

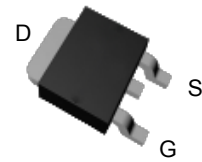
Features

- 40V/170A
 $R_{DS(ON)}=1.85m\Omega(\text{typ.})@V_{GS}=10V$
 $R_{DS(ON)}=2.2m\Omega(\text{typ.})@V_{GS}=10V$
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)
- Moisture Sensitivity Level MSL1
(per JEDEC J-STD-020D)

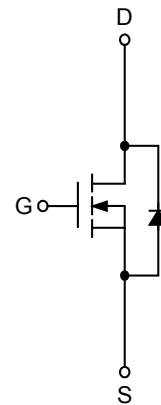
Applications

- SMPS Synchronous Rectification.
- Load Switch.
- DC-DC Conversion.

Pin Description



TO-252-2



N-Channel MOSFET

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	170	A
I _D	Continuous Drain Current	T _C =25°C	170	A
		T _C =100°C	128	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	510	
P _D	Maximum Power Dissipation	T _C =25°C	104	W
		T _C =100°C	42	
R _{θJC}	Thermal Resistance-Junction to Case	Steady state	1.2	°C/W
R _{θJA} ^c	Thermal Resistance-Junction to Ambient	t ≤ 10s	17	°C/W
		Steady state	58	
I _{AS} ^d	Avalanche Current, Single pulse	L=0.1mH	90	A
E _{AS} ^d	Avalanche Energy, Single pulse	L=0.1mH	405	mJ

Note a : Max. continuous current is limited by bonding wire.

Note b : Pulse width limited by max. junction temperature.

Note c : Surface mounted on 1in^2 pad area, steady state $t = 999\text{s}$.

Note d : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^{\circ}\text{C}$).

Electrical Characteristics (T_A = 25°C unless otherwise noted)

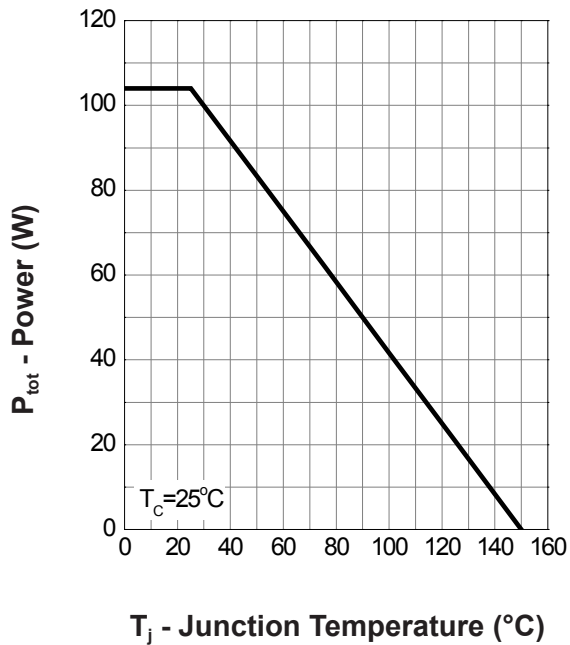
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	-	-	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.3	1.7	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^e	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =25A T _J =125°C V _{GS} =4.5V, I _{DS} =15A	- - -	1.85 2.3 2.2	2.2 - 3.0	mΩ
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	47	-	S
Diode Characteristics						
V _{SD} ^e	Diode Forward Voltage	I _{SD} =25A, V _{GS} =0V	-	0.8	1.1	V
t _{rr}	Reverse Recovery Time	I _{SD} =25A, dI _{SD} /dt=100A/μs	-	38	-	ns
t _a	Charge Time		-	23.8	-	
t _b	Discharge Time		-	14.2	-	
Q _{rr}	Reverse Recovery Charge		-	30	-	nC
Dynamic Characteristics ^f						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1	2	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	3225	4193	pF
C _{oss}	Output Capacitance		-	755	-	
C _{rss}	Reverse Transfer Capacitance		-	107	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	18.3	33	ns
t _r	Turn-on Rise Time		-	10.3	19	
t _{d(OFF)}	Turn-off Delay Time		-	57.5	104	
t _f	Turn-off Fall Time		-	51.3	93	
Gate Charge Characteristics ^f						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =25A	-	50	70	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =25A	-	23	-	
Q _{gth}	Threshold Gate Charge		-	5.3	-	
Q _{gs}	Gate-Source Charge		-	9.6	-	
Q _{gd}	Gate-Drain Charge		-	6.7	-	

Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.

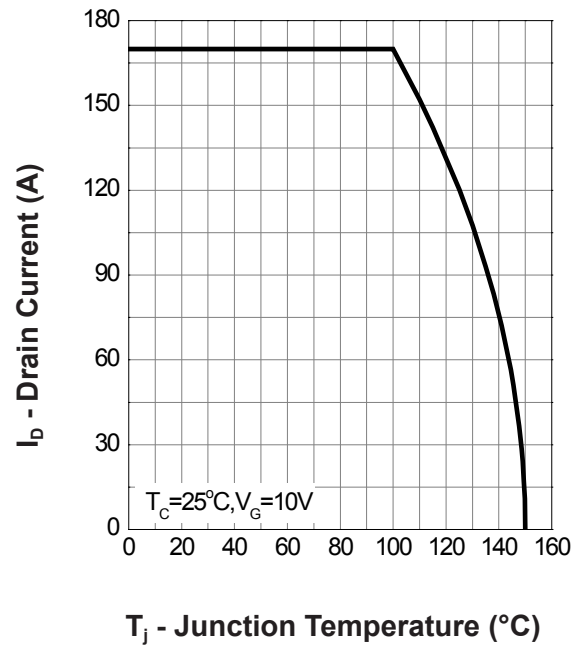
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

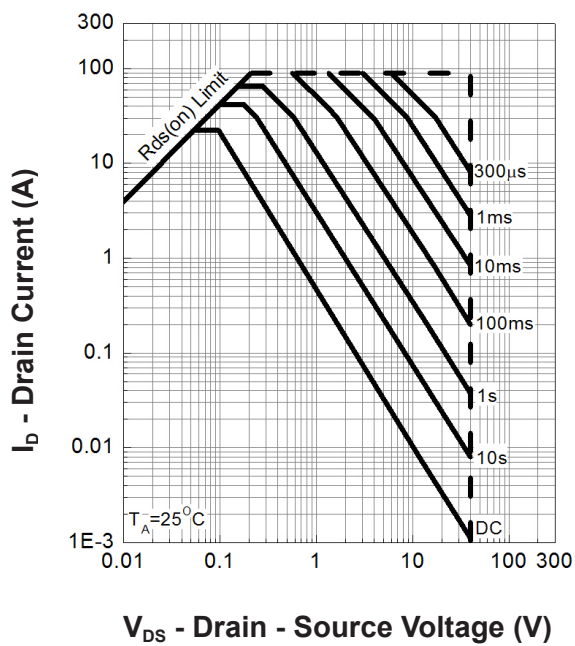
Power Dissipation



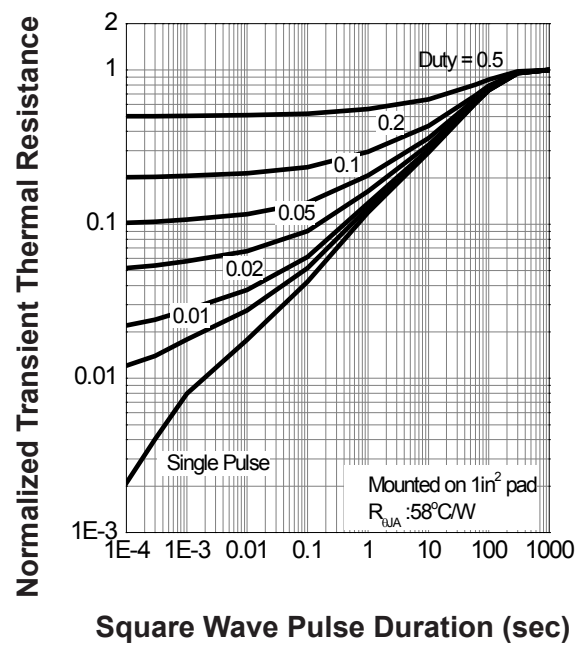
