
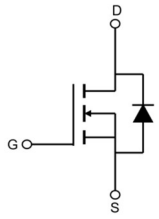


Description

Features <ul style="list-style-type: none"> ● $V_{DS}=700V$, $I_D=11A$ $R_{DS(ON)} < 0.4\Omega @ V_{GS} = 10V$ ● Multi-Epi process SJ-MOSFET ● Smart design in high voltage technology ● Ultra lower on-resistance ● Fast switching ● Ultra low gate charge ● Low reverse recovery charge 	Application <ul style="list-style-type: none"> ● Power factor correction (PFC) ● Switched mode power supplies (SMPS) ● Uninterruptible power supply (UPS) <p style="text-align: center;">100% UIS 100% ΔV_{ds}</p>
 TO-220F	 Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	OUTLINE	Device Package	TUBE (PCS)	Inner Box (PCS)	Per Carton (PCS)
VSM11N70-TF	VSM11N70	TUBE	TO-220F	50	1,000	8,000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Symbol	Parameter	Max.	Units
V _{DSS}	Drain-Source Voltage	700	V
V _{GSS}	Gate-Source Voltage	±30	V
I _D	Continuous Drain Current	T _C = 25°C	11
		T _C = 100°C	7.2
I _{DM}	Pulsed Drain Current ^{note1}	44	A
E _{AS}	Single Pulsed Avalanche Energy ^{note2}	280	mJ
P _D	Power Dissipation	T _C = 25°C	32.7
R _{θJC}	Thermal Resistance, Junction to Case	3.82	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	80	°C/W
T _J , T _{STG}	Operating and Storage Temperature Range	-55 to +150	°C

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	700	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=700V, V_{GS}=0V, T_C=25^{\circ}\text{C}$	-	-	1	μA
		$V_{DS}=700V, V_{GS}=0V, T_C=125^{\circ}\text{C}$	-	-	100	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	5.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note3</small>	$V_{GS}=10V, I_D=5.5A$	-	0.36	0.4	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1.0\text{MHz}$	-	1030	-	pF
C_{oss}	Output Capacitance		-	85	-	pF
C_{rss}	Reverse Transfer Capacitance		-	4.5	-	pF
Q_g	Total Gate Charge	$V_{DS}=480V, I_D=11A, V_{GS}=10V$	-	23	40	nC
Q_{gs}	Gate-Source Charge		-	5.7	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	8	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=380V, I_D=5.5A, V_{GS}=10V, R_G=6.8\Omega$	-	9	-	ns
t_r	Turn-on Rise Time		-	4	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	40	-	ns
t_f	Turn-off Fall Time		-	4.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	11	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	44	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=11A$	-	-	1.2	V
t_{rr}	Reverse Recovery Time	$V_{GS}=0V, I_S=11A, di/dt=100A/\mu s$	-	245	-	ns
Q_{rr}	Reverse Recovery Charge		-	2.4	-	μC

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

 2. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=20\text{mH}, I_{AS}=5.5A$

