



TMG70N10D

N-Channel Enhancement Mosfet

Electrical Characteristics (TA= 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	100	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =100V, V _{GS} =0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =+20V, V _{DS} =0V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =-20V, V _{DS} =0V	--	--	-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)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	9.5	11	mΩ
		V _{GS} =4.5V, I _D =15A		12	15	mΩ
Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} = 0V V _{DS} = 50V f = 1.0MHz	--	1368	--	pF
C _{oss}	Output Capacitance		--	451	--	
C _{rss}	Reverse Transfer Capacitance		--	12.9	--	
R _g	Gate resistance	V _{GS} =0V, V _{DS} Open	--	0.48	--	Ω
Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D = 10A V _{DS} = 50V V _{GS} = 10V R _G = 4Ω	--	16	--	ns
t _r	Rise Time		--	10	--	
t _{d(OFF)}	Turn-Off Delay Time		--	40	--	
t _f	Fall Time		--	6	--	
Q _g	Total Gate Charge	V _{GS} = 10V V _{DS} = 50V I _D = 10A	--	31.3	--	nC
Q _{gs}	Gate Source Charge		--	3.49	--	
Q _{gd}	Gate Drain Charge		--	7.63	--	
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Value
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C = 25 °C	--	--	70	A
V _{SD}	Diode Forward Voltage	I _S =10A, V _{GS} =0V	--	--	1.2	V
t _{rr}	Reverse Recovery time	I _S =10A, V _{DD} =50V dI/dt=100A/μs	--	103	--	ns
Q _{rr}	Reverse Recovery Charge		--	187	--	nC

a1: Repetitive rating; pulse width limited by maximum junction temperature

a2: VDD=50V, L=0.3mH, Rg=25Ω, Starting T_J=25 °C

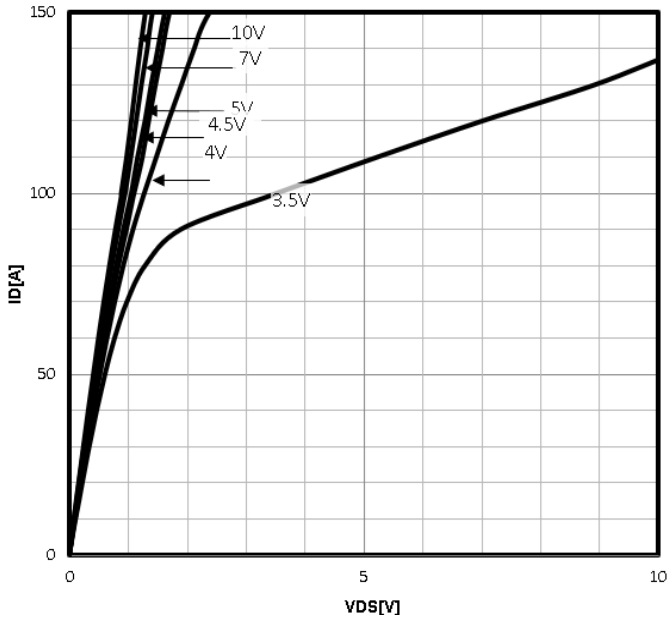


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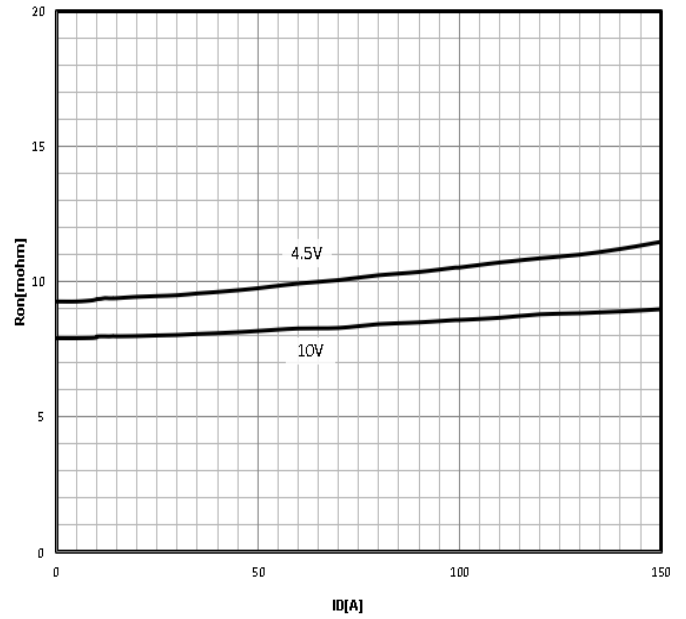
N-Channel Enhancement Mosfet

