirements of IEC 61000-4-2,  $\pm 30\text{kV}$  air,  $\pm 30\text{kV}$  contact discharge.

### Features

- Transient Protection for Data Lines to IEC 61000-4-2 (ESD)  $\pm 30\text{kV}$  (Air),  $\pm 30\text{kV}$  (Contact)
- Small Package for Use in Portable Electronics
- Suitable Replacement for MLV's in ESD Protection Applications
- Bidirectional TVS Protection
- Stand-off Voltages: 5V
- Low Leakage Current
- Low Diode Capacitance
- Small Body Outline Dimensions: 1.0mmx0.6mm

### Applications

- Cell Phone Handsets and Accessories
- Personal Digital Assistants (PDA's)
- Notebooks, Desktops and Servers
- Portable Instrumentation
- Cordless Phones
- Smart Card
- Digital Cameras
- MP3 Players

### Absolute Maximum Ratings

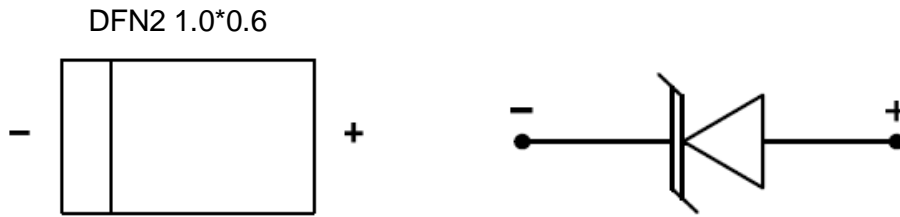
Parameter	Symbol	Max	Unit
Peak Pulse Power ( $t_P=8/20\mu\text{s}$ )	$P_{PK}$	140	Watts
Maximum Peak Pulse Current ( $t_P=8/20\mu\text{s}$ )	$I_{PP}$	11	Amps
Lead Soldering Temperature	TL	260 (10 sec.)	$^{\circ}\text{C}$
Operating Temperature	TJ	-55 to 125	$^{\circ}\text{C}$
Storage Temperature	TSTG	-55 to 150	$^{\circ}\text{C}$



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### Packaging Type



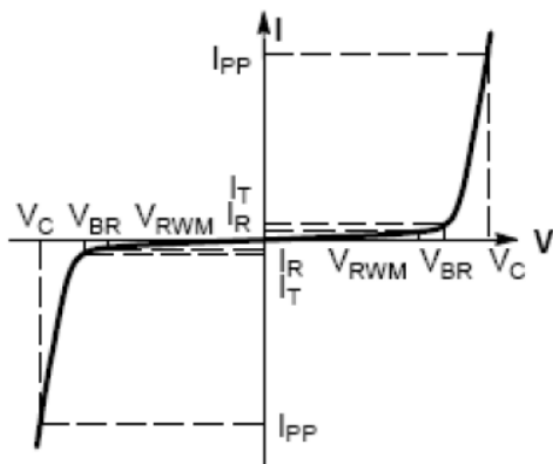
### Ordering information

ACE01508U XX + H

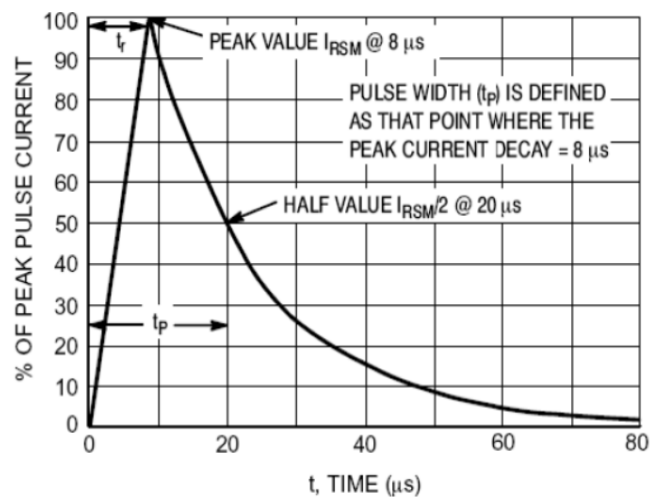
- └─ Halogen - free
- └─ Pb - free
- └─ FF: DFN2 1.0\*0.6

### Symbol Definition

Parameter	Symbol
Maximum Reverse Peak Pulse Current	$I_{PP}$
Clamping Voltage @ $I_{pp}$	$V_C$
Working Peak Reverse Voltage	$V_{RWM}$
Maximum Reverse Leakage Current @ $V_{RWM}$	$I_R$
Breakdown Voltage @ $I_T$	$V_{BR}$
Test Current	$I_T$
Peak Power Dissipation	$P_{PK}$
Max. Capacitance @ $V_R=0V, f=1MHz$	$C_J$



Bi-Directional TVS





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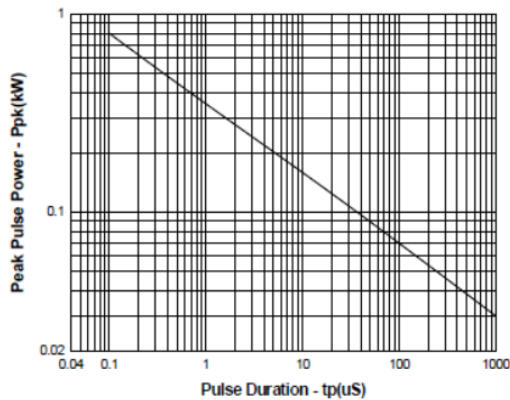
### Electrical Characteristics

T<sub>A</sub>=25°C, unless otherwise specified.

