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

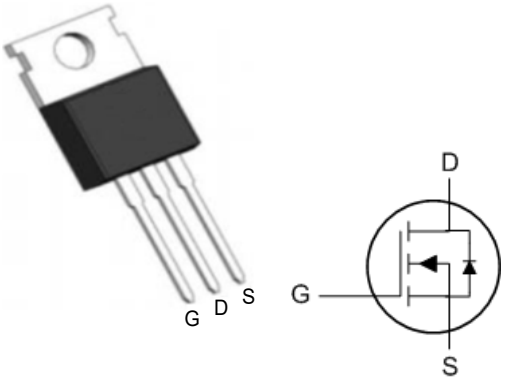
Green

BVDSS	RDSON	ID
100V	5mΩ	80A

Applications

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

TO220AB Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	80	A
I_D@T_C=100°C	Continuous Drain Current, V_{GS} @ 10V[1,6]	56	A
I_{DM}	Pulsed Drain Current[2]	320	A
EAS	Single Pulse Avalanche Energy[3]	238	mJ
I_{AS}	Avalanche Current	---	A
P_D@T_C=25°C	Total Power Dissipation[4]	111	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	1.1	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	40	°C/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	100	---	---	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=18A	---	5	6.3	mΩ
		V_{GS}=4.5V , I_D=18A	---	7	8.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	---	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=80V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=80V, V_{GS}=0V , T_J=100℃	---	---	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=15A	---	---	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	---	---	Ω
Q_g	Total Gate Charge	V_{DS}=50V , V_{GS}=10V , I_D=18A	---	44	---	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V,ID=18A, R_G = 6.2Ω, V_{GS}=10V	---	11	---	ns
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	50	---	
T_f	Fall Time		---	40	---	
C_{iss}	Input Capacitance	V_{DS}=50V , V_{GS}=0V , f=1MHz	---	2615	---	pF
C_{oss}	Output Capacitance		---	806	---	
C_{rss}	Reverse Transfer Capacitance		---	22	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	80	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=18A , T_J=25C	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=18A ,di/dt=100A / μs , T_J= 2 5 C	---	49	---	nS
Q_{rr}	Reverse Recovery Charge		---	67	---	nC

Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=50V, V_G=10V, R_G=25ohm, L=3mH, I_{AS}=12A, V_{DD}=0V during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Typical Performance Characteristics