Characteristics Curve:

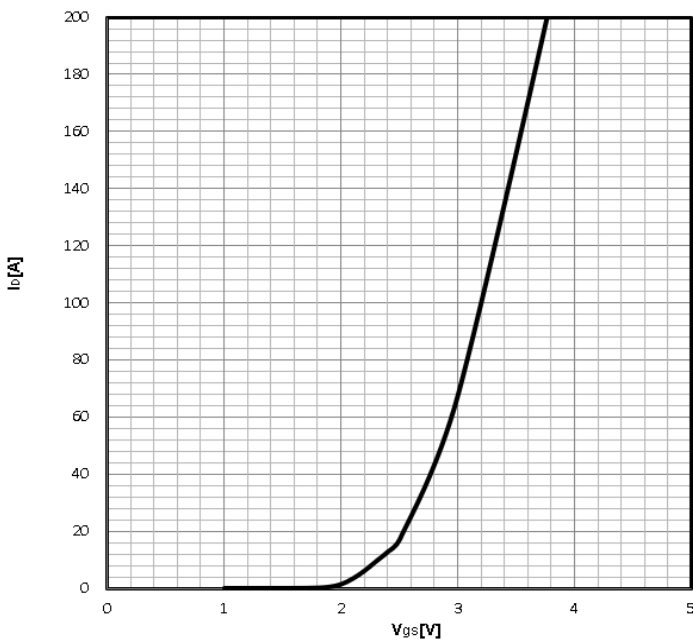
Typ. output characteristics
 $I_D = f(V_{DS})$



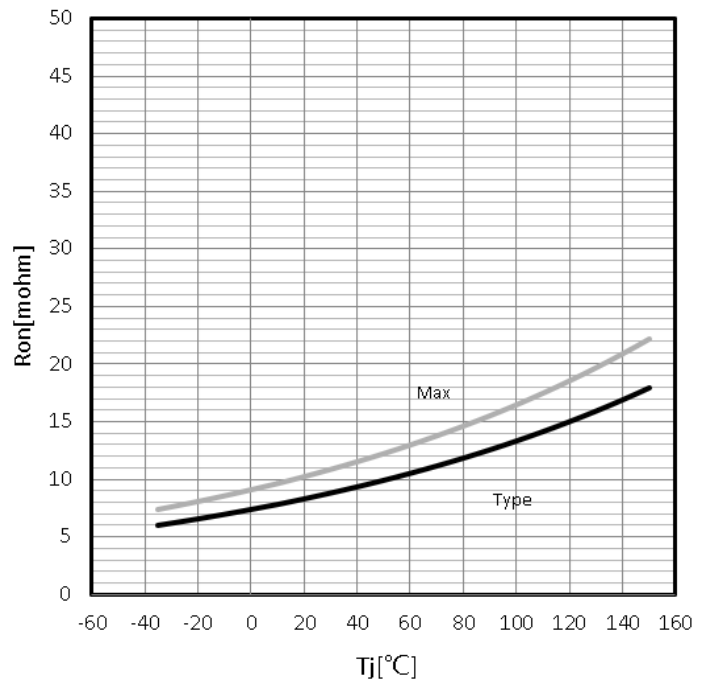
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



