FH3210B
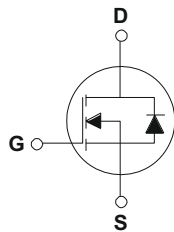
N-Channel Enhancement Mode MOSFET

Features

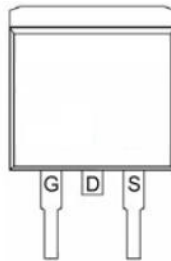- 100V / 120A

  $R_{DS(ON)} = 6.8 \ m\Omega \ (typ) \ @ \ V_{GS} = 10V$

- 100% avalanche tested
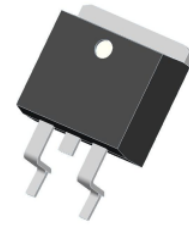
- Reliable and Rugged

Applications

- Switching application

- Power Management for Inverter Systems.

TO-263

Schematic diagram

Marking and pin assignment

TO-263 Top View

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings ($T_C = 25°C$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		±25	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		55 to 175	°C
I_S	Diode Continuous Forward Current	$T_C=25°C$	120	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	$T_C=25°C$	480**	A
I_D	Continuous Drain Current	$T_C=25°C$	120	A
		$T_C=100°C$	84	
P_D	Maximum Power Dissipation	$T_C=25°C$	237	W
		$T_C=100°C$	119	
$R_{\theta JC}$	Thermal Resistance Junction to Case		0.63	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient		62.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	756***	mJ

Note   *   Repetitive rating ; pulse width limiited by junction temperature
          ** Drain current is limited by junction temperature
          *** VD=80V

Electrical Characteristics $(T_C = 25℃$ Unless Otherwise Noted)

