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

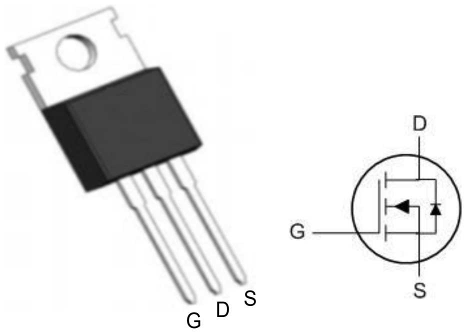
Green

BVDSS	RDSON	ID
100V	8.5mΩ	70A

Applications

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

TO220AB 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 °C	70	A
	Continuous Drain Current	T_C = 100 °C	45	A
I_{DM}[a1]	Pulsed Drain Current		280	A
E_{AS}[a2]	Single pulse avalanche energy		110	mJ
V_{GS}	Gate-to-Source Voltage		±20	V
P_D	Power Dissipation		100	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range		150, –55 to 150	℃
T_L	Maximum Temperature for Soldering		260	℃

Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	64	℃/W

Electrical Characteristics (TA= 25℃ 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	10.5	mΩ
		V_{GS}=4.5V, I_D=15A		9.5	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

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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
tr	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

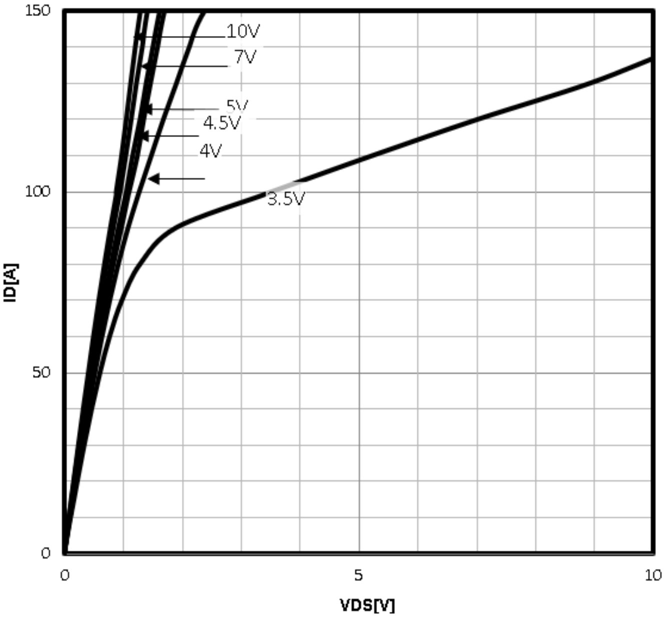
[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: VDD=50V, L=0.3mH, Rg=25Ω, Starting TJ=25 ℃