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



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



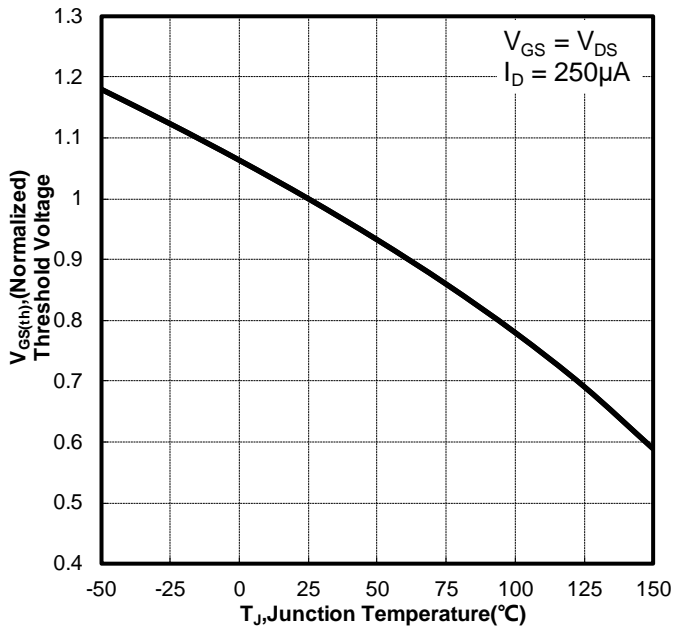


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Echannel Enhancement Mosfet

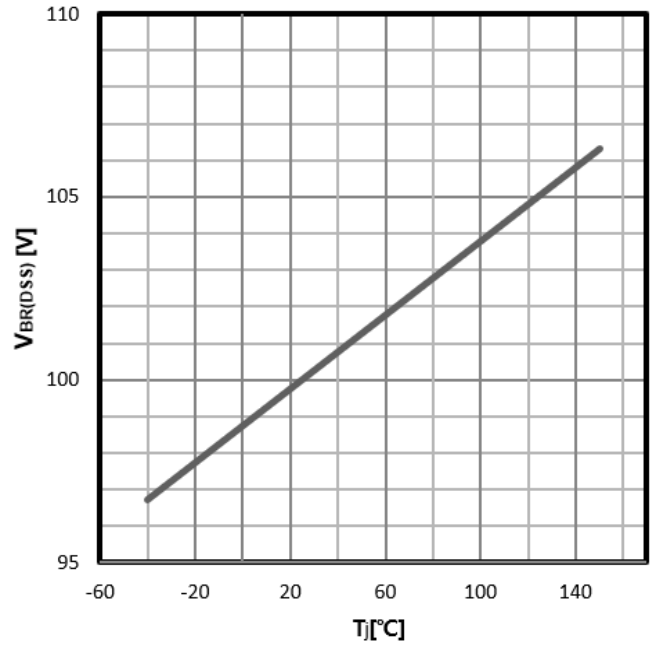