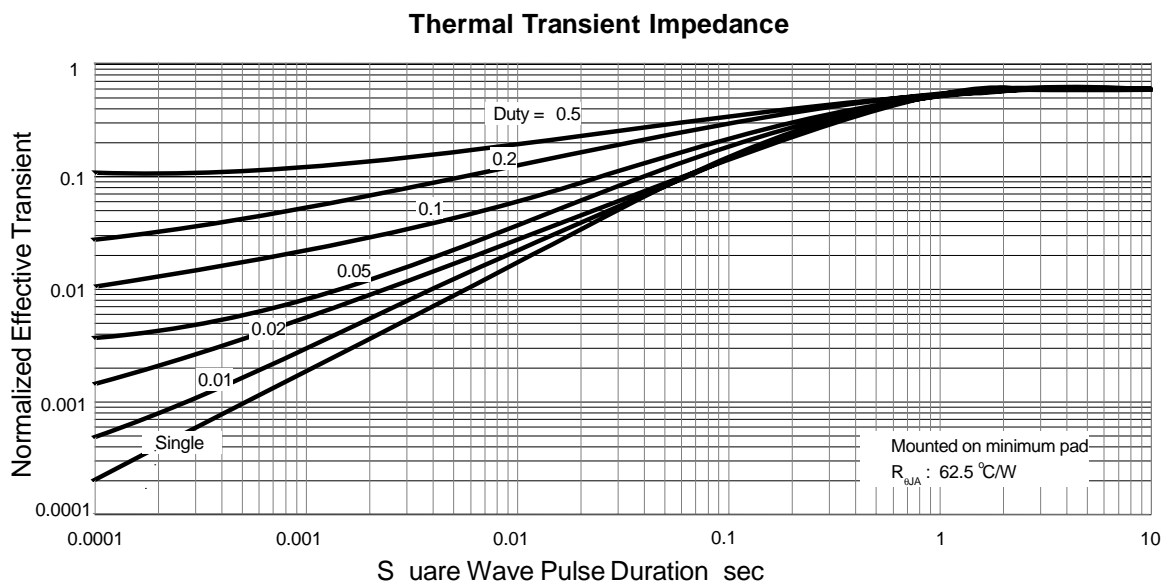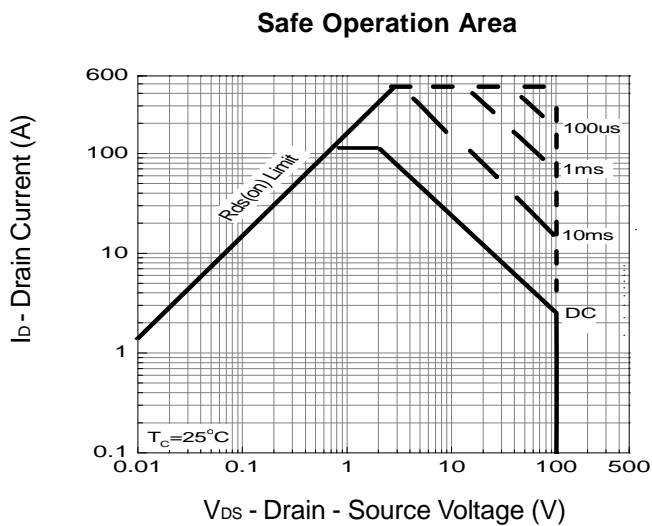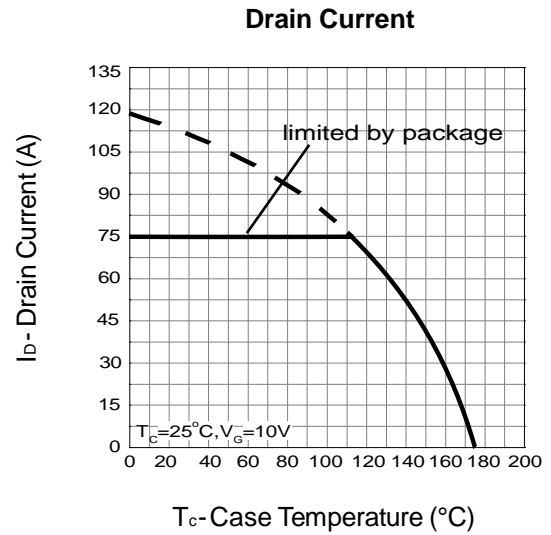| Symbol	Parameter	Test Conditions	FH3210			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_{DS}=250\mu A$	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=100V$, $V_{GS}=0V$	-	-	1	μA
		$T_J=85°C$	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_{DS}=250\mu A$	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm25V$, $V_{DS}=0V$	-	-	±100	nA
$R_{DS(ON)}$*	Drain Source On state Resistance	$V_{GS}=10V$, $I_{DS}=60A$		6.8	8.5	mΩ
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.) $(T_C = 25°C$ Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	FH3210			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics						
