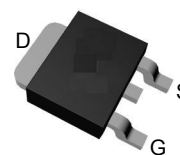


P-Channel Enhancement Mode MOSFET
Pin Configuration

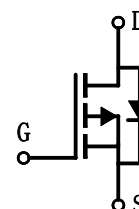
- -30V/-70A
- $R_{DS(ON)}=5.1m\Omega$ (typ) @ $V_{GS}=-20V$
 $R_{DS(ON)}=6.2m\Omega$ (typ) @ $V_{GS}=-10V$
- 100% UIS & RG Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)



Top View of TO-252-3

Applications

- Power Management for Industrial DC/DC Converters


Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Unit	
Common Ratings				
V_{DSS}	Drain-Source Voltage	-30	V	
V_{GSS}	Gate-Source Voltage	± 25		
I_D	Continuous Drain Current ^G	$T_C=25^\circ C$	-70	A
		$T_C=100^\circ C$	-55	
I_{DM}	Pulsed Drain Current ^C	$T_C=25^\circ C$	-200	A
I_{DSM}	Continuous Drain Current	$T_A=25^\circ C$	-15	A
		$T_A=70^\circ C$	-12	
P_D	Power Dissipation ^B	$T_C=25^\circ C$	90	W
		$T_C=100^\circ C$	45	
T_{STG}, T_j	Storage Temperature Range	-55 to 175	$^\circ C$	
P_{DSM}	Power Dissipation ^A	$T_A=25^\circ C$	2.5	W
		$T_A=70^\circ C$	1.6	
I_{AS}	Single pulsed avalanche Current ^C	-50	A	
E_{AS}	Single pulsed avalanche energy ^C	$L=0.1mH$	125	mJ
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady-State	1.6	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient ^{AD}	$t \leq 10S$	20	
		Steady-State	50	

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±25V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.5	-2.5	-3.5	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-200			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-20V, I _D =-20A T _J =125°C		5.1 7.6	6.2 9.2	mΩ
		V _{GS} =-10V, I _D =-20A		6.2	8	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-20A		42		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Maximum Body-Diode Continuous Current ^G				-70	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance		2310	2890	3500	pF
C _{oss}	Output Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz	410	585	760	pF
C _{riss}	Reverse Transfer Capacitance		280	470	660	pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	1.9	3.8	5.7	Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge		40	51	61	nC
Q _{gs}	Gate Source Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-20A	10	12	14	nC
Q _{gd}	Gate Drain Charge		10	16	22	nC
t _{D(on)}	Turn-On DelayTime			16		ns
t _r	Turn-On Rise Time	V _{GS} =-10V, V _{DS} =-15V, R _L =0.75Ω,		12		ns
t _{D(off)}	Turn-Off DelayTime	R _{GEN} =3Ω		45		ns
t _f	Turn-Off Fall Time			22		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-20A, dI/dt=100A/μs	14	18	22	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-20A, dI/dt=100A/μs	9	11	13	nC

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175° C may be used if the PCB allows it.

B. The power dissipation P_D is based on T_{J(MAX)}=175° C, using junction-to-case thermal impedance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=175° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° C.