Figure 1: Power De-rating

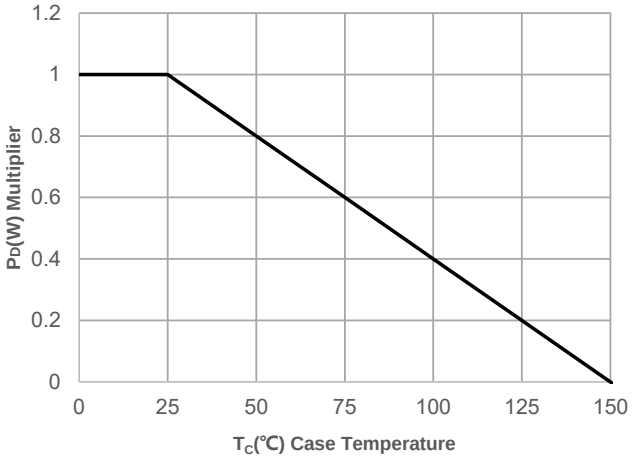


Figure 2: Current De-rating

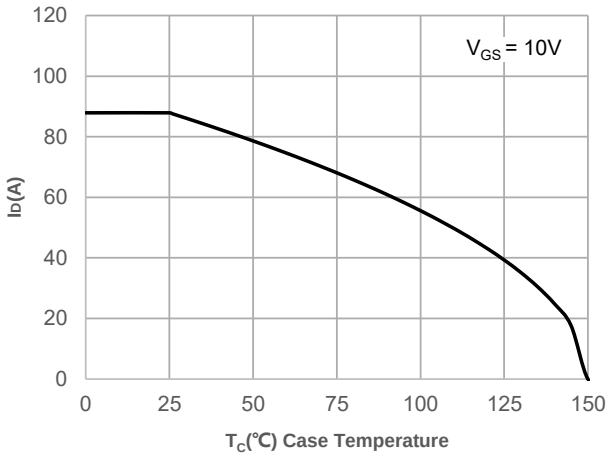


Figure 3: Normalized Maximum Transient Thermal Impedance

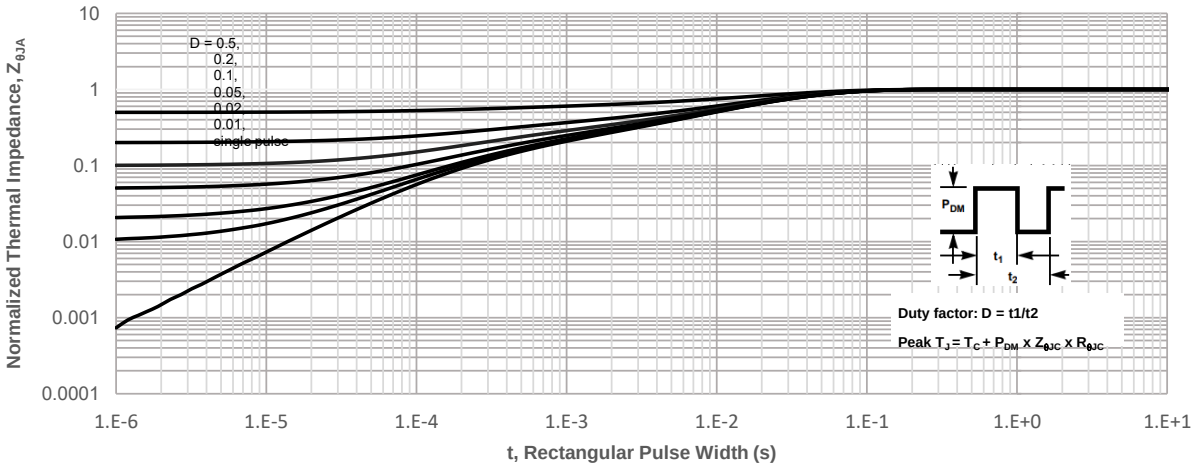
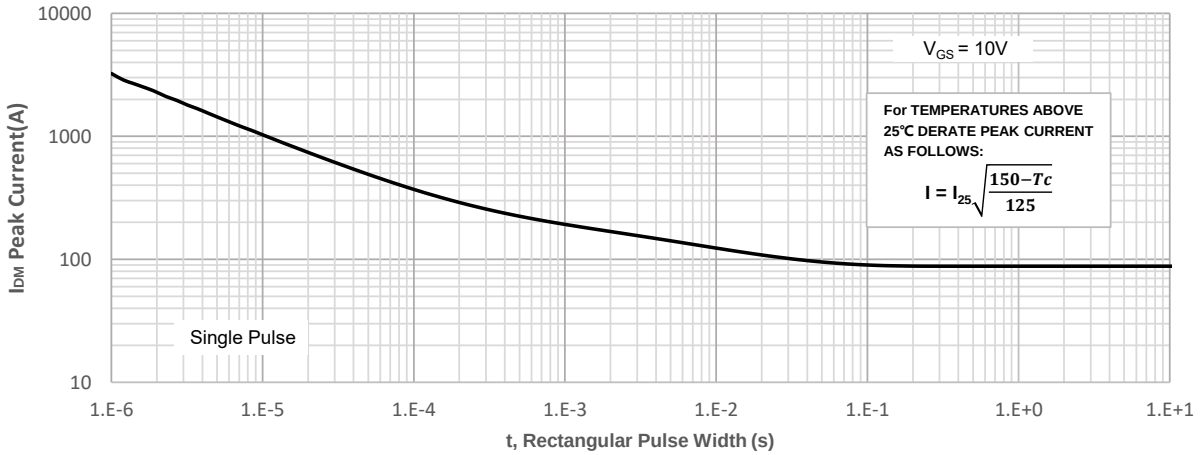


