

MT3238B

N-Channel Power MOSFET

80V, 120A, 5.5mΩ



MT Semiconductor®

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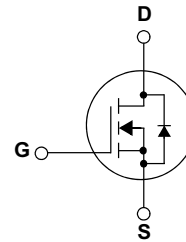
Features

- Max $R_{DS(on)} = 5.5m\Omega$ at $V_{GS} = 10V$, $I_D = 45A$
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extr emely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

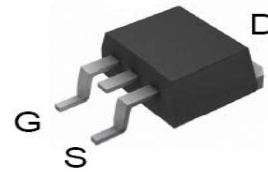
General Description

This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Hot swap

MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

TO-263-2L

Symbol	Parameter	Rating	Unit
Common Ratings ($T_C = 25^\circ C$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	80	V
V_{GSS}	Gate-Source Voltage	± 25	
T_J	Maximum Junction Temperature	175	$^\circ C$
T_{STG}	Storage Temperature Range	55 to 175	$^\circ C$
I_S	Diode Continuous Forward Current	$T_C = 25^\circ C$ 120	A
Mounted on Large Heat Sink			
I_{DM}		$T_C = 25^\circ C$ 480**	A
I_D	Continuous Drain Current	$T_C = 25^\circ C$ 120	A
		$T_C = 100^\circ C$ 85	
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$ 226	W
		$T_C = 100^\circ C$ 113	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	0.66	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	62.5	
Avalanche Ratings			
E_{AS}	Avalanche Energy, Single Pulsed	$L = 0.5mH$ 630***	mJ

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3238B	MT3238B	TO-263-2L	-	-	2500

Electrical Characteristics ($T_c = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	80		-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ\text{C}$	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=60A$	-	5.5	7.0	m Ω
Diode Characteristics						
V_{SD}	Diode Forward Voltage	$I_{SD}=60A, V_{GS}=0V$	-	0.8	1	V
t_{rr}	Reverse Recovery Time	$I_{SD}=60A, dI_{SD}/dt=100A/\mu s$	-	46	-	ns
Q_{rr}	Reverse Recovery Charge		-	98	-	nC

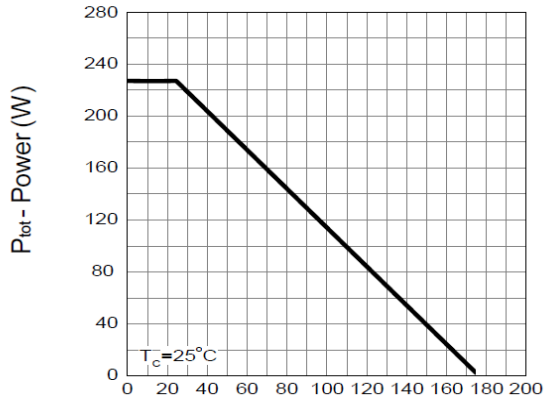
Electrical Characteristics (Cont.) ($T_c = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions				Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	0.6	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ Frequency=1.0MHz	-	3680	-	pF
C_{oss}	Output Capacitance		-	552	-	
C_{rss}	Reverse Transfer Capacitance		-	192	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=40V, R_G=6\Omega,$ $I_{DS}=60A, V_{GS}=10V,$	-	23	-	ns
T_r	Turn-on Rise Time		-	35	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	77	-	
T_f	Turn-off Fall Time		-	44	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	$V_{DS}=64V, V_{GS}=10V,$ $I_{DS}=60A$	-	87.9	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	
Q_{gd}	Gate-Drain Charge		-	30	-	