Characteristics Curve：

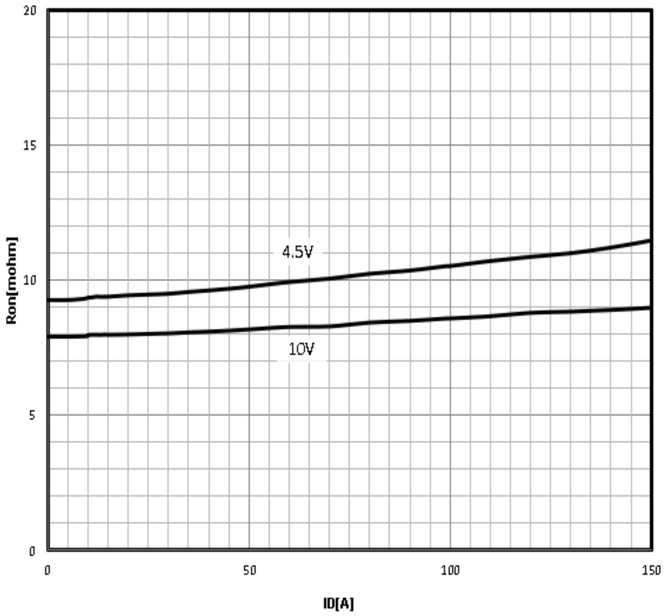
Typ. output characteristics

$I_D=f(V_{DS})$



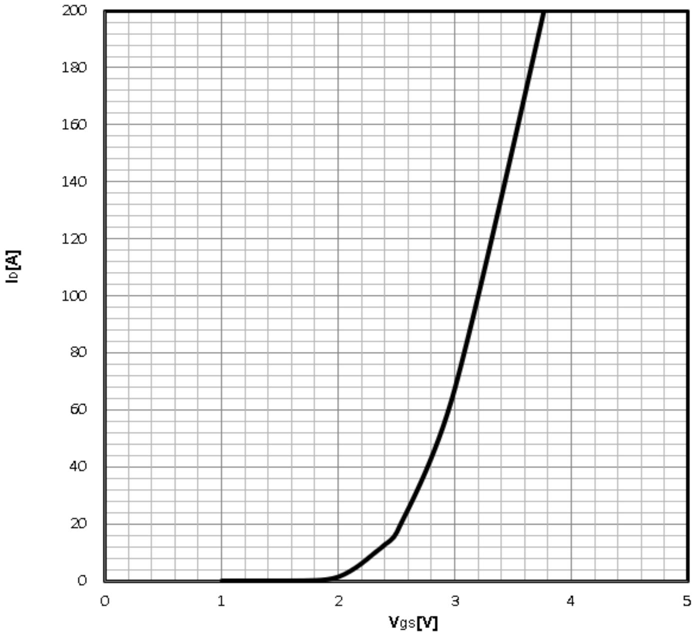
Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$