 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Performance Characteristics

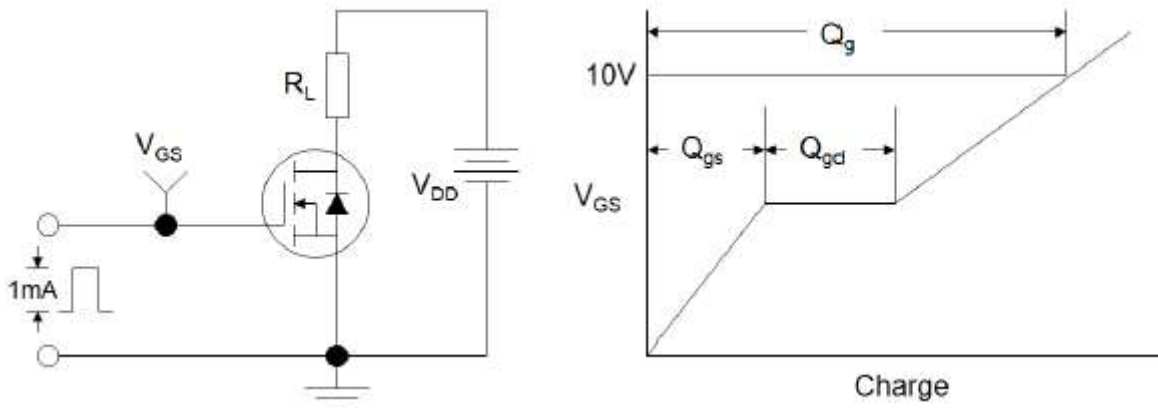


Figure1:Gate Charge Test Circuit & Waveform

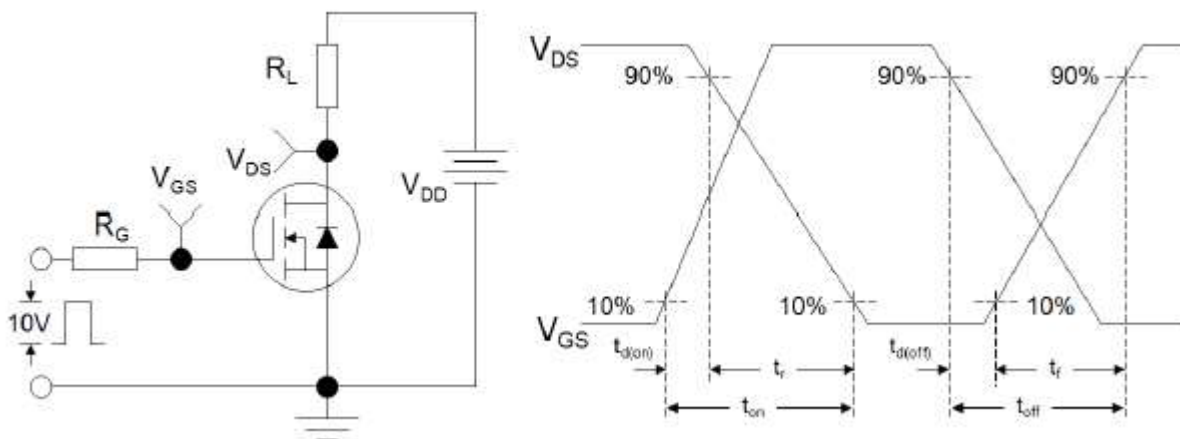


Figure 2: Resistive Switching Test Circuit & Waveforms

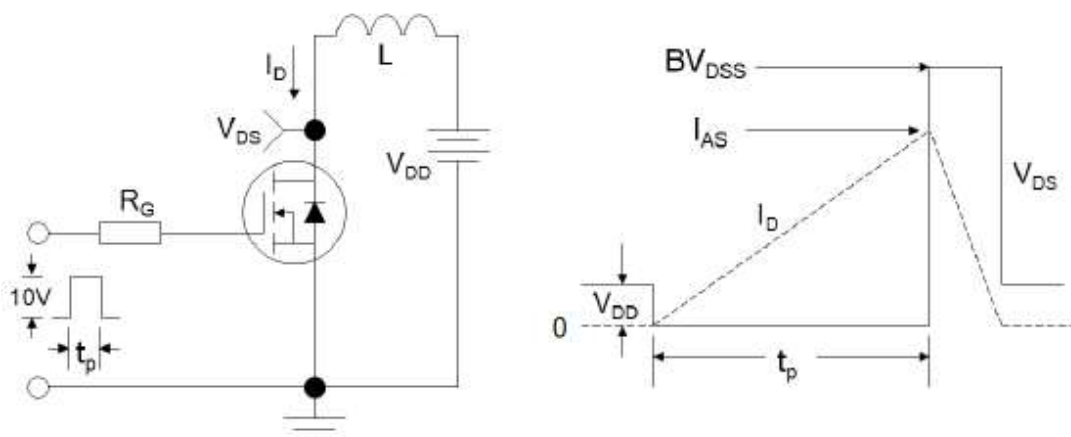


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms