N-Ch 120V Fast Switching MOSFETs

Features

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- Low Reverse transfer capacitances

Green

Product Summary

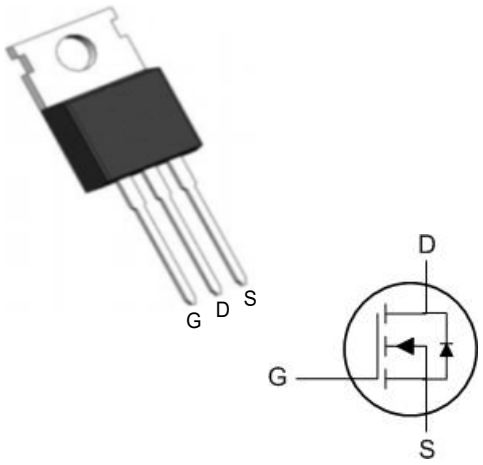
BVDSS	RDSON	ID
120V	10mΩ	70A

Applications

- DC-DC converter
- Portable Equipment
- Power management

100% DVDS Tested
100% Avalanche Tested

TO220 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	70	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	35	A
I_{DM}	Pulsed Drain Current[2]	220	A
EAS	Single Pulse Avalanche Energy[3]	210	mJ
I_{AS}	Avalanche Current	---	A
P_D@T_C=25℃	Total Power Dissipation[4]	85	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	---	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.47	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	120	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	---	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10 V, I_D=84A	---	10	12.5	mΩ
		V_{GS}=4.5V , I_D=84A	---	11.5	15	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.4	1.8	2.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V, V_{GS}=0V , T_J=125℃	---	---	100	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=84A	---	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	---	---	Ω
Q_g	Total Gate Charge	V_{DS}=60V , V_{GS}=10V , I_D=20A	---	31	---	nC
Q_{gs}	Gate-Source Charge		---	9.4	---	
Q_{gd}	Gate-Drain Charge		---	7.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD} =60V, R_{G_ext} = 5Ω, V_{GS}=10V, ID =20A	---	15	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	32	---	
T_f	Fall Time		---	9	---	
C_{iss}	Input Capacitance	V_{DS}=60V , V_{GS}=0V , f=1MHz	---	1807	---	pF
C_{oss}	Output Capacitance		---	212	---	
C_{rss}	Reverse Transfer Capacitance		---	6	---	

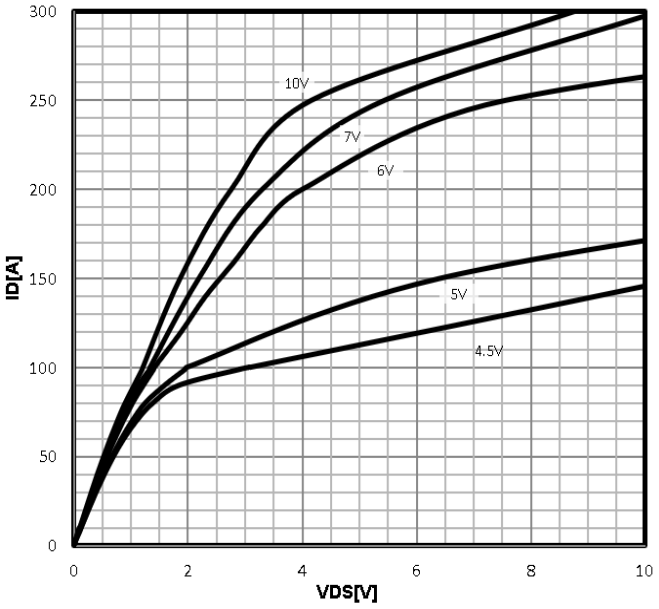
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	60	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=84A , T_J=25℃	---	---	1.4	V
t_{rr}	Reverse Recovery Time	IF=40A ,di/dt=100A / μs , T_J= 25 ℃	---	60	---	nS
Q_{rr}	Reverse Recovery Charge		---	100	---	nC

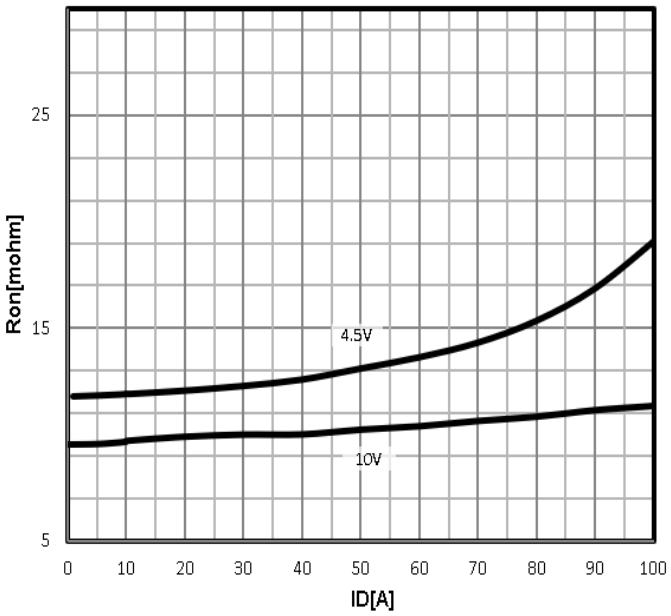
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.5mH,
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Characteristics Curve:

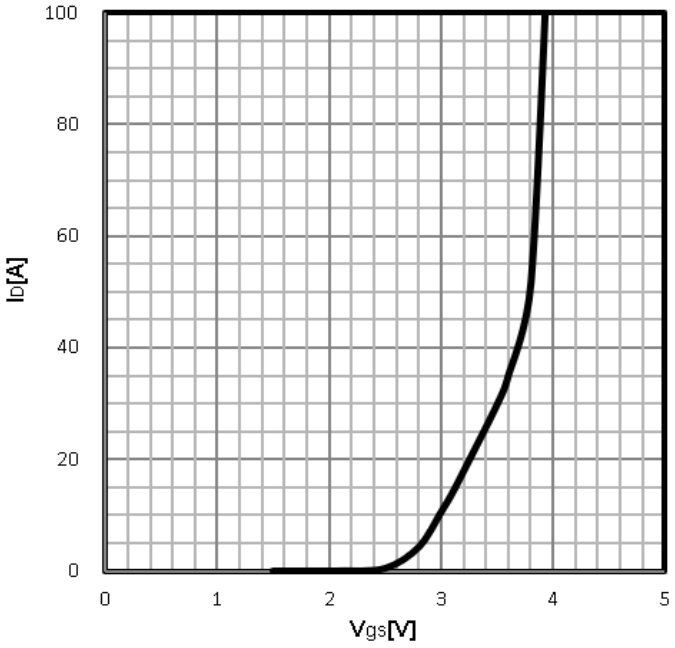
Typ. output characteristics
$I_D=f(V_{DS})$



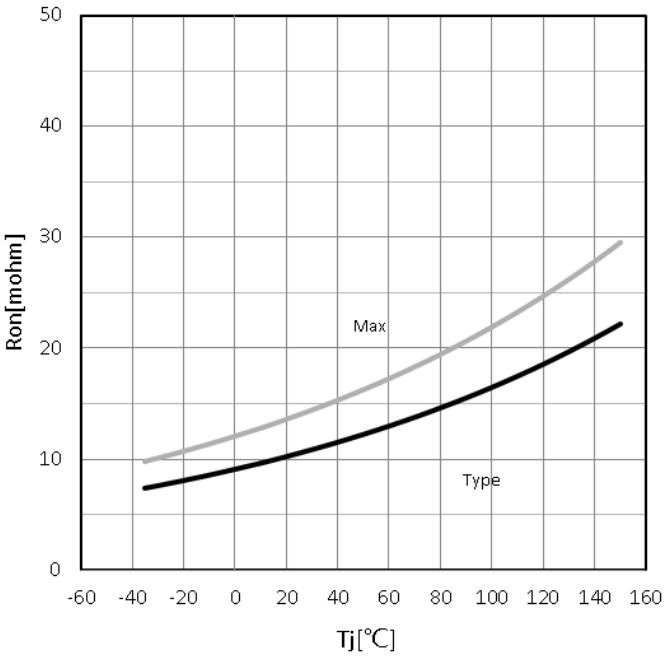
Typ. drain-source on resistance
$R_{DS(on)}=f(I_D)$



