Truesemi

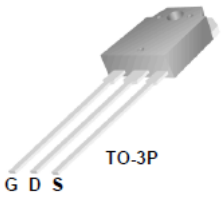
TSA69N25M 250V N-Channel MOSFET

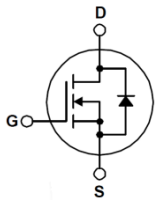
General Description

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. These devices are well suited foHigh power inverter, cutting machine.

Features

- 69A,250V,Max.$R_{DS(on)}$=35mΩ @ V_{GS} =10V
- Low gate charge(typical 70nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability





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		± 20	V
I_D	Drain Current	T_C = 25℃	69	A
		T_C = 100℃	62	A
I_{DM}	Pulsed Drain Current	(Note 1)	276	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	3062	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Power Dissipation (T_C = 25℃)		550	W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	℃
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	℃

Thermal Resistance Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	0.29	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	--	40	℃/W

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		4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 40 A	--	29	35	mΩ
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 uA	250	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 250V, V_{GS} = 0 V	--	--	1	uA
		VDS=200V , VGS=0V , TC=125℃	--	--	10	uA
I_{GSSF}	Gate-Body Leakage Current,Forward	V_{GS} = 20 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current,Reverse	V_{GS} =- 20 V, V_{DS} = 0 V	--	--	-100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0 V, f = 1.0 MHz	--	6904	--	pF
C_{oss}	Output Capacitance		--	783	--	pF
C_{rss}	Reverse Transfer Capacitance		--	67	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Time	V_{DS} = 125 V, I_D = 69A, R_G =25Ω $V_{GS=15V}$ (Note 4,5)	--	80	--	ns
t_r	Turn-On Rise Time		--	26	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	297	--	ns
t_f	Turn-Off Fall Time		--	79	--	ns
Q_g	Total Gate Charge	V_{DS} = 250V, I_D = 69 A, V_{GS} = 10 V (Note 4,5)	--	123	--	nC
Q_{gs}	Gate-Source Charge		--	45	--	nC
Q_{gd}	Gate-Drain Charge		--	48	--	nC
Source-Drain Diode Maximum Ratings and Characteristics						
I_S	Continuous Source-Drain Diode Forward Current		--	--	82	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	328	A
V_{SD}	Source-Drain Diode Forward Voltage	VGS=0V , IS=69A , TJ=25℃	--	--	1.5	V

NOTES:

1. Repeated rating: Pulse width limited by safe operating area
2. L=5mH, I_{AS}=35A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Typical Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