Note * : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

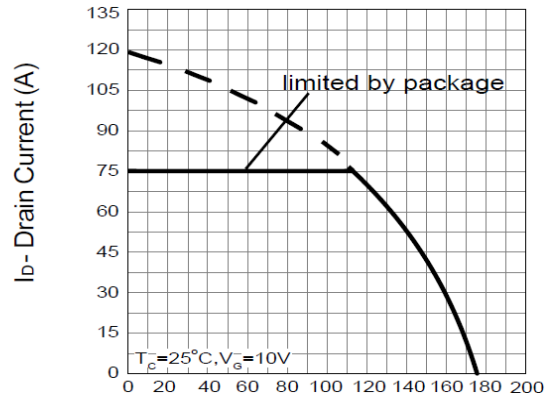
Typical Operating Characteristics

Power Dissipation



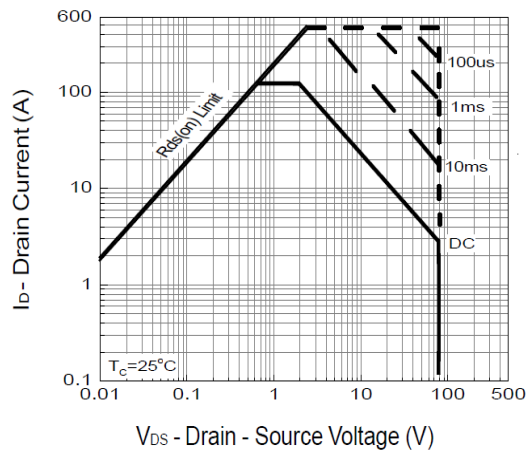
T_c - Case Temperature (°C)

Drain Current



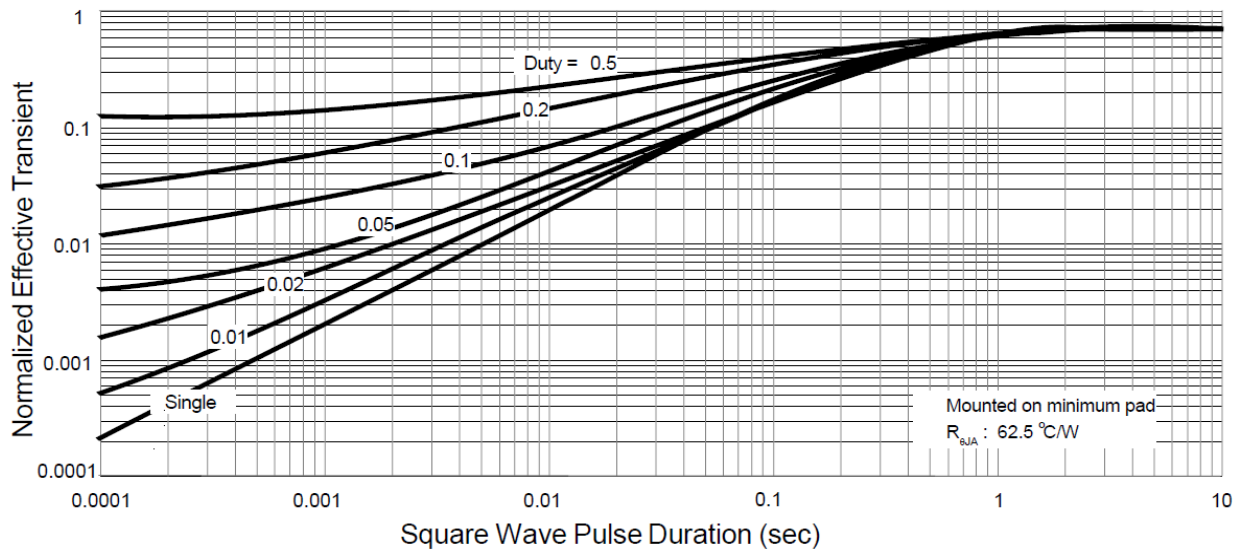
T_c -Case Temperature (°C)