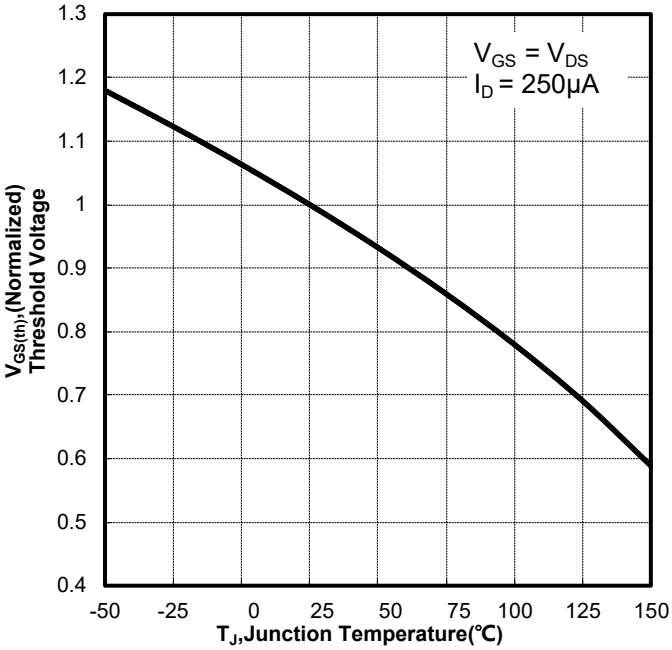
Typ. transfer characteristics
$I_D=f(V_{GS})$



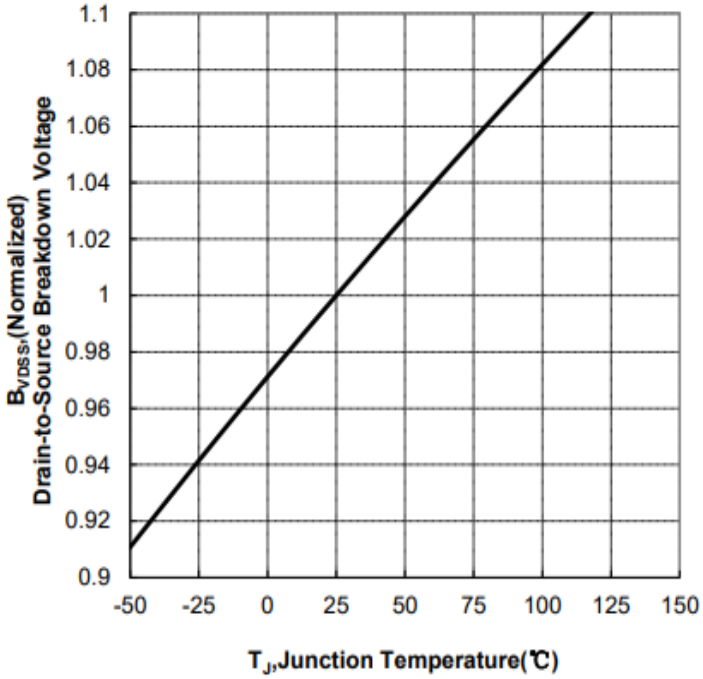
Drain-source on-state resistance
$R_{DS(on)}=f(T_j)$; $I_D=20A$; $V_{GS}=10V$



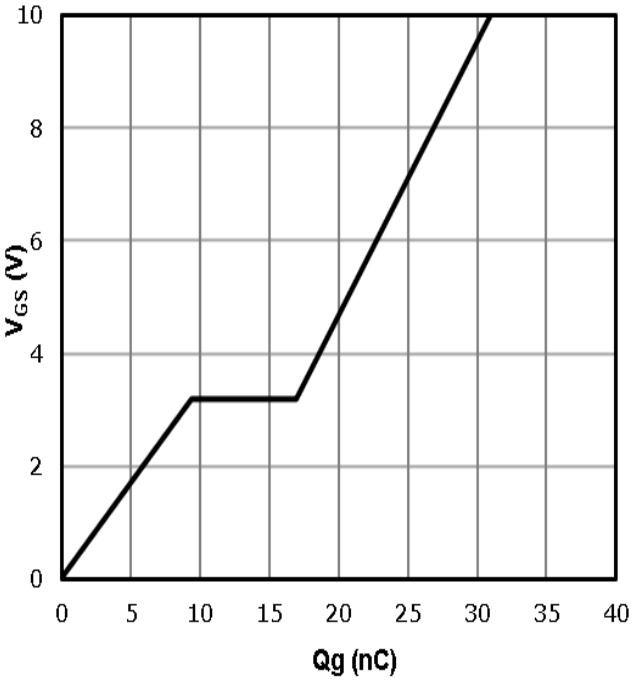
Gate Threshold Voltage
$V_{TH}=f(T_j)$; I_D=250uA



