Truesemi®

TSK110N25MSD

250V N-Channel Fast Recovery MOSFET

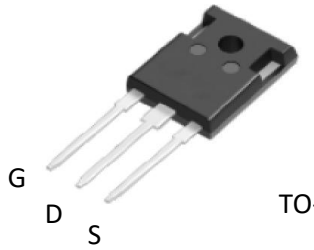
General Description

This Power MOSFET is produced using Truesemi's advanced planar stripe DMOS technology.
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

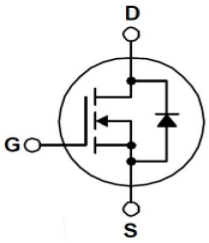
Features

110A,250V,Max.RDS(on)=30mΩ
@ VGS =10V

♦Drain-Source breakdown voltage: BVDSS=250V (Min.)
♦ Low drain-source On resistance: RDS(on)=30mΩ (Max.)
♦ 100% avalanche tested
♦ RoHS compliant device



TO-247



Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter		Value	Units
V_{DSS}	Drain-Source Voltage		250	V
V_{GS}	Gate-Source Voltage		± 30	V
I_D	Drain Current *	T_C = 25℃	110	A
		T_C = 100℃	70	A
I_{DM}	Pulsed Drain Current *		440	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		4500	mJ
I_{AS}	Repetitive avalanche current (Note 1)		60	A
E_{AR}	Repetitive Avalanche Energy (Note 1)		69.4	mJ
P_D	Power Dissipation (T_C = 25℃)		694	W
T_J	Junction temperature		150	℃
T_{stg}	Storage temperature range		-55~150	℃

* Limited only maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	0.18	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	--	62.5	℃/W

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Electrical Characteristics T_C=25 ℃ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	2.0	--	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 55A	--	25	30	mΩ
R_g	Internal gate resistance	Open drain, f=1MHz	--	0.74	--	Ω
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	250	--	--	V
I_{DSS}	Drain-source cut-off current	V_{DS} =250V, V_{GS} = 0 V	--	--	25	uA
		V_{DS}=200V, T_c=125℃	--	--	100	uA
I_{GSS}	Gate leakage current	V_{DS}=0V, V_{GS}=±30V	--	--	±250	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	9926	--	pF
C_{oss}	Output Capacitance		--	1060	--	pF
C_{rss}	Reverse Transfer Capacitance		--	107	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time (Note 3,4)	V_{DD} =125 V, I_D =55A, R_G = 25 Ω	--	104	--	ns
t_r	Turn-On Rise Time (Note 3,4)		--	49	--	ns
$t_{d(off)}$	Turn-Off Delay Time (Note 4,5)		--	540	--	ns
t_f	Turn-Off Fall Time (Note 3,4)		--	71	--	ns
Q_g	Total Gate Charge (Note 3,4)	V_{DS} =200V, I_D =55A, V_{GS} = 10 V	--	200	--	nC
Q_{gs}	Gate-Source Charge (Note 3,4)		--	45	--	nC
Q_{gd}	Gate-Drain Charge (Note 3,4)		--	65	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	110	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	440	
V_{SD}	Source-Drain Diode Forward Voltage	I_S =55A, V_{GS} = 0 V	--	--	1.5	V
t_{rr}	Reverse Recovery Time	I_S =55A, V_{GS} = 0 V dI$_F$/dt=-100A/us (Note 3, 4)	--	231	--	ns
Q_{rr}	Reverse Recovery Charge		--	2.15	--	uC

NOTES:

1. Repeated rating: Pulse width limited by safe operating area

2.L=2mH, I_{AS}=60A, V_{DD}=50V, R_G=25Ω, Starting TJ=25℃

3.Pulse test: Pulse width≤300us, Duty cycle≤2%

4. Essentially independent of operating temperature typical characteristics

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Typical Characteristics Curve

