ACE2N7002A

N-Channel Enhancement Mode MOSFET

Description

The ACE2N7002A is the N-Channel enhancement mode field effect transistors are produced using high cell density DMOS technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. They can be used in most applications requiring up to 300mA DC and can deliver pulsed currents up to 1.0A. These products are particularly suited for low voltage, low current applications such as small servo motor control, power MOSFET gate drivers, and other switching applications.

Features

- 60V/0.50A , $R_{DS(ON)}$= 6.0Ω@V_{GS}=10V
- 60V/0.30A , $R_{DS(ON)}$= 7.0Ω@V_{GS}=5V
- Super high density cell design for extremely low $R_{DS\ (ON)}$
- Exceptional on-resistance and maximum DC current capability
- TSOT-23-3 and SOT-323 package design

Applications

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- High saturation current capability. Direct Logic-Level Interface: TTL/CMOS
- Battery Operated Systems
- Solid-State Relays

Absolute Maximum Ratings

(T_A=25℃ Unless otherwise noted)

Parameter		Symbol	Typical	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Gate –Source Voltage - Non Repetitive (tp < 50μs)		V_{GSS}	±40	V
Continuous Drain Current (T_J=150℃)	T_A=25℃	I_D	0.5	A
Pulsed Drain Current(*)		I_{DM}	1.0	A
Power Dissipation	T_A=25℃	P_D	0.35	A
Operating Junction Temperature		T_J	-55~150	W
Storage Temperature Range		T_{STG}	-55~150	°C
Thermal Resistance-Junction to Ambient		$R_{\theta JA}$	375	°C /W

(*) Pulse width limited by safe operating area

ACE2N7002A

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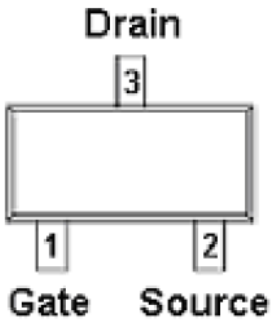
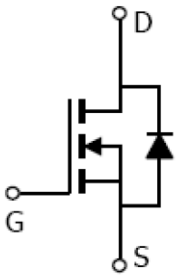
Packaging Type

TSOT-23-3/SOT-323





Pin Description

Pin	Symbol	Description
1	G	Gate
2	S	Source
3	D	Drain

Ordering information

ACE2N7002A XX + H

- Halogen - free
- Pb - free
- BMS: TSOT-23-3
  CM: SOT-323

Electrical Characteristics

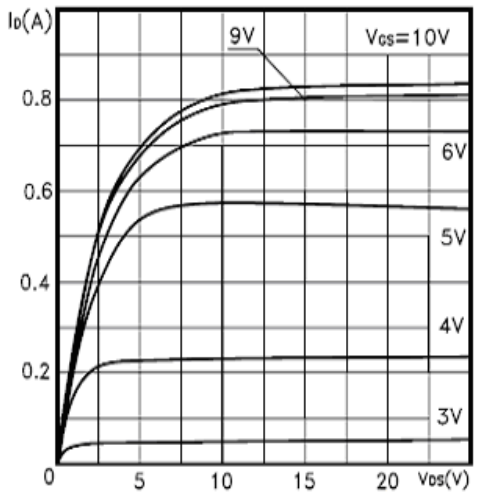
T_A=25℃, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250 uA	60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250uA	1.0	1.7	2.5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V,V_{GS}=±20V			±100	uA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=48V, V_{GS}=0V			1	uA
		V_{DS}=48V, V_{GS}=0V, T_J=55℃			10	
Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=0.5A		2.5	6.0	Ω
		V_{GS}=5V, I_D=0.3A		3.3	7.0	
Source-drain Current	I_{SD}				0.35	A
Source-drain Current (pulsed)	$I_{SDM\ (2)}$				1.4	A
Forward Trans Conductance	$gfs_{(1)}$	V_{DS}=10V, I_D=0.5A		0.6		S
Diode Forward Voltage	$V_{SD(1)}$	V_{GS}=0V, I_S=-0.12A		0.85		V
Dynamic						
Total Gate Charge	Q_g	V_{DD}=30V, V_{GS}=5V, I_D≡1A				nC
Gate-Source Charge	Q_{gs}					
Gate-Drain Charge	Q_{gd}					
Input Capacitance	Ciss	V_{DS} = 25 V, f = 1 MHz, V_{GS} = 0		43	60	pF
Output Capacitance	Coss			20	30	
Reverse Transfer Capacitance	Crss			6	10	
Turn-On Time	td(on)	V_{DD}=30V, I_D≡0.5A, R_G=4.7Ω, V_{GS}=4.5V		5	20	ns
	tr			15		
Turn-Off Time	td(off)			7	20	
	tf			8		

