

TS7N60

7.0Amps, 600V N-Channel Power Mosfet

DRAWING

Features

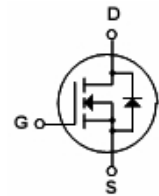
- ◆ 7.0A,600V, $R_{DS(ON)}=0.8\Omega@V_{GS}=10V$
- ◆ Ultra low gate charge(typical 21nc)
- ◆ Low reverse transfer capacitance (C_{rss} =typical 15.0 PF)
- ◆ Fast switching capability
- ◆ Avalanche energy specified
- ◆ Improved dv/dt capability, high ruggedness

General Description

- ◆ Package:ITO-220AB
- ◆ This is a high voltage and high current power MOSFET ,Designed to have better characteristics, such as fast Switching time , low gate charge, low on-state resistance and have a high rugged avalanche characteristics.This power MOSFET is usually used at high speed switching Applications in power supplies ,PWM motor controls. High Efficient DC to DC converters and bridge circuits.



G D S



Absolute Maximum Ratings

Symbol	Parameter	Spec	Units
V_{DSS}	Drain-Source Voltage	600	V
I_D	Drain Current -Continuous($T_c=25^{\circ}C$)	7.0	A
	Drain Current -Continuous($T_c=100^{\circ}C$)	4	
I_{AR}	Avalanche Current (*1)	6.3	A
I_{DM}	Drain Current -Pulsed (*1)	30	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (*2)	200	mJ
E_{AR}	Repetitive Avalanche Energy (*1)	21	mJ
dv/dt	Peak Diode Recovery dv/dt (*3)	5.5	V/ns
P_D	Power Dissipation	34	W
	Derating Factor above 25°C	0.27	W/°C
T_j	Junction Temperature	+150	°C
T_{opr}, T_{stg}	Operating, Storage Temperature Range	-55 to +150	°C
TL	Maximum Temperature for Soldering	300	°C

Thermal Characteristics

Symbol	Parameter	Typ	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	3.68	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	62	°C/W

Electrical Characteristics(Tc=25°C unless otherwise noted)
Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	600	—	—	V
BV _{DSS/Tj}	Breakdown Voltage Temperature Coefficient	ID=250uA, Referenced to 25°C	—	0.74	—	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =600V, V _{GS} =0V 25°C	—	—	1	uA
		V _{DS} =480V, V _{GS} =0V 125°C	—	—	10	
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} =30V, V _{DS} =0V	—	—	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} =-30V, V _{DS} =0V	—	—	-100	nA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2.0	3.1	4.0	V
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =4A	—	0.8	1.25	Ω
Pulse width tp≤380μs, δ≤2%						

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
g _{fs}	Forward Transconductance	V _{DS} =15V, I _D =4A	—	2.5	—	S
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	—	1380	—	pF
C _{oss}	Output Capacitance		—	170	—	pF
C _{rss}	Reverse Transfer Capacitance		—	15	—	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
t _{don}	Turn-On Delay Time	V _{DD} =300V	—	13	—	ns
t _r	Turn-On Rise Time	V _{GS} =10V	—	10	—	ns
t _{doff}	Turn-Off Delay Time	I _D =7.5A	—	26	—	ns
t _f	Turn-Off Fall Time	R _G =4.7Ω	—	8	—	ns
Q _g	Total Gate Charge	V _{DS} =480V	—	21	30	nc
Q _{gs}	Gate-Source Charge	I _D =7.5A	—	10	—	nc
Q _{gd}	Gate-Drain Charge	V _{GS} =10V	—	25	—	nc

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
I _s	Maximum Continuous Drain-source diode forward current		—	—	8.0	A
I _{sm}	Maximum pulsed drain-source diode forward current		—	—	32	A
V _{sd}	Drain-source diode forward Voltage	V _{GS} =0V, I _S =7.5A	—	—	1.5	V
T _{rr}	Reverse Recovery Time	V _{GS} =0V, I _S =7.5A di/dt=100A/us	—	570	—	ns
Q _{rr}	Reverse Recovery charge		—	4.3	—	uc
IRRM	Reverse Recovery Current		—	12	—	A

