

N-Ch 100V Fast Switching MOSFETs

Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

Product Summary

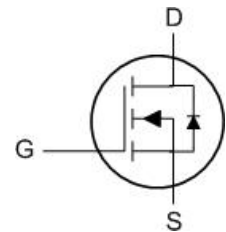
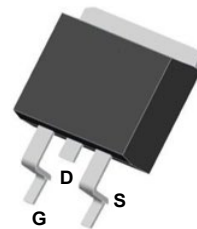


BVDSS	RDSON	ID
100V	8.5mΩ	70A

Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

TO263 Pin Configuration



Absolute Maximum Ratings:

Symbol	Parameter		Value	Units
V_{DSS}	Drain-to-Source Voltage		100	V
I_D	Continuous Drain Current	$T_C = 25\text{ }^{\circ}\text{C}$	70	A
	Continuous Drain Current	$T_C = 100\text{ }^{\circ}\text{C}$	45	A
I_{DM}^{a1}	Pulsed Drain Current		210	A
E_{AS}^{a2}	Single pulse avalanche energy		150	mJ
V_{GS}	Gate-to-Source Voltage		± 20	V
P_D	Power Dissipation		96	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, -55 to 150	$^{\circ}\text{C}$
T_L	Maximum Temperature for Soldering		260	$^{\circ}\text{C}$

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.3	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	94	$^{\circ}\text{C}/\text{W}$

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	--	8.5	13	mΩ
		V _{GS} =4.5V, I _D =20A	--	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	--	1200	--	pF
C _{oss}	Output Capacitance		--	462	--	
C _{rss}	Reverse Transfer Capacitance		--	8.7	--	
R _g	Gate resistance	V _{GS} =0V, V _{DS} Open	--	11.5	--	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 = 5Ω	--	16	--	ns
t _r	Rise Time		--	18	--	
t _{d(OFF)}	Turn-Off Delay Time		--	32	--	
t _f	Fall Time		--	10	--	
Q _g	Total Gate Charge	V _{GS} =10V V _{DS} = 50V I _D =10A	--	21.8	--	nC
Q _{gs}	Gate Source Charge		--	3.72	--	
Q _{gd}	Gate Drain Charge		--	4.97	--	

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	--	43	--	ns
Q _{rr}	Reverse Recovery Charge		--	90	--	nC

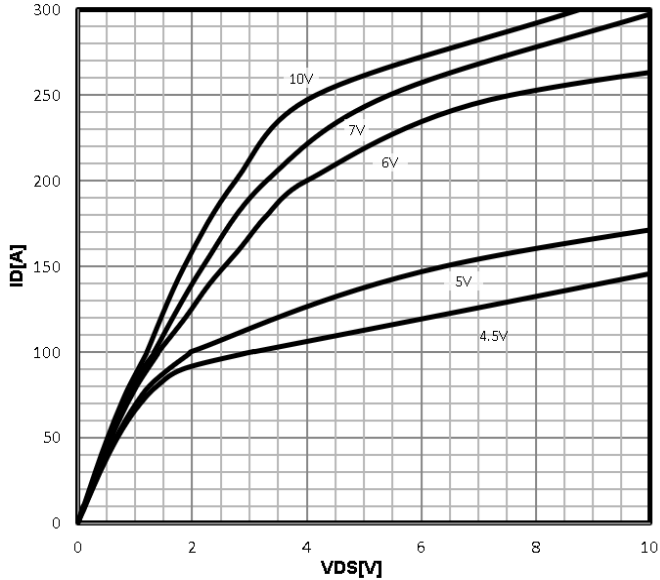
a1: Repetitive rating; pulse width limited by maximum junction temperature