Gate Threshold Voltage

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



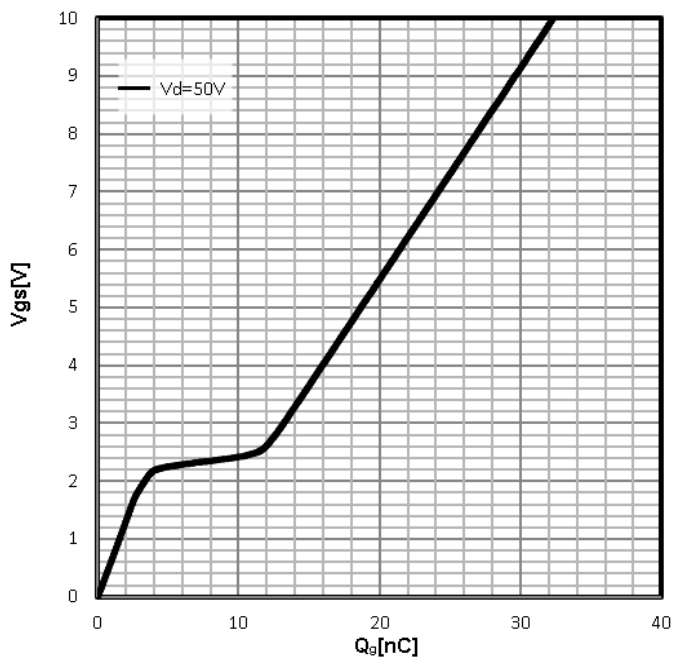
Drain-source breakdown voltage

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



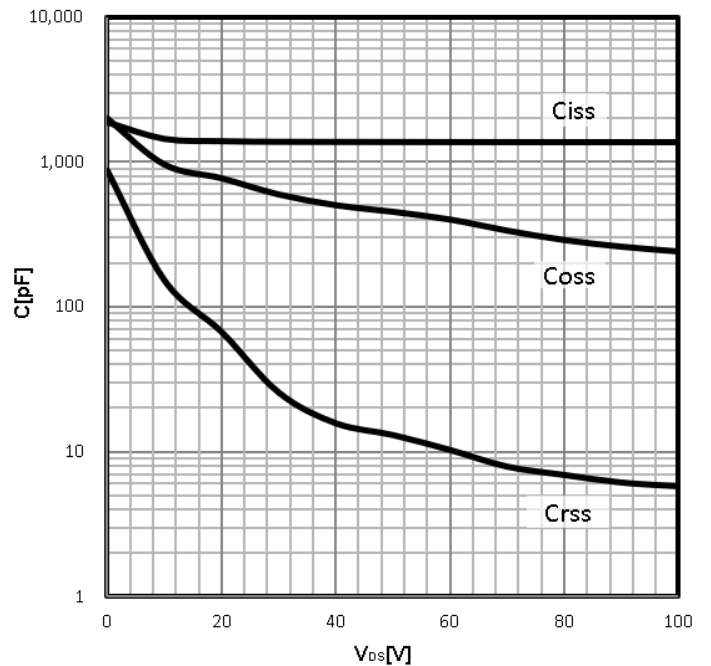
Typ. gate charge

$V_{GS}=f(Q_g); I_D=10A$