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

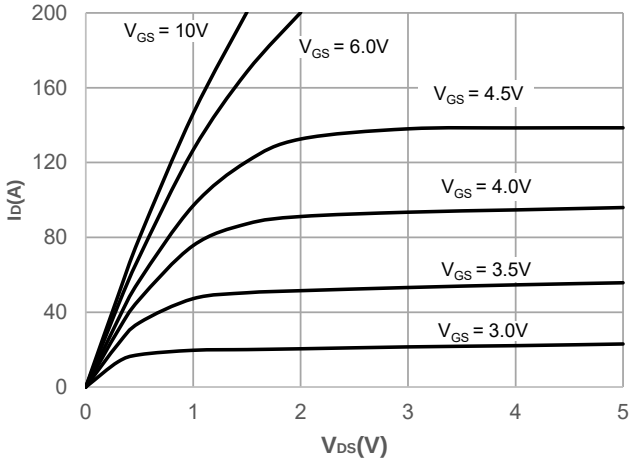


Figure 6: Typical Transfer Characteristics

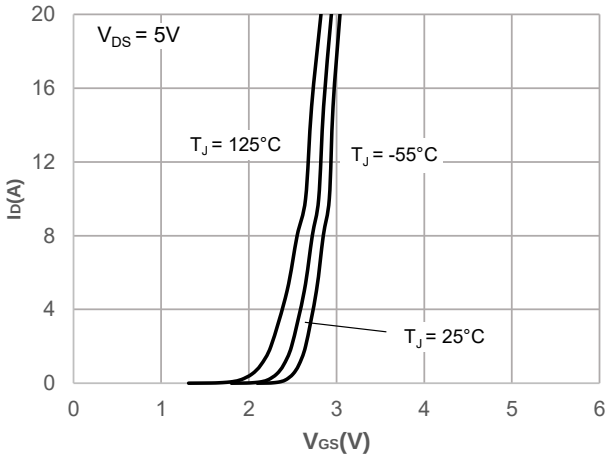


Figure 7: On-resistance vs. Drain Current

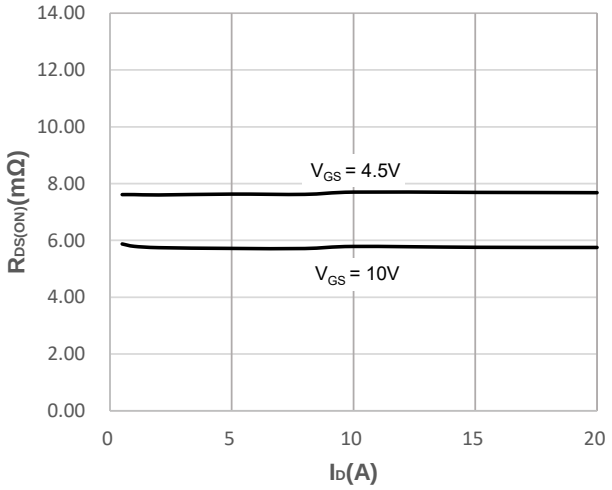


Figure 8: Body Diode Characteristics

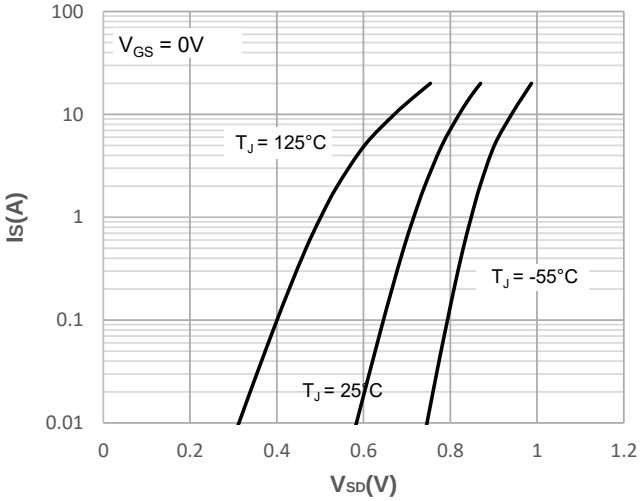


Figure 9: Gate Charge Characteristics

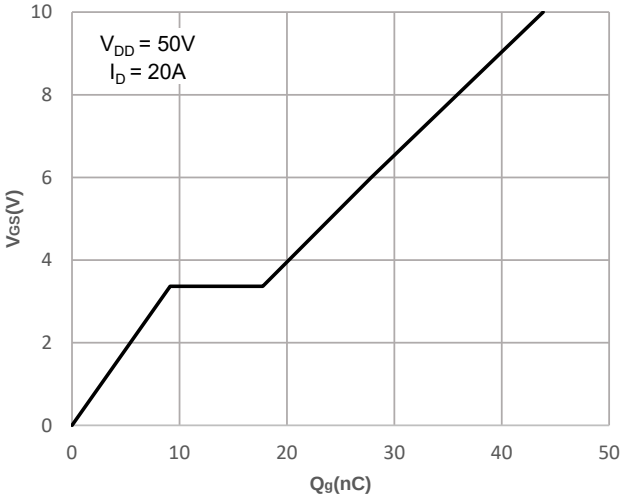
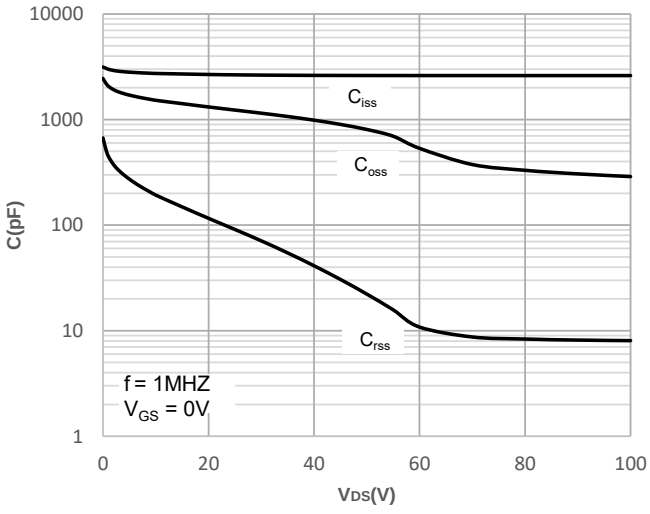