a2: VDD=50V, L=0.5mH, Rg=25Ω, Starting TJ=25 °C

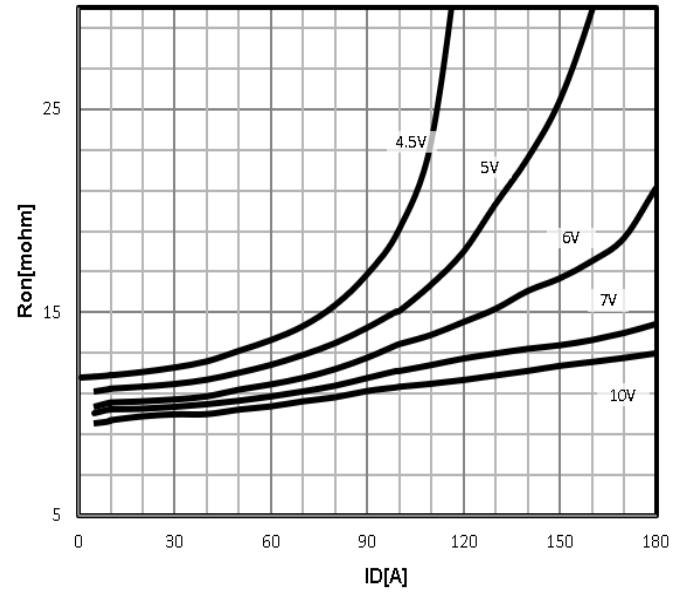


Characteristics Curve:

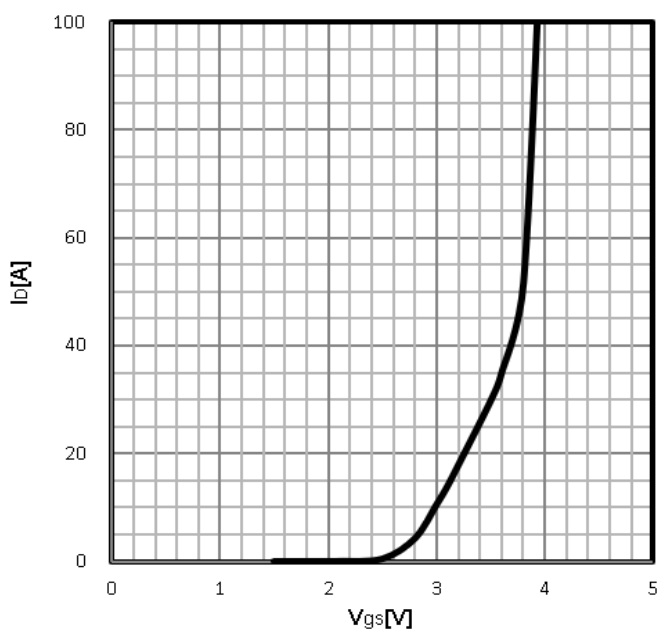
Typ. output characteristics
 $I_D = f(V_{DS})$



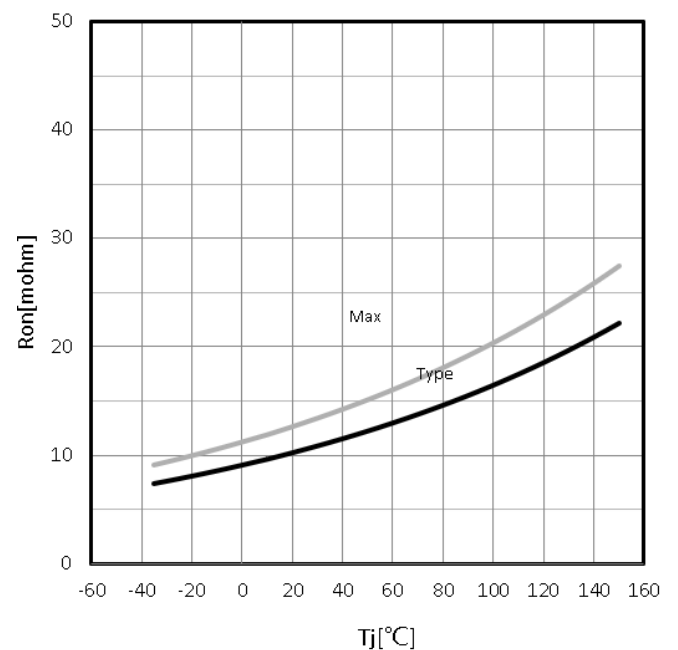
Typ. drain-source on resistance
 $R_{DS(on)} = f(I_D)$



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



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

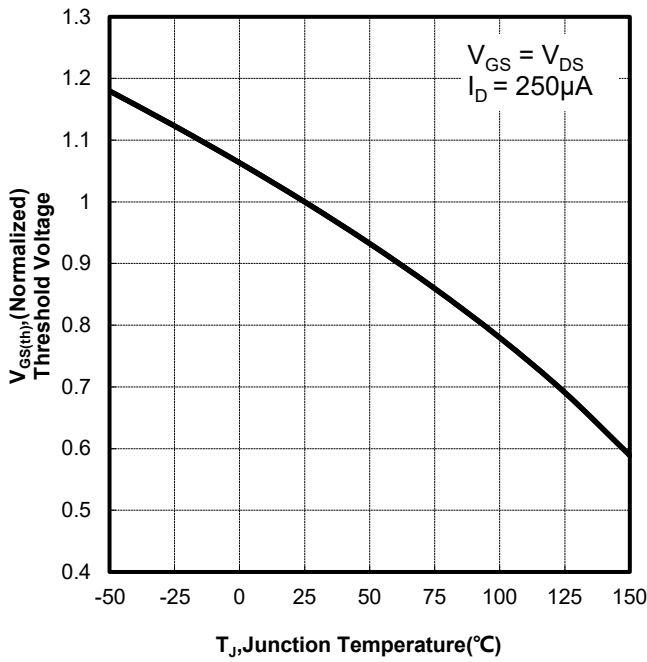




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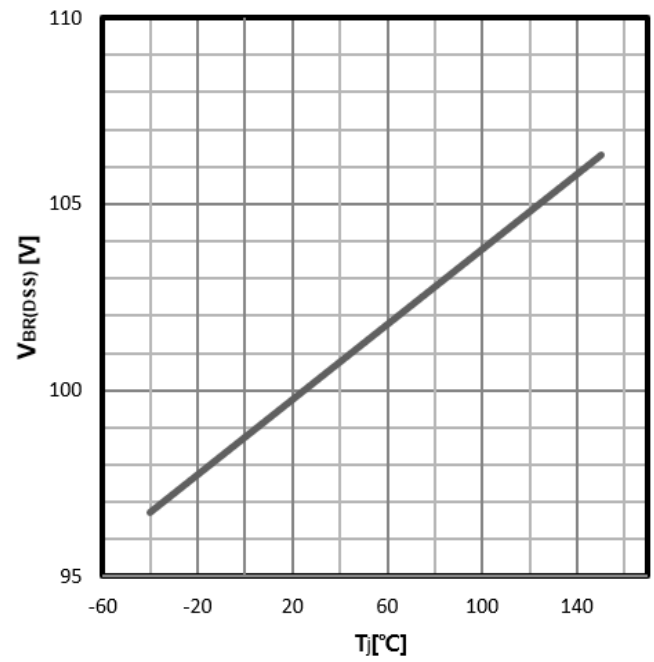
Gate Threshold Voltage

