
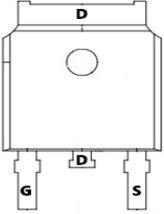
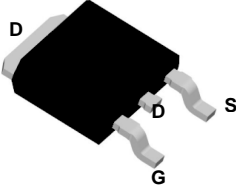
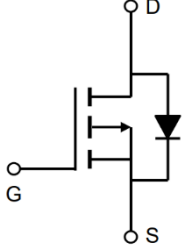


TMG60P06D

P -Channel Enhancement Mosfet

<p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM 	<p>General Features</p> <p>$V_{DS} = -60V$ $I_D = -60A$ $R_{DS(ON)} = 12m\Omega$ (Typ.) @ $V_{GS} = -10V$</p> <p>100% UIS Tested 100% R_g Tested</p> 
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D:TO-252-3L

Marking: G60P06

Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise specified):

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Voltage	-60	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	-60
	Continuous Drain Current	$T_C = 100^\circ C$	-39
I_{DM}^{a1}	Pulsed Drain Current	-172	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	100	W
E_{AS}^{a2}	Single pulse avalanche energy	337	mJ
T_J, T_{STG}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ C$
T_L	Maximum Temperature for Soldering	260	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	60	$^\circ C/W$

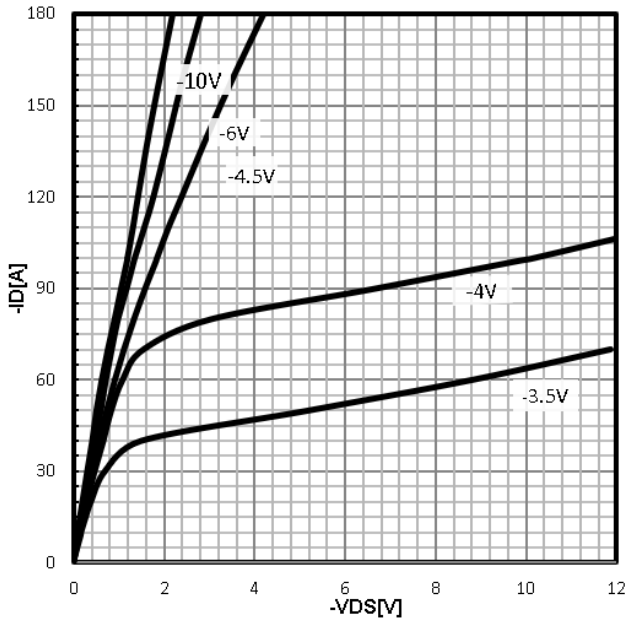
**TMG60P06D****P -Channel Enhancement Mosfet**Electrical Characteristics (T_J= 25°C unless otherwise specified) :

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-60	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -60V, V _{GS} = 0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =-20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =+20V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.3	-1.8	-2.3	V
R _{DS(ON)} ₁	Drain-to-Source Resistance	On- V _{GS} =-10V, I _D =-20A	--	12	17	mΩ
R _{DS(ON)} ₂	Drain-to-Source Resistance	On- V _{GS} =-4.5V, I _D =-10A	--	18	24	mΩ
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =-30V f=1.0MHz	--	2200	--	pF
C _{oss}	Output Capacitance		--	484	--	
C _{rss}	Reverse Transfer Capacitance		--	9.4	--	
R _g	Gate resistance	V _{GS} =0V, V _{DS} Open	--	12.5	--	Ω
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =-10A, R _L =3.0Ω V _{DS} = -30V V _{GS} = -10V R _G = 3Ω	--	20	--	ns
t _r	Rise Time		--	25	--	
t _{d(OFF)}	Turn-Off Delay Time		--	60	--	
Note:	Fall Time		--	30	--	
Q _g	Total Gate Charge	V _{GS} =-10V V _{DS} =-30V I _D =-10A	--	38	--	nC
Q _{gs}	Gate Source Charge		--	6.9	--	
Q _{gd}	Gate Drain Charge		--	4.98	--	
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	-60	A
V _{SD}	Diode Forward Voltage	I _S =-5.0A, V _{GS} =0V	--	--	-1.2	V
t _{rr}	Reverse Recovery time	I _S =-10A, V _{DD} =-30V dI/dt=100A/μs	--	50	--	ns
Q _{rr}	Reverse Recovery Charge		--	80	--	nC