Safe Operation Area



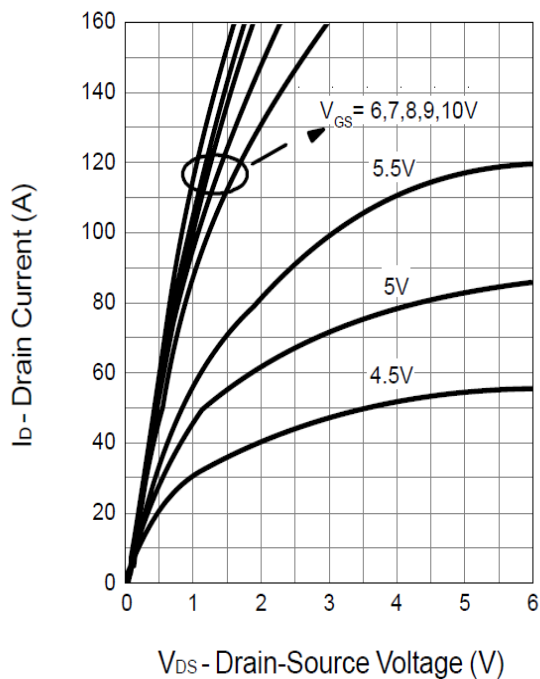
V_{DS} - Drain - Source Voltage (V)

Thermal Transient Impedance

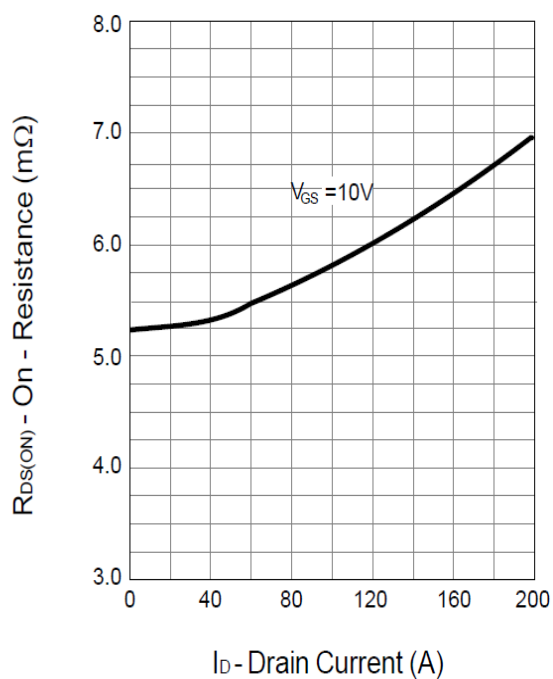


Typical Operating Characteristics (Cont.)