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



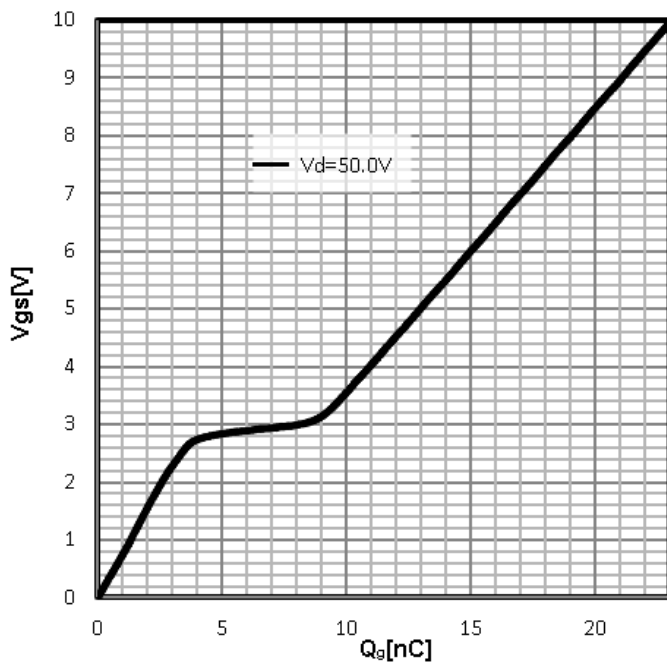
Drain-source breakdown voltage

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



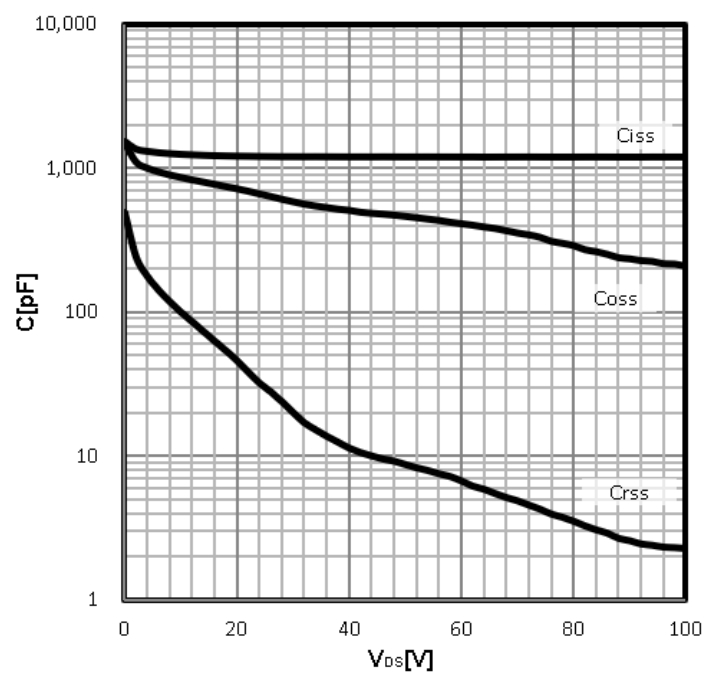
Typ. gate charge

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