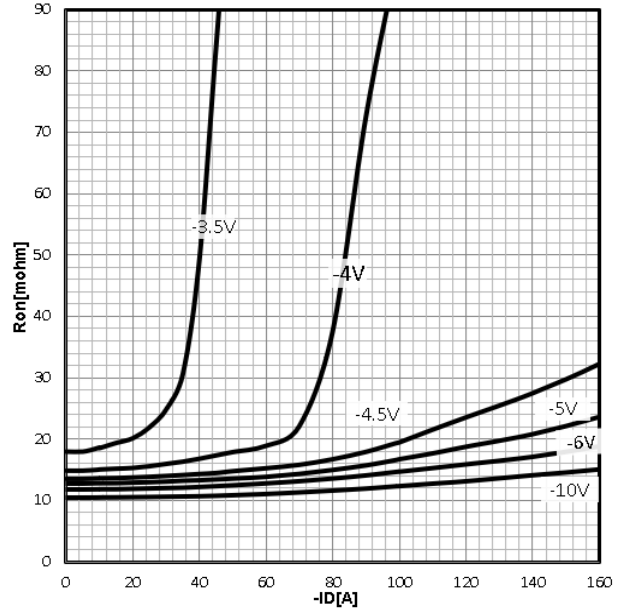


Characteristics Curve:

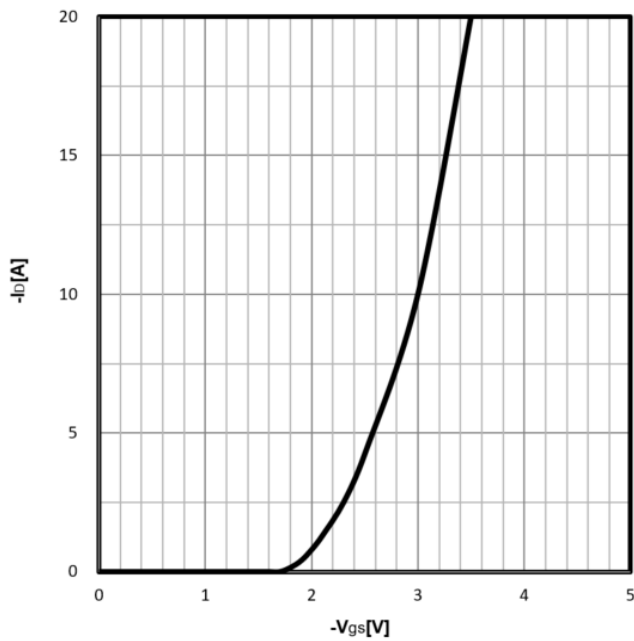
Typ. output characteristics
 $-I_D=f(-V_{DS})$