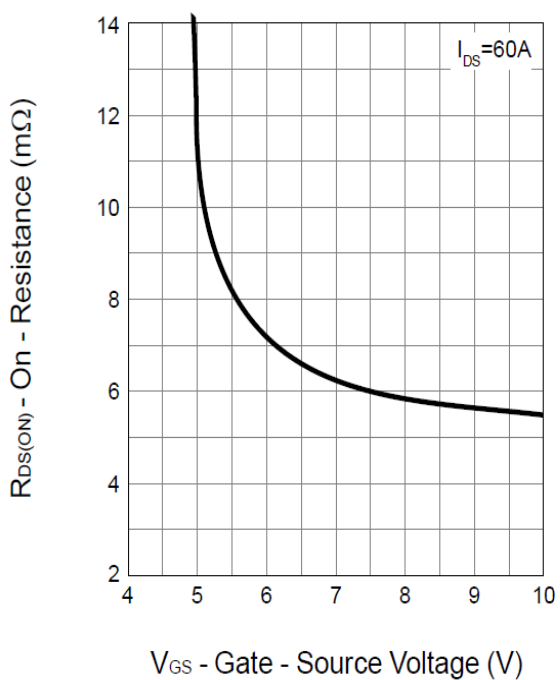
Output Characteristics



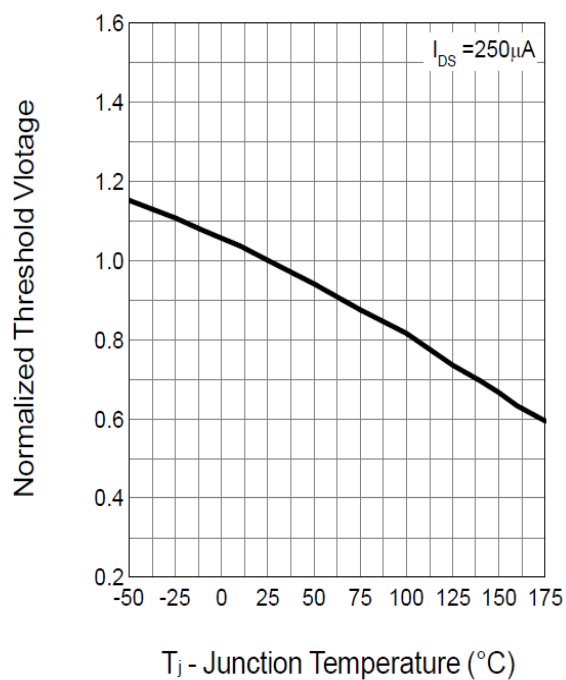
Drain-Source On Resistance



Drain-Source On Resistance

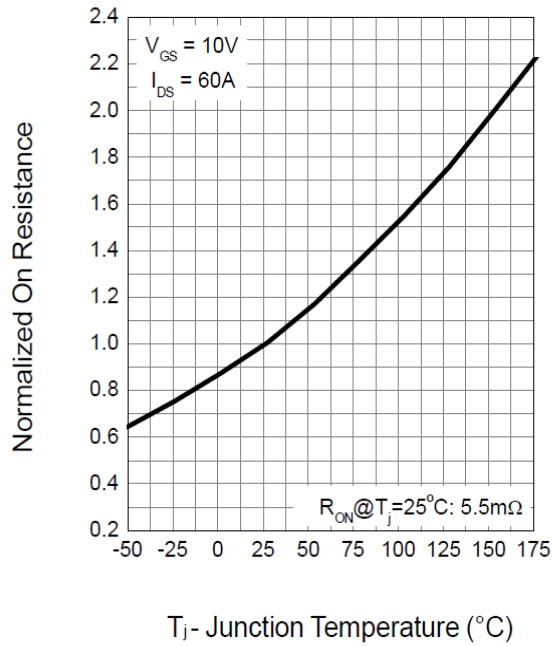


Gate Threshold Voltage

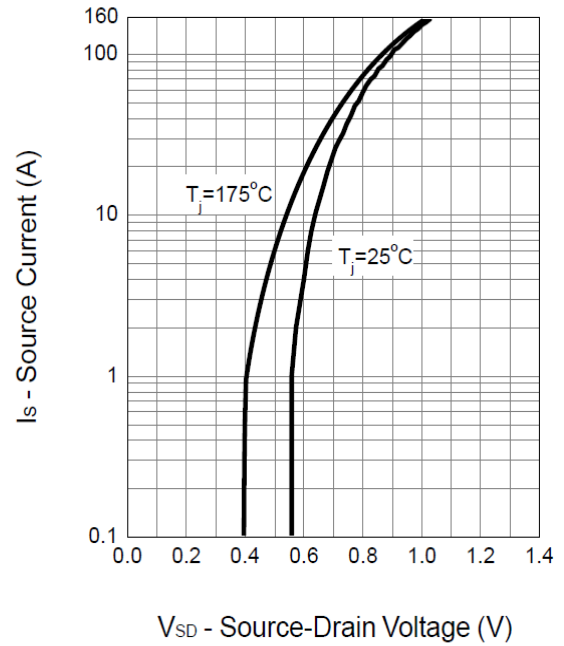


Typical Operating Characteristics (Cont.)