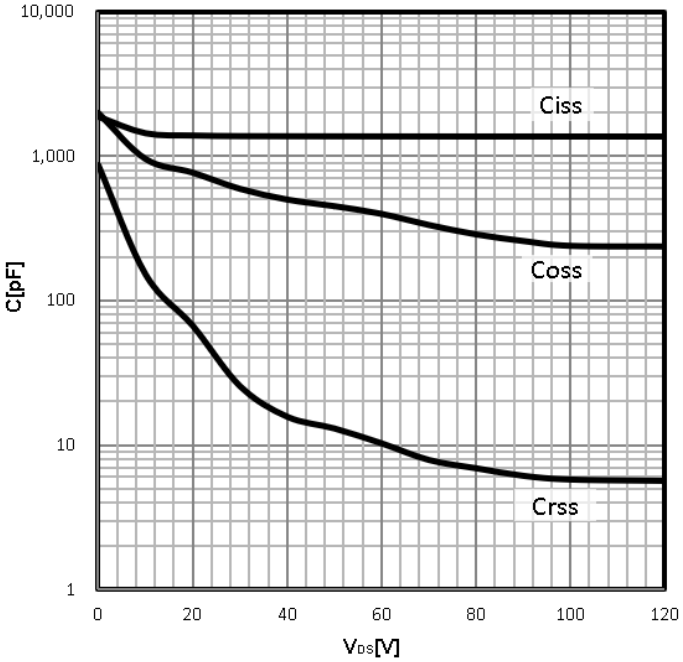
Drain-source breakdown voltage
$V_{BR(DSS)}=f(T_j)$; I_D=250uA