Fig. 1 Typical Output Characteristics

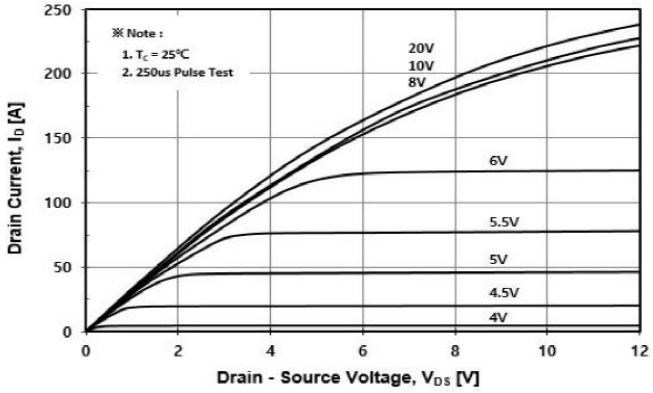


Fig. 2 Typical Transfer Characteristics

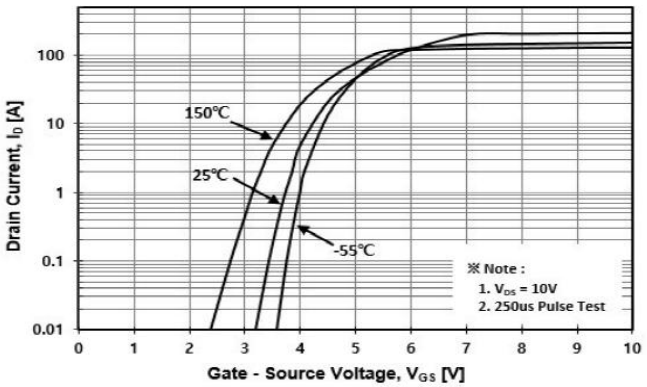


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

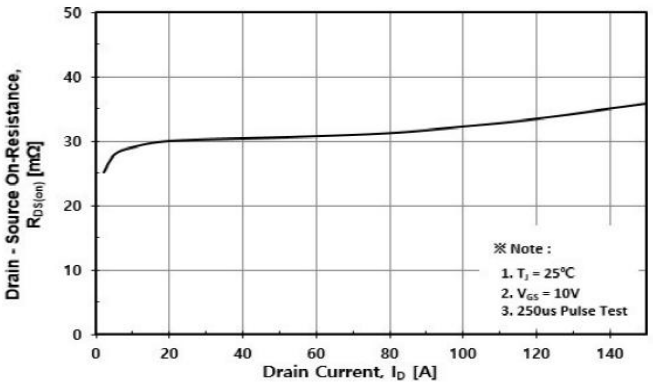


Fig. 4 Body Diode Forward Voltage Variation with Source Current

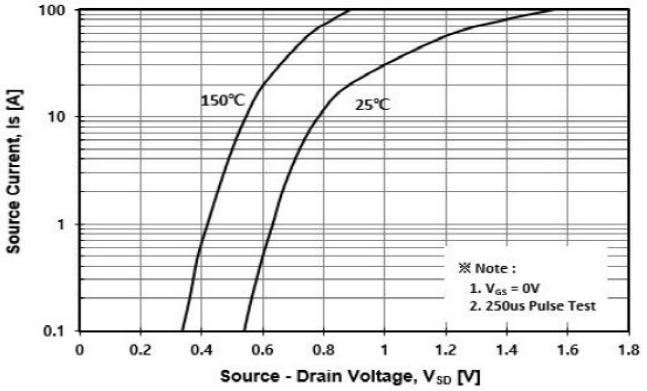


Fig. 5 Typical Capacitance Characteristics

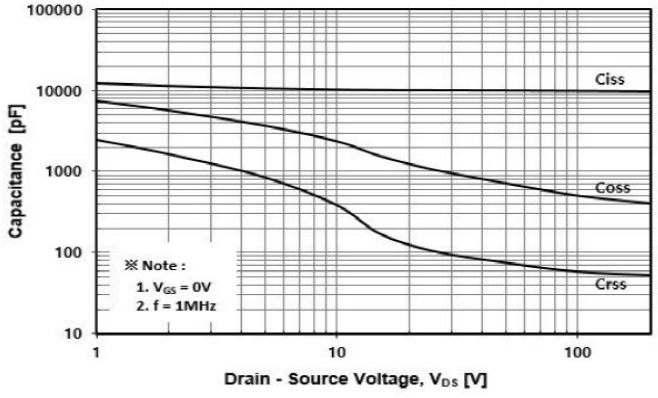
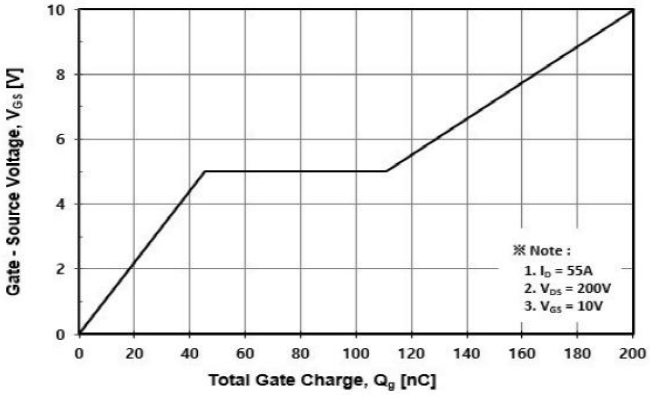


