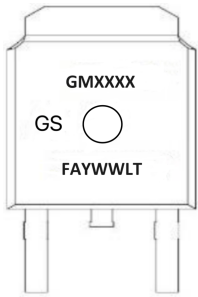
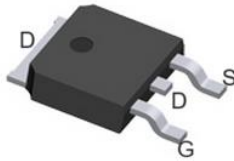


Product Summary

V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
150	78 @ $V_{GS} = 10V$	19

View and Internal Schematic Diagram



TO-252

NOTE:
 LOGO - GS
 GMXXXXX- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

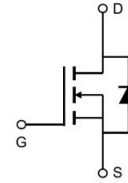
Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

- Primary side switch
- Synchronous rectification
- DC/DC conversion
- Load switching
- Boost converters
- DC/AC inverters

Equivalent circuit



Absolute maximum rating@25°C

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	150	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	19	A
$T_C=25^\circ\text{C}$		13.5	
$T_C=100^\circ\text{C}$			
Pulsed Drain Current ^C	I_{DM}	35	
Continuous Drain Current	I_{DSM}	3	A
$T_A=25^\circ\text{C}$		2.5	
$T_A=70^\circ\text{C}$			
Avalanche Current ^C	I_{AS}	9	A
Avalanche energy $L=0.1\text{mH}$ ^C	E_{AS}	4	mJ
Power Dissipation ^B	P_D	83	W
$T_C=25^\circ\text{C}$		41.5	
$T_C=100^\circ\text{C}$			
Power Dissipation ^A	P_{DSM}	2.5	W
$T_A=25^\circ\text{C}$		1.6	
$T_A=70^\circ\text{C}$			
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C

Thermal Characteristic

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	16	20	°C/W
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient ^{A,D}	$R_{\theta JA}$	41	50	°C/W
Steady-State				
Maximum Junction-to-Case	$R_{\theta JC}$	1.5	1.8	°C/W
Steady-State				

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	150			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =150V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	3.0	3.3	4.2	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	35			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =10A		75	78	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A		35		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.72	1	V
I _S	Maximum Body-Diode Continuous Current				19	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =75V, f=1MHz		1165		pF
C _{oss}	Output Capacitance			61.5		pF
C _{rss}	Reverse Transfer Capacitance			2.5		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.37		Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =75V, I _D =10A		15.5	22	nC
Q _g (4.5V)	Total Gate Charge			7	10	nC
Q _{gs}	Gate Source Charge			4		nC
Q _{gd}	Gate Drain Charge			1.2		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =75V, R _L =7.5Ω, R _{GEN} =3Ω		6.5		ns
t _r	Turn-On Rise Time			5		ns
t _{D(off)}	Turn-Off DelayTime			23		ns
t _f	Turn-Off Fall Time			2.5		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=500A/μs		37		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=500A/μs		265		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 resistance, 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 Performance Characteristics

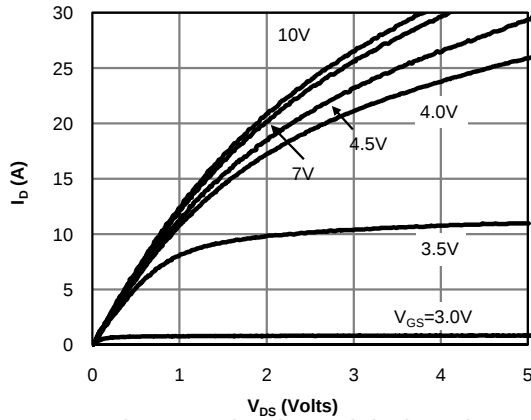


Fig 1: On-Region Characteristics (Note E)

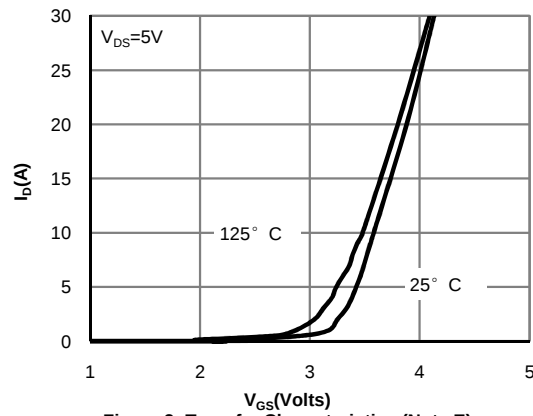


Figure 2: Transfer Characteristics (Note E)