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

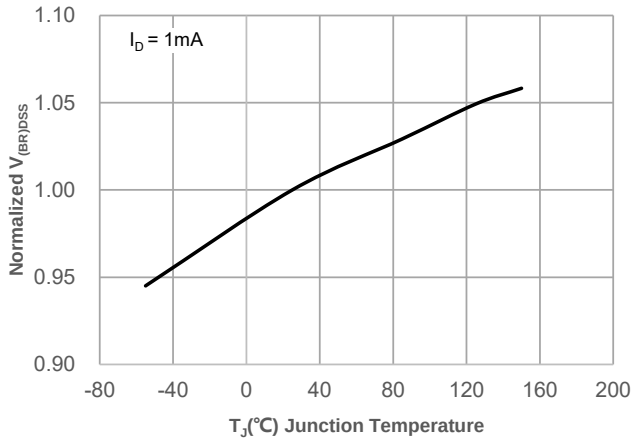


Figure 12: Normalized on Resistance vs. Junction Temperature

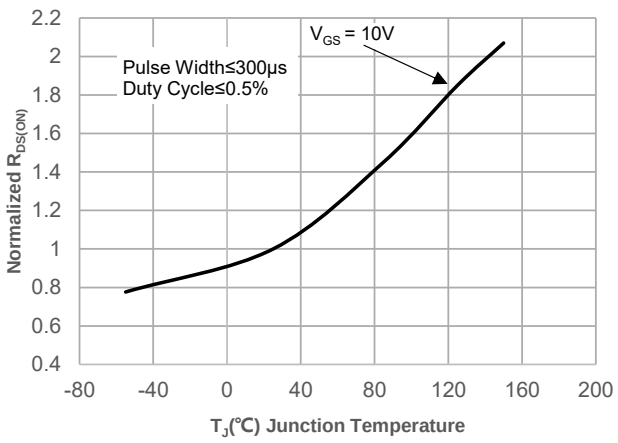


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

