

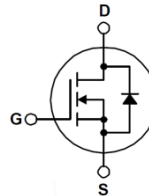
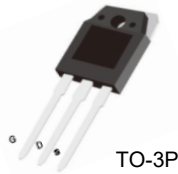
TSA100N20M 200V N-Channel MOSFET

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 for high power inverter, cutting machine.

Features

- 100A,200V,Max. $R_{DS(on)}$ =25m Ω @ V_{GS} =10V
- Low gate charge(typical 70nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current	$T_C = 25^\circ\text{C}$	100
		$T_C = 100^\circ\text{C}$	66
I_{DM}	Pulsed Drain Current (Note 1)	400	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 ($T_C = 25^\circ\text{C}$)	500	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Resistance Characteristics

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

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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On Characteristics

V_{GS}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	3		5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 \text{ V}, I_D = 40 \text{ A}$	--	21	25	m Ω

Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	200	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 200 \text{ V}, V_{GS} = 0 \text{ V}$	--	--	1	μA
		$V_{DS}=180 \text{ V},$ $V_{GS}=0 \text{ V}, T_C=125^\circ\text{C}$	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	100	nAnA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	-100	nAnA

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V},$ $f = 1.0 \text{ MHz}$	--	6904	--	pF
C_{oss}	Output Capacitance		--	783	--	pF
C_{riss}	Reverse Transfer Capacitance		--	67	--	pF

Switching Characteristics

$t_{d(on)}$	Turn-On Time	$V_{DS} = 125 \text{ V}, I_D = 100 \text{ A},$ $R_G = 25 \Omega, V_{GS} = 15 \text{ V}$ (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	$V_{DS} = 250 \text{ V}, I_D = 100 \text{ A},$ $V_{GS} = 10 \text{ V}$ (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	--	--	100	A	
I_{SM}	Pulsed Source-Drain Diode Forward Current	--	--	328		
V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0 \text{ V},$ $I_S=100 \text{ A}, T_J=25^\circ\text{C}$	--	--	1.5	V

NOTES:

1. Repeated rating: Pulse width limited by safe operating area
2. $L=5\text{mH}, I_{AS}=35\text{A}, V_{DD}=50\text{V}, R_G=25\Omega,$ Starting $T_J=25^\circ\text{C}$
3. Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature typical characteristics