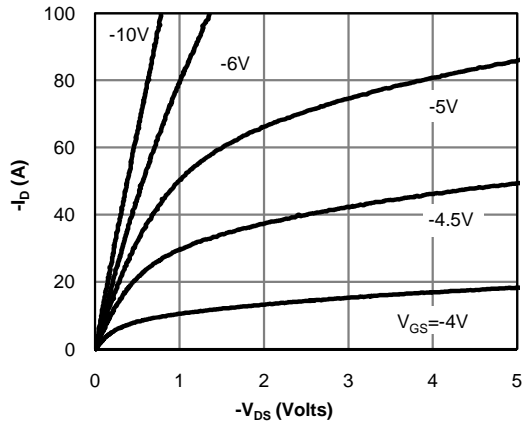
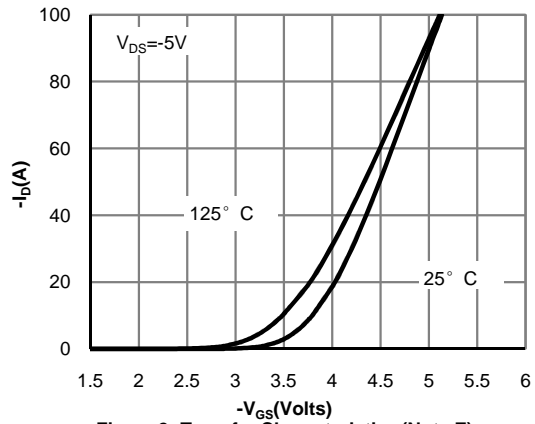
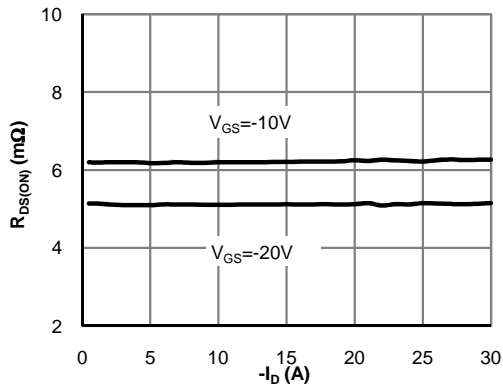
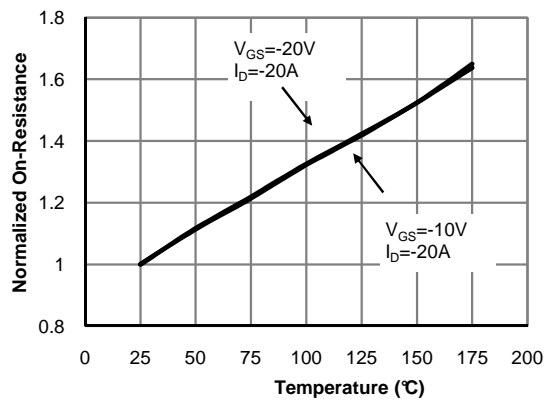
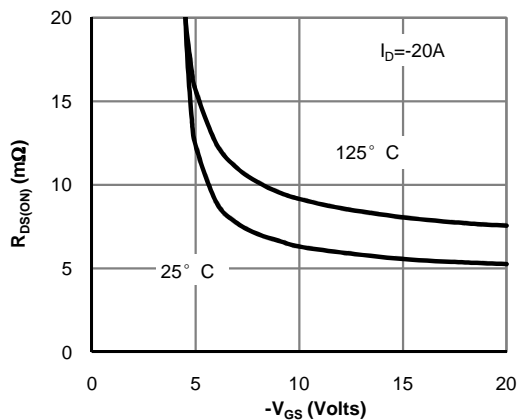
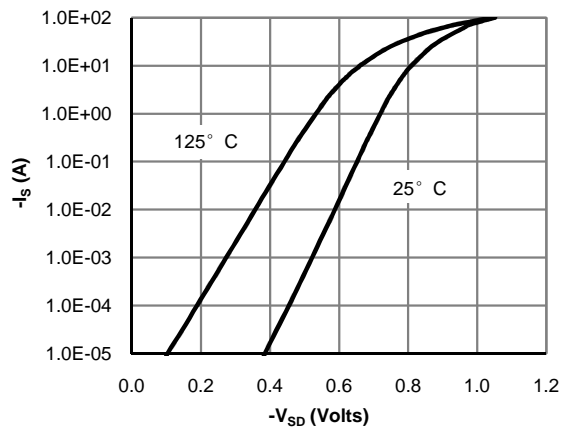
D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=175° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Fig 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