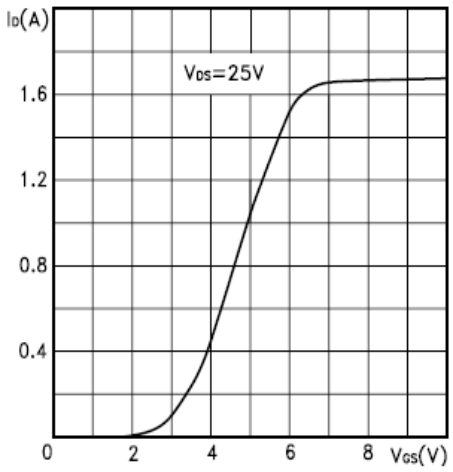
(1) Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %.

(2) Pulse width limited by safe operating area.

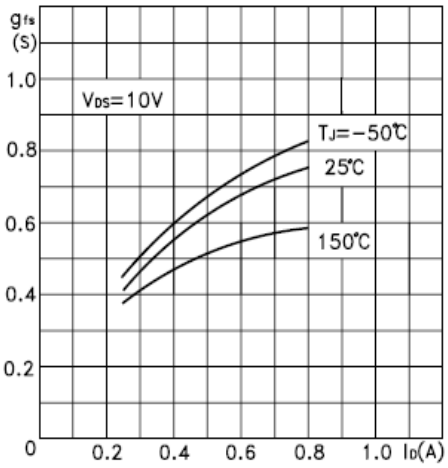
Typical Performance Characteristics



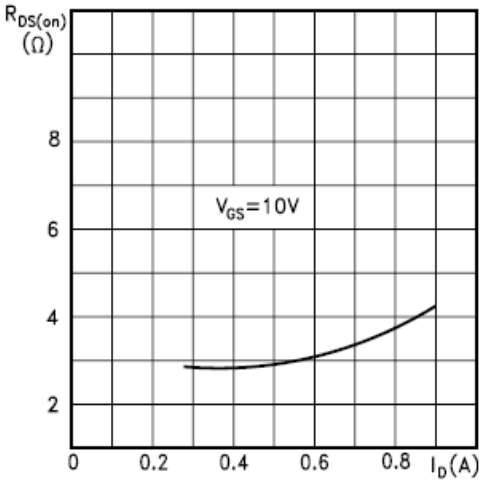
Output Characteristics



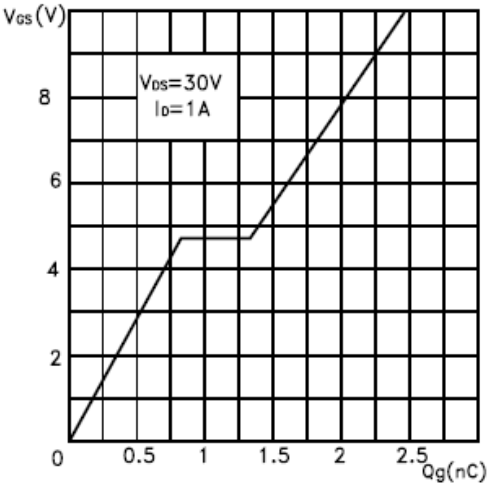
Transfer Characteristics