Fig. 6 Typical Total Gate Charge Characteristics



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Typical Characteristics Curve (Continue)

Fig. 7 Breakdown Voltage Variation vs. Temperature

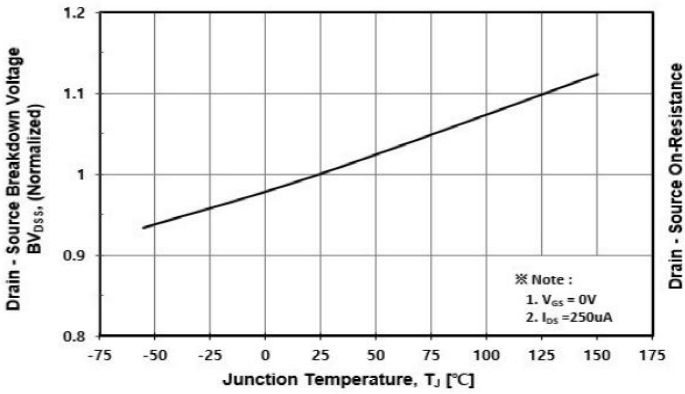


Fig. 8 On-Resistance Variation vs. Temperature

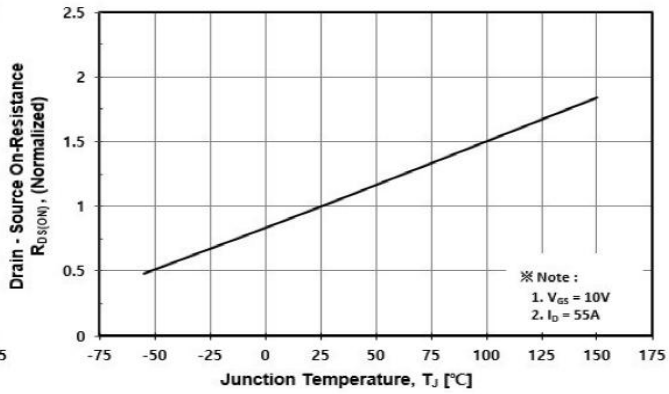


Fig. 9 Maximum Drain Current vs. Case Temperature

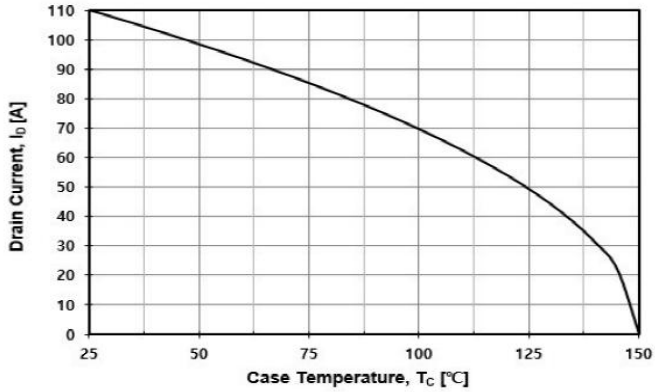