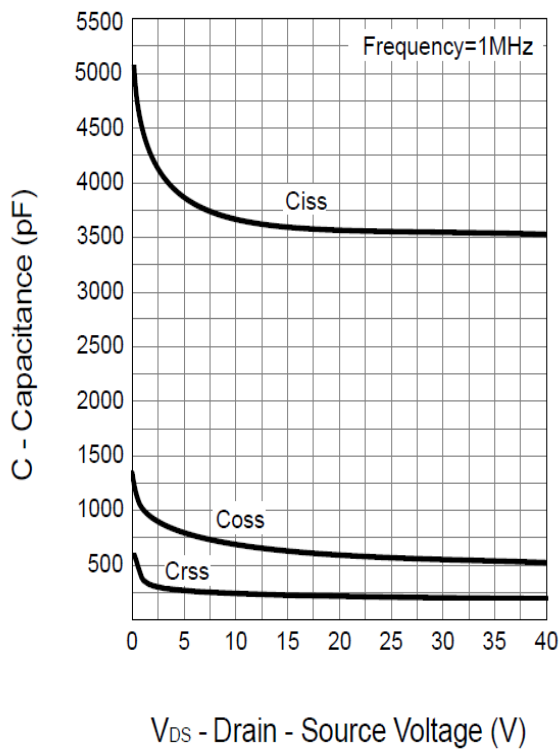
Drain-Source On Resistance



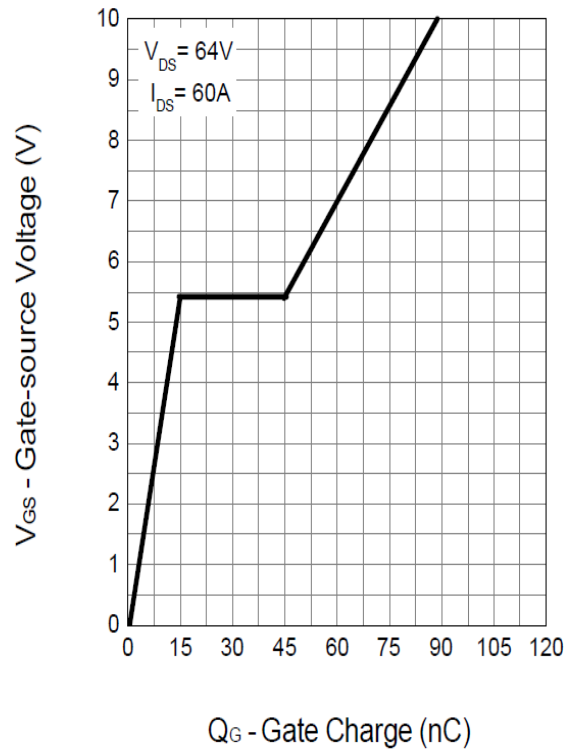
Source-Drain Diode Forward



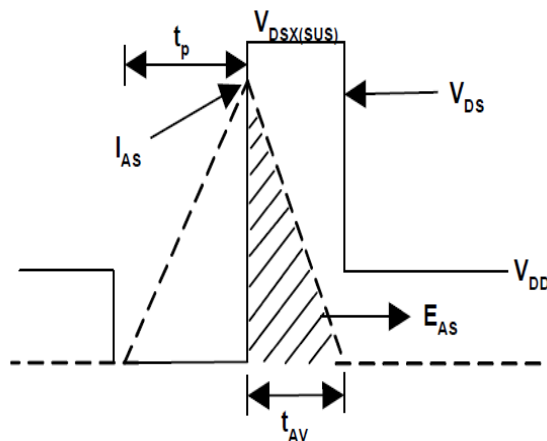
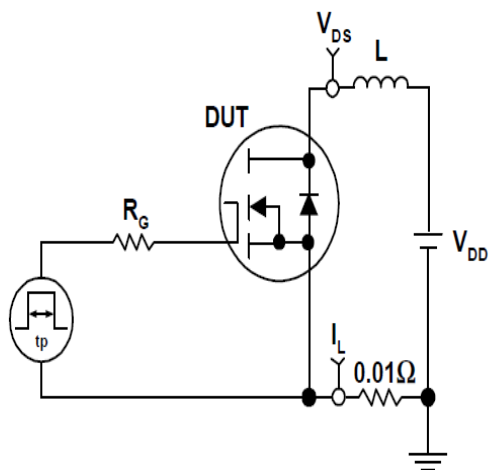
Capacitance