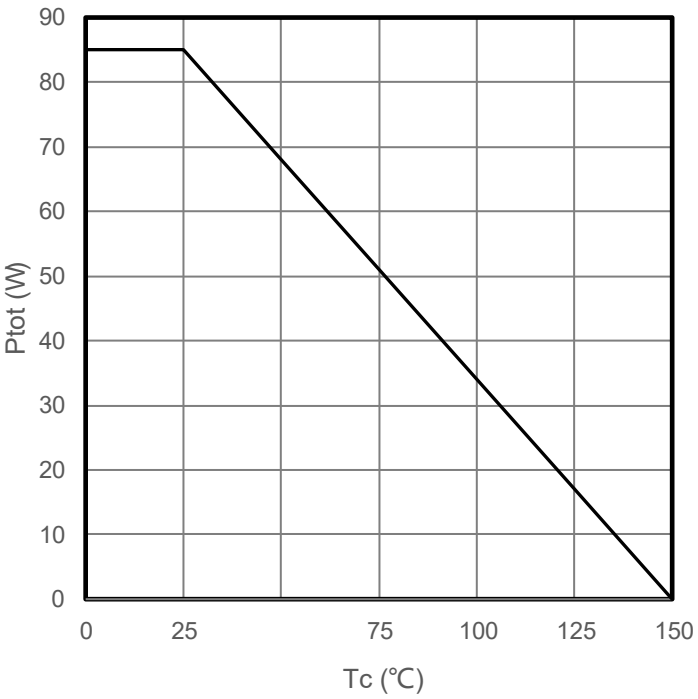
Typ. gate charge
$V_{GS}=f(Q_{gate})$



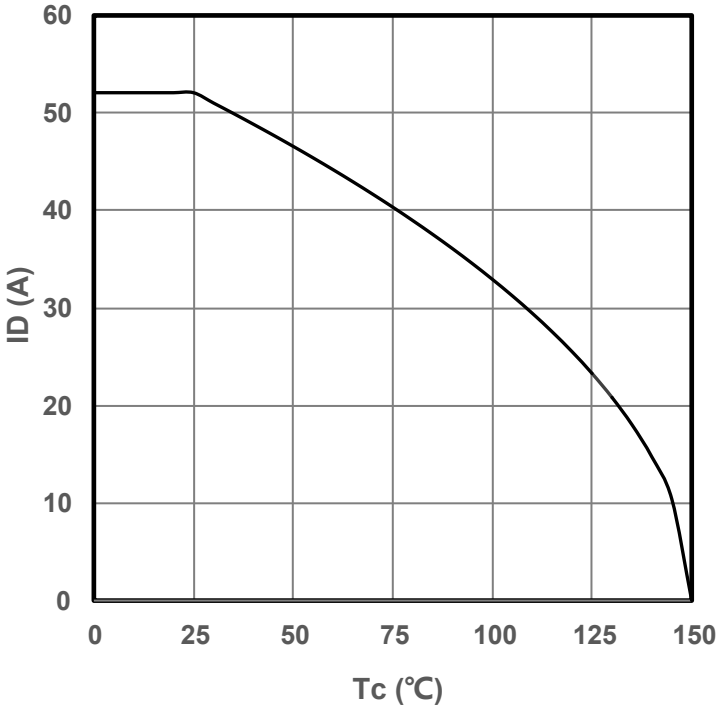
Typ. capacitances
C =f(V_{DS}); V_{GS}=0V; f