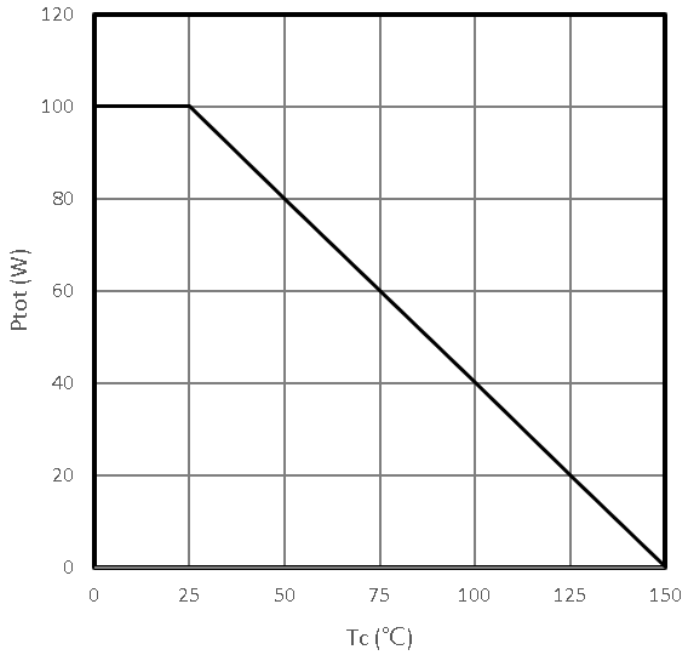
Typ. capacitances

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



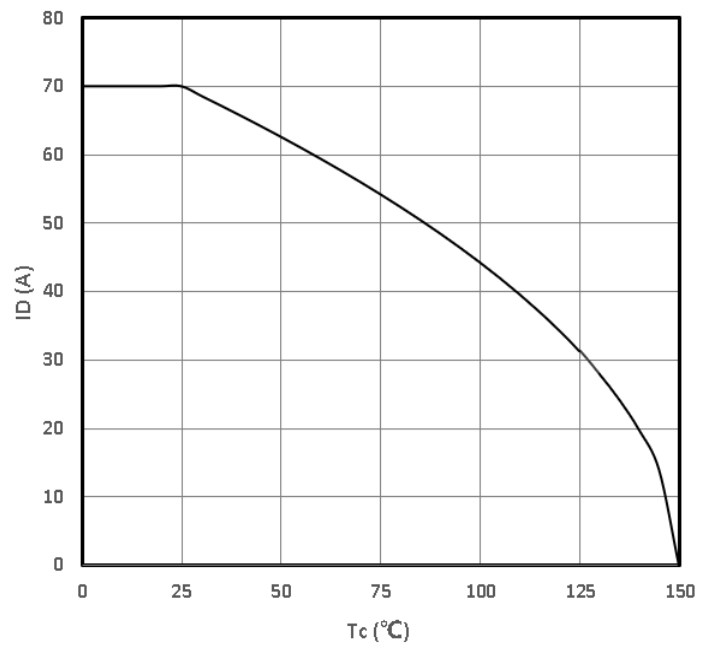
Power Dissipation

$P_{tot}=f(T_C)$



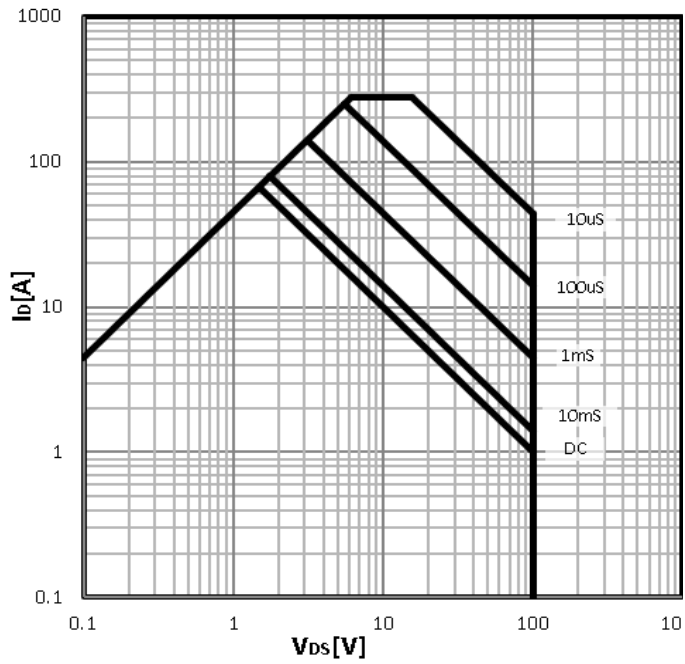
Maximum Drain Current

$I_D=f(T_C)$