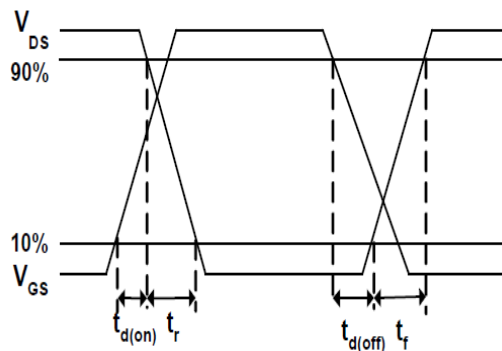
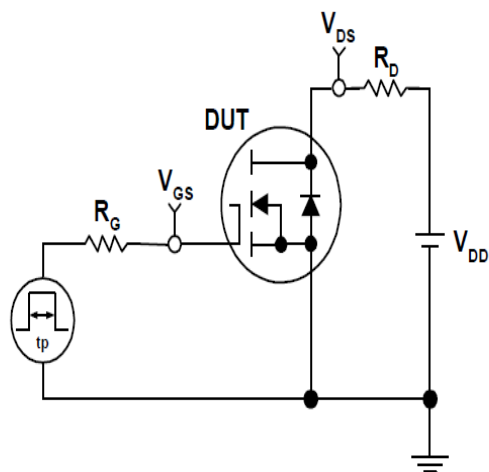
Gate Charge



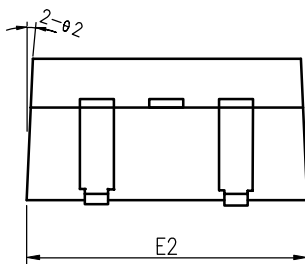
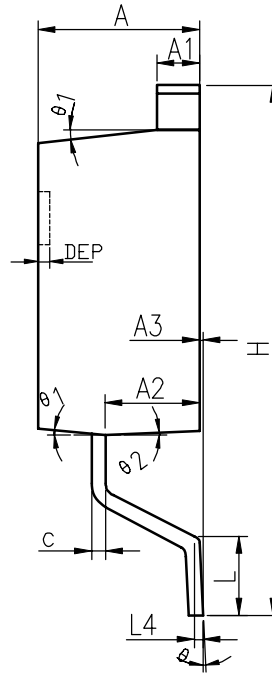
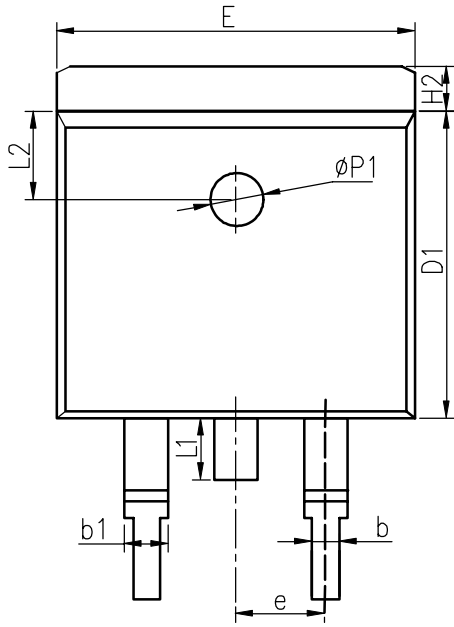
Avalanche Test Circuit and Waveforms



Avalanche Test Circuit and Waveforms



TO-263-2L



COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2	2.50 REF			0.098 REF		
L4	0.25 BSC			0.010 BSC		
	0°	5°	8°	0°	5°	8°
1	5°	7°	9°	5°	7°	9°
2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008

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