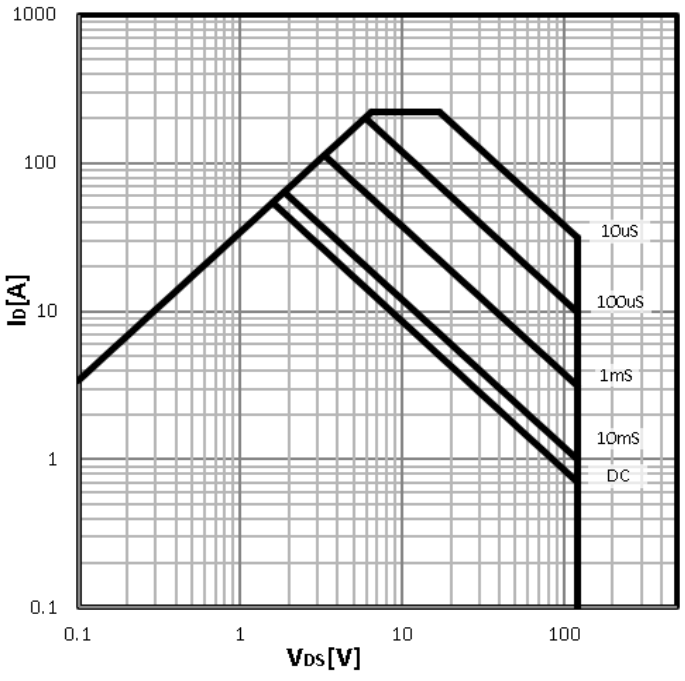
Power Dissipation
$P_{tot}=f(T_j)$



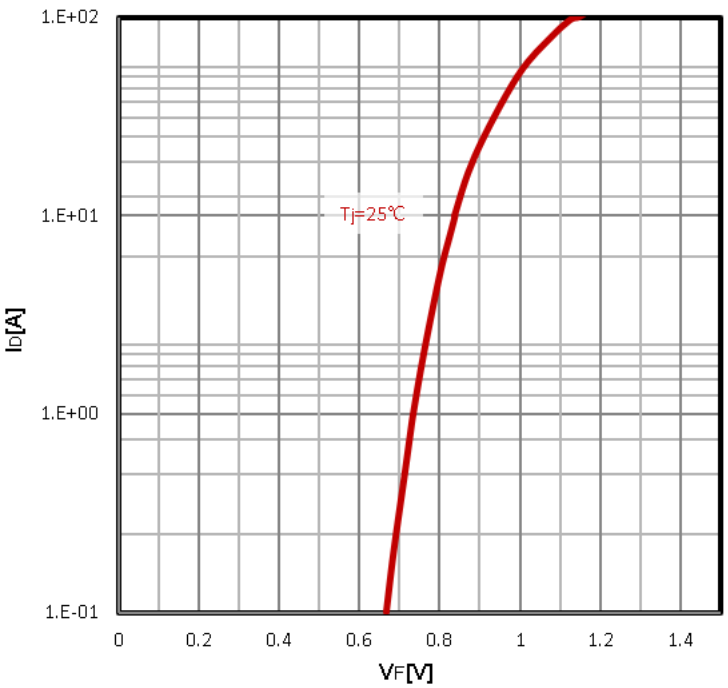
Maximum Drain Current
$I_D=f(T_C)$



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

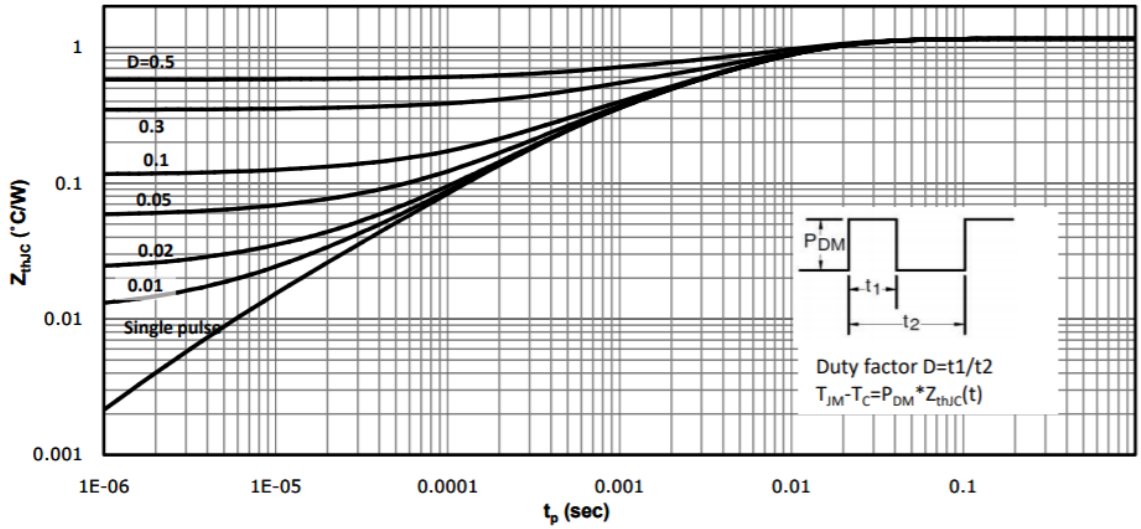


Body Diode Forward Voltage Variation
$I_F=f(V_{GS})$

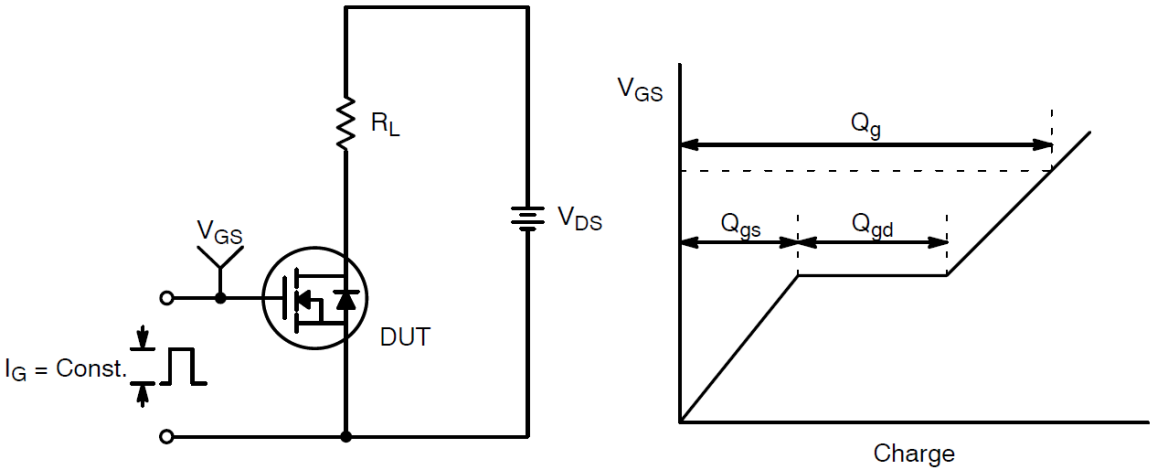


Max. transient thermal impedance