*1: Repetitive rating; pulse width limited by maximum junction temperature

*2: L=10.0mH, I_D=7A, Start T_J=25°C

*3: I_{SD}=7A, di/dt ≤100A/us, V_{DD} ≤BV_{DS}, Start T_J=25°C

Typical Characteristics

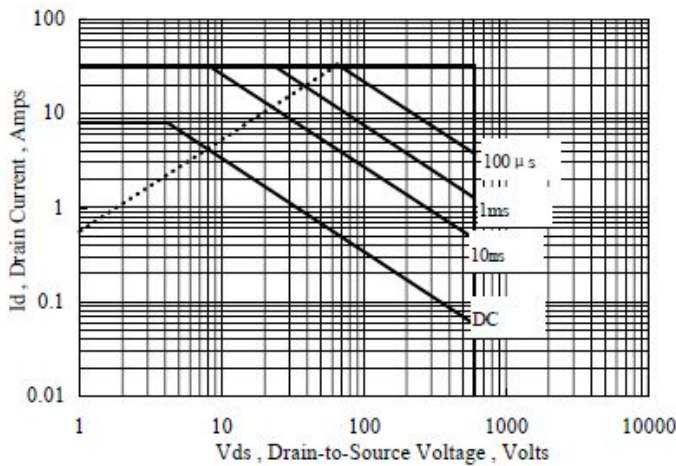


Figure 1 Maximum Forward Bias Safe Operating Area

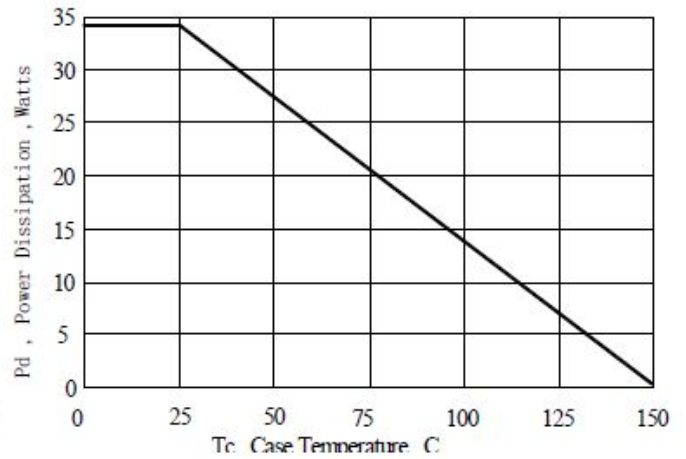


Figure 2 Maximum Power Dissipation vs Case Temperature