Fig. 10 Maximum Safe Operating Area

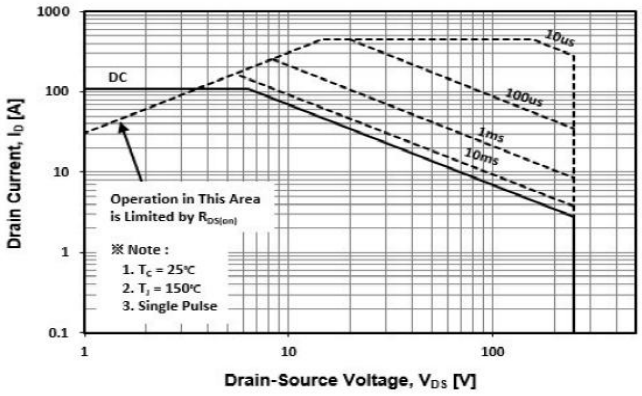
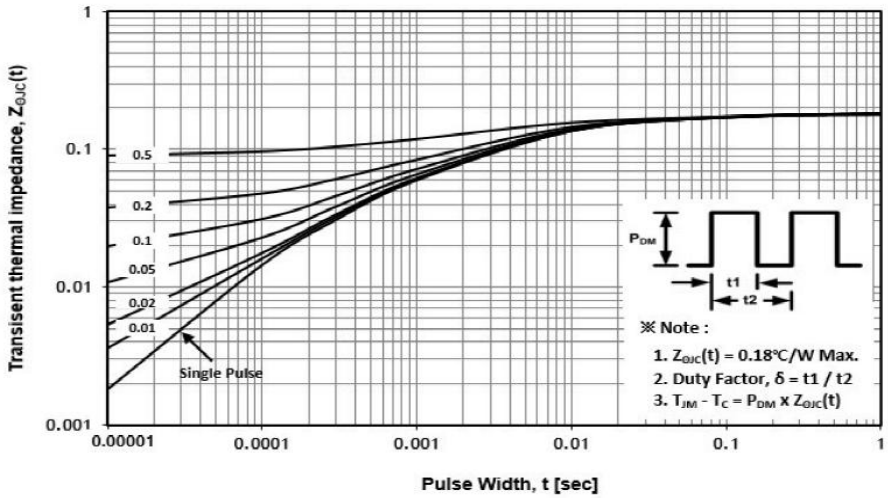
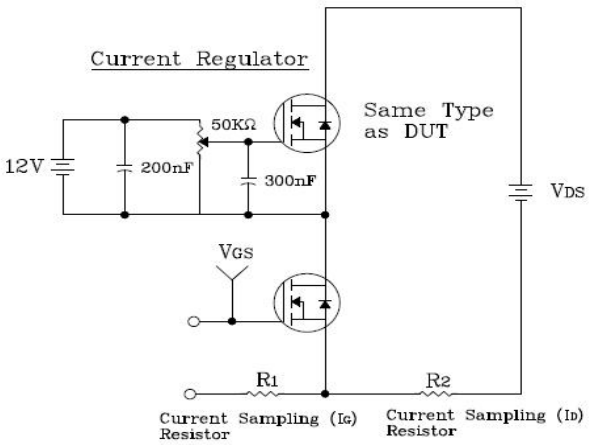


Fig. 11 Transient Thermal Impedance



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Fig. 12 Gate Charge Test Circuit & Waveform



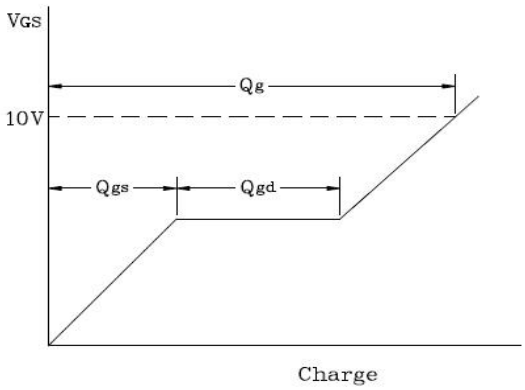
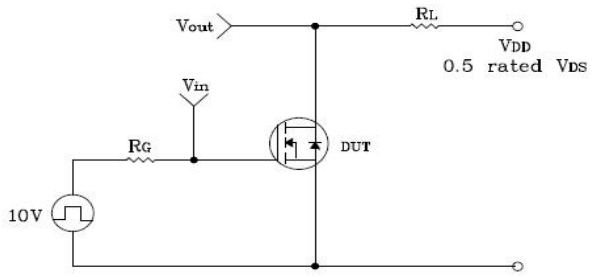


