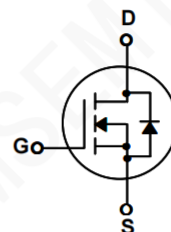


Features

- ☐ Low Intrinsic Capacitances
- ☐ Excellent Switching Characteristics
- ☐ Extended Safe Operating Area
- ☐ 100% Avalanche Tested
- ☐ BVDSS=800V, ID=10A
- ☐ $R_{DS(on)} : 1.0 \Omega$ (Max) @VG=10V
- ☐ Unrivalled Gate Charge :Qg= 44nC (Typ.)



TO-220F

G-Gate, D-Drain, S-Source

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless other wise noted

Symbol	Parameter	STP10NK70ZFP-JSM	Units
V_{DSS}	Drain-Source Voltage	800	V
I_D	Drain Current -continuous ($T_c=25^\circ\text{C}$)	10*	A
	-continuous ($T_c=100^\circ\text{C}$)	6.32*	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Plused Avanche Energy (Note1)	920	mJ
I_{AR}	Avalanche Current (Note2)	10	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	240	W
T_J, T_{STG}	Operating and Storage Temperature Range	$-55 \sim +150$	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	--	0.52	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	40	$^\circ\text{C/W}$

*Drain current limited by maximum junction temperature.

Electrical Characteristics $T_c=25^{\circ}\text{C}$ unless other wise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0$	800	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Confficient	$I_D=250\mu\text{A}$, Reference to 25°C	--	0.98	--	$\text{V}/^{\circ}\text{C}$
$IDSS$	Zero Gate Voltage Drain Current	$V_{DS}=800\text{V}, V_{GS}=0\text{V}$	--	--	10	μA
		$V_{DS}=640\text{V}, T_c=125^{\circ}\text{C}$	--	--	100	μA
$IGSSF$	Gate-body leakage Current, Forward	$V_{GS}=+30\text{V}, V_{DS}=0\text{V}$	--	--	100	nA
$IGSSR$	Gate-body leakage Current, Reverse	$V_{GS}=-30\text{V}, V_{DS}=0\text{V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Date Threshold Voltage	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$	3.0	--	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=5\text{A}, V_{GS}=10\text{V}$	--	0.9	1.0	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS}=25\text{V}, V_{GS}=0, f=1.0\text{MHz}$	--	2150	2800	pF
C_{oss}	Output Capacitance		--	180	230	pF
C_{rss}	Reverse Transfer Capacitance		--	15	20	pF

Switching Characteristics

$T_d(on)$	Turn-On Delay Time	$V_{DD}=400\text{V}, I_D=10\text{A}$ $R_G=25\Omega$ (Note 3,4)	--	50	110	nS
T_r	Turn-On Rise Time		--	130	270	nS
$T_d(off)$	Turn-Off Delay Time		--	90	190	nS
T_f	Turn-Off Fall Time		--	80	170	nS
Q_g	Total Gate Charge	$V_{DS}=640, V_{GS}=10\text{V}, I_D=10\text{A}$ (Note 3,4)	--	45	58	nC
Q_{gs}	Gate-Source Charge		--	13.5	--	nC
Q_{gd}	Gate-Drain Charge		--	17	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximun Continuous Drain-Source Diode Forward Current		--	--	10	A
I _{SM}	Maximun Plused Drain-Source DiodeForwad Current		--	--	40	A
V _{SD}	Drain-Source Diode Forward Voltage	Id=10A	--	--	1.4	V
trr	Reverse Recovery Time	I _S =10A,V _{GS} =0V	--	730	--	nS
Qrr	Reverse Recovery Charge	di _F /dt=100A/ μ s (Note3)	--	10.9	--	μ C

- *Notes
- 1, $L=25.0\text{mH}$, $I_{AS}=10\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
 - 2, Repetitive Rating : Pulse width limited by maximum junction temperature
 - 3, Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 - 4, Essentially Independent of Operating Temperature

Typical Characteristics

Figure 1. On-Region Characteristics

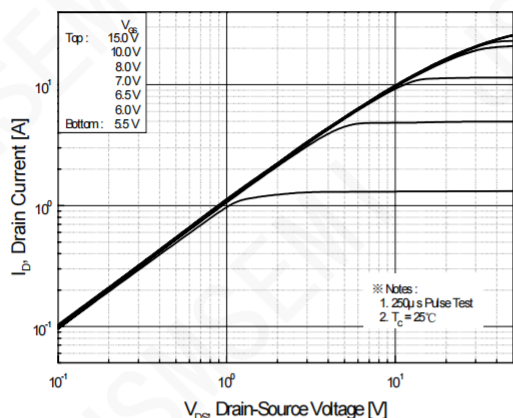


Figure 2. Transfer Characteristics

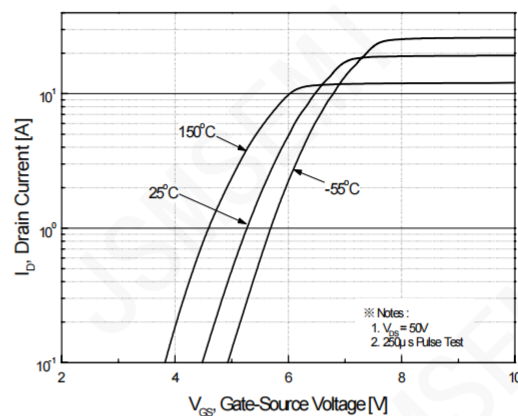


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

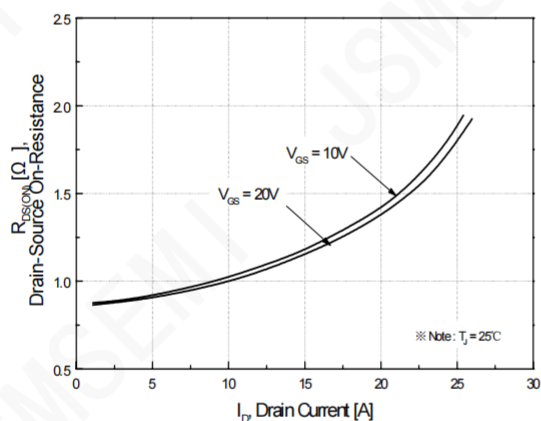


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

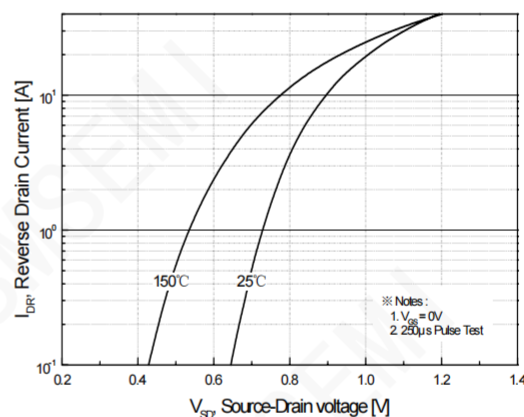


Figure 5. Capacitance Characteristics

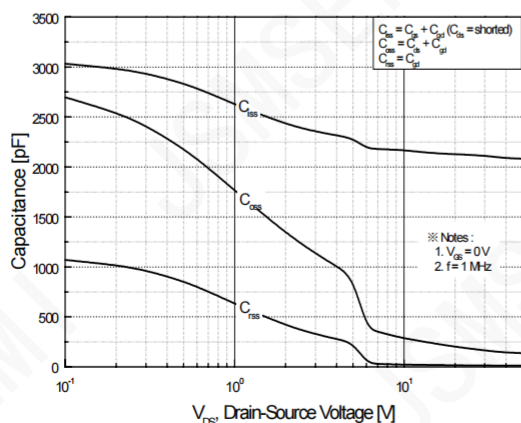
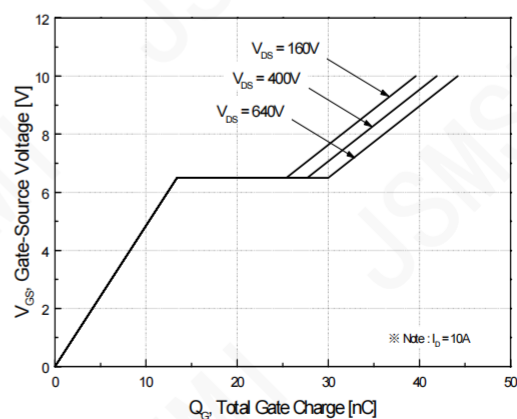


Figure 6. Gate Charge Characteristics



Typical Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

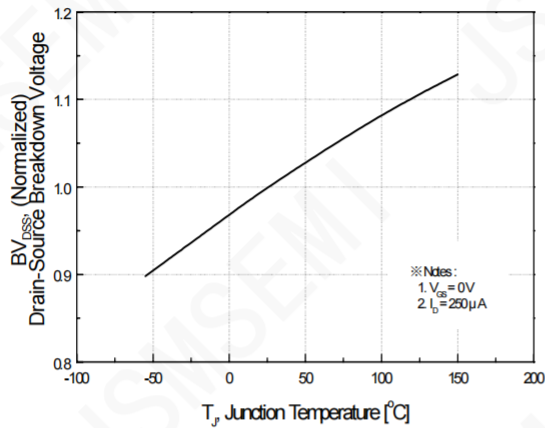


Figure 8. On-Resistance Variation vs. Temperature

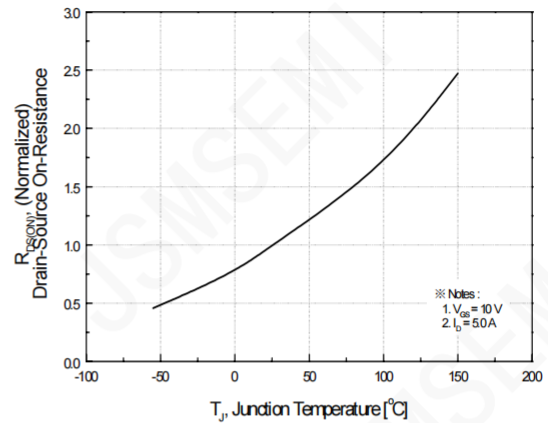


Figure 9. Maximum Safe Operating Area

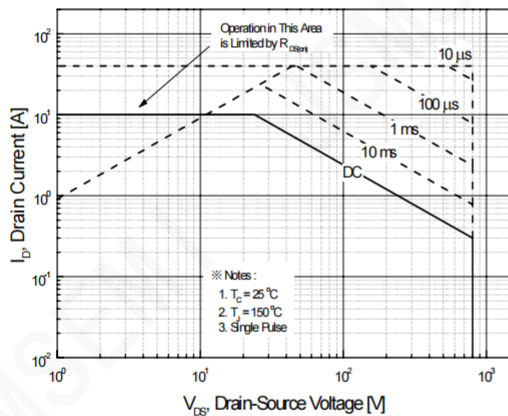


Figure 10. Maximum Drain Current vs. Case Temperature

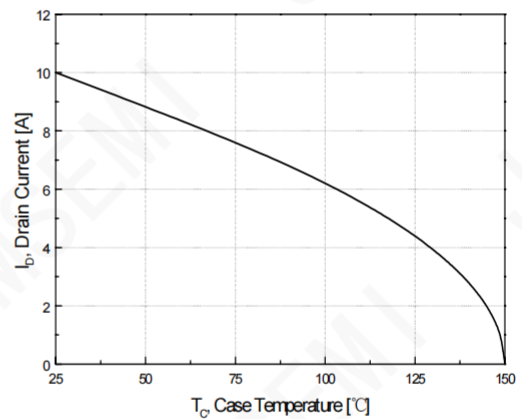
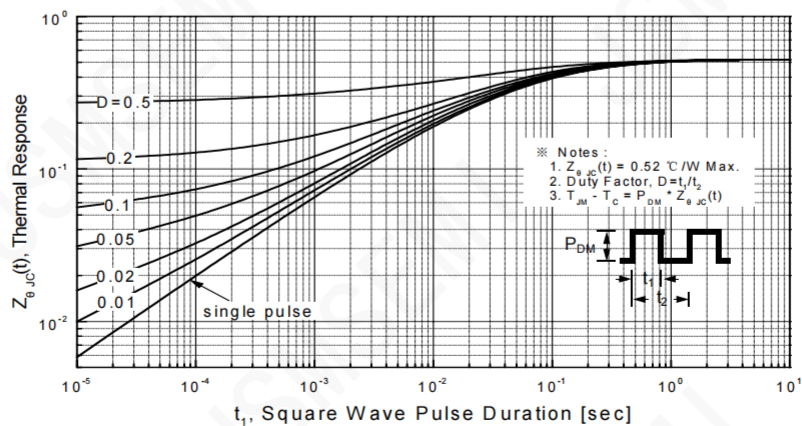
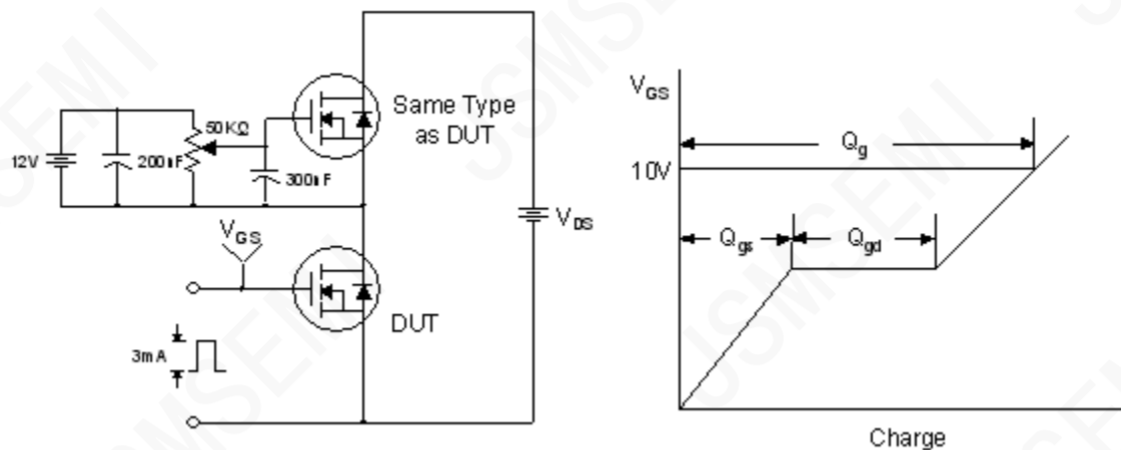


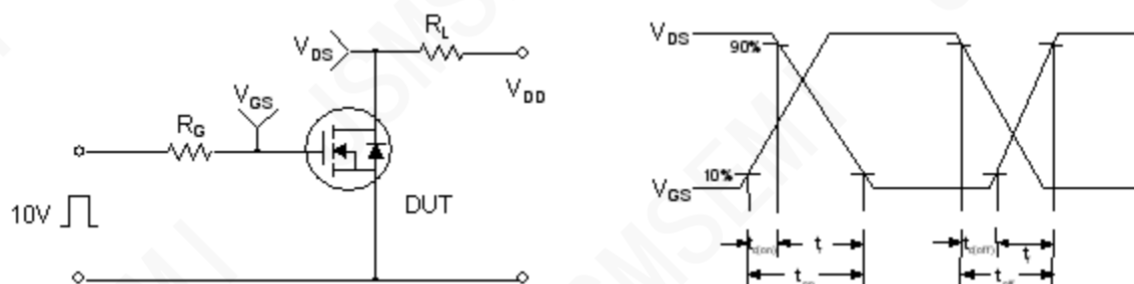
Figure 11. Transient Thermal Response Curve