Drain Current



Safe Operation Area

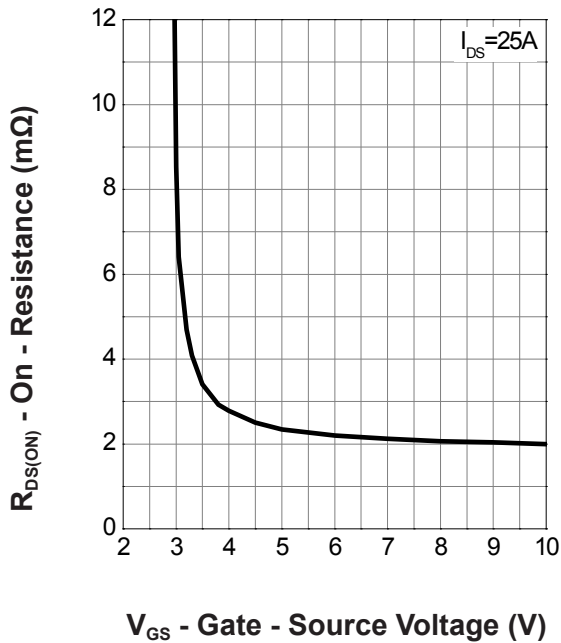


Thermal Transient Impedance

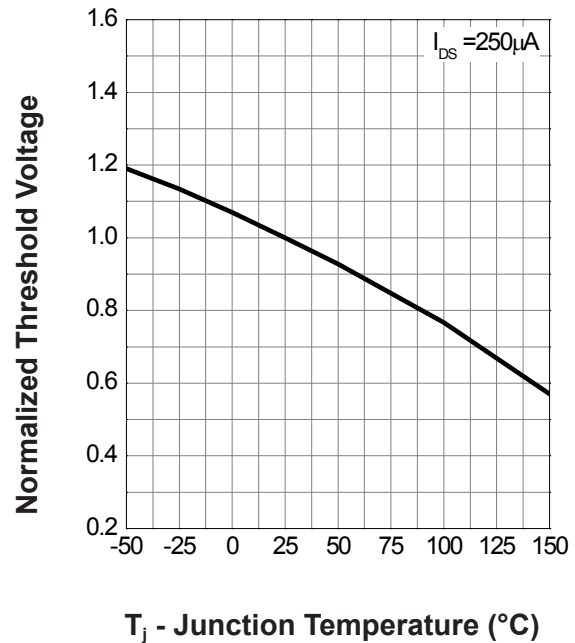


Typical Operating Characteristics(Cont.)