R_G	Gate Resistance	$V_{GS}=0V$,$V_{DS}=0V$,F=1MHz	-	1.7	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V$, $V_{DS}=25V$, Frequency=1.0MHz	-	4922	-	pF
C_{oss}	Output Capacitance		-	902	-	
C_{rss}	Reverse Transfer Capacitance		-	508	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=50V$, $R_G=6 \Omega$, $_{DS}=60A$, $V_{GS}=10V$,	-	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	$V_{DS}=80V$, $V_{GS}=10V$, $_{DS}=60A$	-	120	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	
Q_{gd}	Gate-Drain Charge		-	28	-	

Note * : Pulse test ; pulse width≤300μs, duty cycle≤2%.
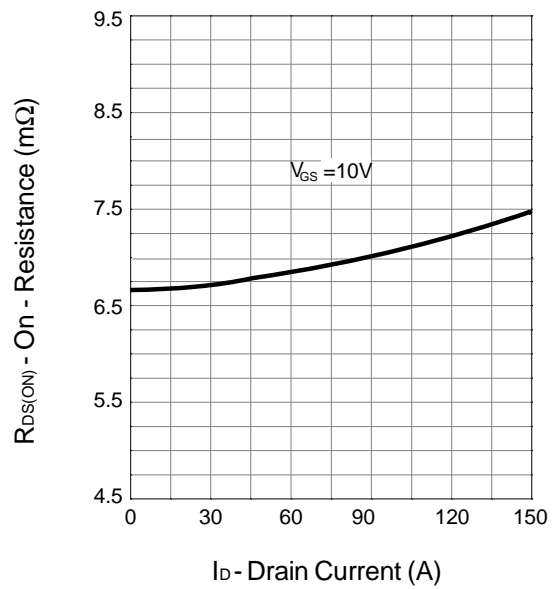
Typical Operating Characteristics