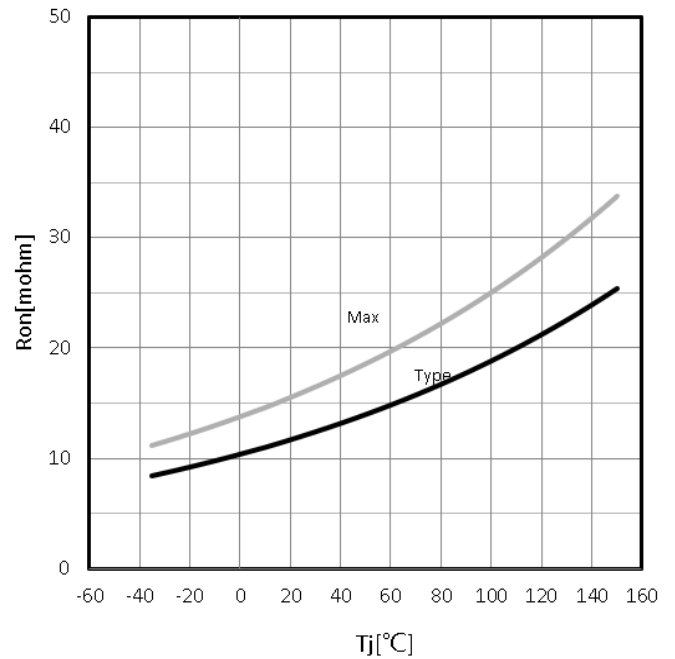
Typ. drain-source on resistance
 $R_{DS(on)}=f(-I_D)$



Typ. transfer characteristics
 $-I_D=f(-V_{GS})$



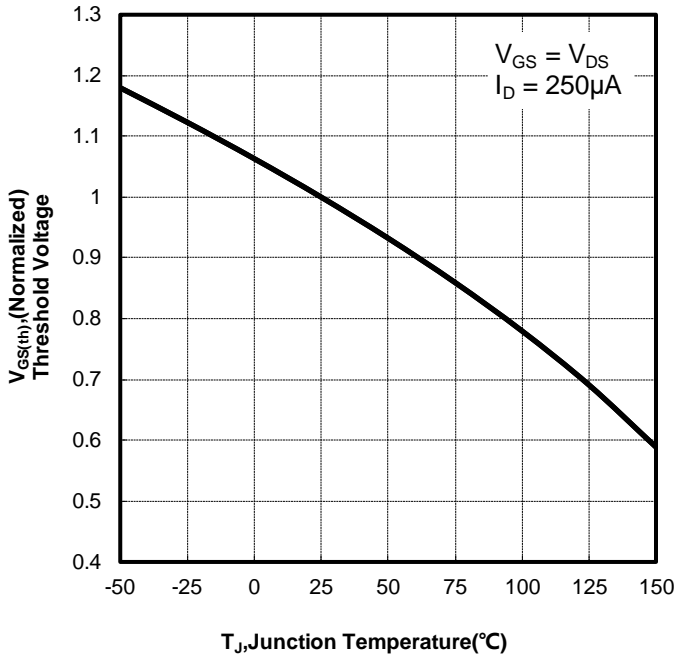
Drain-source on-state resistance
 $R_{DS(on)}=f(T_j); I_D=-20A; V_{GS}=-10V$