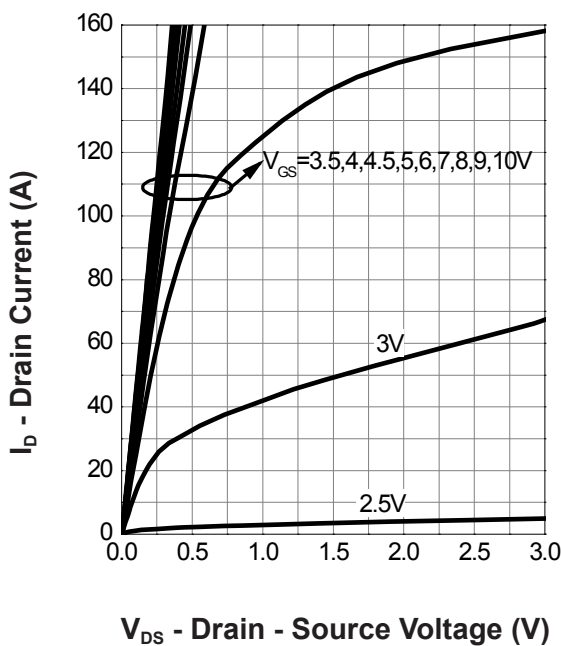
Gate-Source On Resistance



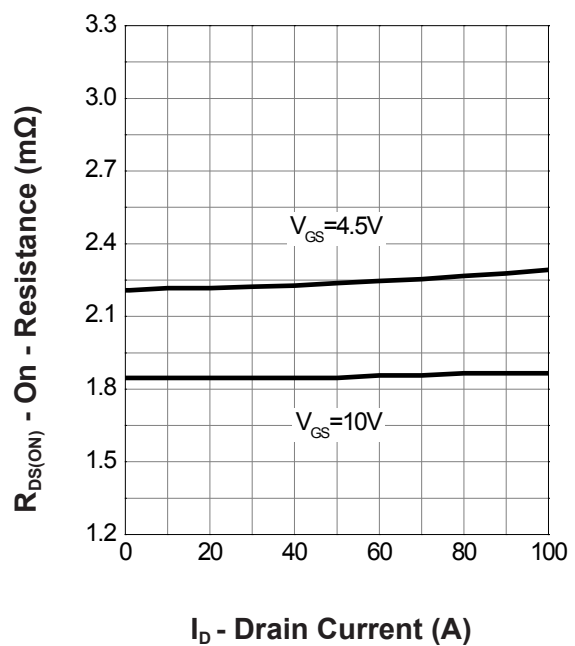
Gate Threshold Voltage



Output Characteristics

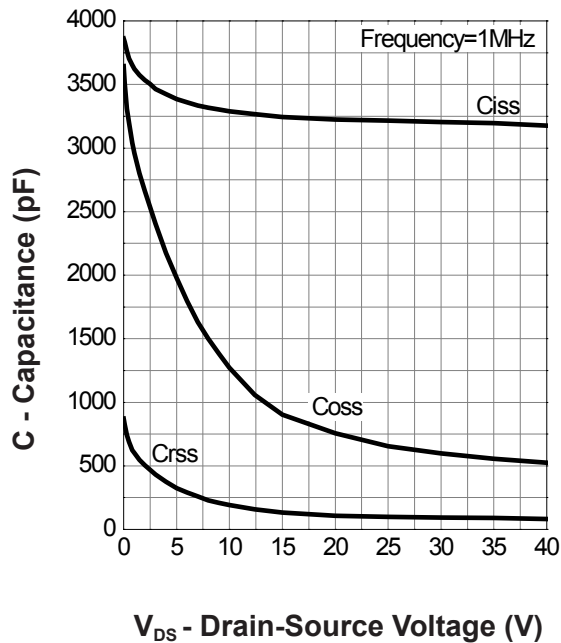


Drain-Source On Resistance

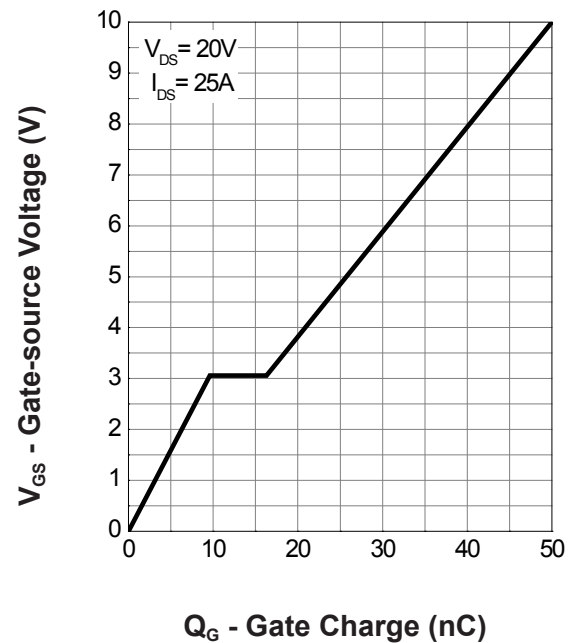


Typical Operating Characteristics(Cont.)