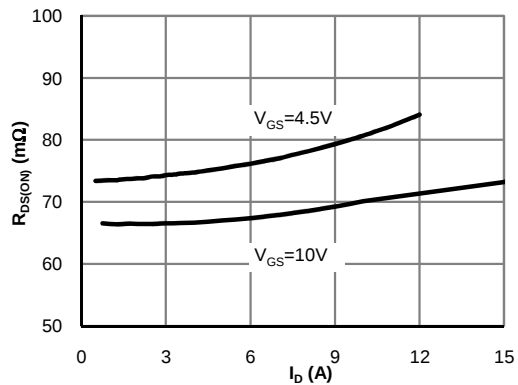


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

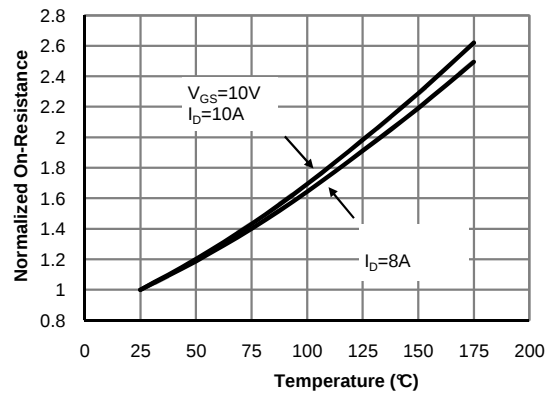


Figure 4: On-Resistance vs. Junction Temperature (Note E)