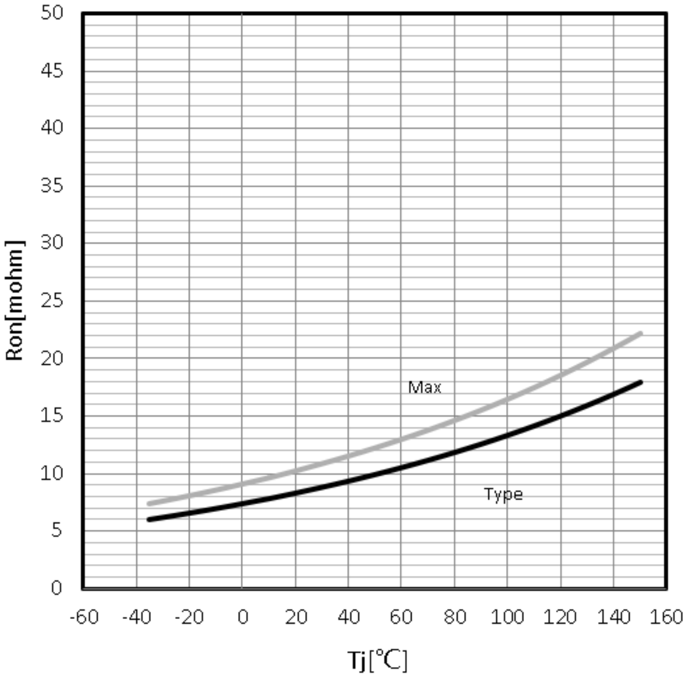
Typ. transfer characteristics

$I_D=f(V_{GS})$

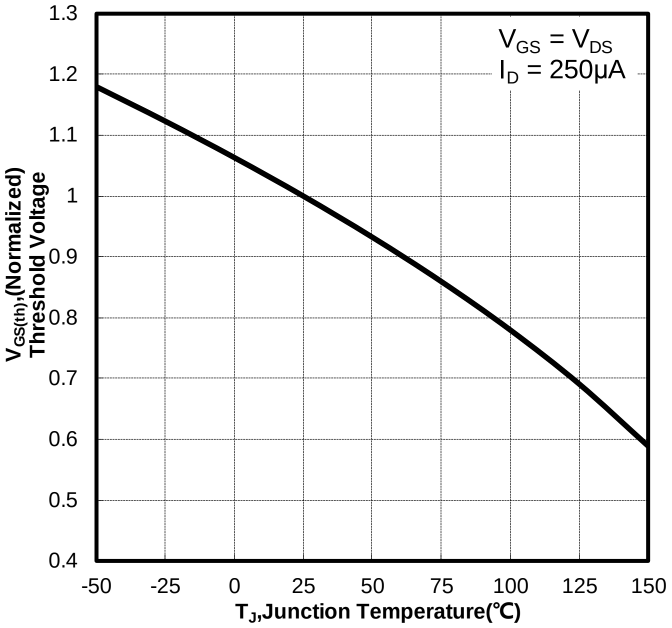


Drain-source on-state resistance

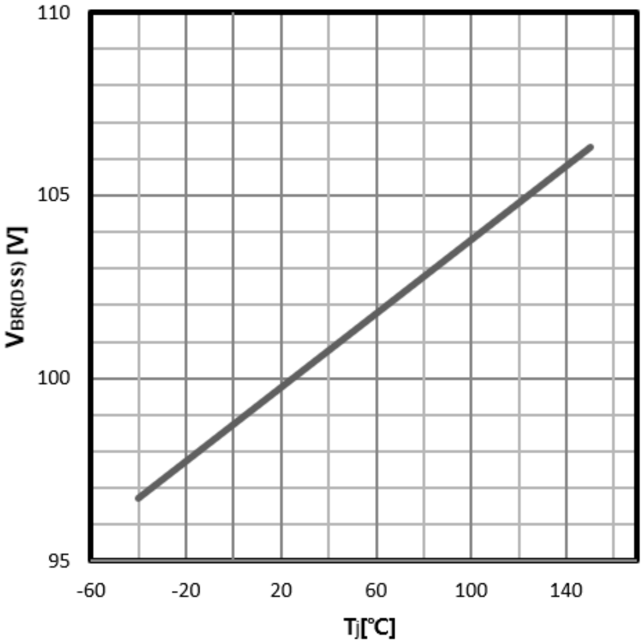
$R_{DS(on)}=f(T_j);I_D=20A;\ V_{GS}=10V$



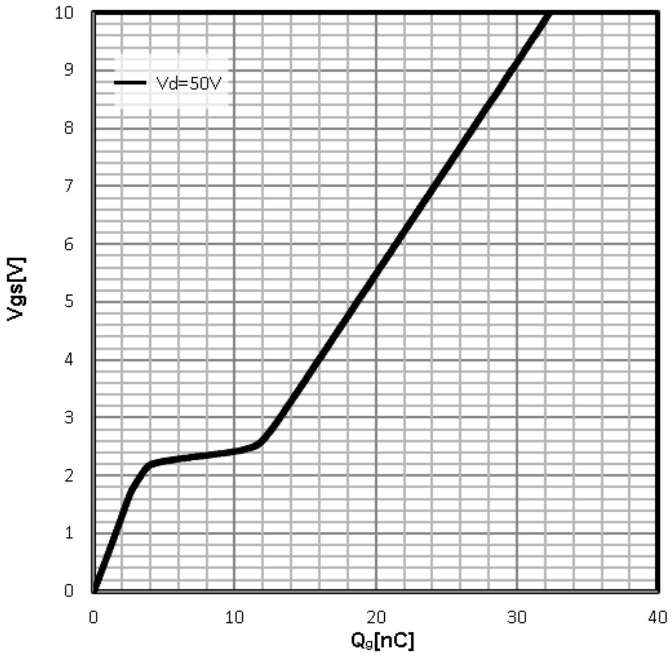
Gate Threshold Voltage
$V_{TH}=f(T_j)$; $I_D=250uA$