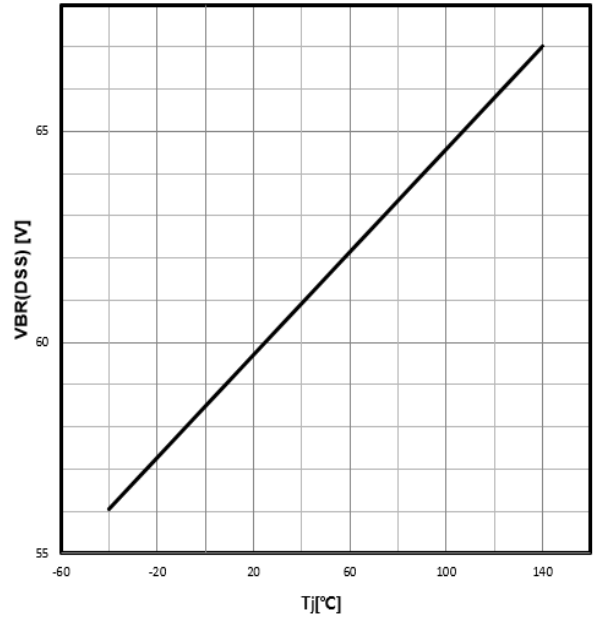
Gate Threshold Voltage

$-V_{TH}=f(T_j); I_D=-250\mu A$



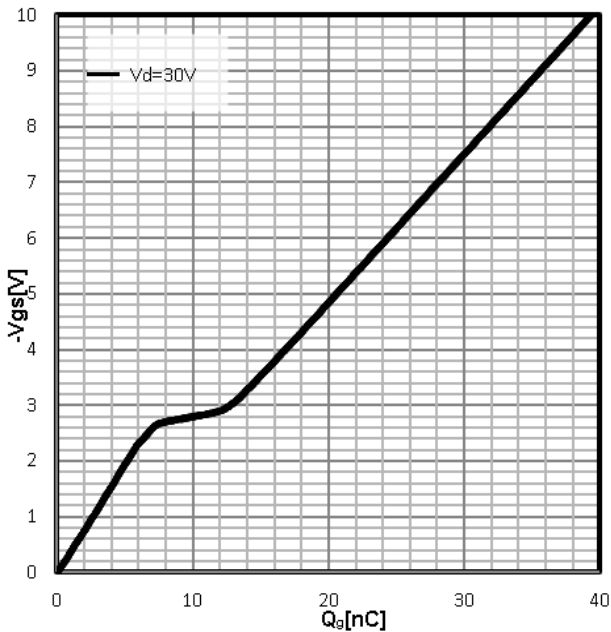
Drain-source breakdown voltage

$-V_{BR(DSS)}=f(T_j); I_D=-250\mu A$



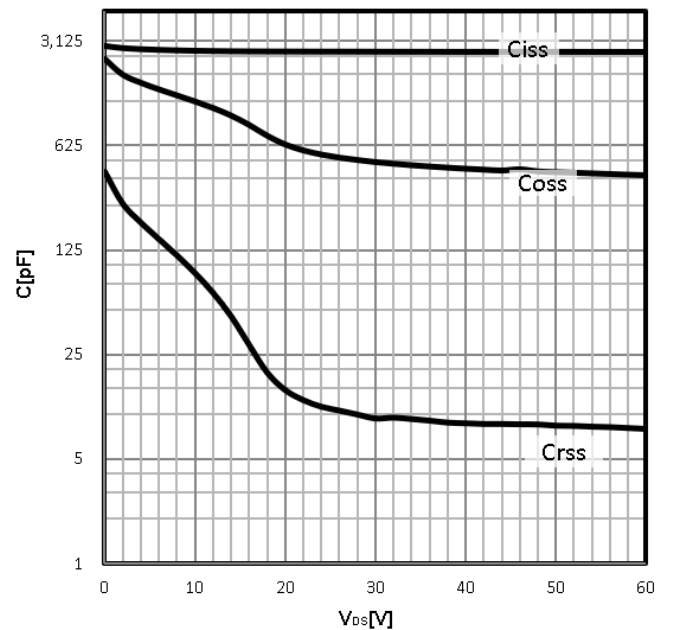