Typ. capacitances

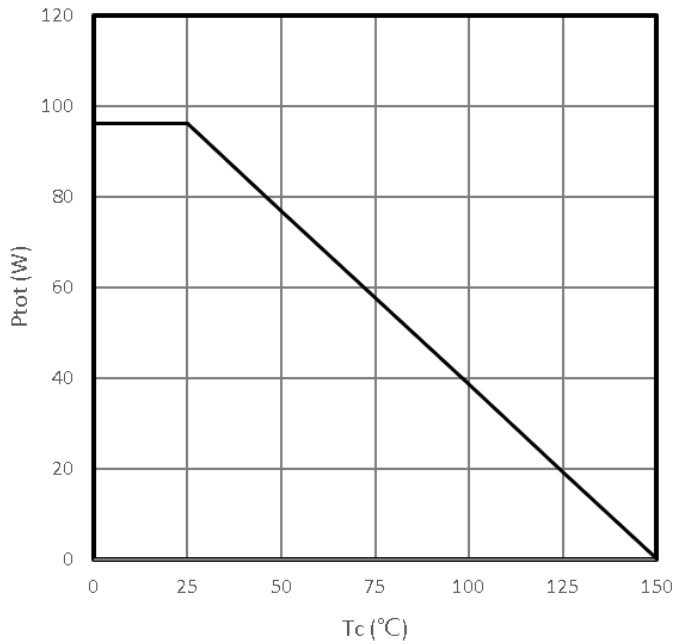
$$C=f(V_{DS}); V_{GS}=0V; f=1MHz$$



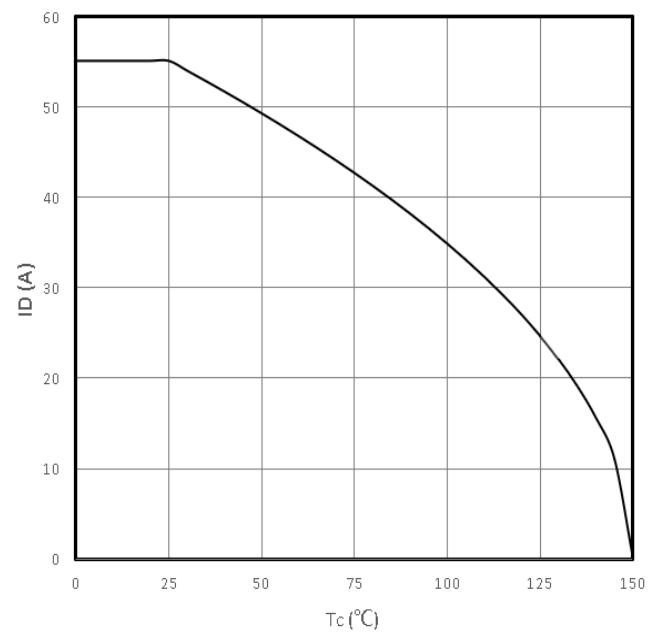


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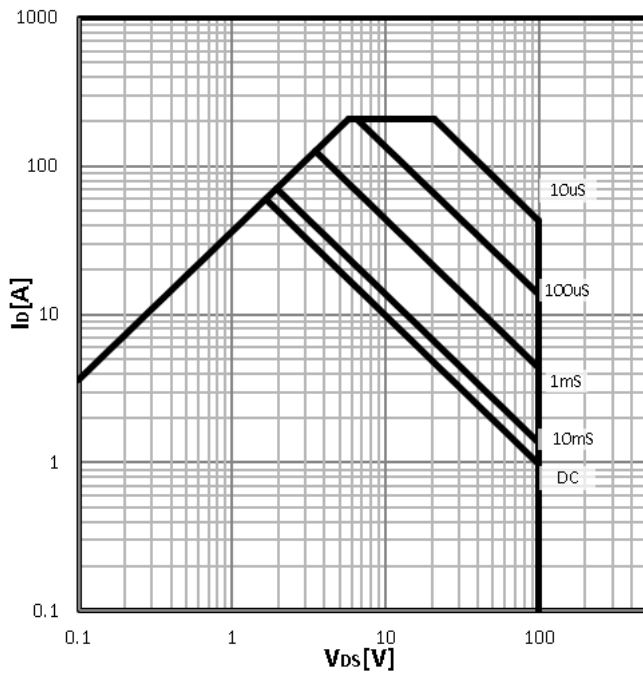
Power Dissipation
 $P_{tot}=f(T_c)$