Fig. 13 Resistive Switching Test Circuit & Waveform



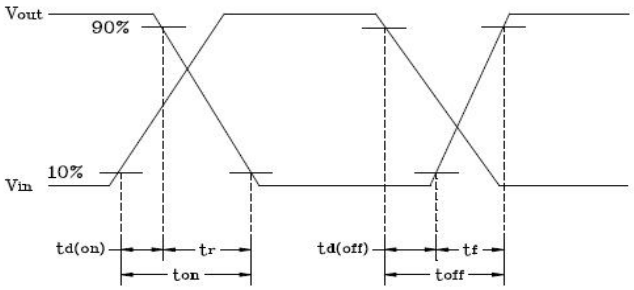
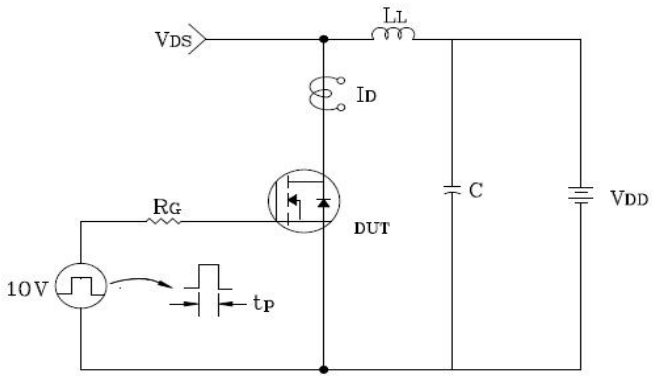
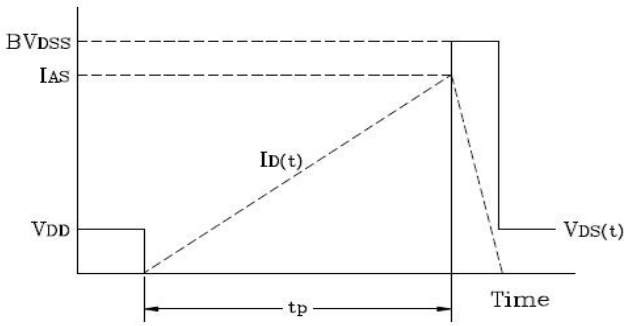


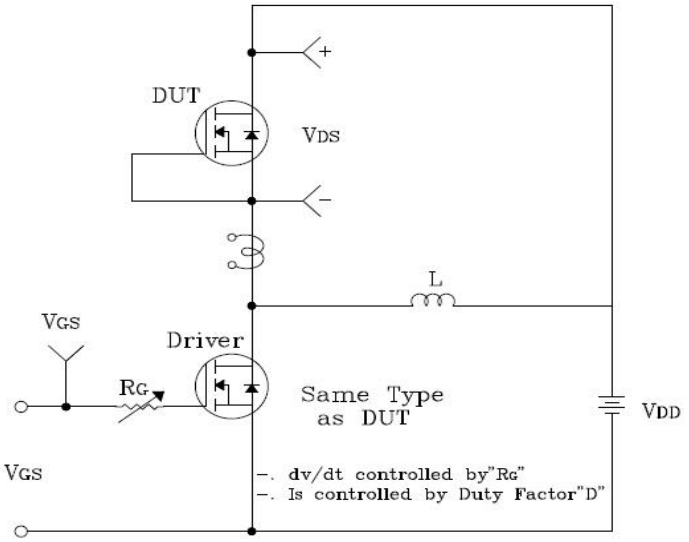
Fig. 14 E_{AS} Test Circuit & Waveform

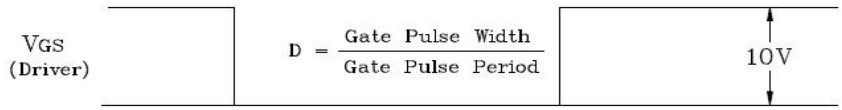


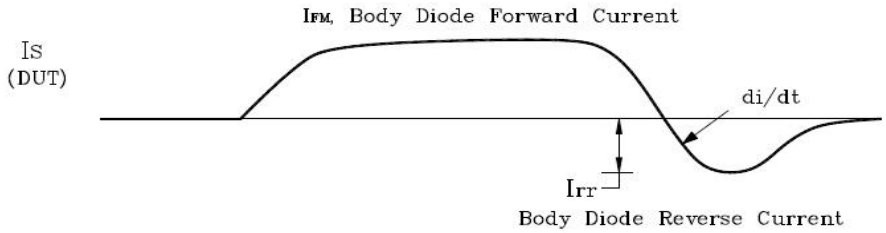


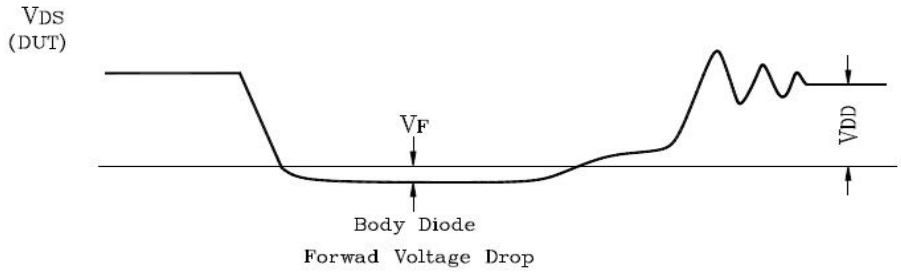
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Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform









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