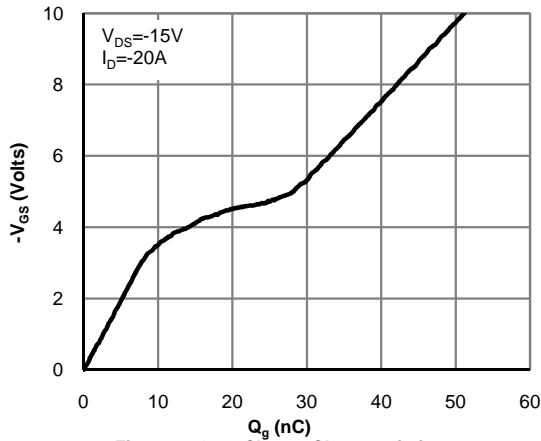


Figure 7: Gate-Charge Characteristics

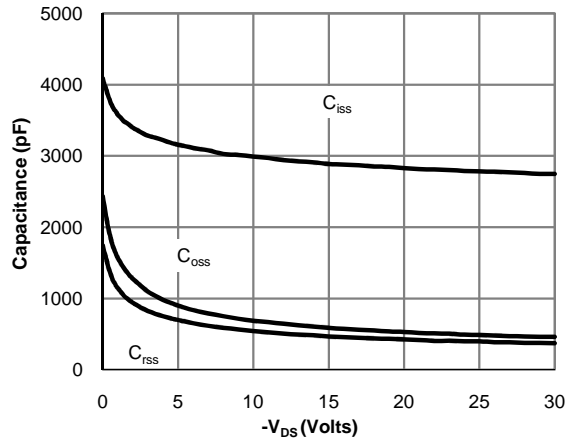


Figure 8: Capacitance Characteristics

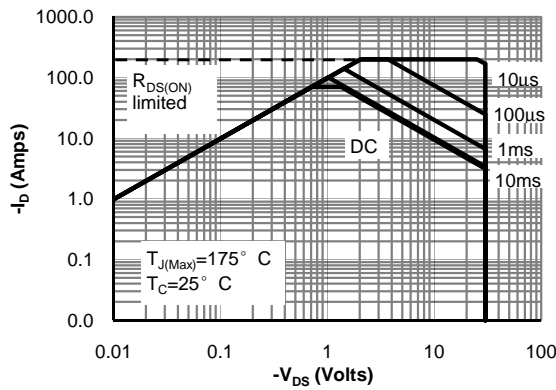


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

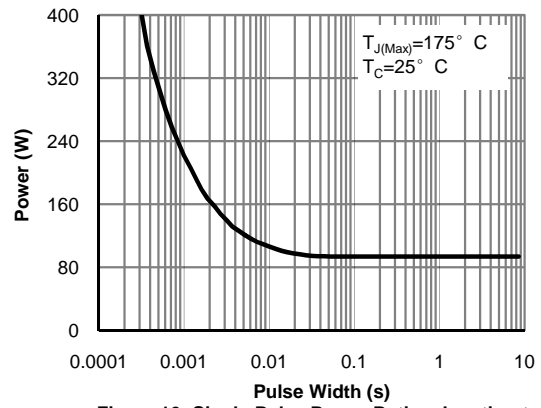


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