Typical Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

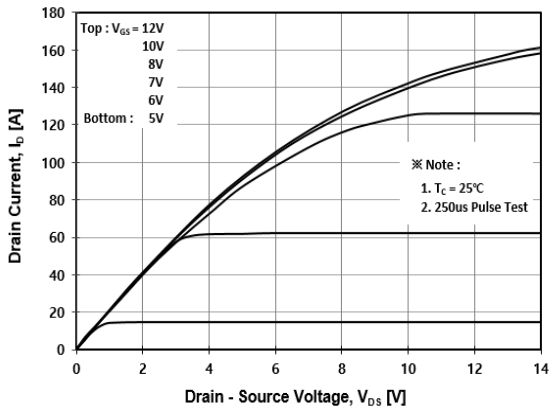


Fig. 2 Typical Transfer Characteristics

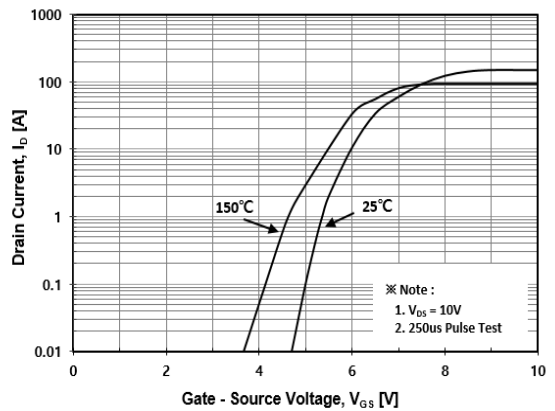


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

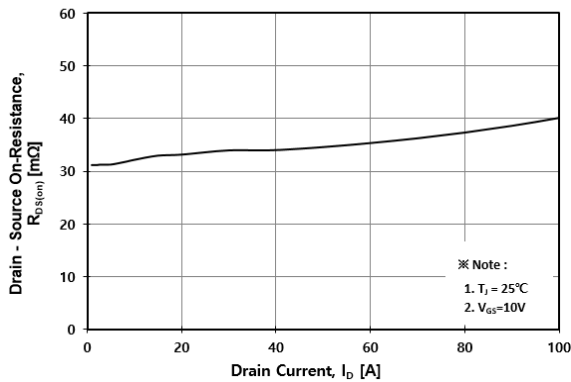


Fig. 4 Body Diode Forward Voltage Variation with Source Current

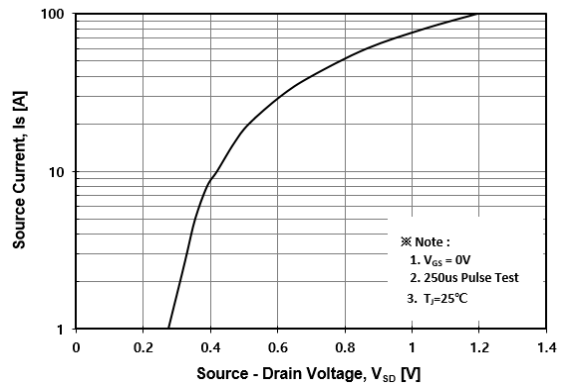


Fig. 5 Typical Capacitance Characteristics

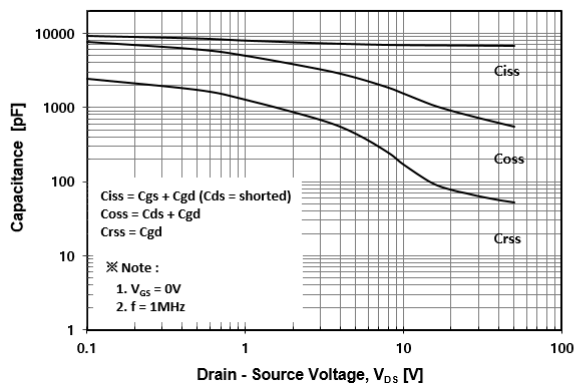


Fig. 6 Typical Total Gate Charge Characteristics

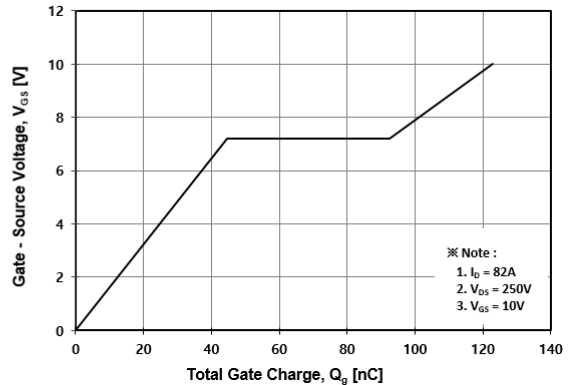


Fig. 7 Breakdown Voltage Variation vs. Temperature

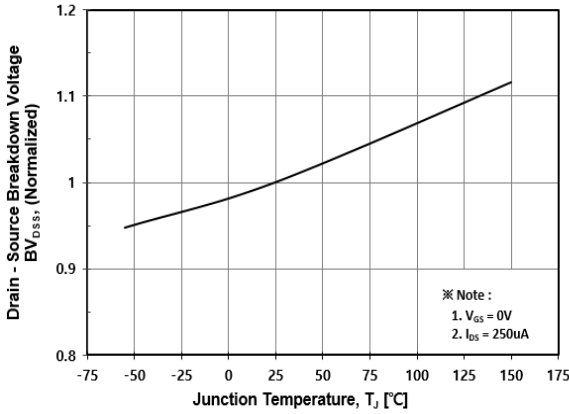


Fig. 8 On-Resistance Variation vs. Temperature

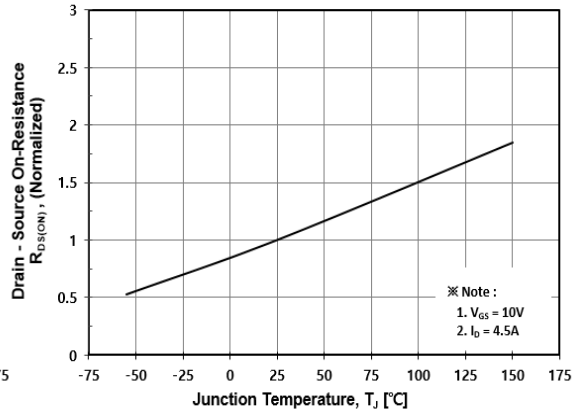


Fig. 9 Maximum Drain Current vs. Case Temperature

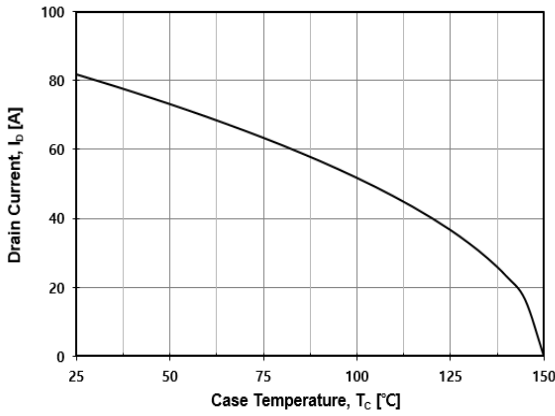


Fig. 10 Maximum Safe Operating Area

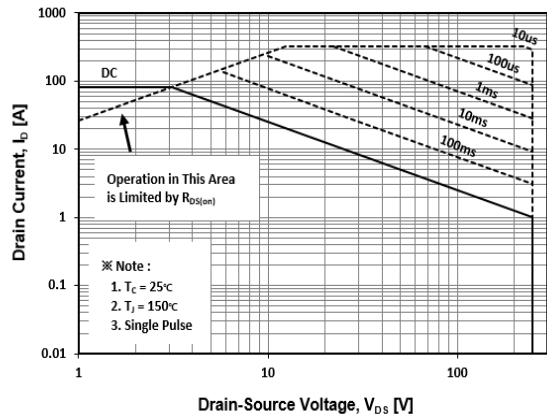


Fig. 11 Transient Thermal Impedance