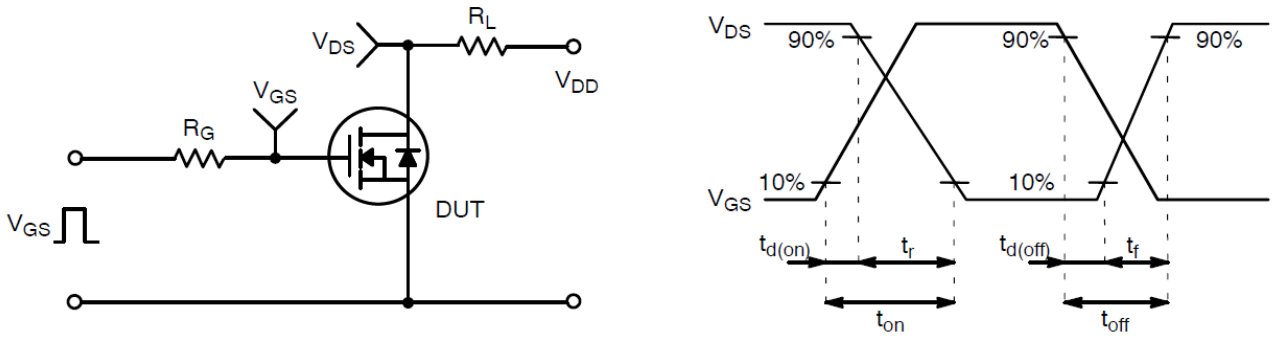
$Z_{thJC}=f(t_p)$



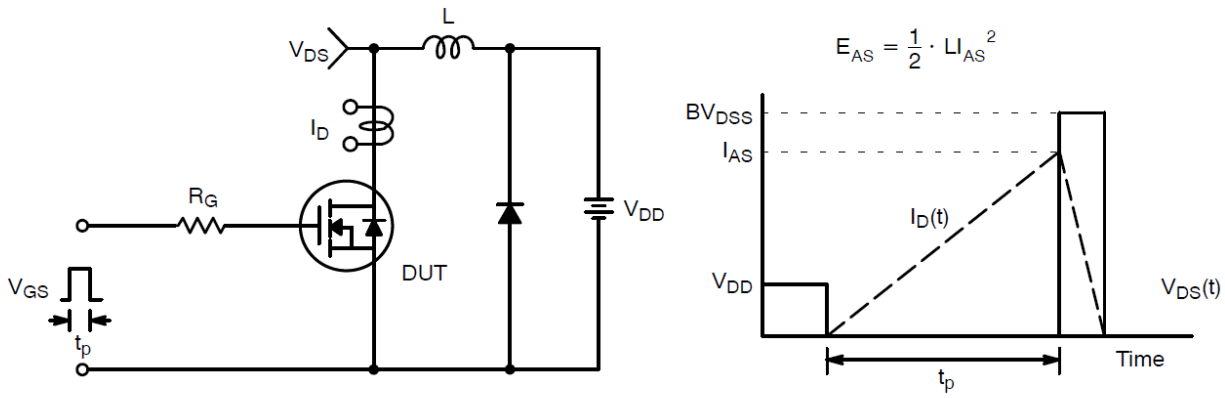
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

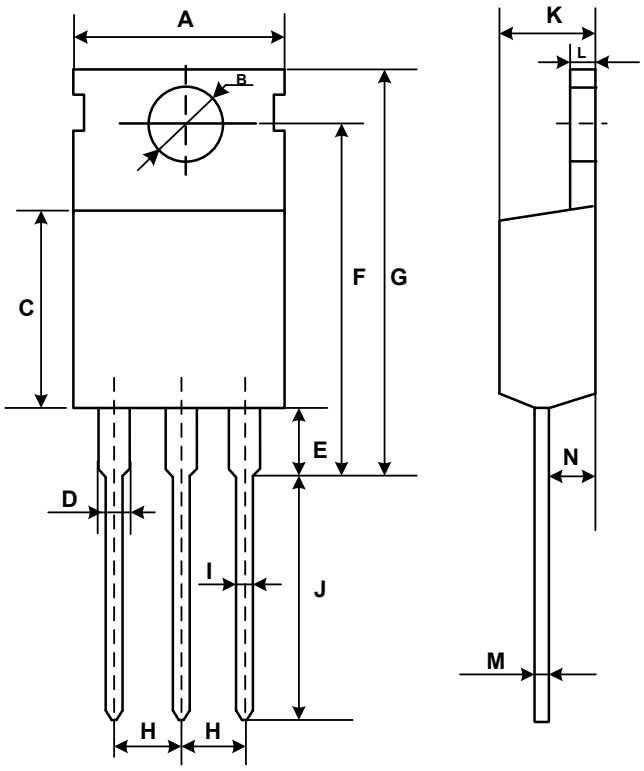


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

Mechanical Dimensions for TO-220



OMMON DIMENSIONS

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