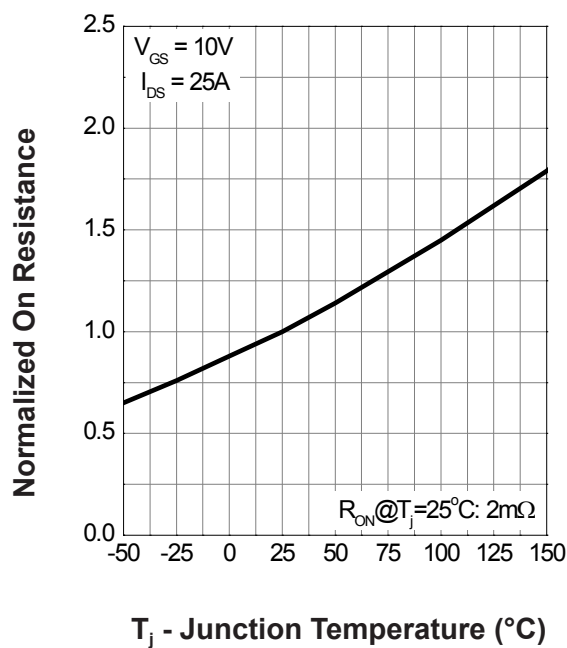
Capacitance



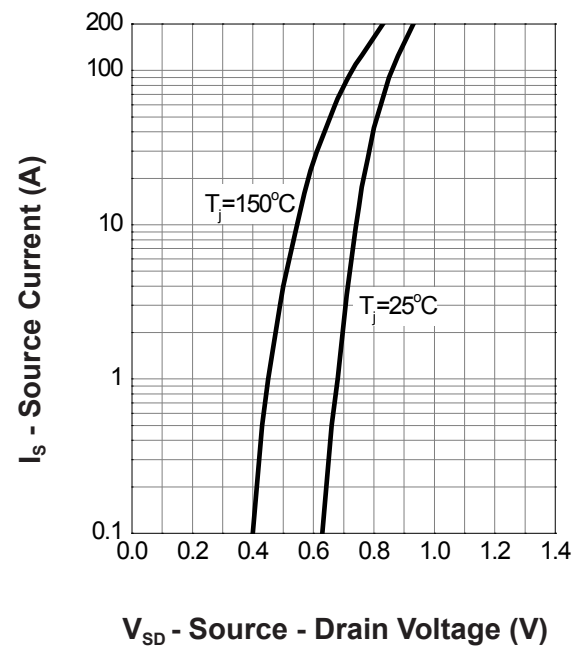
Gate Charge



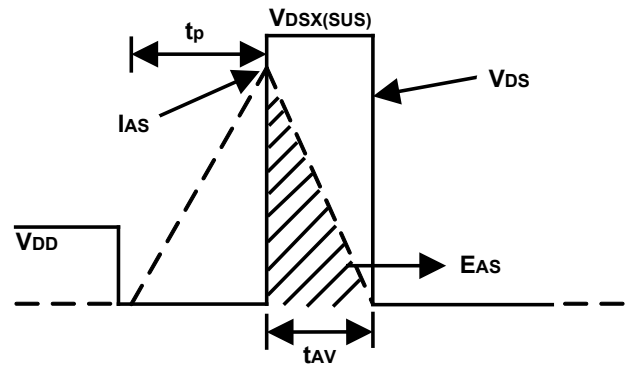
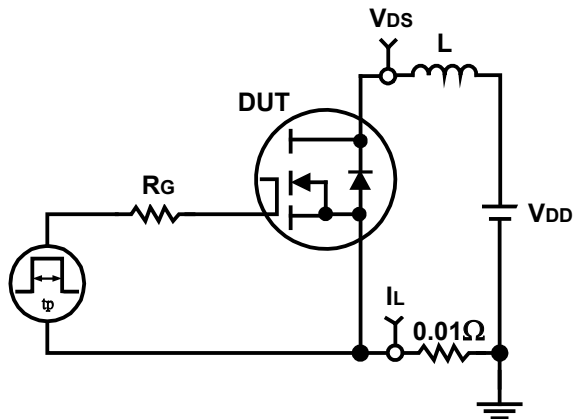
Drain-Source On Resistance