Typ. gate charge

$V_{GS}=f(Q_{gate}); I_D=-10A$



Typ. Capacitances

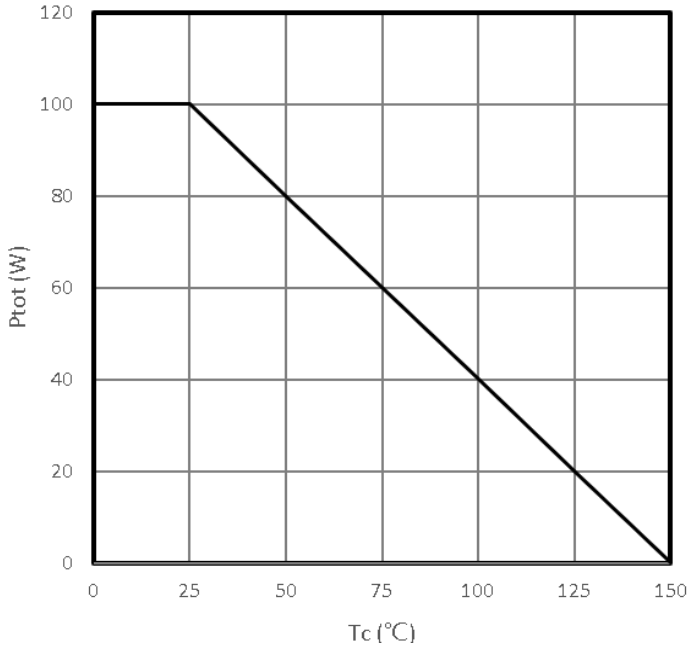
$C=f(-V_{DS}); V_{GS}=0V; f=1MHz$





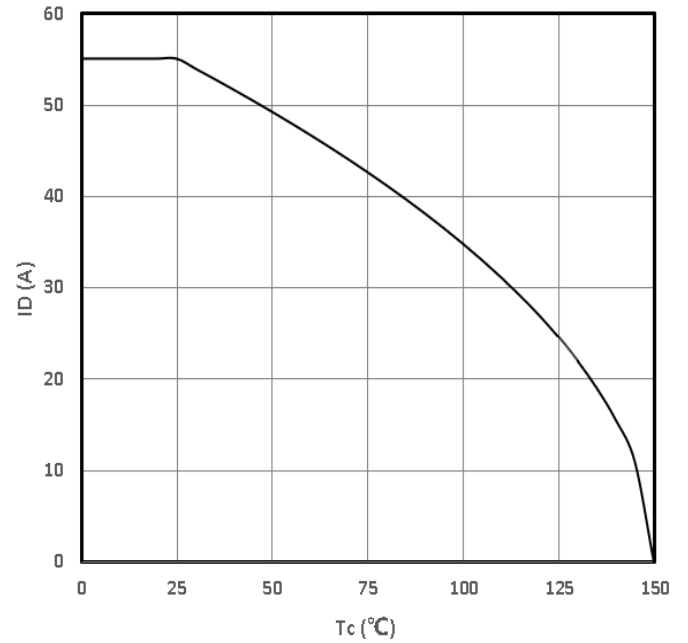
Power Dissipation