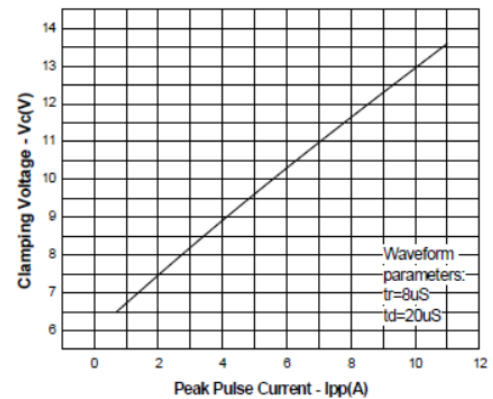
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage	V <sub>RWM</sub>				5	V
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>T</sub> =1mA	6.5		8.5	V
Reverse Leakage Current	I <sub>R</sub>	V <sub>RWM</sub> =5V, T=25°C			1	μA
Clamping Voltage	V <sub>C</sub>	I <sub>PP</sub> =5A, t <sub>p</sub> =8/20μs			9.7	V
		I <sub>PP</sub> =11A, t <sub>p</sub> =8/20μs			13.6	
Junction Capacitance	C <sub>j</sub>	V <sub>R</sub> =0V, f=1MHz		45	59	pF
		V <sub>R</sub> =2.5V, f=1MHz		35	45	

### Typical Performance Characteristics

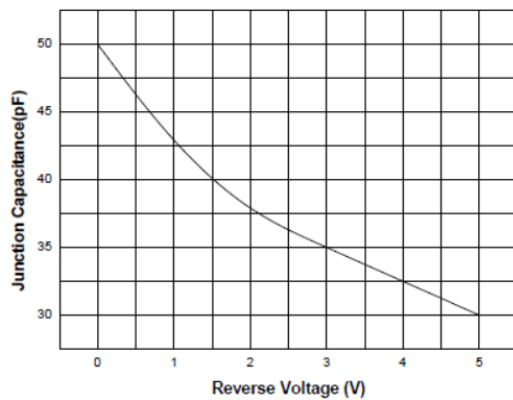
Non-Repetitive Peak Pulse Power vs. Pulse Time



Clamping Voltage vs. Peak Pulse Current



Junction Capacitance vs. Reverse Voltage





### Applications Information

#### Device Connection Options

ACE01508U ESD protection diode is designed to protect one bidirectional data, I/O or power supply line from the damage caused by ESD and surge pulses. The device is bidirectional and may be used on lines where the signal polarity is above ground and below ground.

#### Circuit Board Layout Recommendations for Suppression of ESD

Good circuit board layout is critical for the suppression of ESD induced transients. The following guidelines are recommended:

1. Place the TVS near the input terminals or connectors to restrict transient coupling.
2. Minimize the path length between the TVS and the protected line.
3. Minimize all conductive loops including power and ground loops.
4. The ESD transient return path to ground should be kept as short as possible.
5. Never run critical signals near board edges.
6. Use ground planes whenever possible. For multilayer printed-circuit boards, use ground vias.
7. Keep parallel signal paths to a minimum.
8. Avoid running protection conductors in parallel with unprotected conductor.
9. Avoid using shared transient return paths to a common ground point.

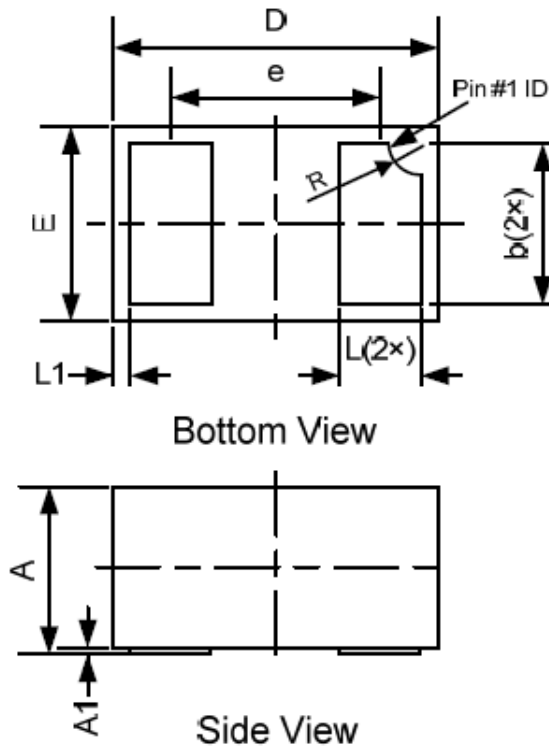


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### Packing Information

DFN2 1.0\*0.6



Dimensions						
Symbol	Millimeters			Inches		
	Min	Typ	Max	Min	Typ	Max
A	0.40		0.53	0.016		0.021
A1	0.00		0.05	0.000		0.002
b	0.45	0.50	0.55	0.018	0.020	0.022
D	0.95	1.00	1.075	0.037	0.039	0.042
E	0.55	0.60	0.675	0.022	0.024	0.027
e	0.65TYP			0.026TYP		
L	0.20	0.25	0.30	0.008	0.010	0.012
L1	0.00	0.05	0.10	0.000	0.002	0.004
R	0.05	0.10	0.15	0.002	0.004	0.006

Note: R is optional.



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### Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Technology Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.