Power Dissipation

P_{tot} - Power (W)

T_C - Case Temperature (°C)

T_C=25°C

Drain Current

I_D - Drain Current (A)

limited by package

T_C - Case Temperature (°C)

T_C=25°C, V_G=10V

Safe Operation Area

I_D - Drain Current (A)

Rds(on) Limit

100us
1ms
10ms
DC

T_C=25°C

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

Thermal Transient Impedance

Normalized Effective Transient

Duty = 0.5
0.2
0.1
0.05
0.02
0.01
Single

Mounted on minimum pad
$R_{\theta JA}$: 62.5 °C/W

S uare Wave Pulse Duration sec
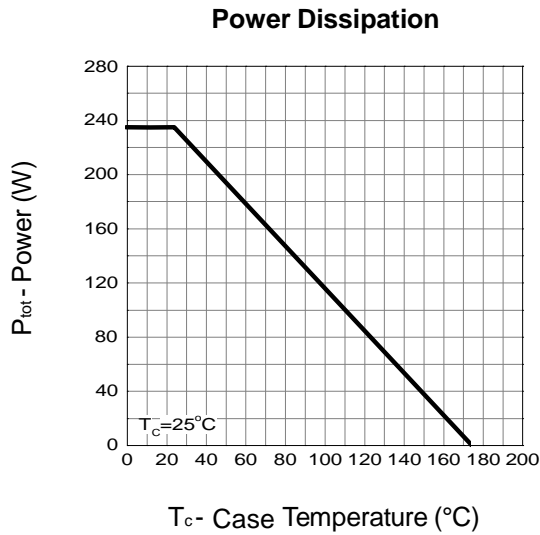
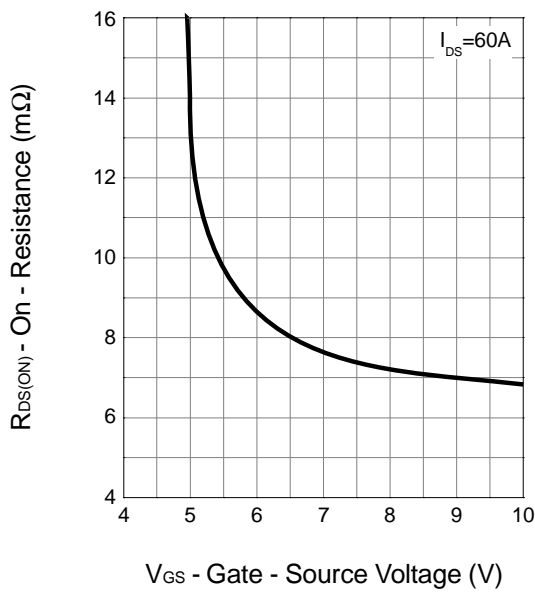## Typical Operating Characteristics (Cont.)
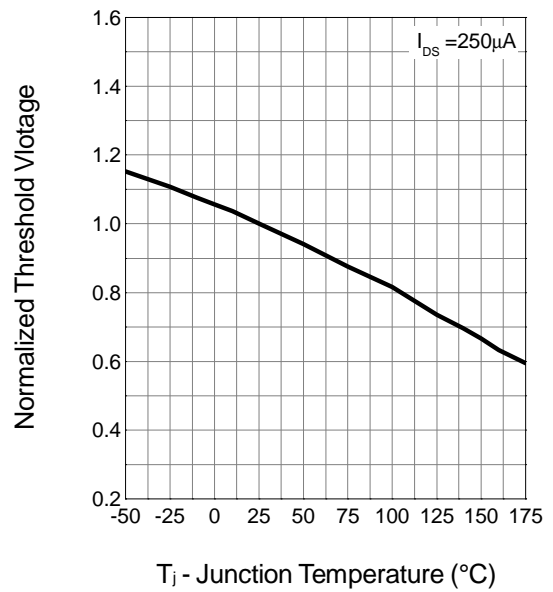
Output Characteristics
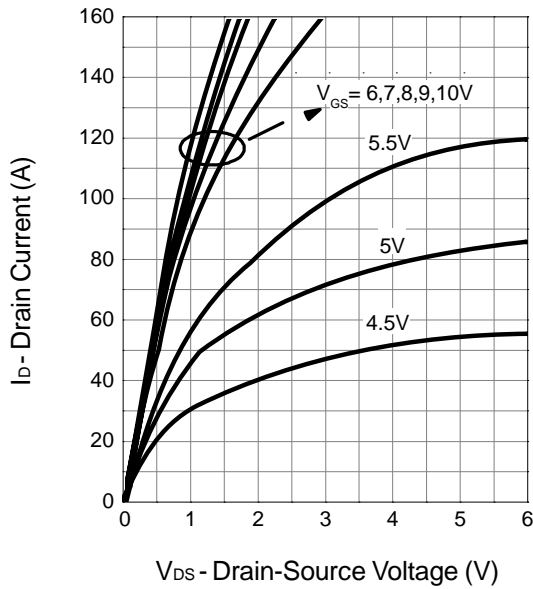
Drain-Source On Resistance
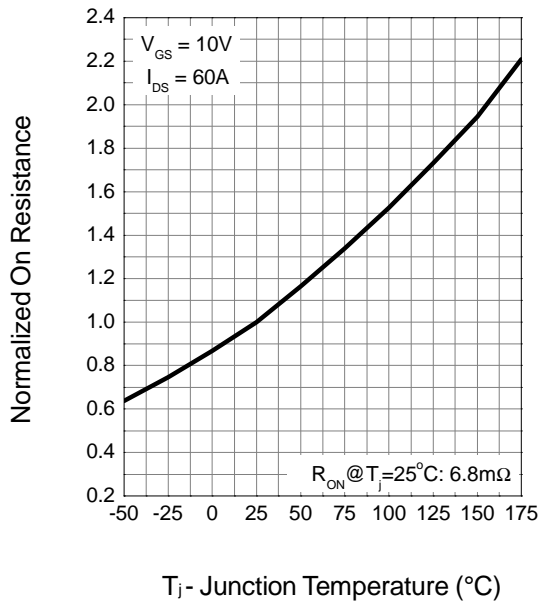
Drain-Source On Resistance