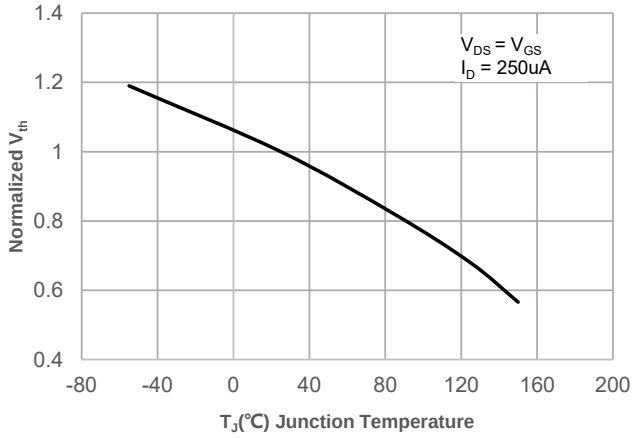


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

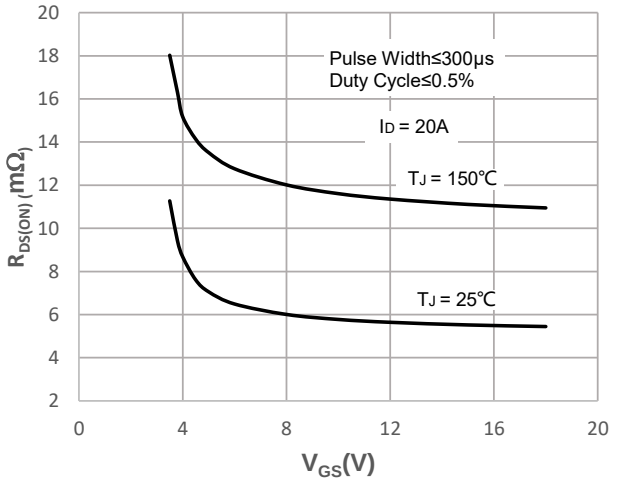
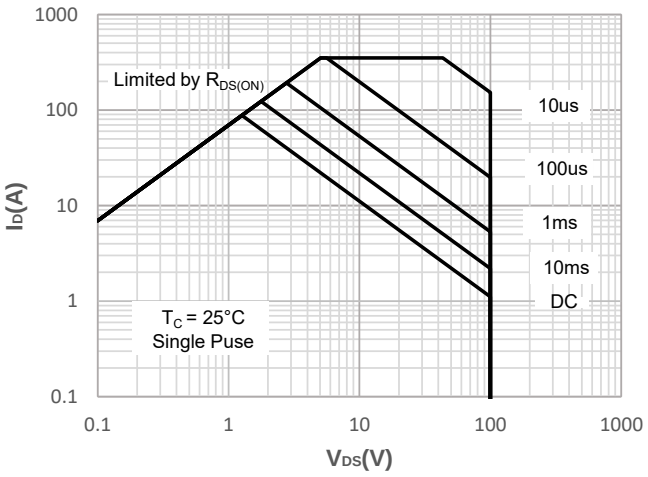
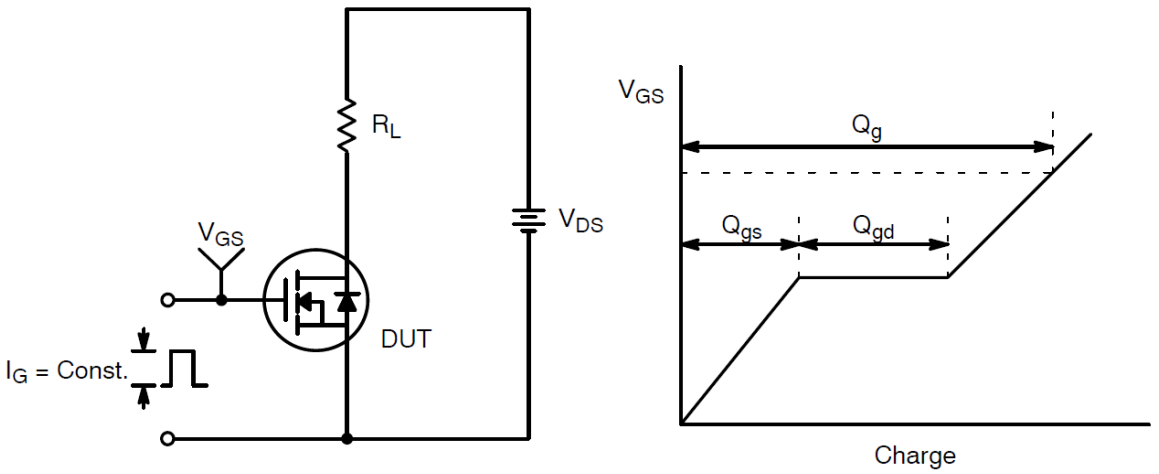