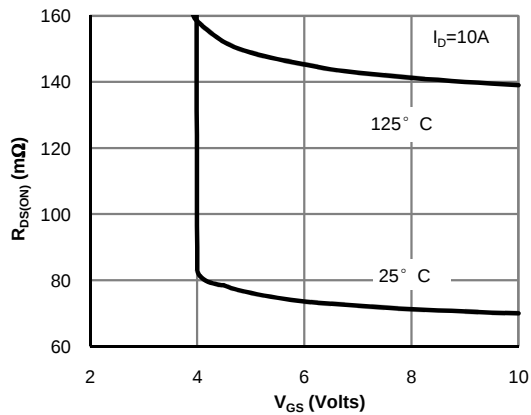


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

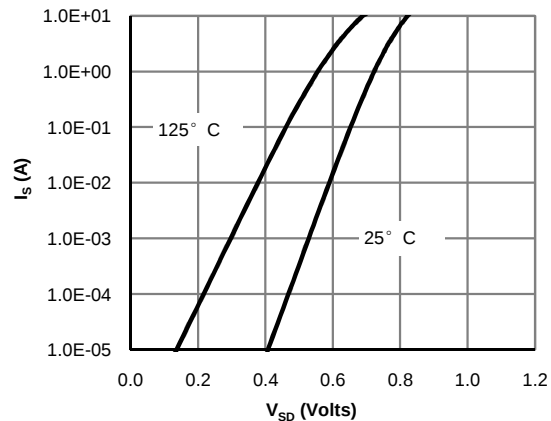
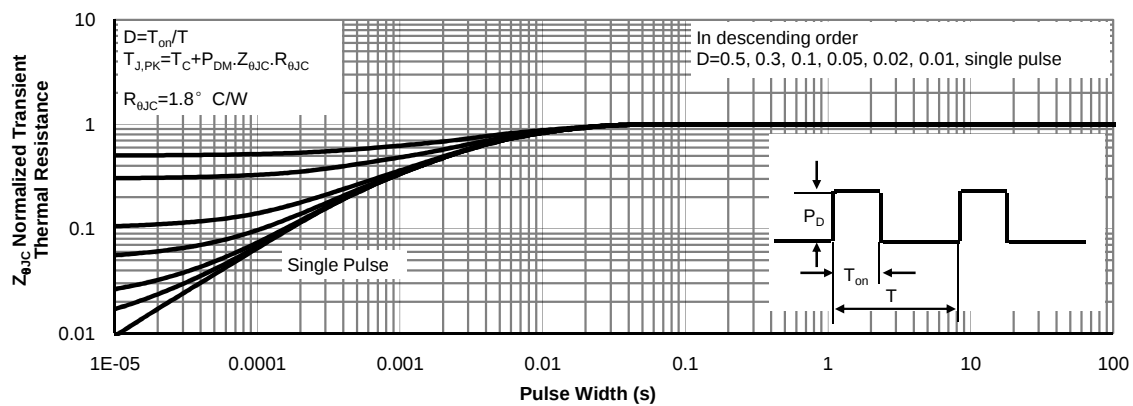
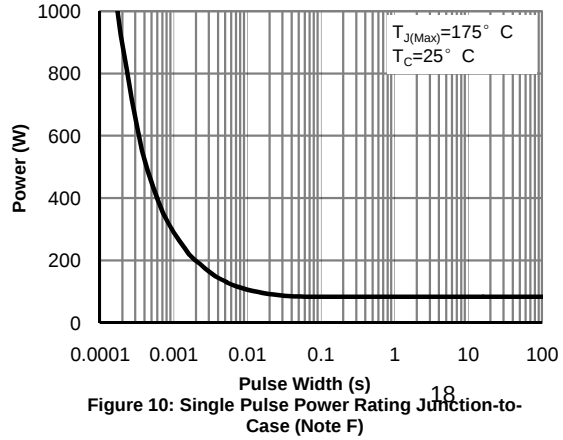
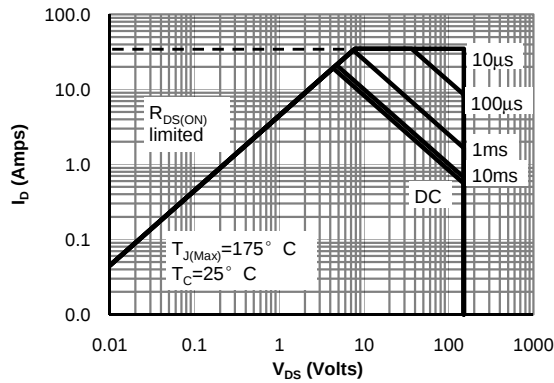
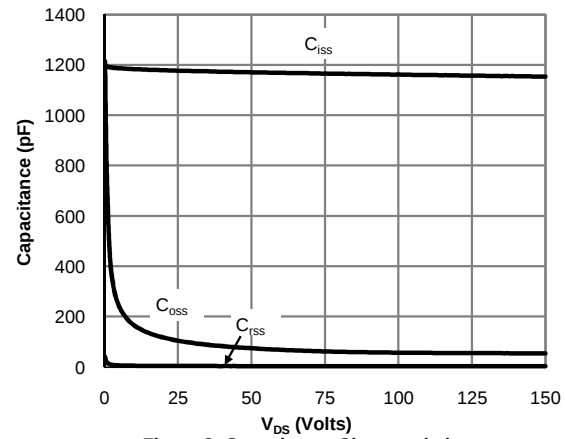
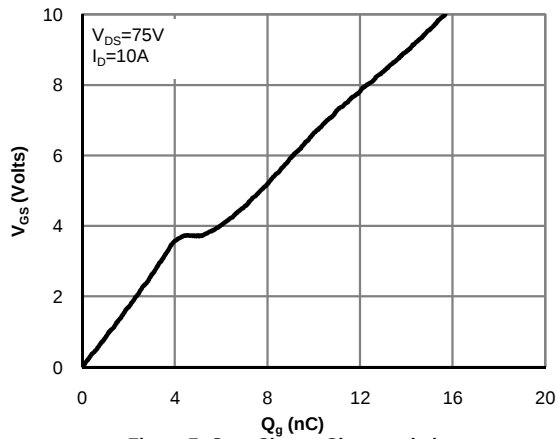


Figure 6: Body-Diode Characteristics (Note E)

Typical Performance Characteristics



Typical Performance Characteristics

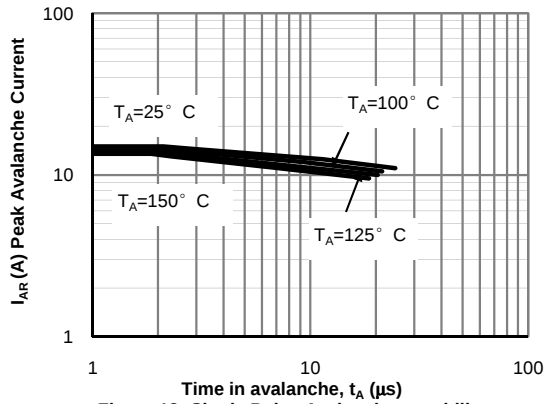


Figure 12: Single Pulse Avalanche capability (Note C)