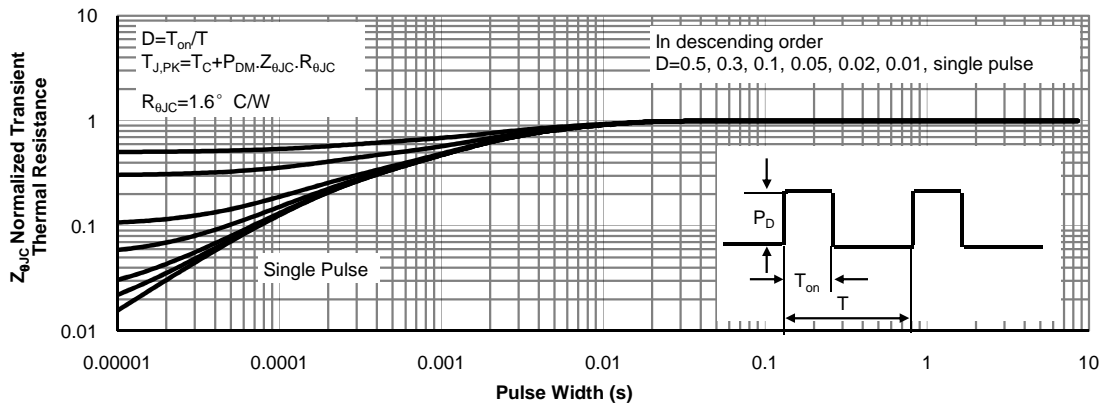


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

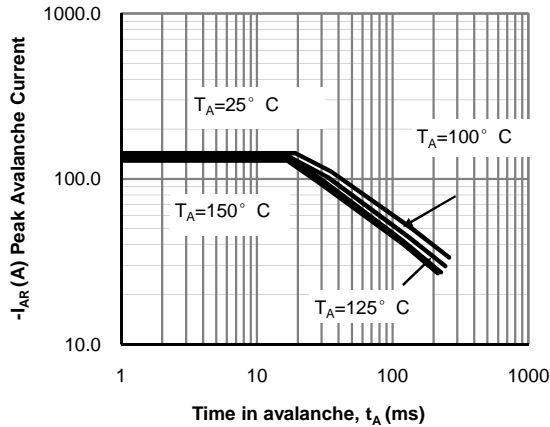


Figure 12: Single Pulse Avalanche capability (Note C)

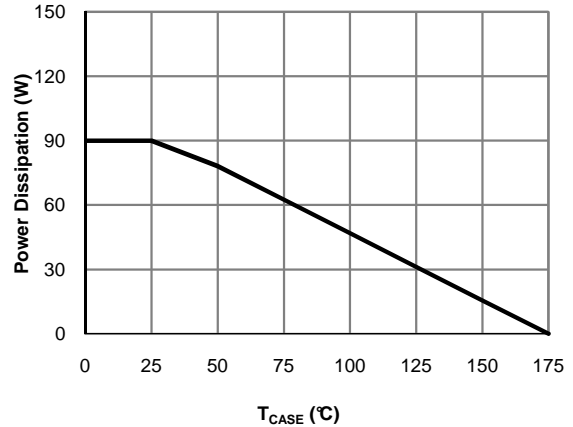


Figure 13: Power De-rating (Note F)

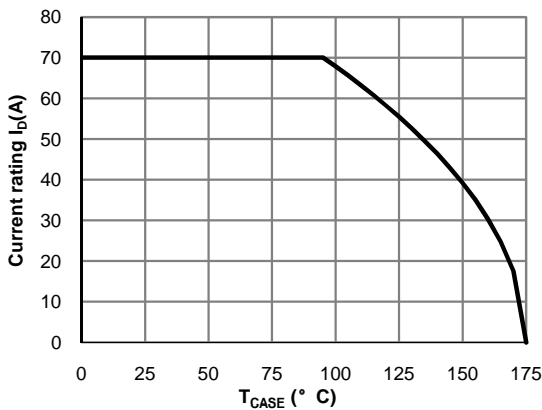


Figure 14: Current De-rating (Note F)