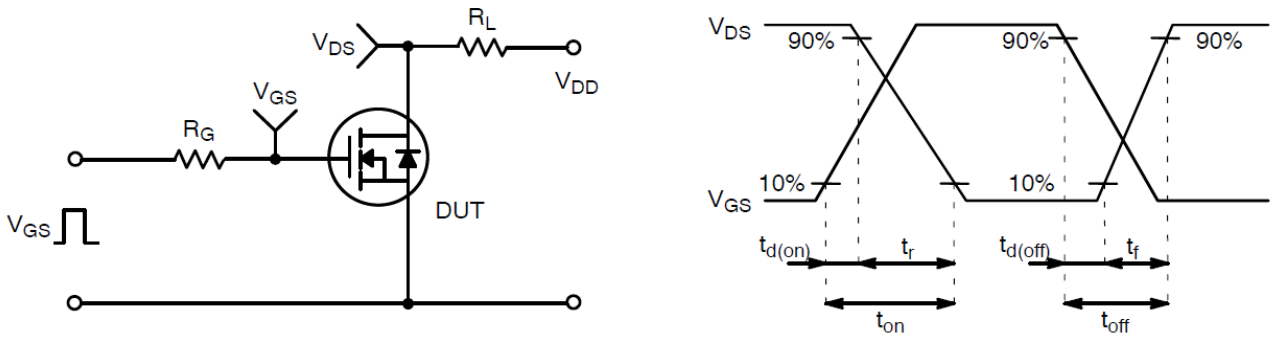
Figure 15: Maximum Safe Operating Area



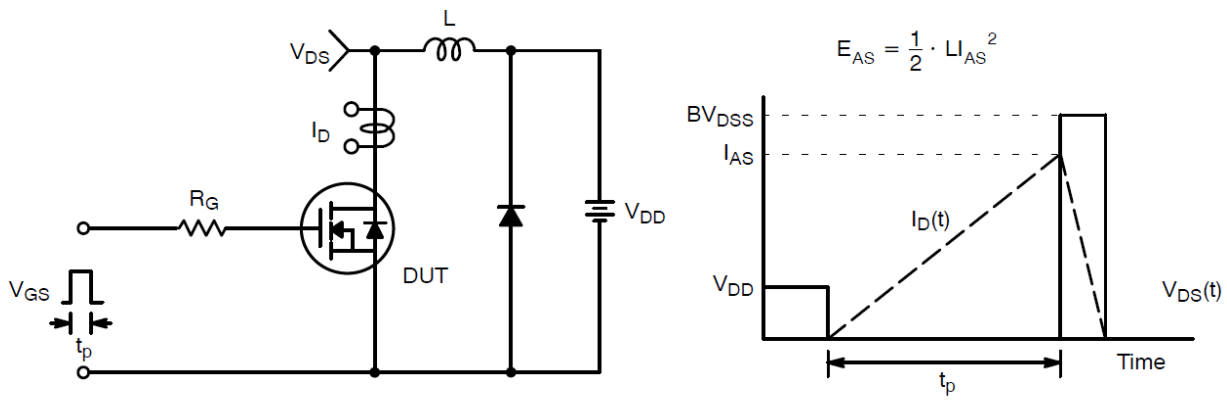
Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform

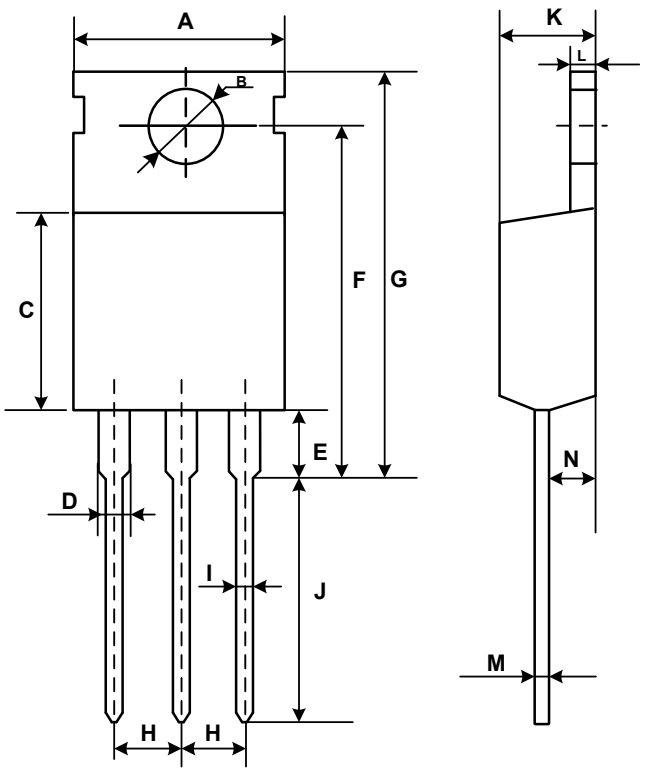


Resistive Switching Test Circuit & Waveforms



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