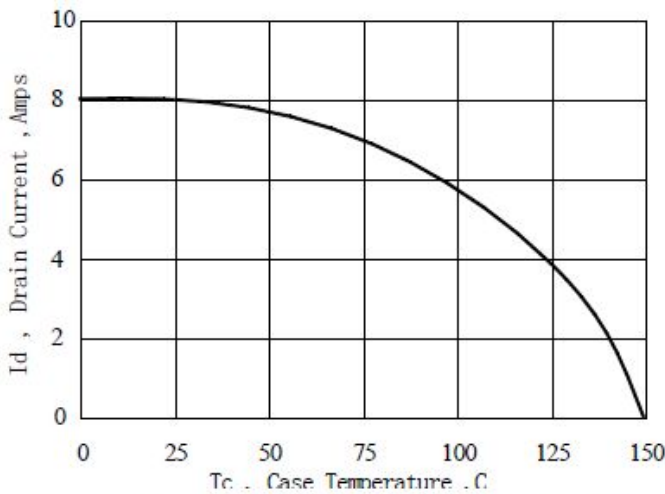


Figure 3 Maximum Continuous Drain Current vs Case Temperature

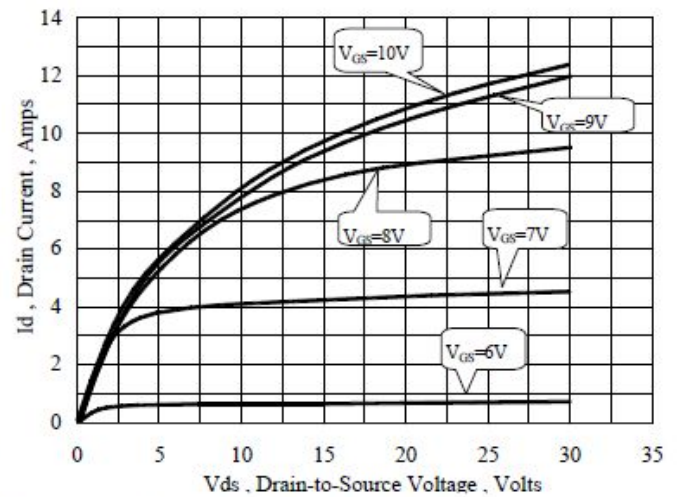


Figure 4 Typical Output Characteristics

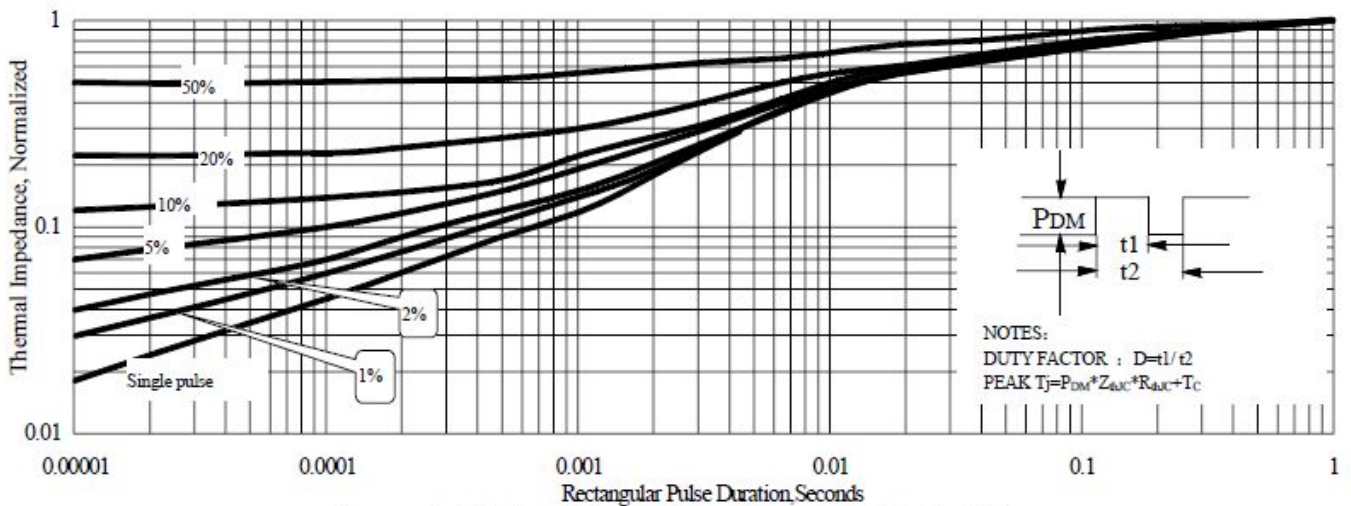
