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 1.0×0.6 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, ±30kV air, ±30kV contact discharge.

Features

- Transient Protection for Data Lines to IEC 61000-4-2 (ESD) ±30kV (Air), ±30kV (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: 1.0mm×0.6mm

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 (tP=8/20μs)	P_{PK}	140	Watts
Maximum Peak Pulse Current (tP=8/20μs)	I_{PP}	11	Amps
Lead Soldering Temperature	TL	260 (10 sec.)	°C
Operating Temperature	TJ	-55 to 125	°C
Storage Temperature	TSTG	-55 to 150	°C

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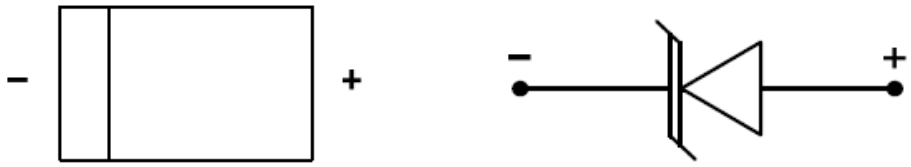
Packaging Type

DFN2 1.0*0.6



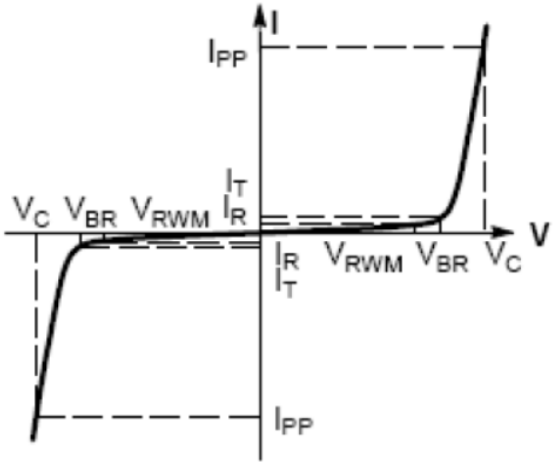
Ordering information

ACE01508U XX + H

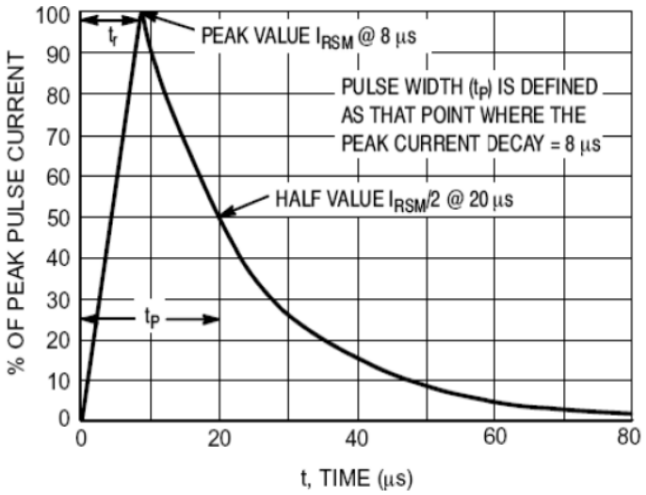
- Halogen - free
- Pb - free
- FF: DFN2 1.0*0.6

Symbol Definition

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



Bi-Directional TVS



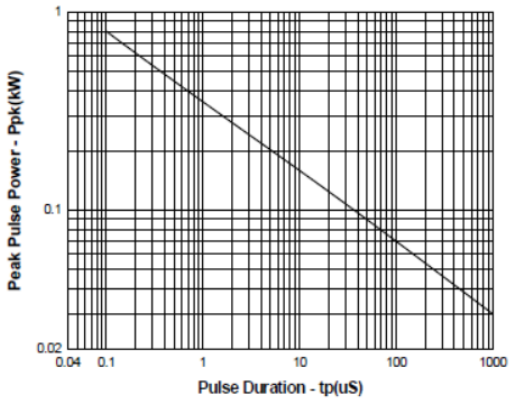
Electrical Characteristics

T_A=25℃, unless otherwise specified.

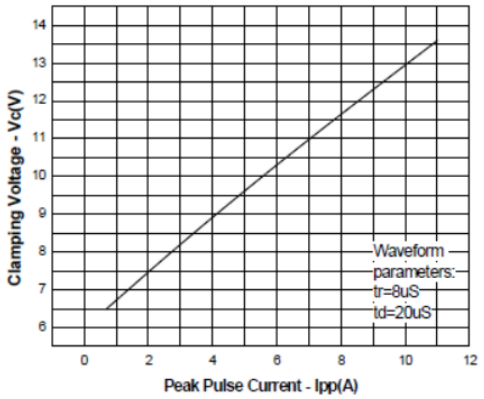
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6.5		8.5	V
Reverse Leakage Current	I_R	V_{RWM}=5V, T=25°C			1	μA
Clamping Voltage	V_C	I_{PP}=5A, t_P=8/20μs			9.7	V
		I_{PP}=11A, t_P=8/20μs			13.6	
Junction Capacitance	C_j	V_R=0V, f=1MHz		45	59	pF
		V_R=2.5V, f=1MHz		35	45	

Typical Performance Characteristics

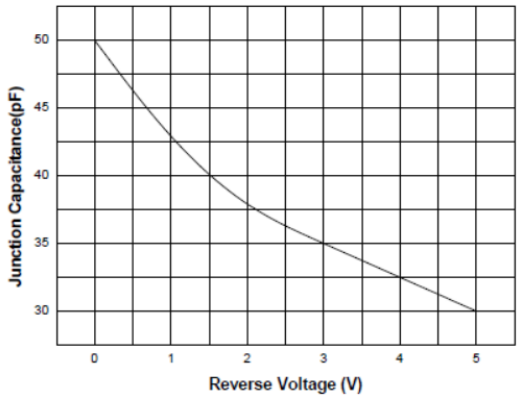
Non-Repetitive Peak Pulse Power vs. Pulse Time



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.

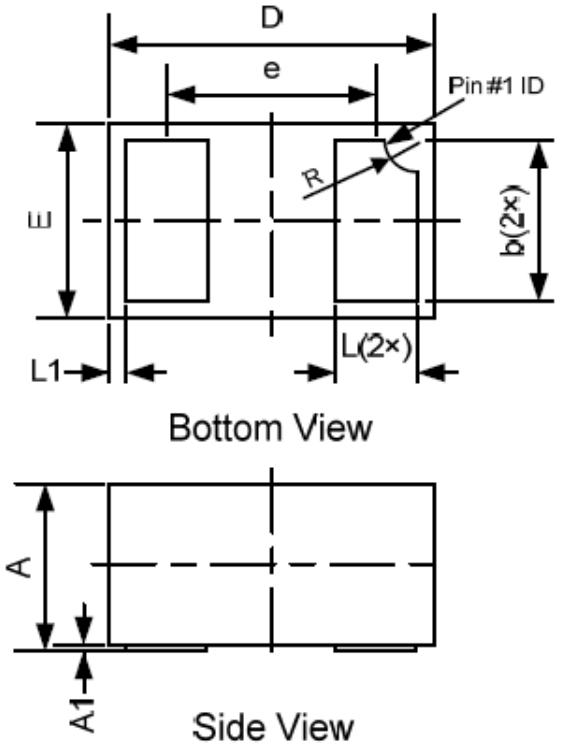
Circuit Board Layout Recommendations for Suppression of ESD

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.

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.

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 shoes 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.