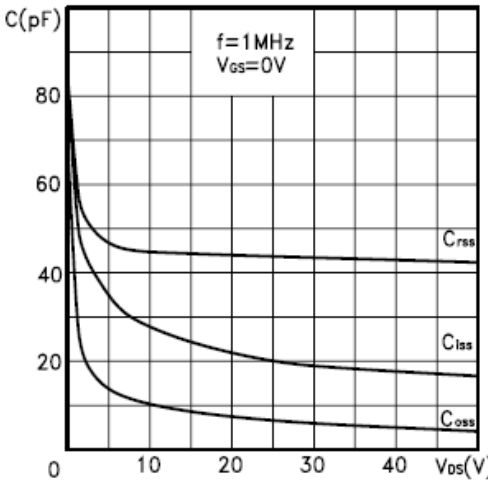
Transconductance



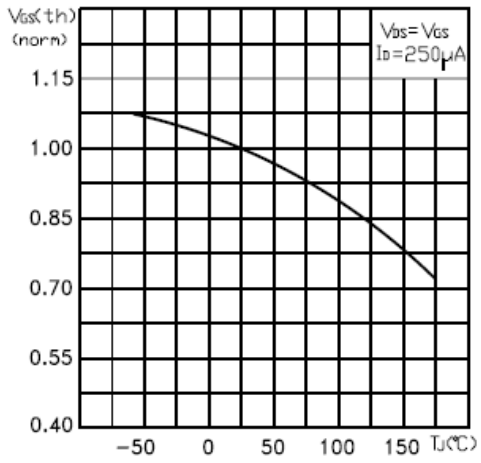
Static Drain-source On Resistance



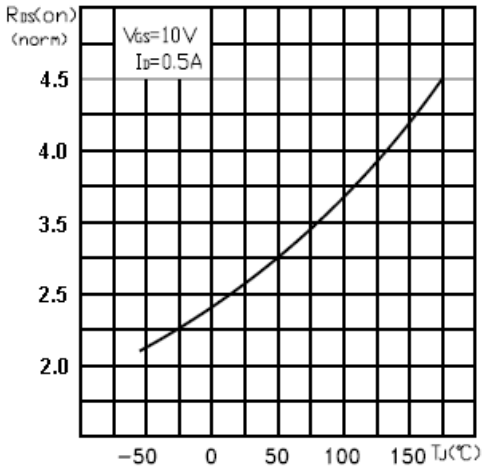
Gate Charge vs Gate-source Voltage



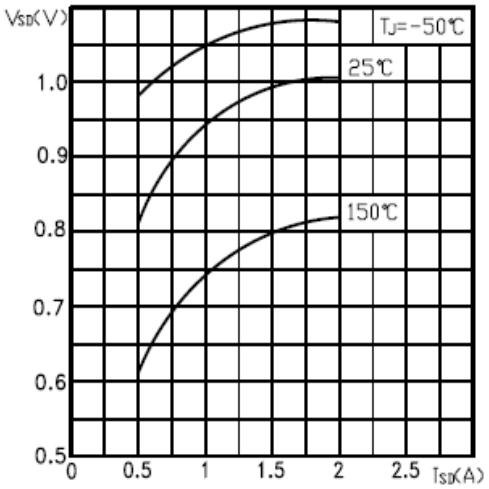
Capacitance Variations



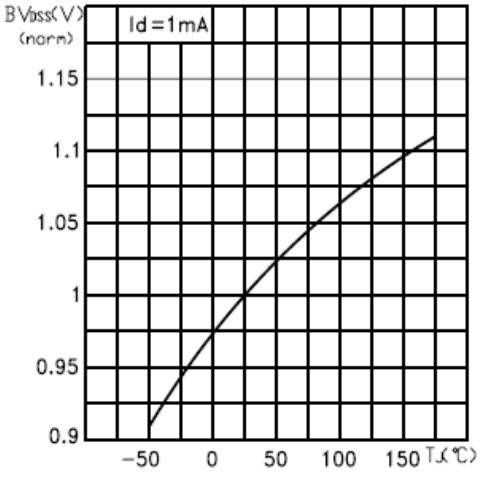
Normalized Gate Threshold Voltage vs Temperature