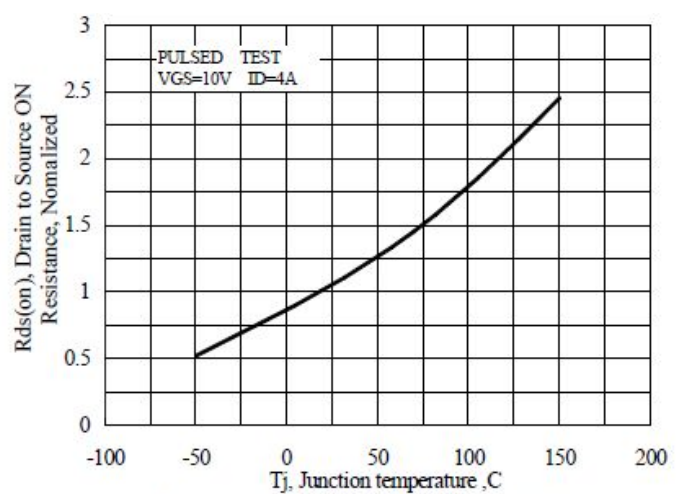
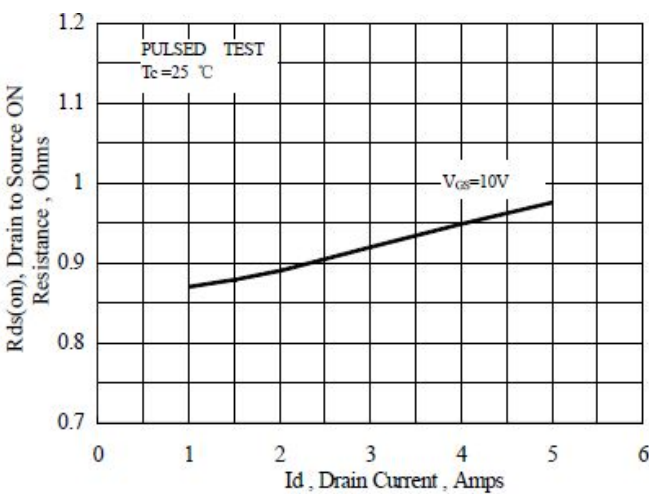
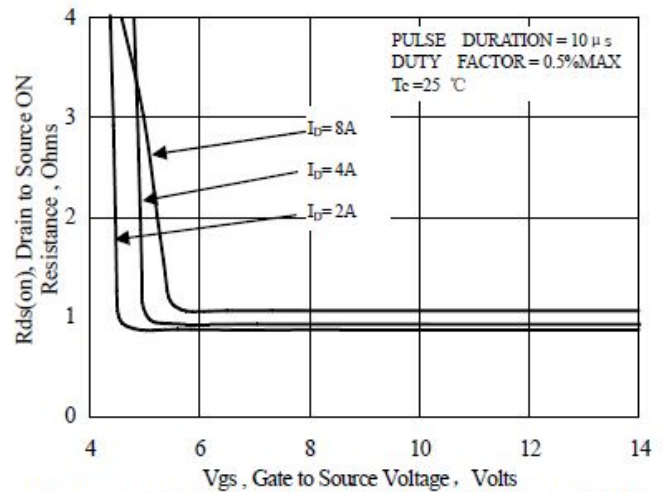
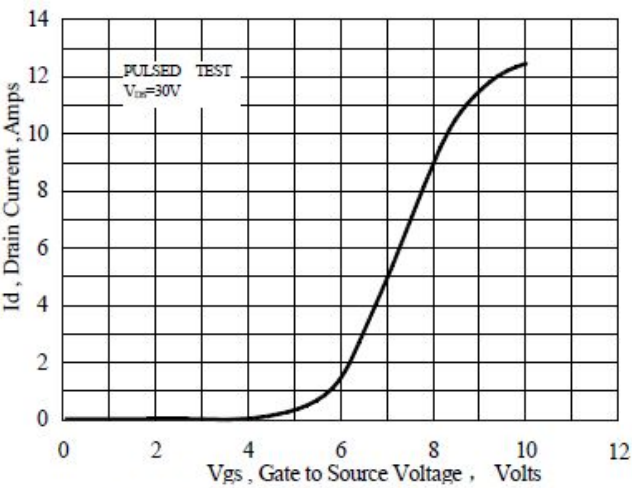
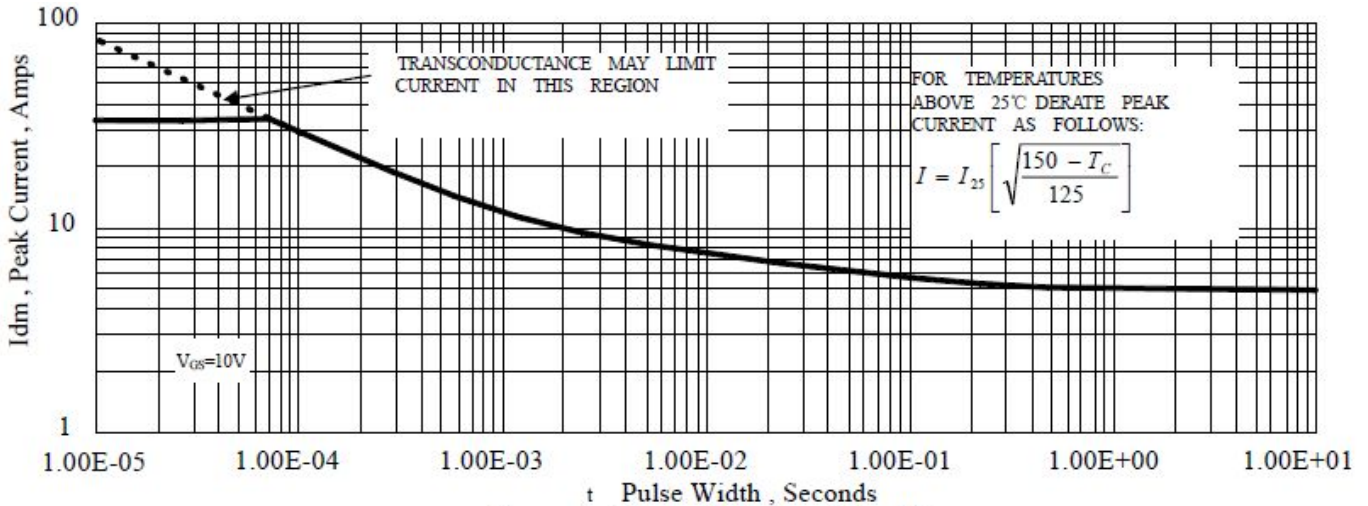