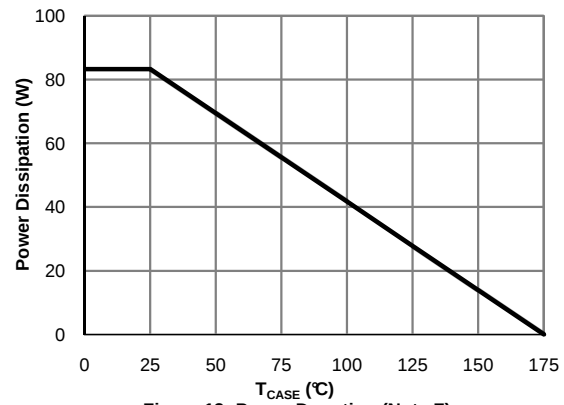


Figure 13: Power De-rating (Note F)

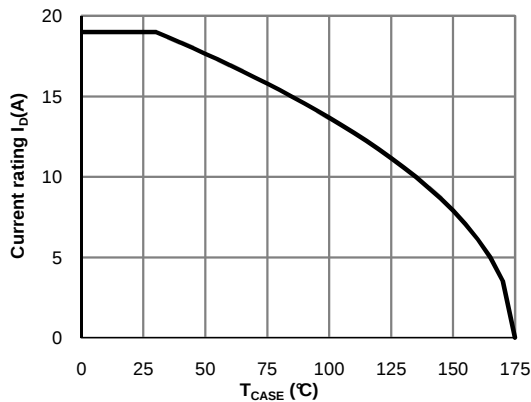


Figure 14: Current De-rating (Note F)

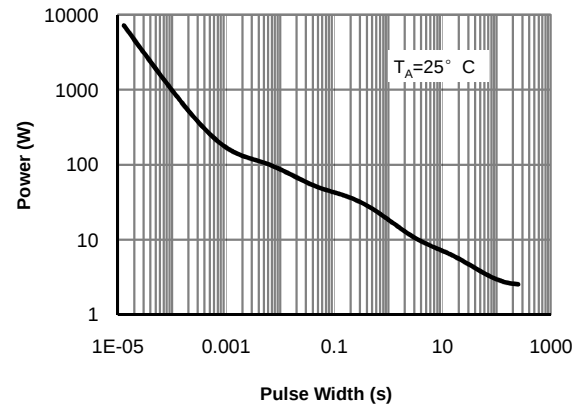


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

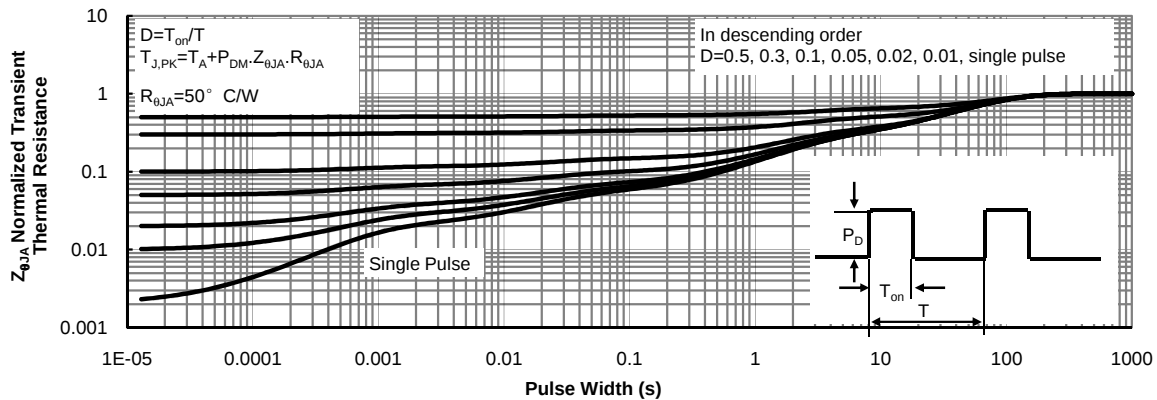
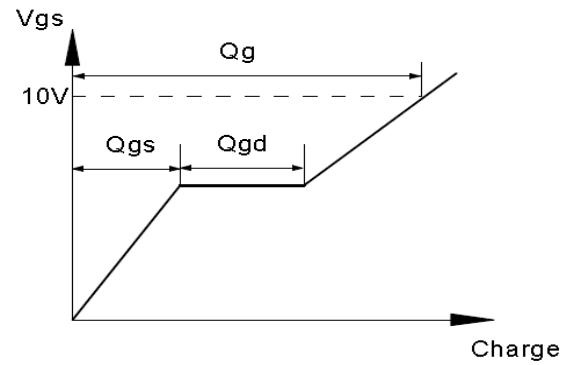
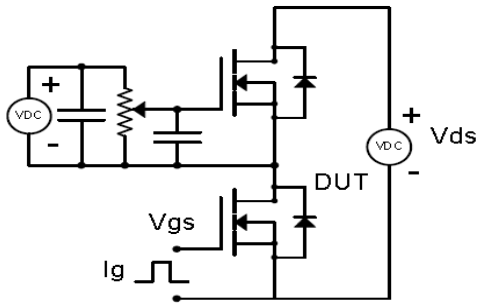