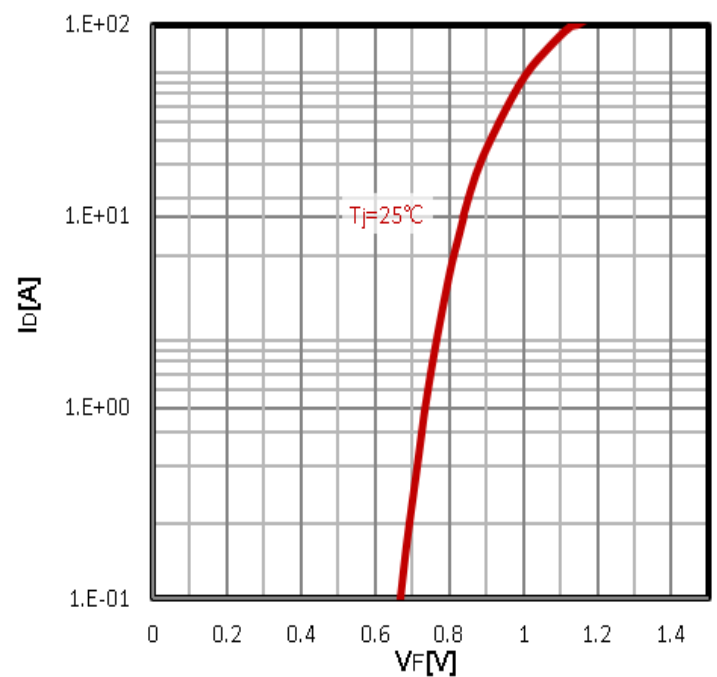
Maximum Drain Current
 $I_D=f(T_c)$



Safe operating area
 $I_D=f(V_{DS})$



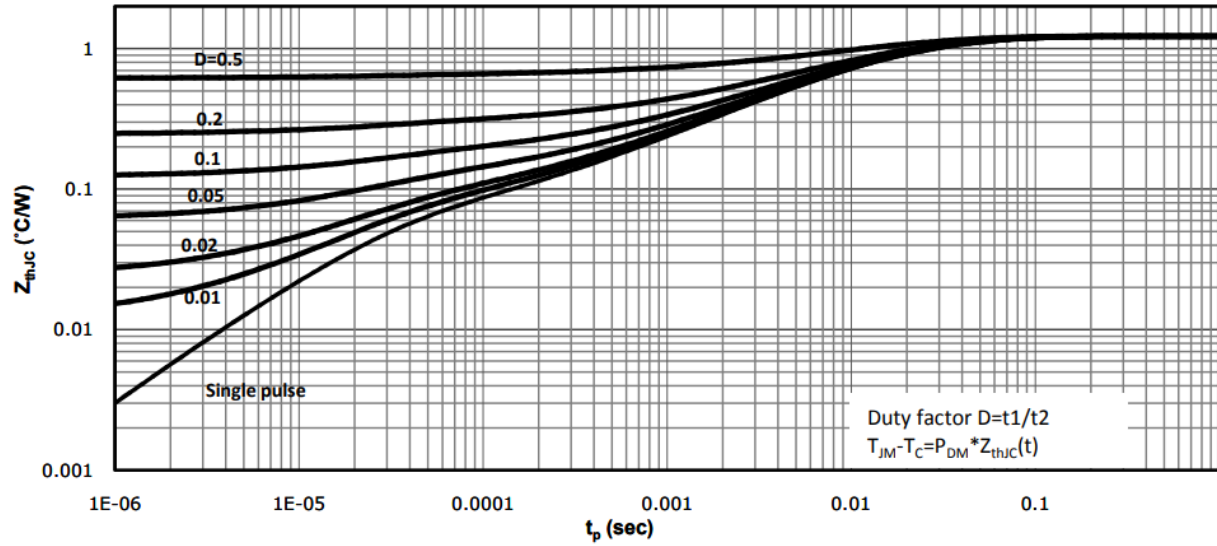
Body Diode Forward Voltage Variation
 $I_F=f(V_{GS})$