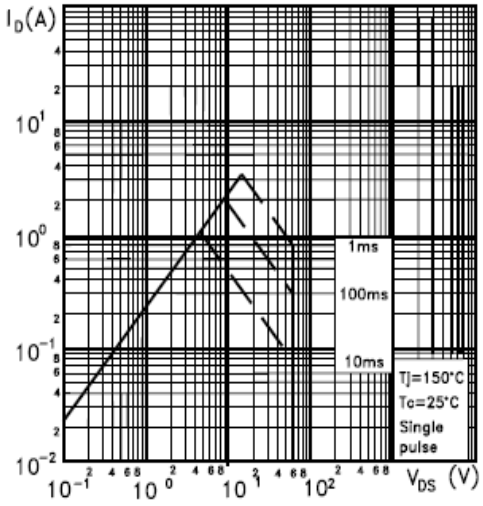
Normalized On Resistance vs Temperature



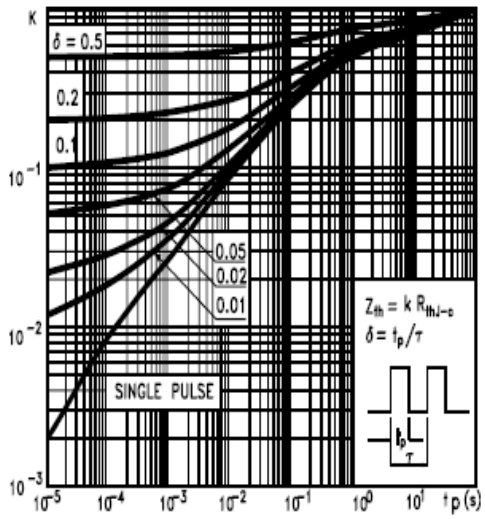
Source-Drain Forward



Normalized BVDSS vs Temperature

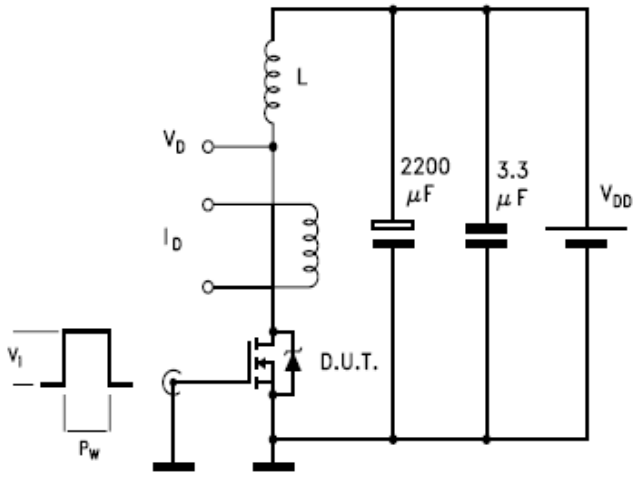


Safe Operating Area

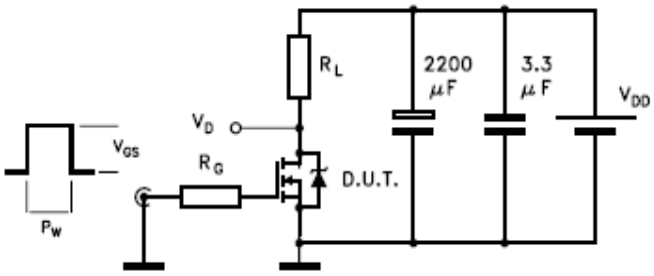


Thermal Impedance

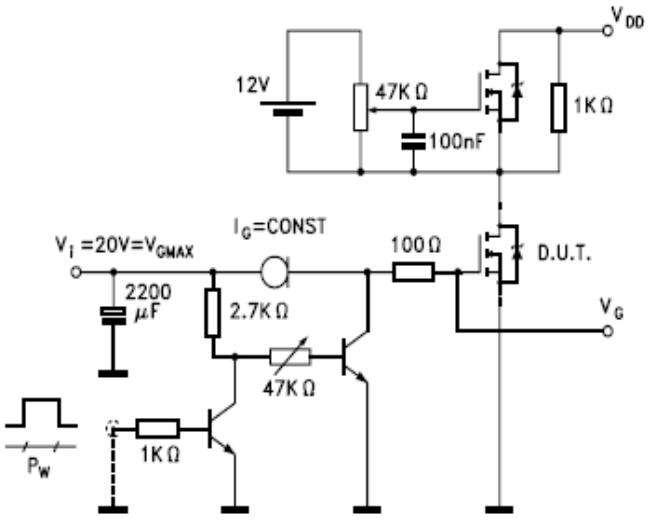