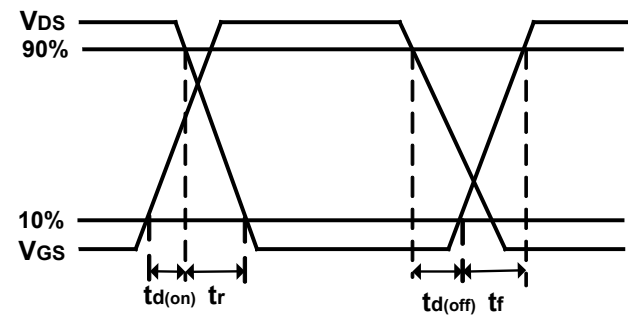
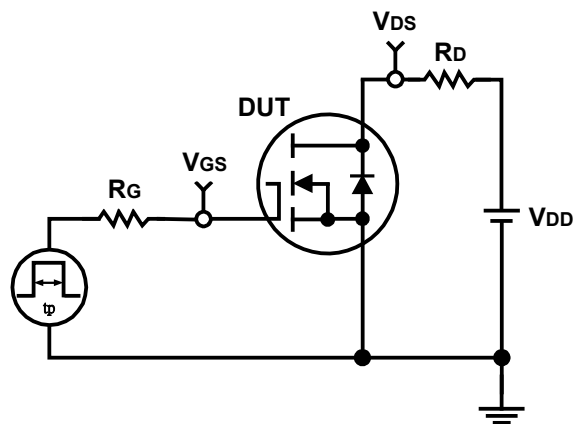
Source-Drain Diode Forward



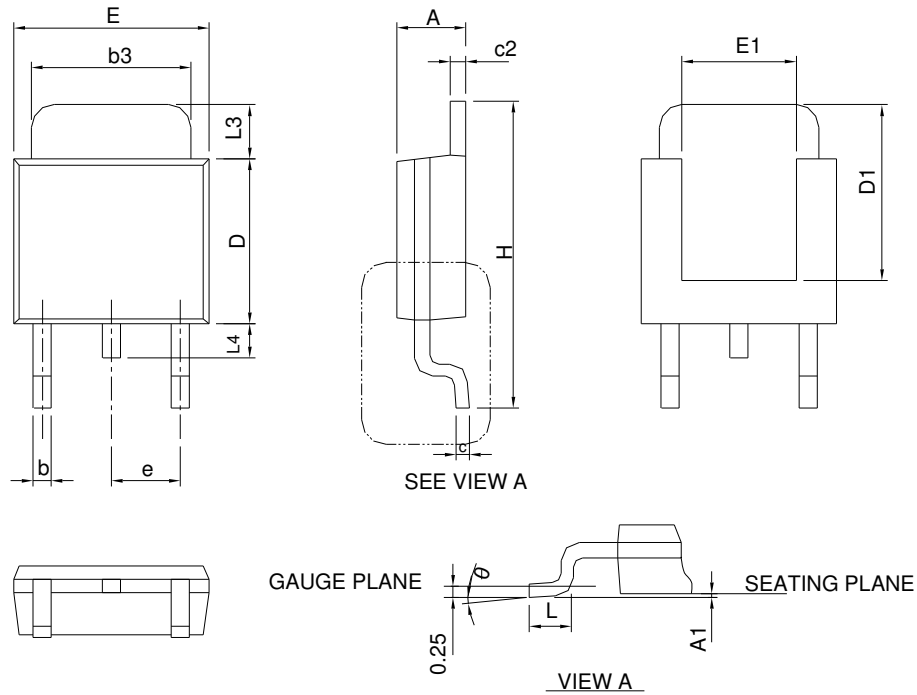
Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



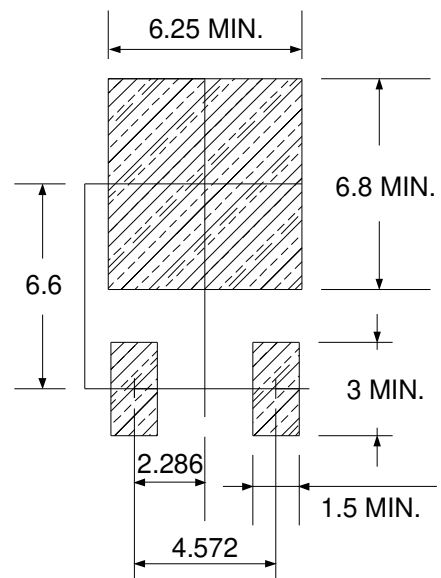
Package Information



DIMENSIONS	TO-252-2			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-252 .

RECOMMENDED LAND PATTERN



UNIT: mm