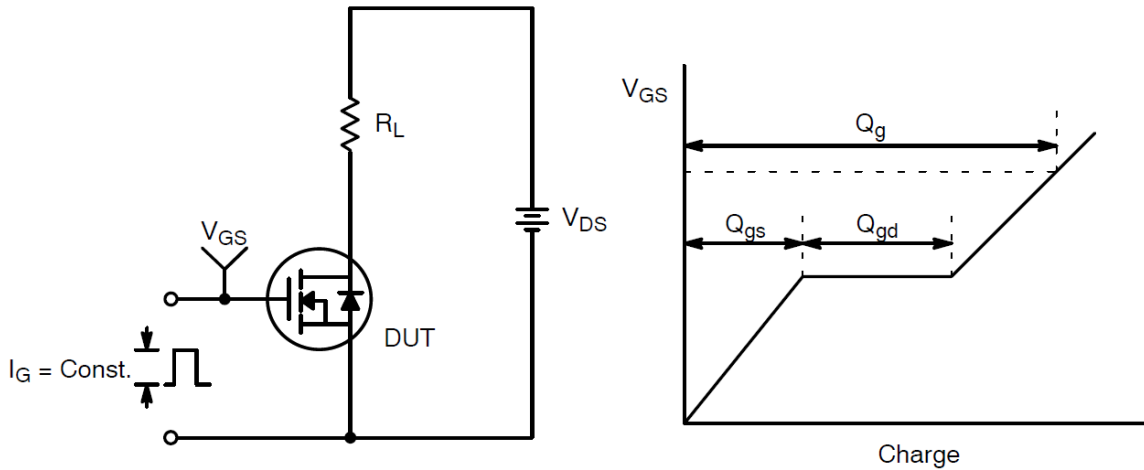
Max. transient thermal impedance

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

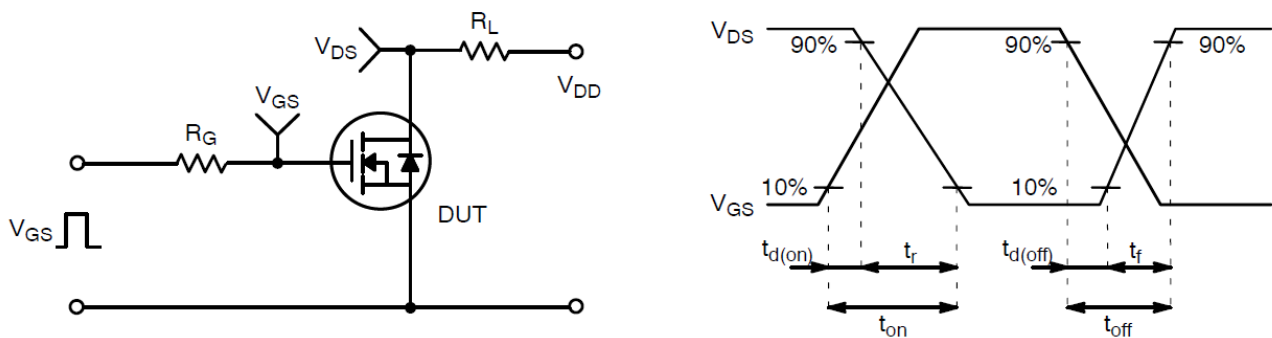




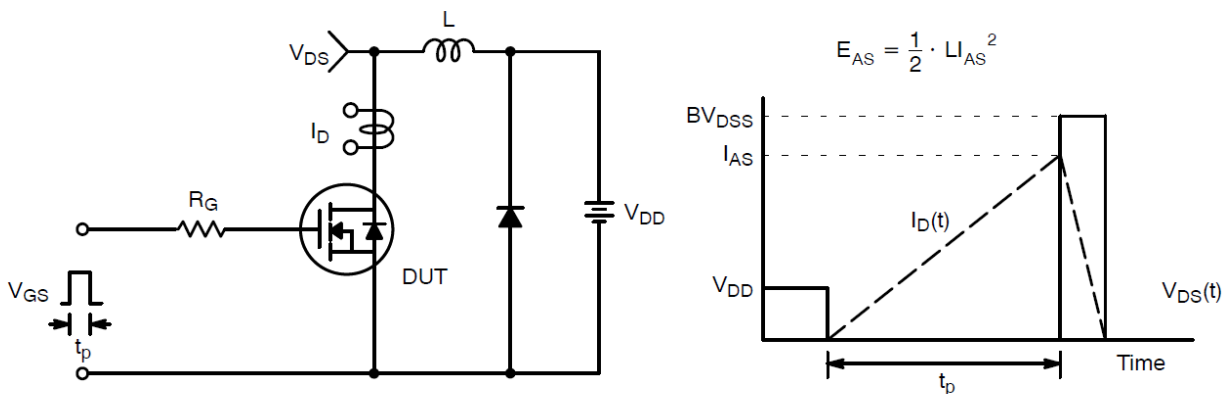
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

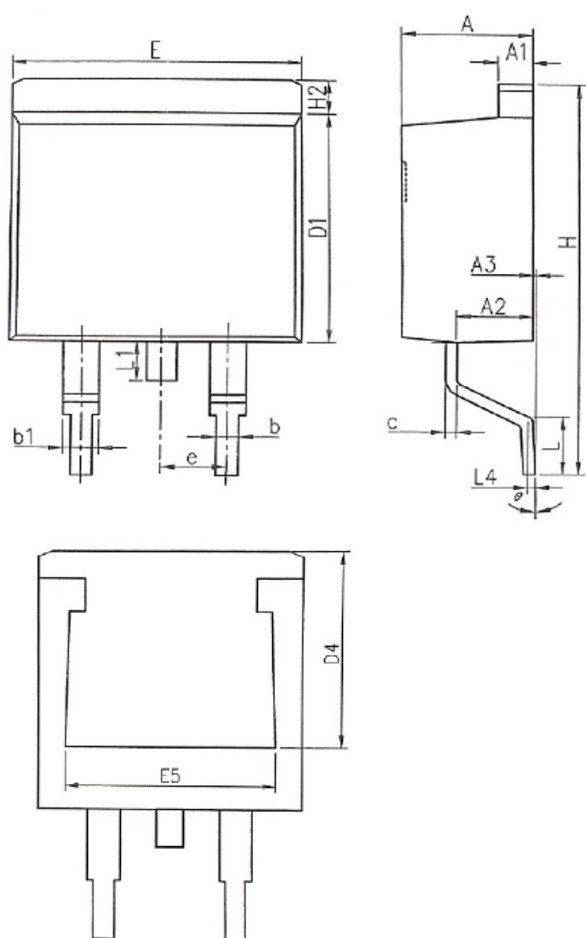


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Mechanical Dimensions for TO-263



COMMON DIMENSIONS

SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°