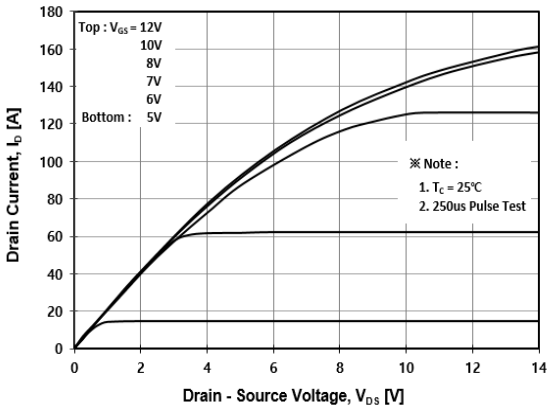


Fig. 2 Typical Transfer Characteristics

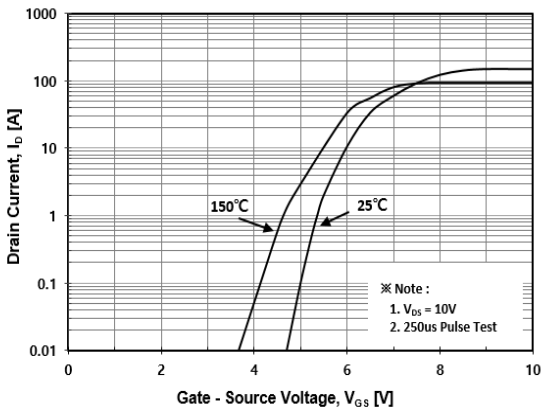


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

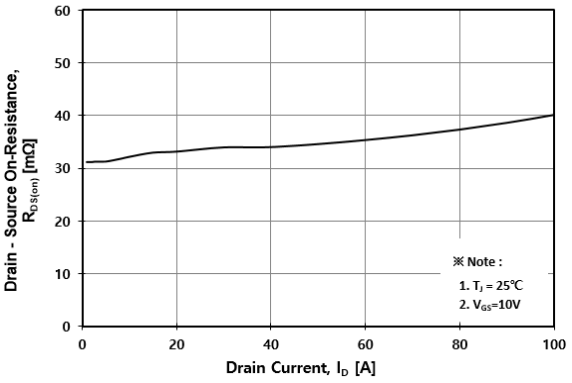


Fig. 4 Body Diode Forward Voltage Variation with Source Current

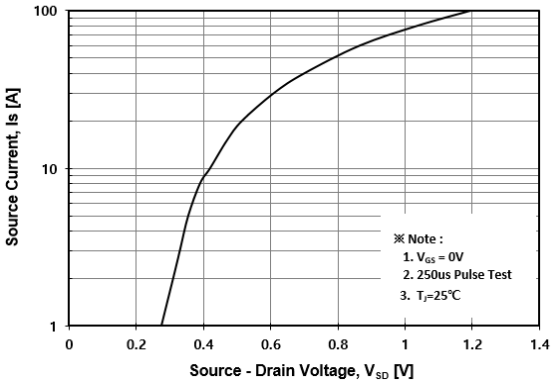


Fig. 5 Typical Capacitance Characteristics

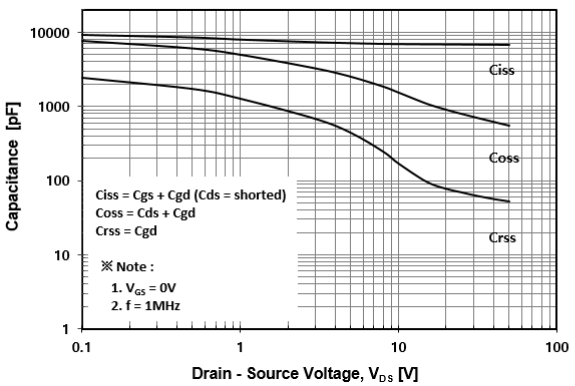


Fig. 6 Typical Total Gate Charge Characteristics

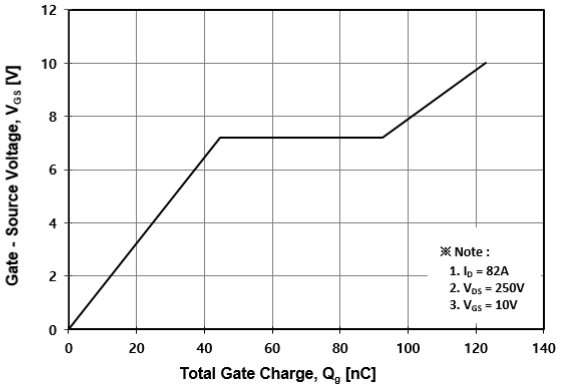


Fig. 7 Breakdown Voltage Variation vs. Temperature

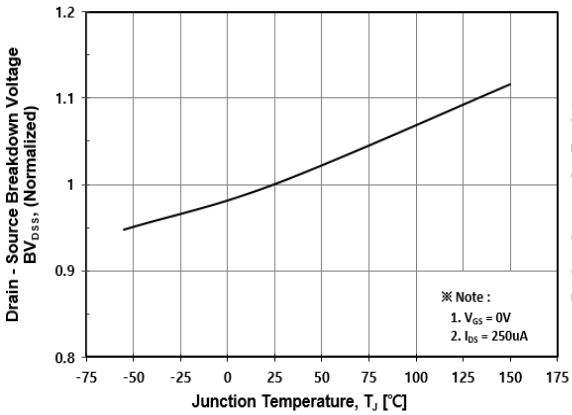


Fig. 8 On-Resistance Variation vs. Temperature

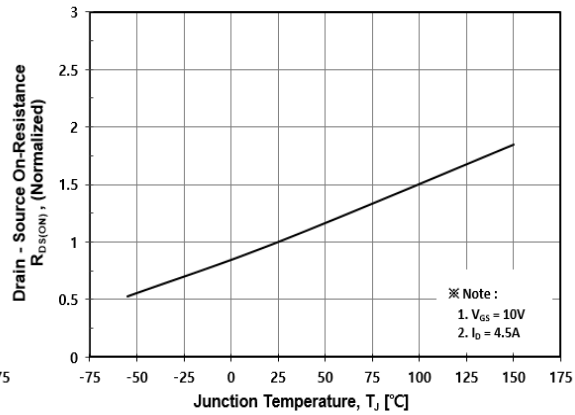


Fig. 9 Maximum Drain Current vs. Case Temperature

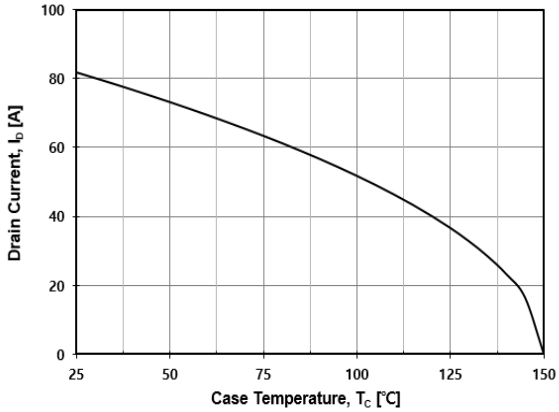


Fig. 10 Maximum Safe Operating Area

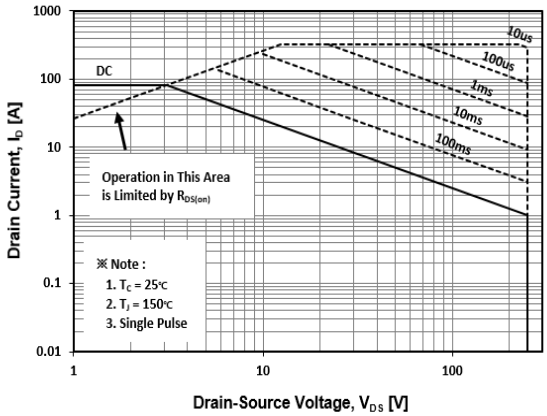


Fig. 11 Transient Thermal Impedance