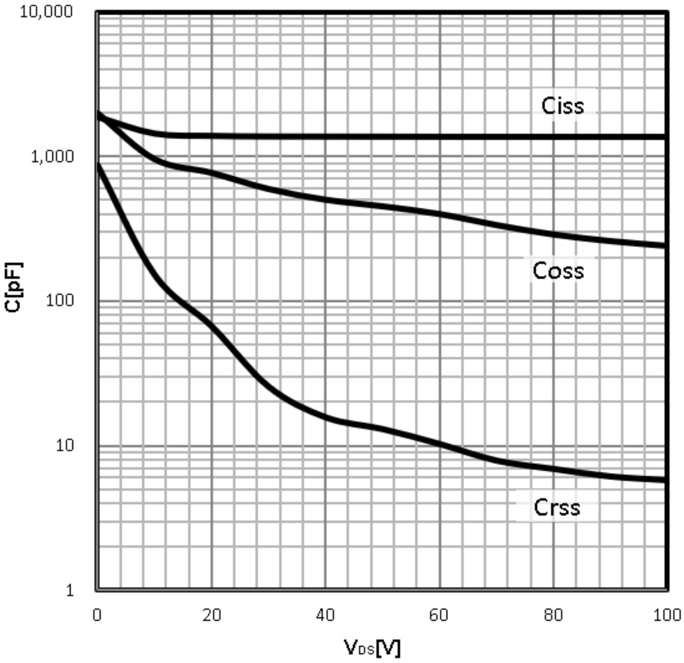
Drain-source breakdown voltage
$V_{BR(DSS)}=f(T_j)$; $I_D=250uA$



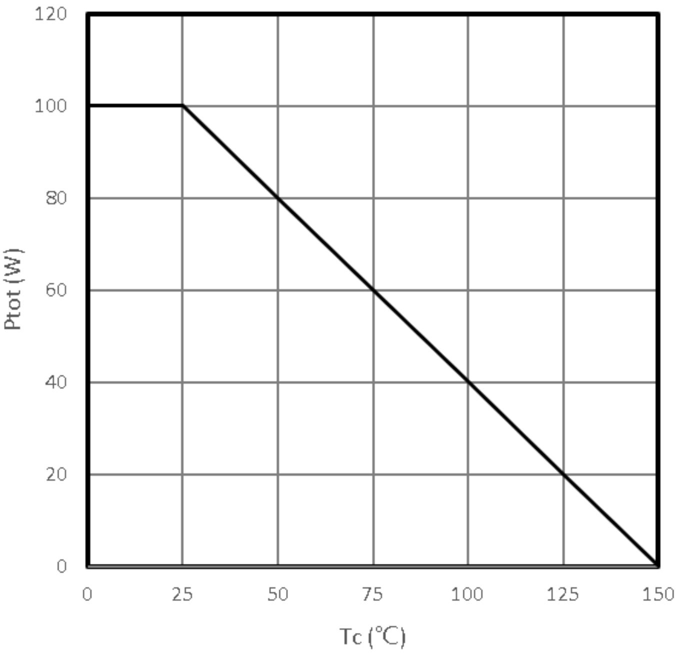
Typ. gate charge
$V_{GS}=f(Q_g)$; $I_D=10A$



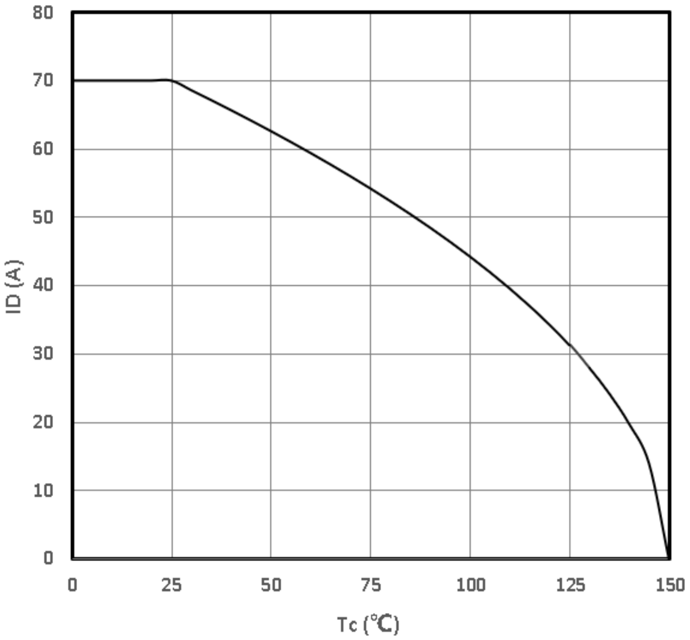
Typ. capacitances
$C=f(V_{DS})$; $V_{GS}=0V$; $f=1MHz$