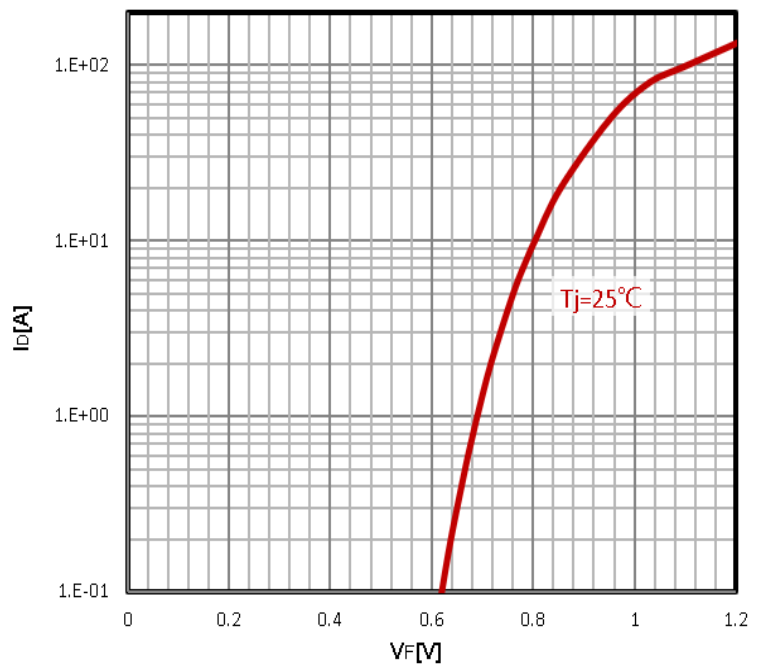
Safe operating area

$I_D=f(V_{DS})$



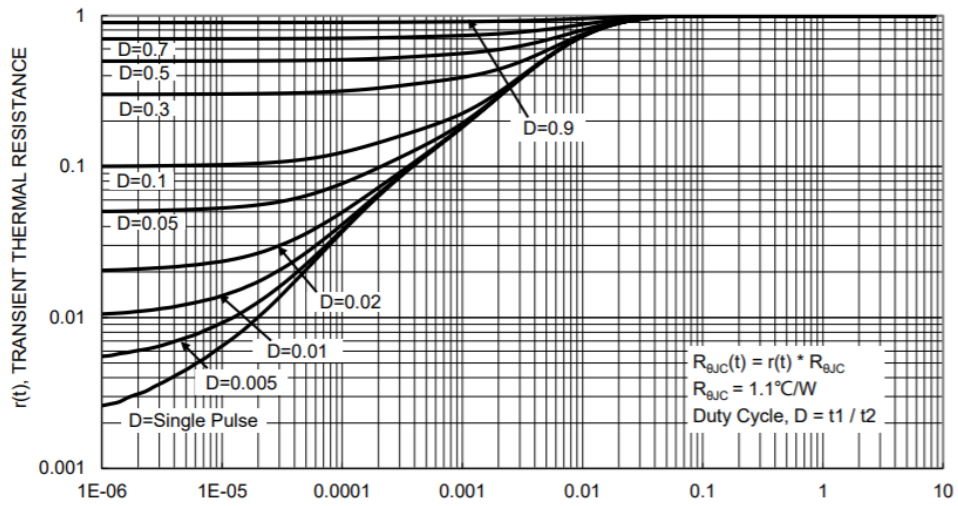
Body Diode Forward Voltage Variation

$I_F=f(V_{GS})$

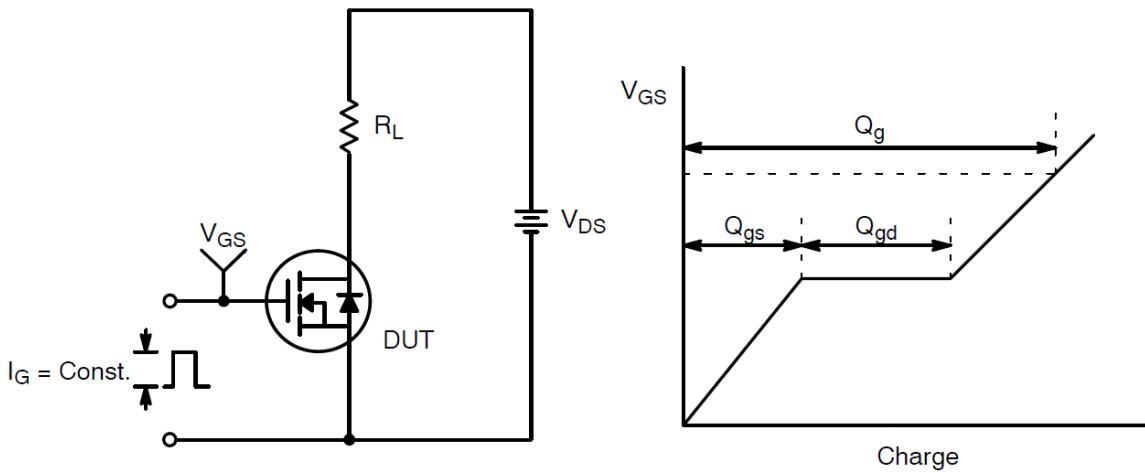


Max. transient thermal impedance

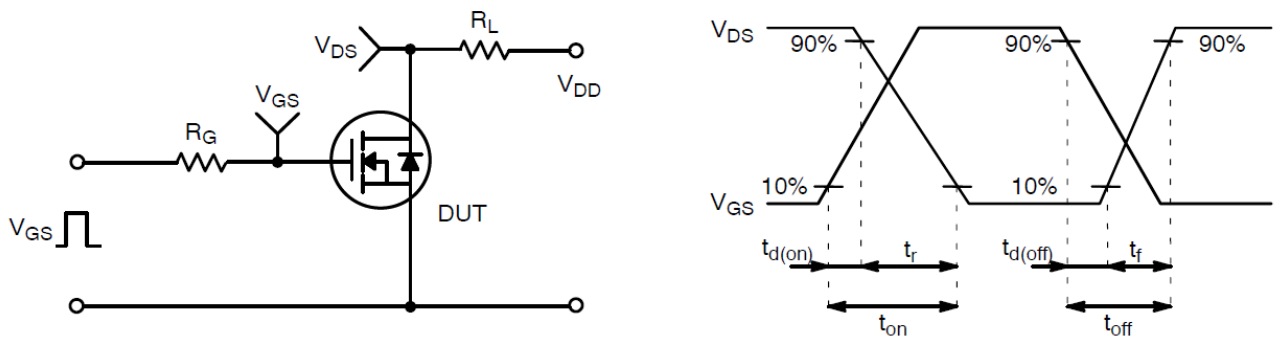