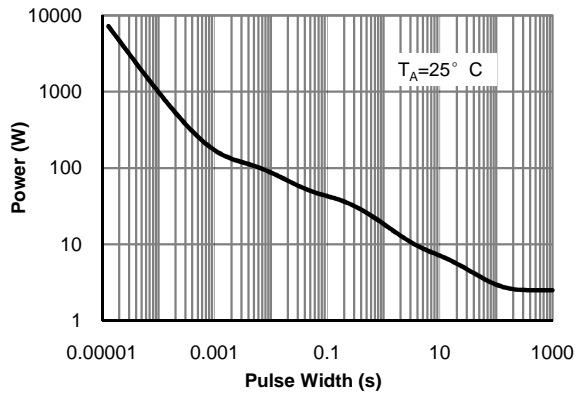


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

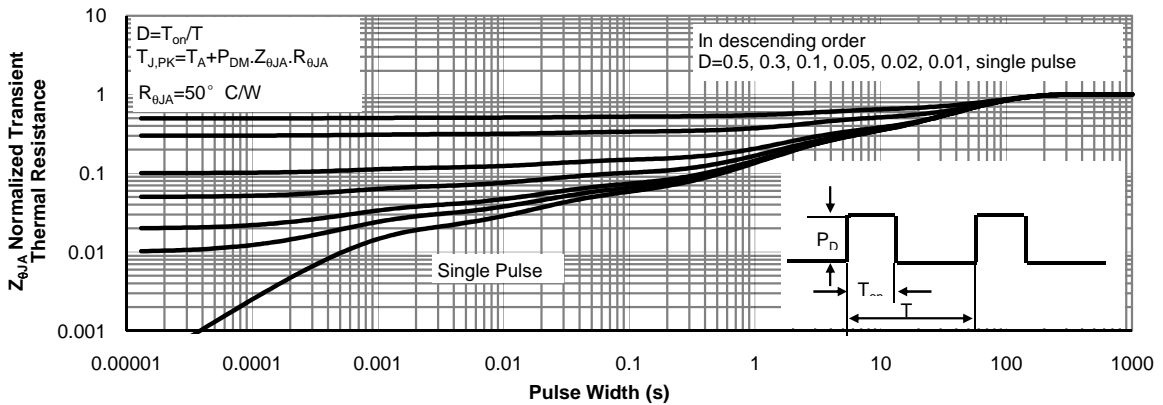
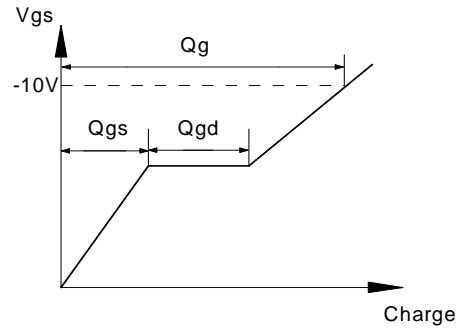
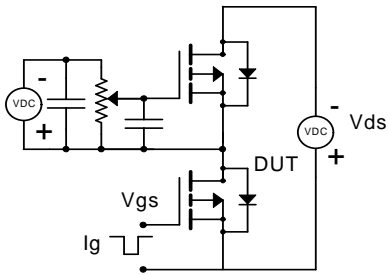
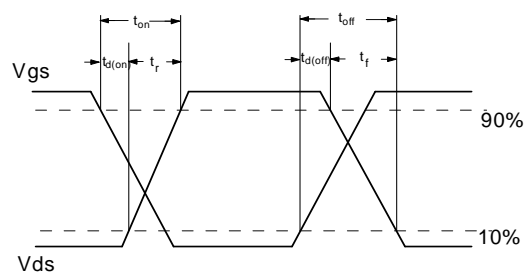
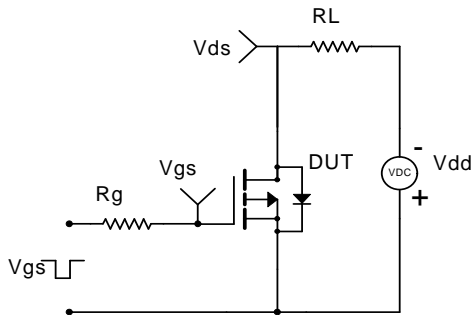
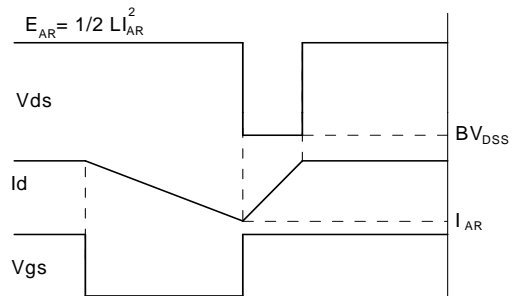
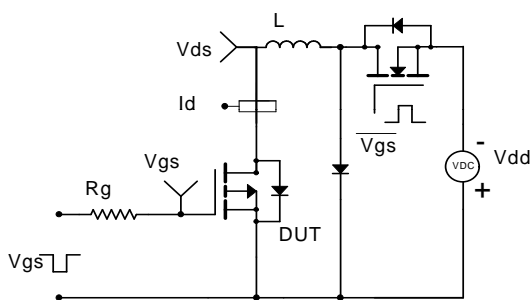
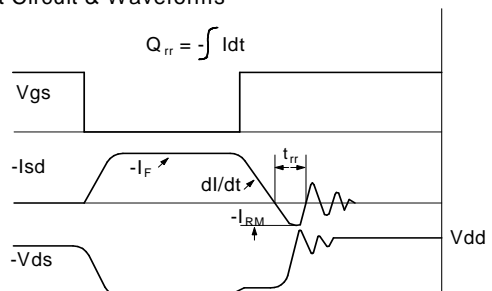
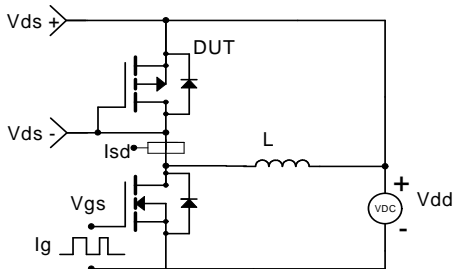