Figure 5 Maximum Effective Thermal Impedance, Junction to Case



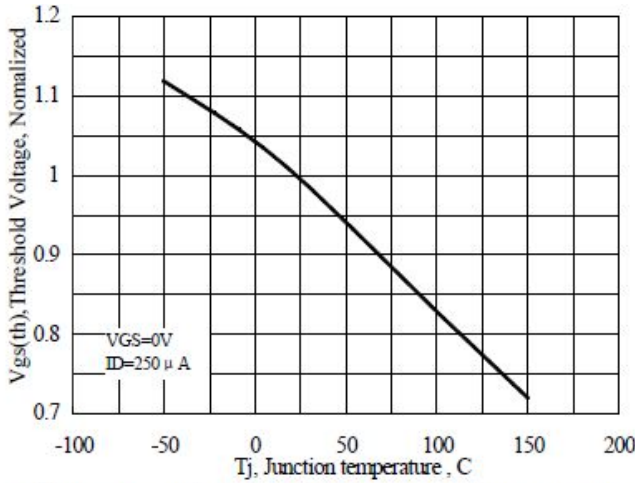


Figure 11 Typical Threshold Voltage vs Junction Temperature

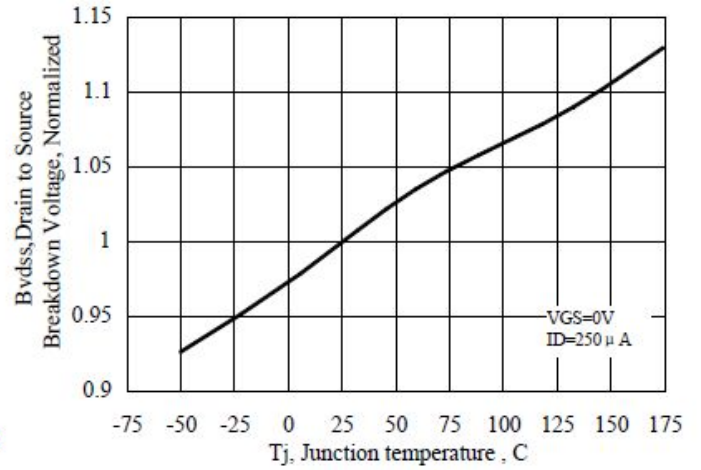


Figure 12 Typical Breakdown Voltage vs Junction Temperature

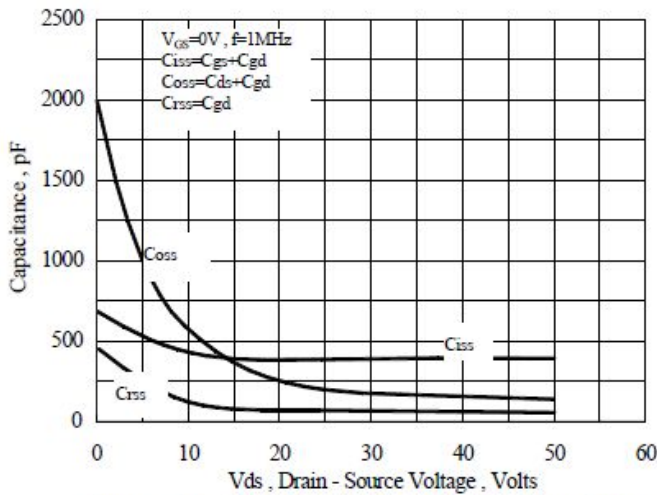


Figure 13 Typical Capacitance vs Drain to Source Voltage

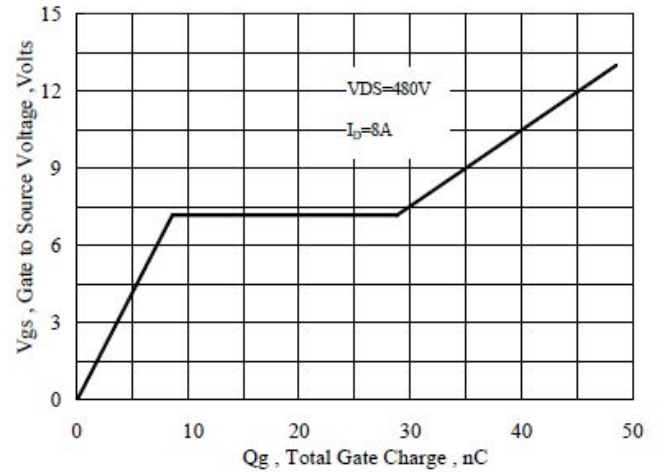


Figure 14 Typical Gate Charge vs Gate to Source Voltage

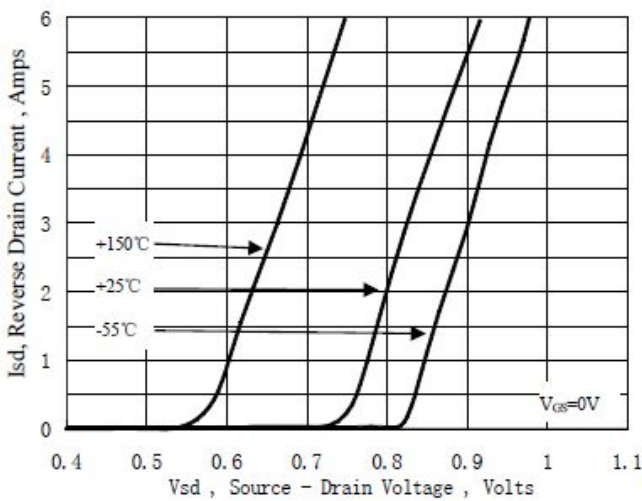


Figure 15 Typical Body Diode Transfer Characteristics

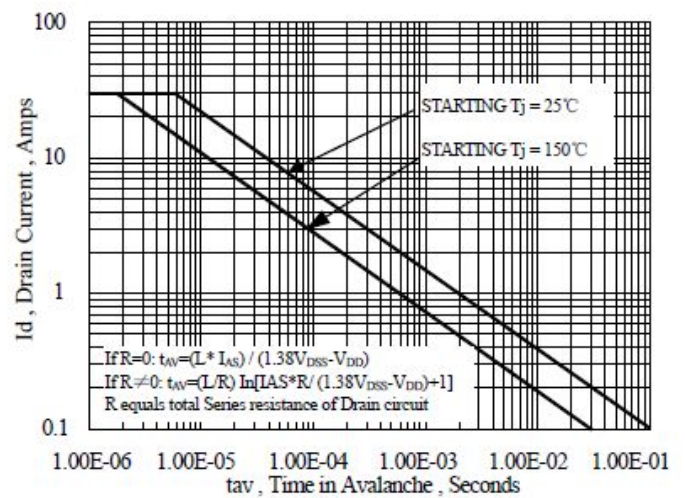
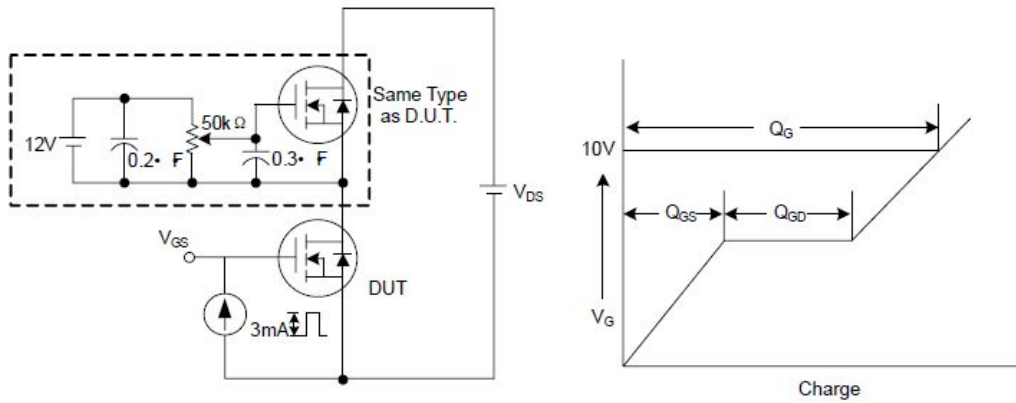


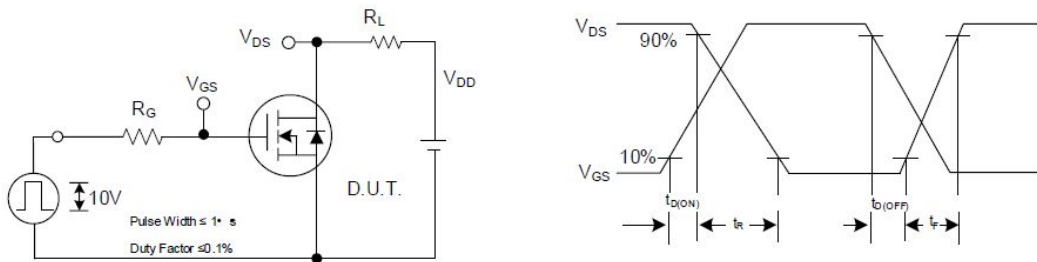
Figure 16 Unclamped Inductive Switching Capability

Test circuits and waveforms

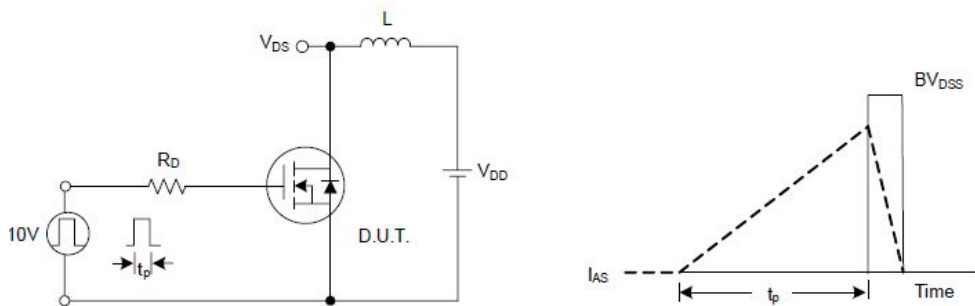
Gate Charge Test Circuit & Waveform



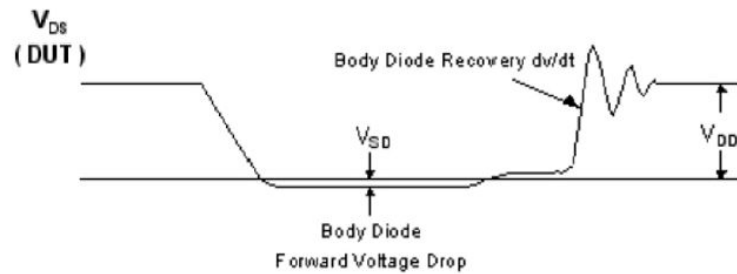
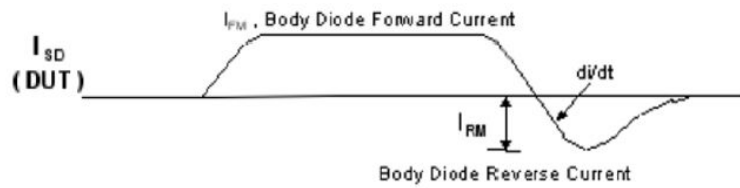
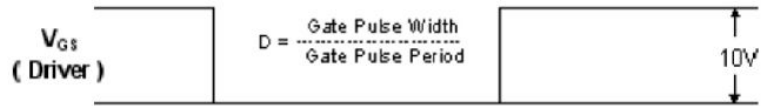
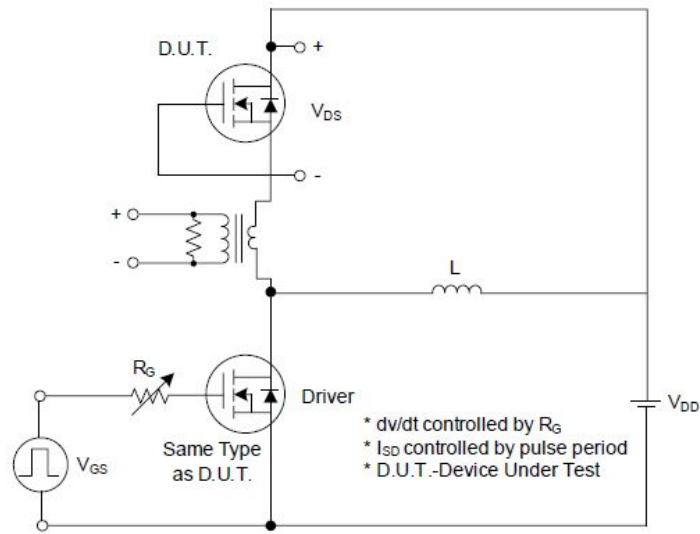
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms



Peak Diode Recovery dv/dt Circuit & Waveforms



Mechanical Dimensions