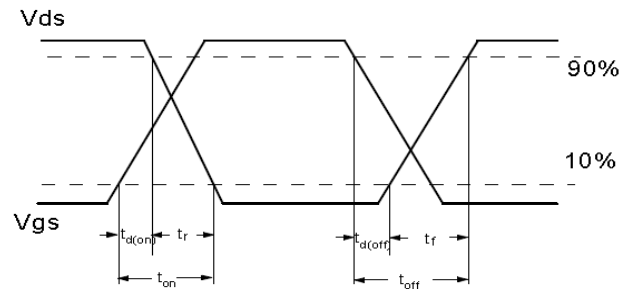
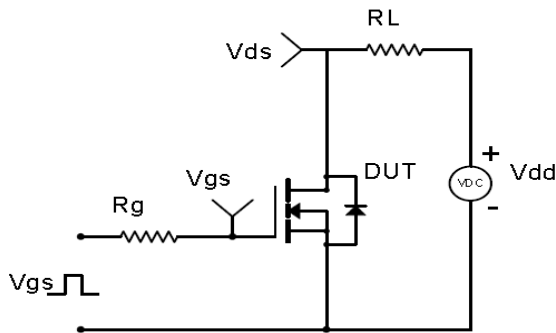
Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Test Circuit & Waveform

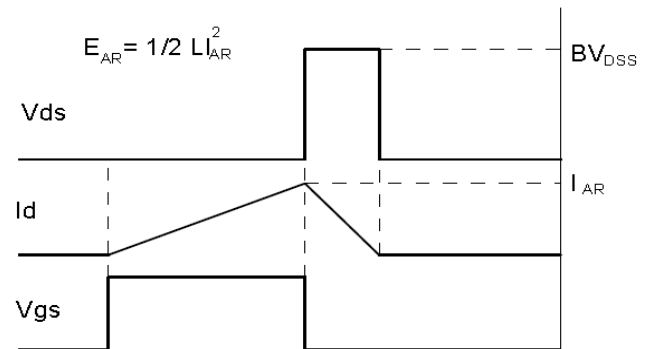
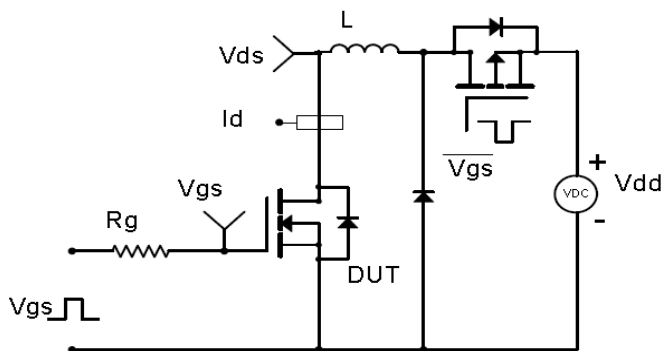
Gate Charge Test Circuit & Waveform