$P_{tot}=f(T_C)$



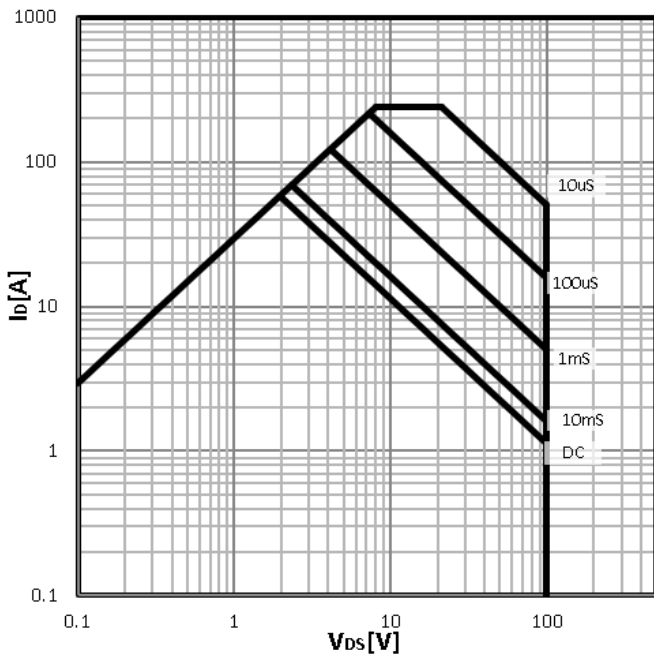
Maximum Drain Current

$-I_D=f(T_C)$



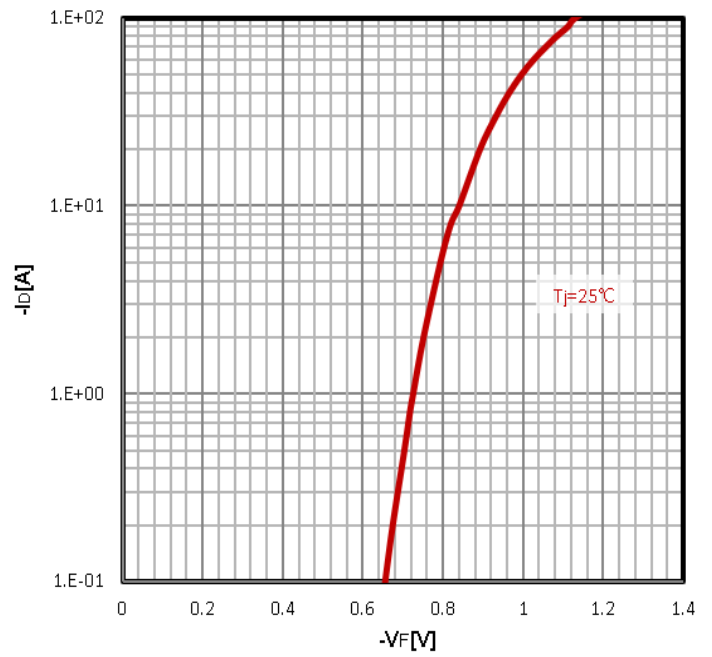
Safe operating area

$-I_D=f(-V_{DS})$



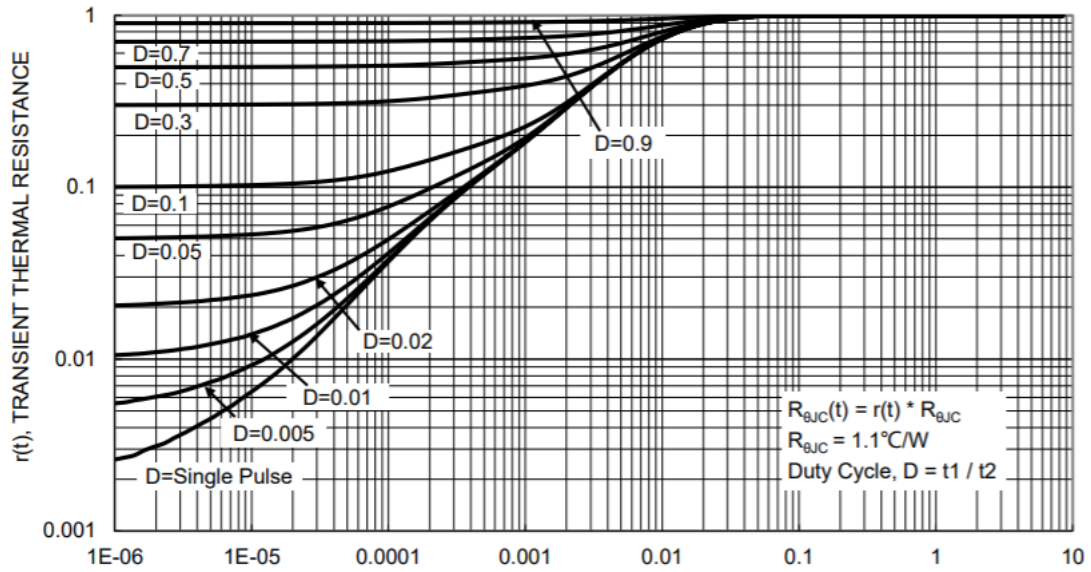
Body Diode Forward Voltage Variation