Typical Testing Circuit



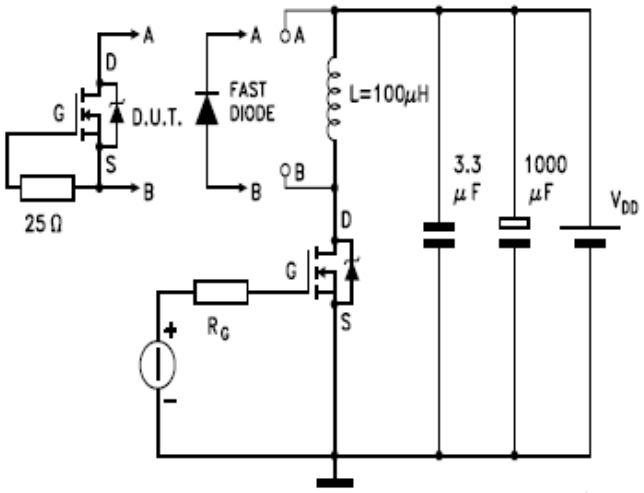
Unclamped Inductive Load Test



Switching Times Test Circuit



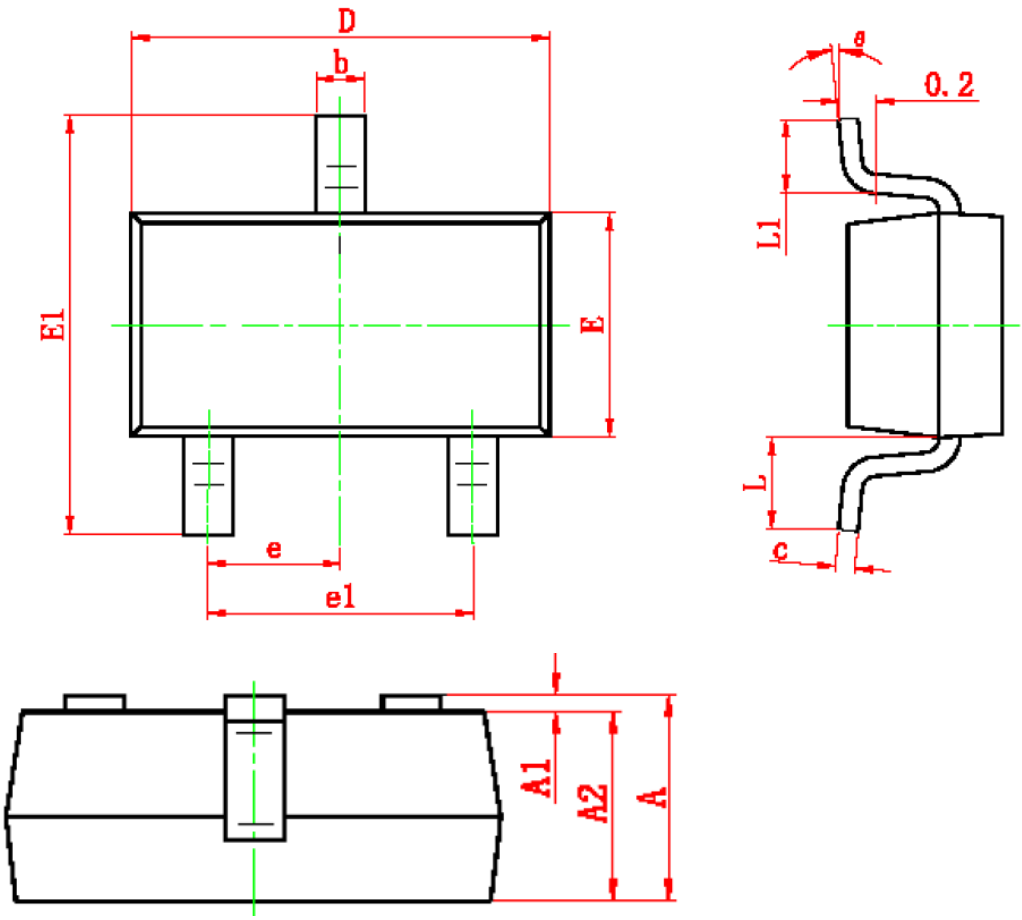
Gate Charge Test Circuit



Test Circuit For Inductive Load Switching and Diode Recovery Times

Packing Information

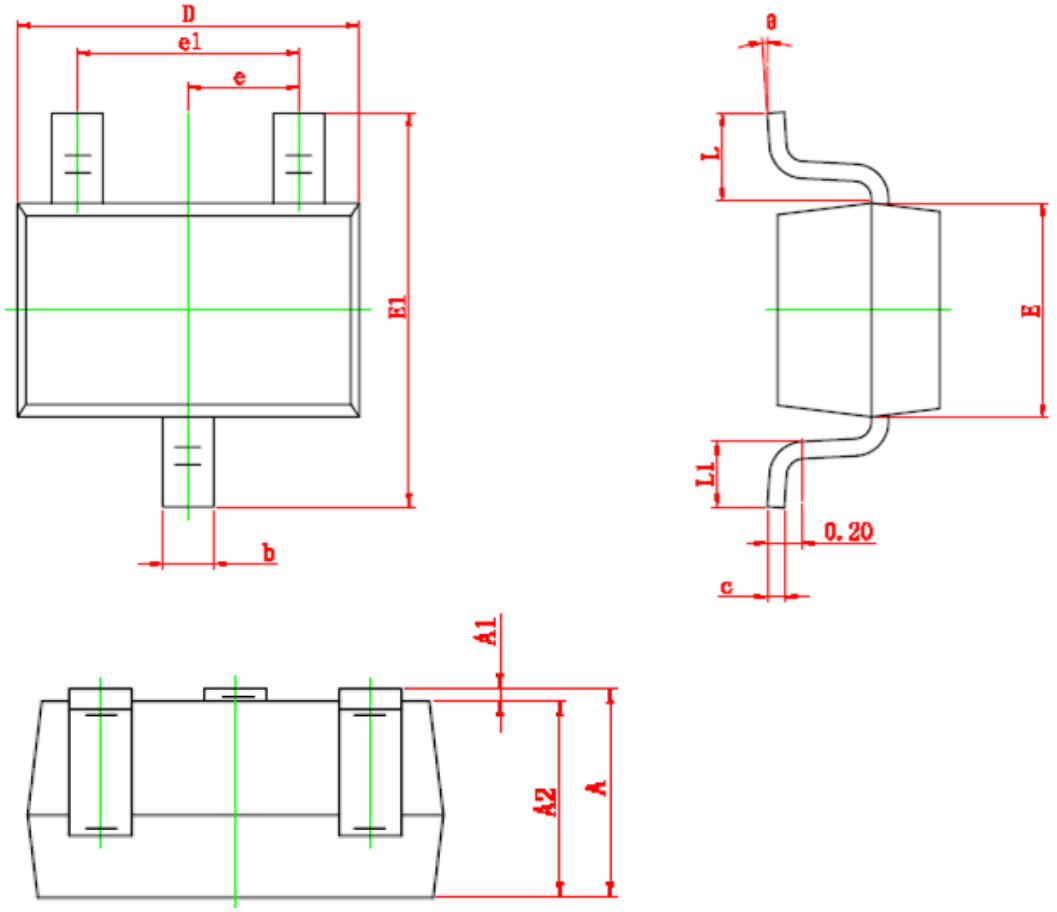
TSOT-23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.200	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.100	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

Packing Information

SOT-323



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

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 Electronics 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.