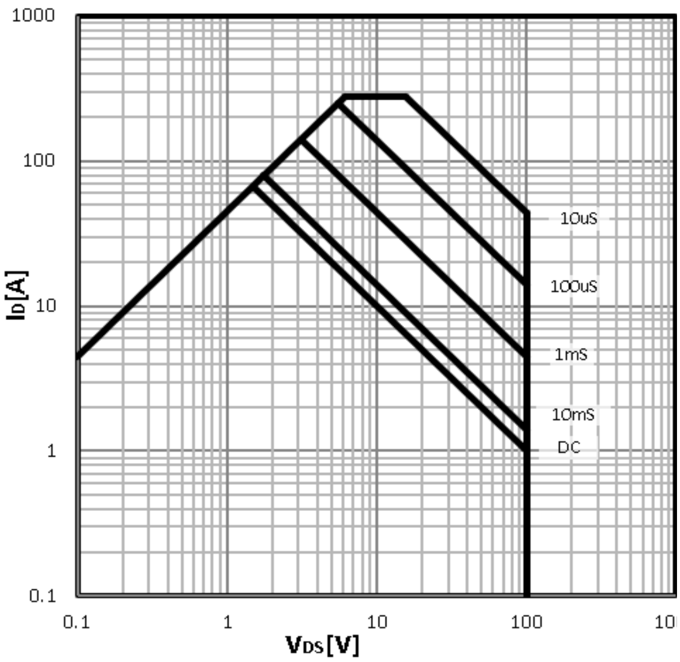
Power Dissipation
$P_{tot}=f(T_C)$



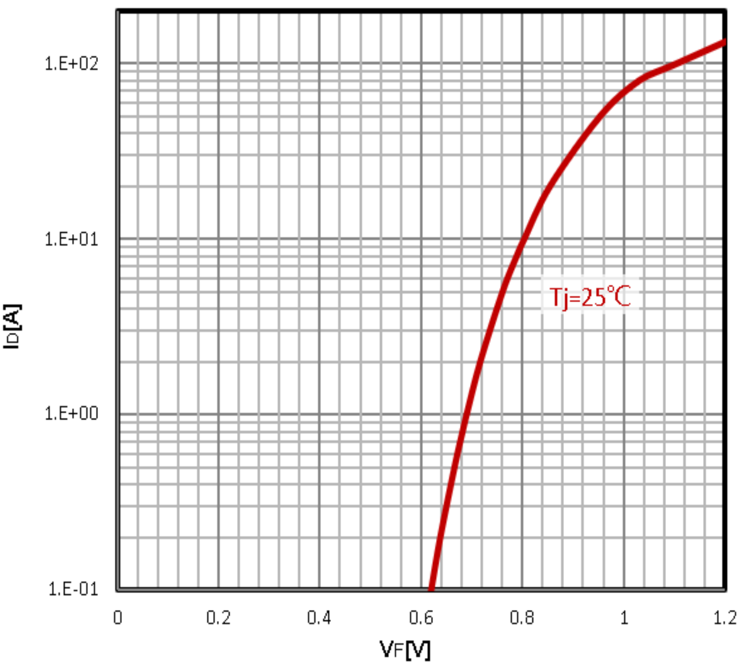
Maximum Drain Current
$I_D=f(T_C)$



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

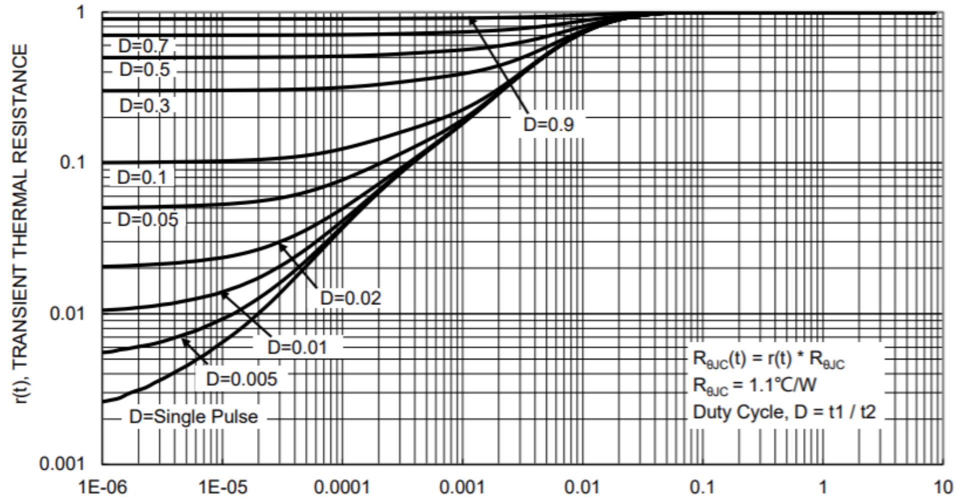


Body Diode Forward Voltage Variation
$I_F=f(V_{GS})$