$-I_F=f(-V_{DS})$



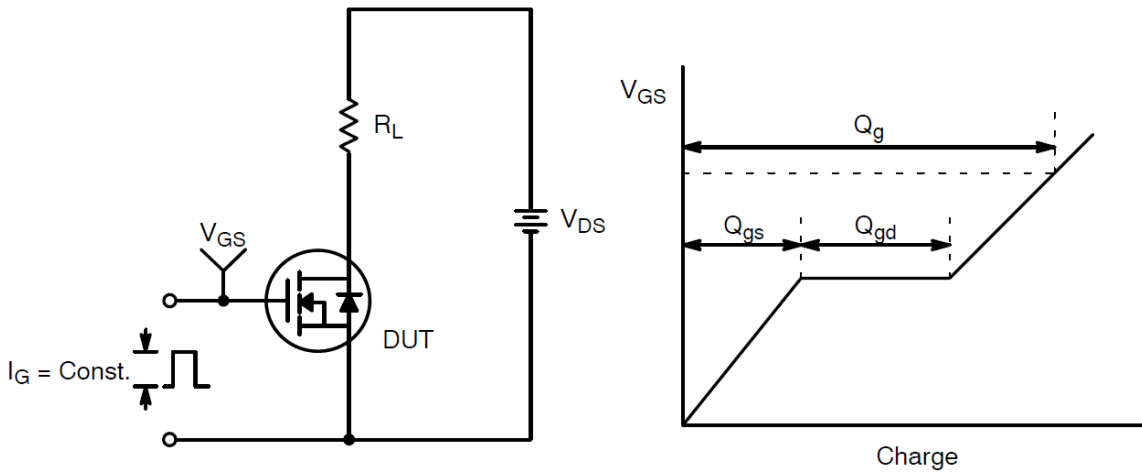
Max. transient thermal impedance

$$Z_{thJC} = f(t_p)$$

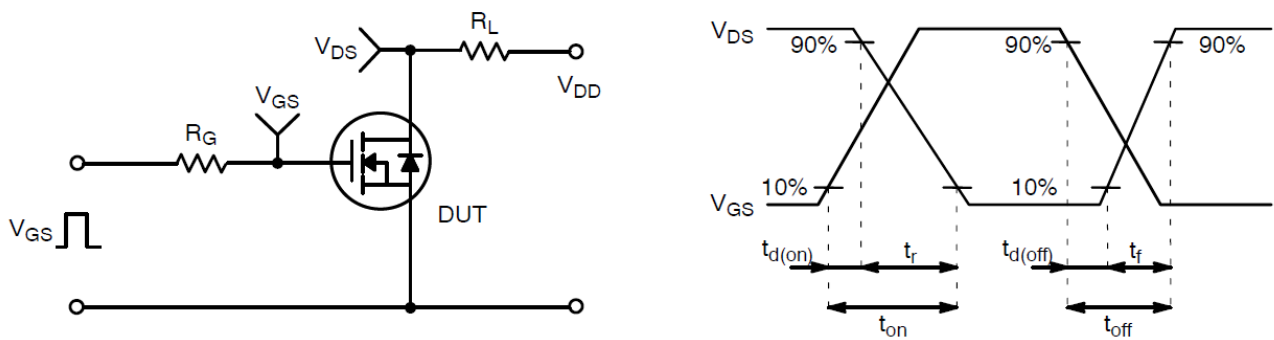




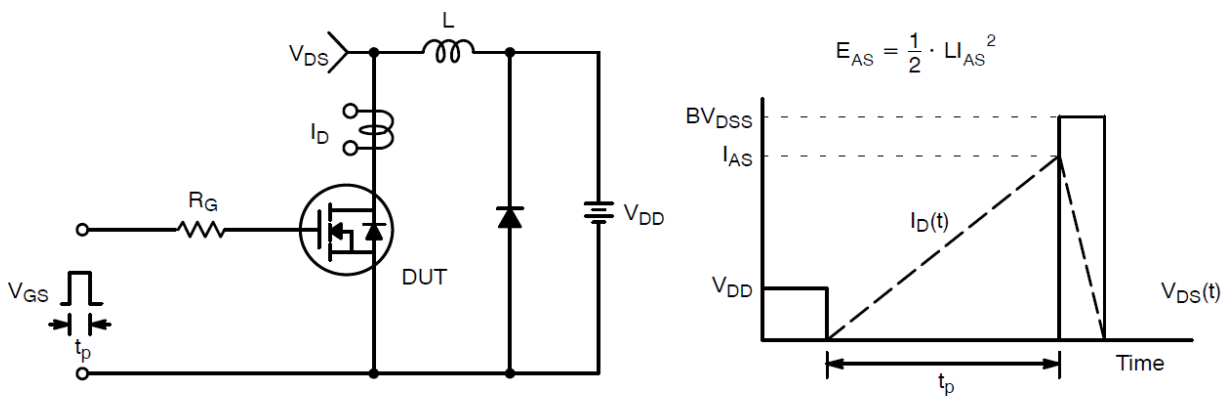