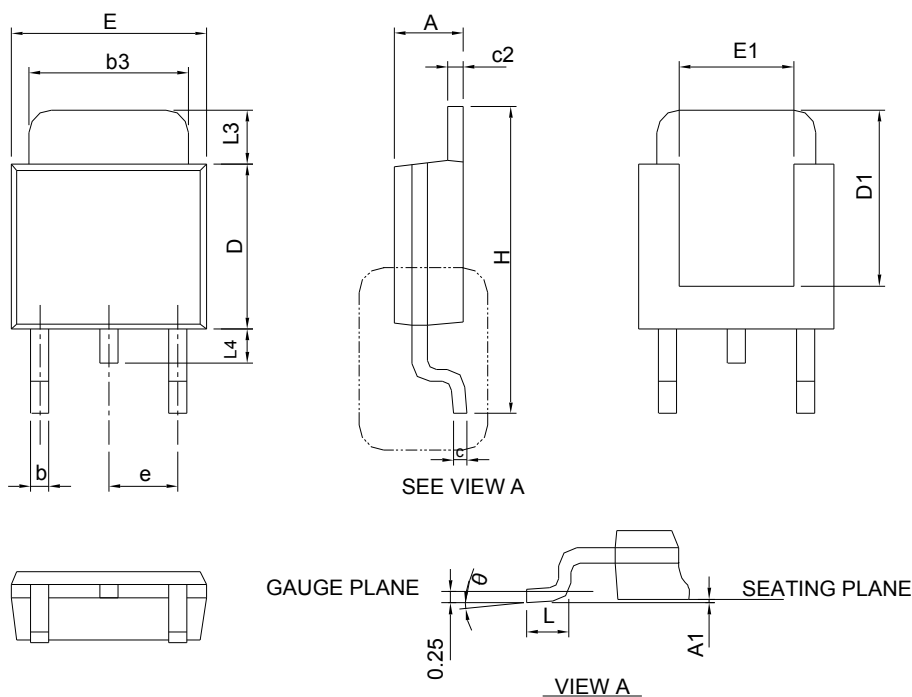


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms


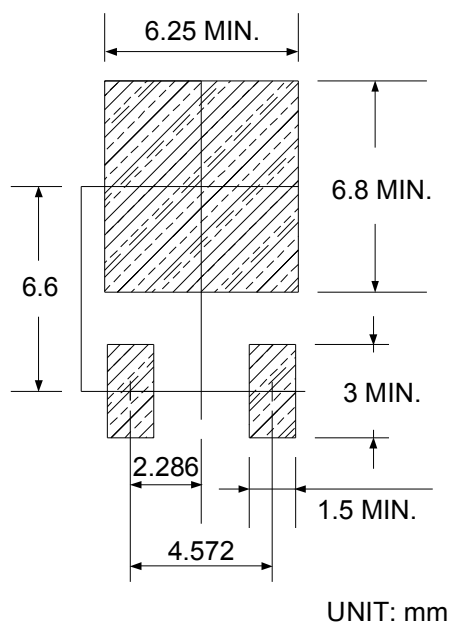
Package Information

TO-252-3


SYMBOLS	TO-252-3			
	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 .

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[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1_T0_00201](#) [PJMF380N65E1_T0_00201](#)
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