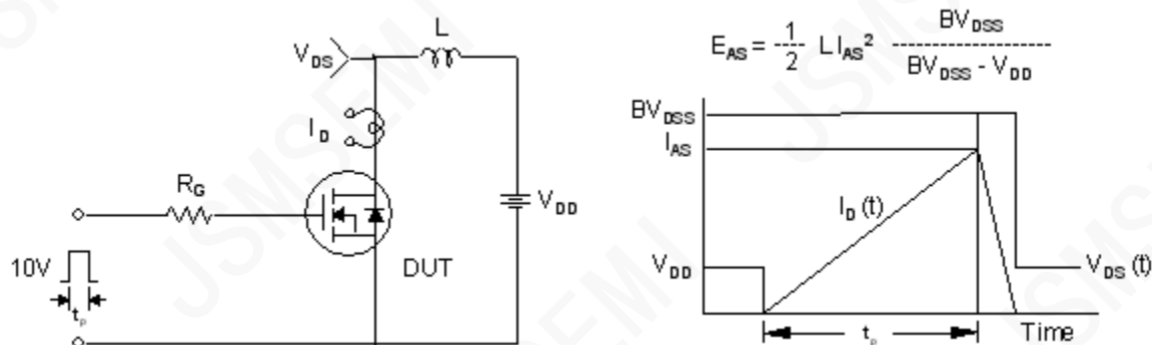
Gate Charge Test Circuit & Waveform

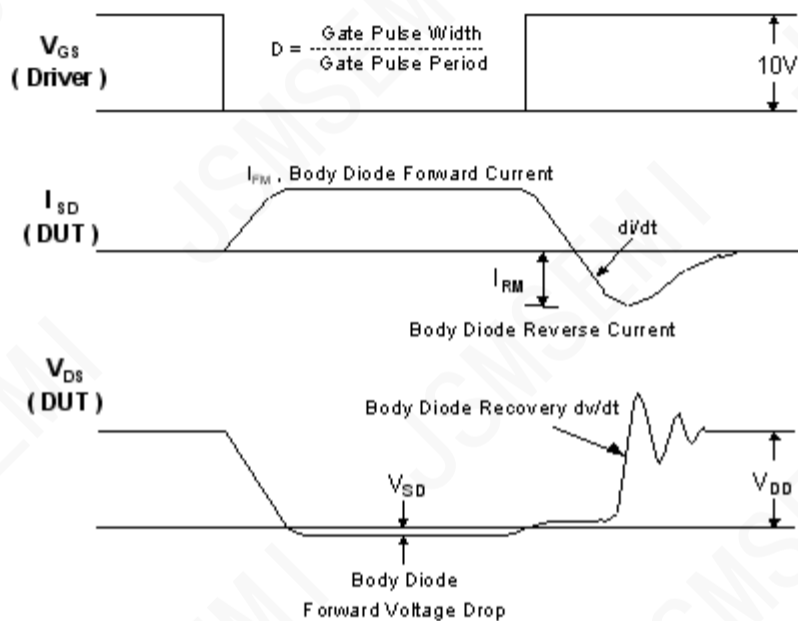
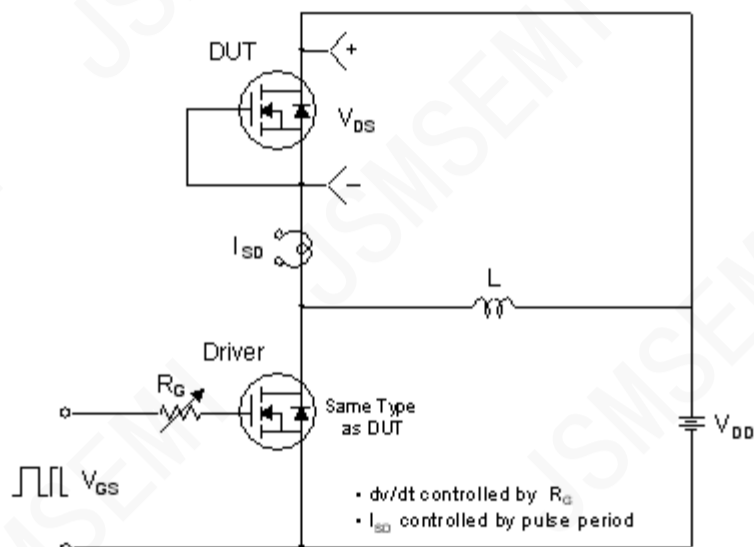


Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms





Package Dimension

TO-220F