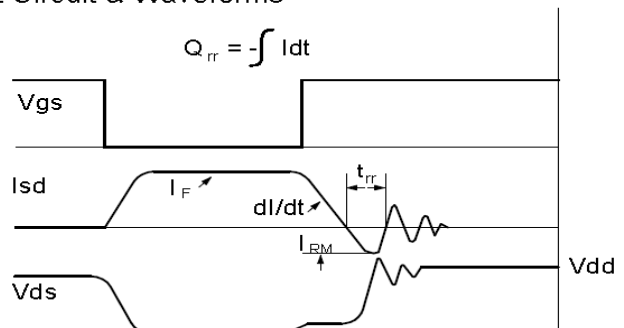
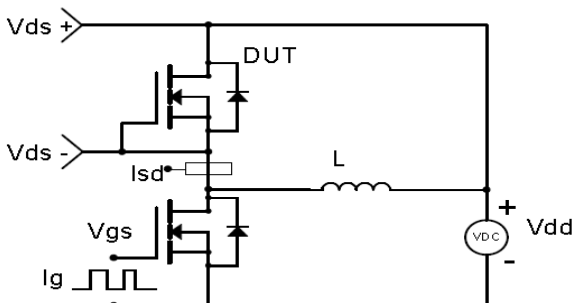
Resistive Switching Test Circuit & Waveforms

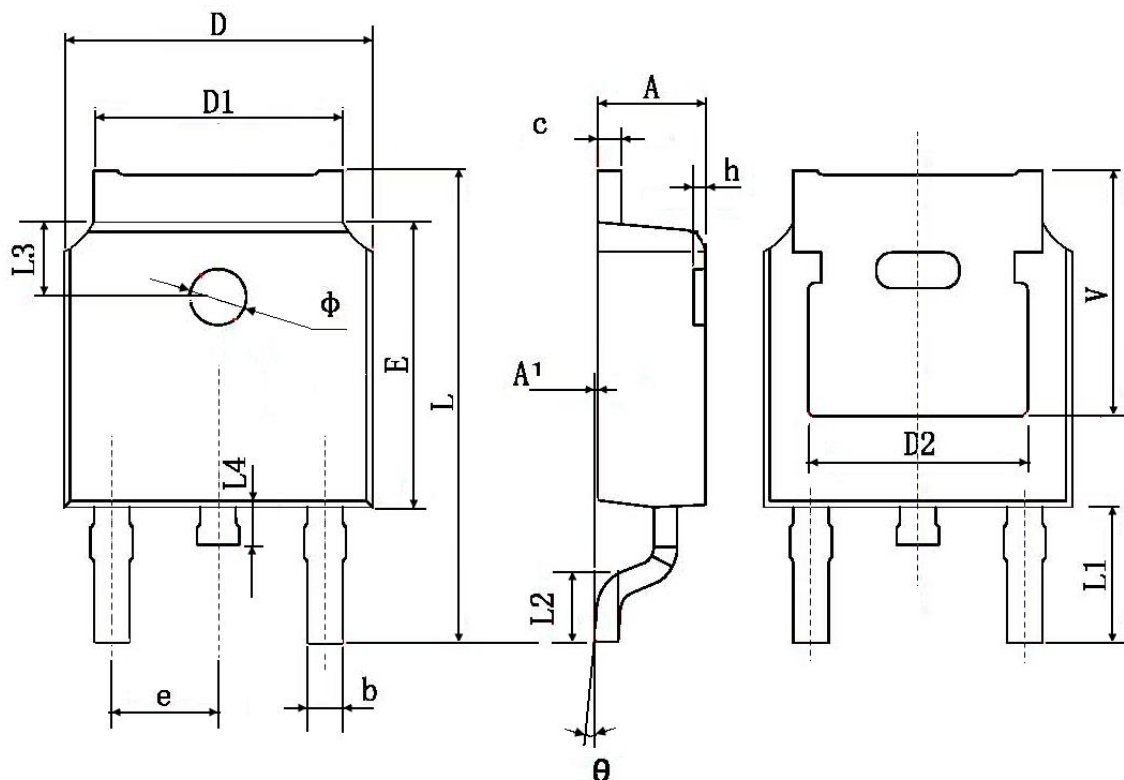


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Outline Drawing TO-252


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
ϕ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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