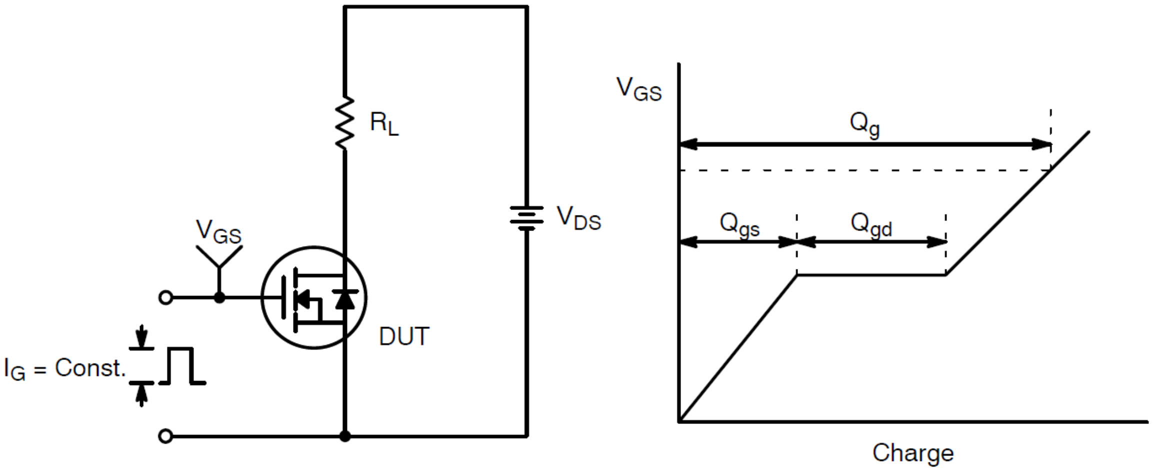


Max. transient thermal impedance

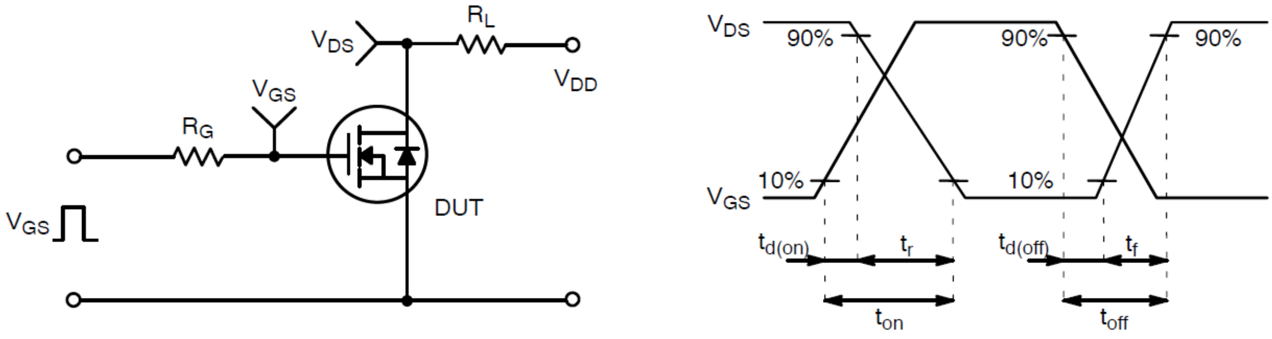
$Z_{thJC}=f(t_p)$



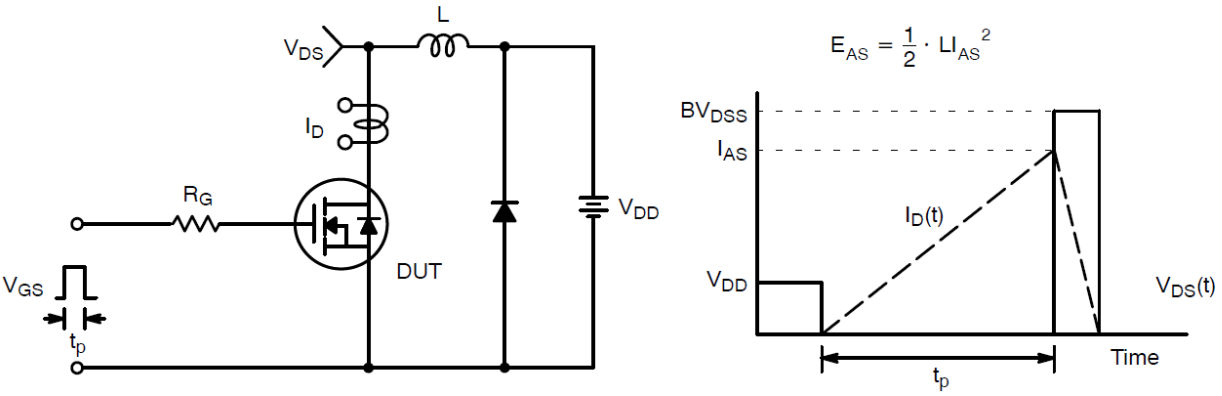
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

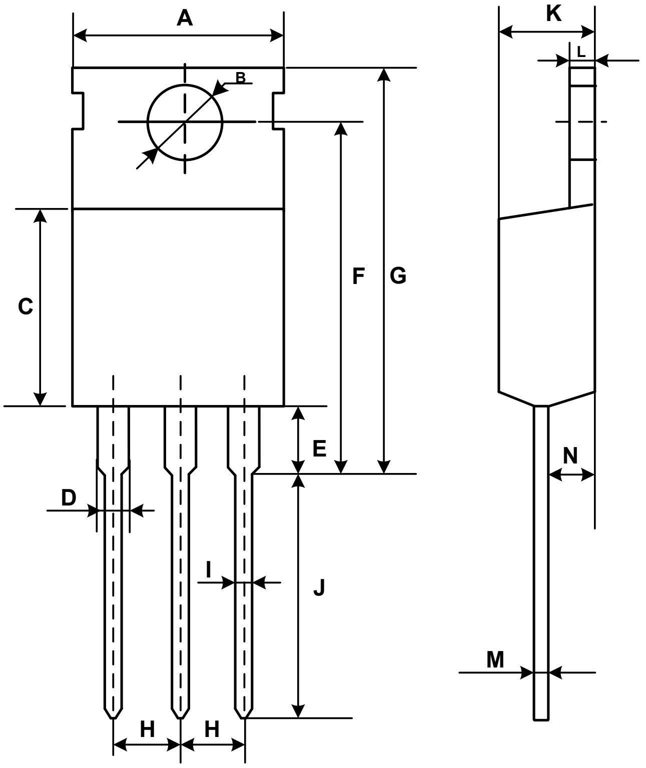


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Mechanical Dimensions for TO-220



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SYMBOL	MM	
	MIN	MAX
A	9.70	10.30
B	3.40	3.80
C	8.80	9.40
D	1.17	1.47
E	2.60	3.50
F	15.10	16.70
G	19.55MAX	
H	2.54REF	
I	0.70	0.95
J	9.35	11.00
K	4.30	4.77
L	1.20	1.45
M	0.40	0.65
N	2.20	2.60