Gate Threshold Voltage

Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

V_{GS} = 10V
I_{DS} = 60A
R_{ON}@T_j=25°C: 6.8mΩ

Normalized On Resistance vs T_j - Junction Temperature (°C)

Source-Drain Diode Forward

T_j=175°C
T_j=25°C

I_S - Source Current (A) vs V_{SD} - Source-Drain Voltage (V)

Capacitance

Frequency=1MHz

Ciss
Coss
Crss

C - Capacitance (pF) vs V_{DS} - Drain - Source Voltage (V)

Gate Charge

V_{DS}= 80V
I_{DS}= 60A

V_{GS} - Gate-source Voltage (V) vs Q_G - Gate Charge (nC)
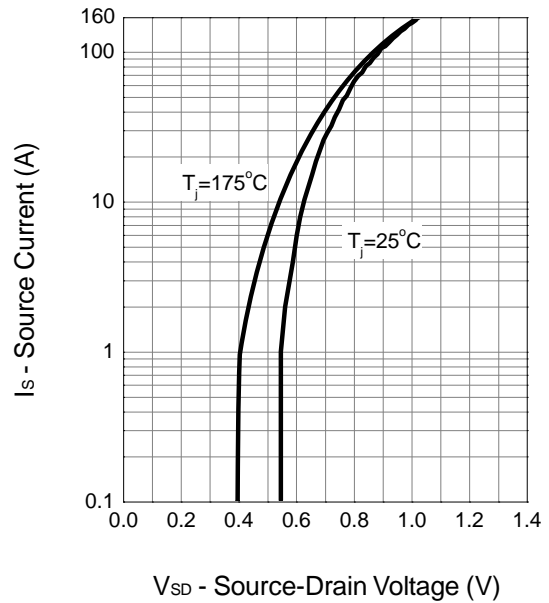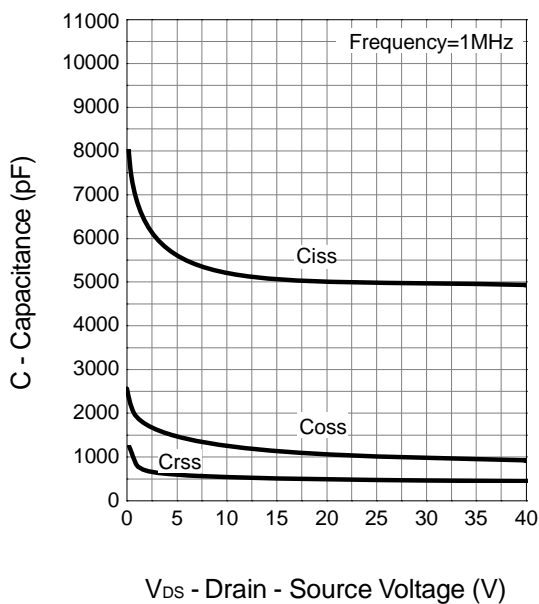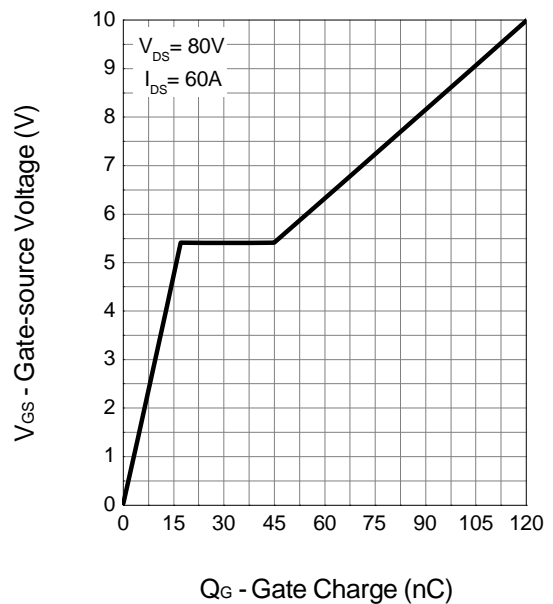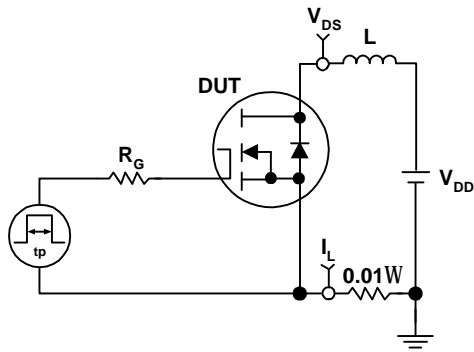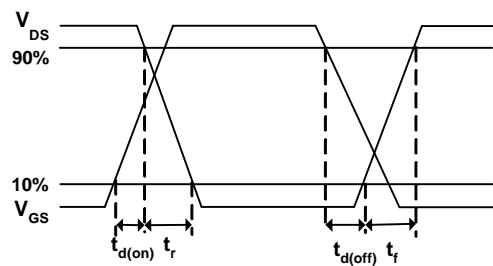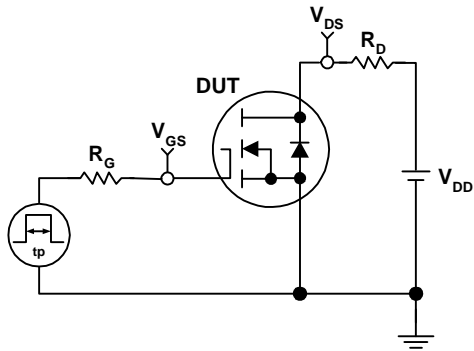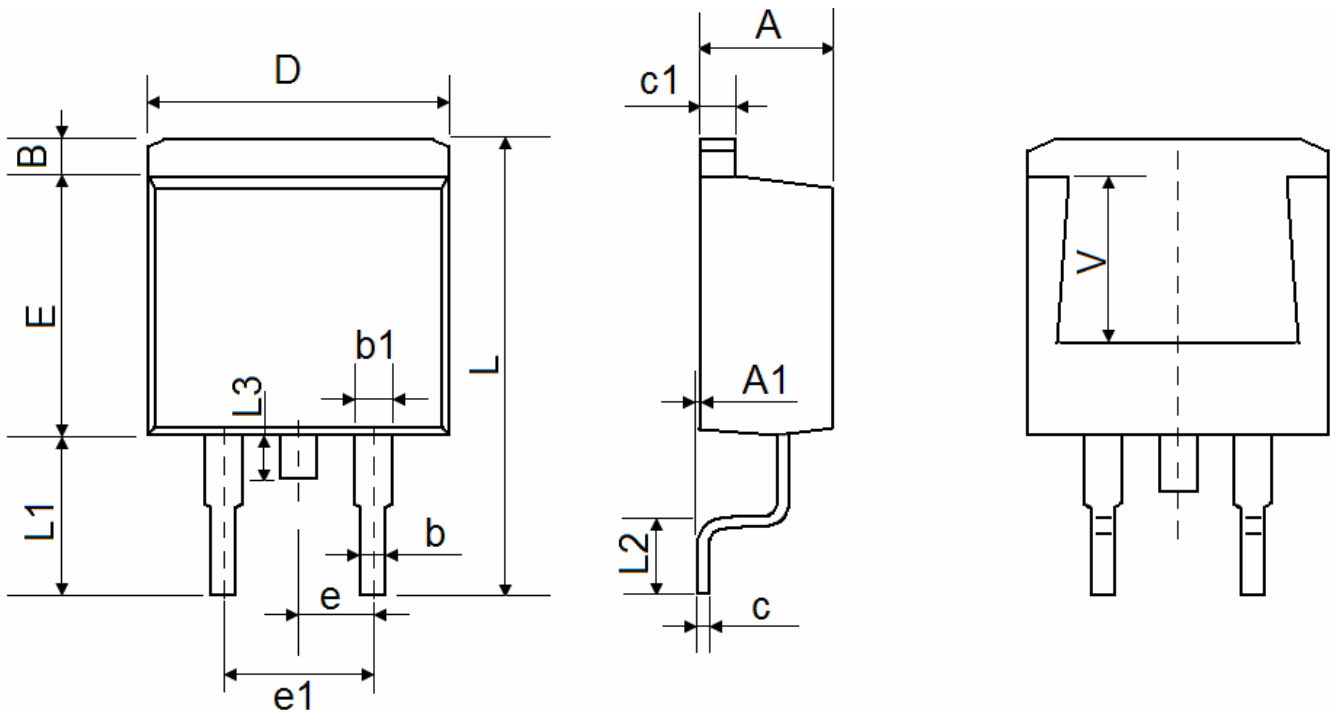
Avalanche Test Circuit and Waveforms
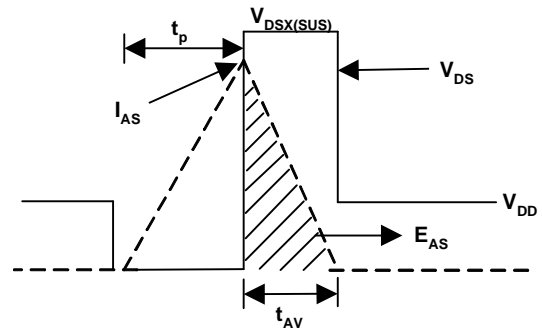
Avalanche Test Circuit and Waveforms

TO-263-2L Package Information

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	