Test Circuit and Waveform



Gate Charge Test Circuit & Waveform

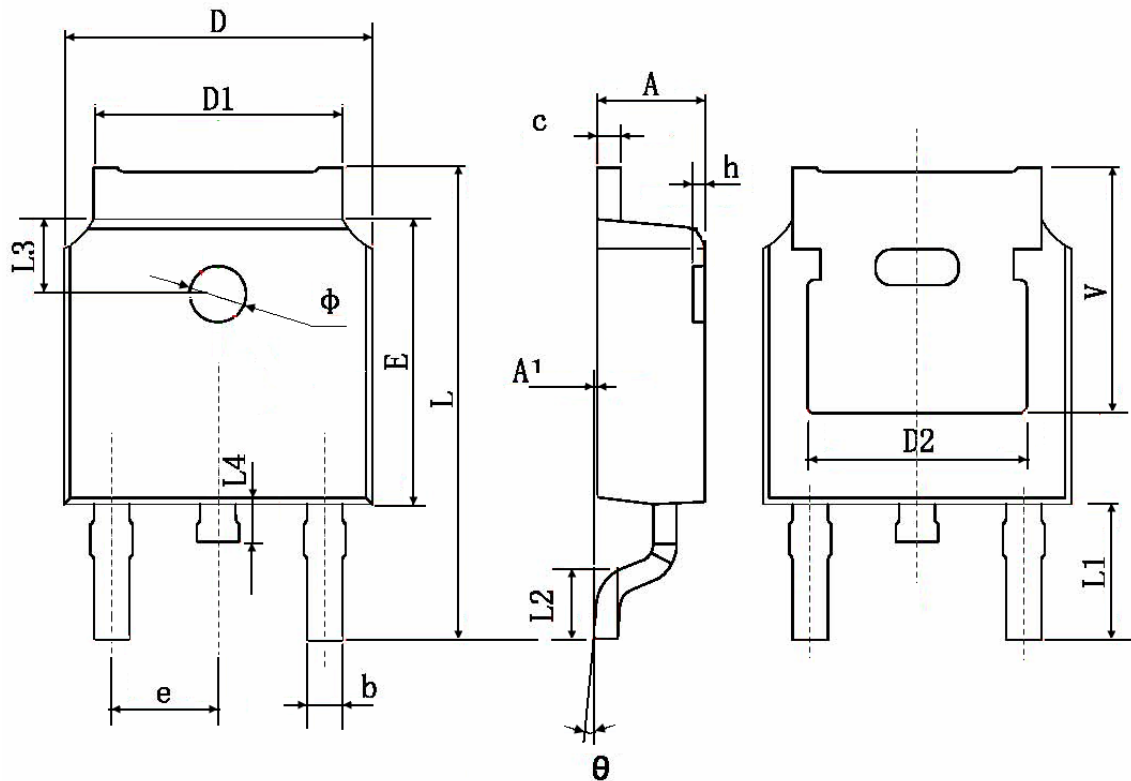


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Package Information: TO-252-3L



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.	