$$Z_{thJC} = f(t_p)$$



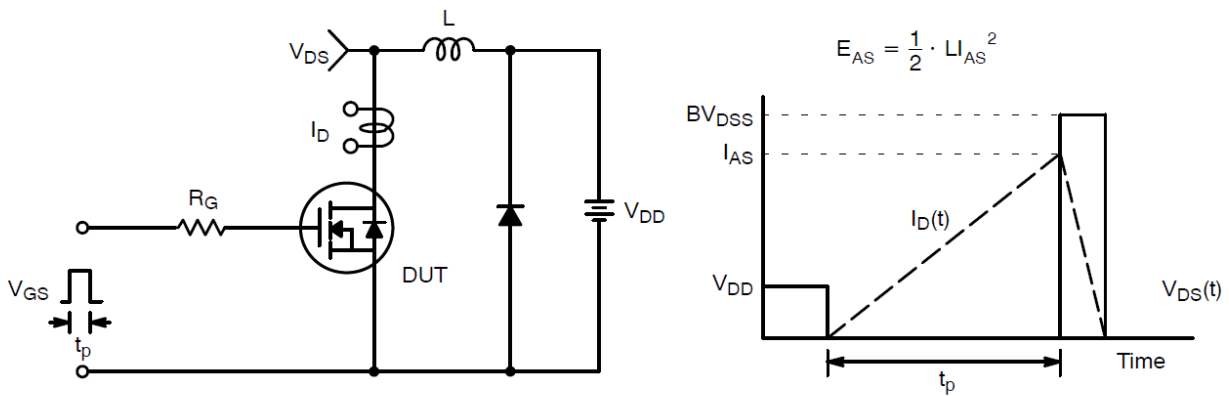
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

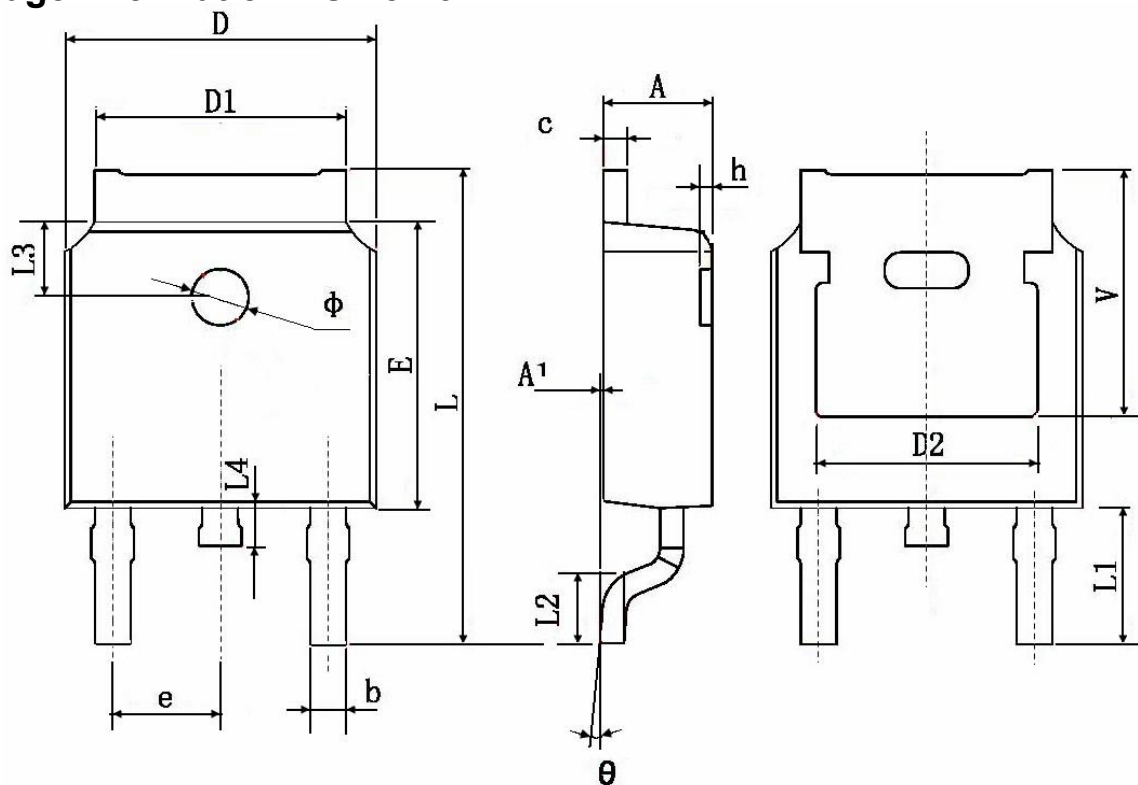


Resistive Switching Test Circuit & Waveforms



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.	