

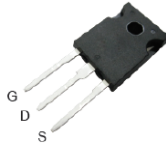
## TSK100N20M 200V N-Channel MOSFET

### General Description

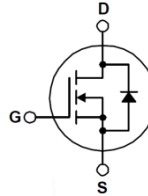
This Power MOSFET is produced using Truesemi's advanced planar stripe DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are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

### Features

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



TO-247



### 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	$\pm 20$	V	
$I_D$	Drain Current	$T_C = 25^\circ\text{C}$	100	A
		$T_C = 100^\circ\text{C}$	66	A
$I_{DM}$	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 ( $T_C = 25^\circ\text{C}$ )	550	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 $\Omega$

**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	$\mu\text{A}$
		$V_{DS} = 180 \text{ V}, V_{GS} = 0 \text{ V}, T_C = 125^\circ\text{C}$	--	--	10	$\mu\text{A}$
$I_{GSSF}$	Gate-Body Leakage Current, Forward	$V_{GS} = 20 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	100	nA
$I_{GSSR}$	Gate-Body Leakage Current, Reverse	$V_{GS} = -20 \text{ V}, V_{DS} = 0 \text{ V}$	--	--	-100	nA

**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

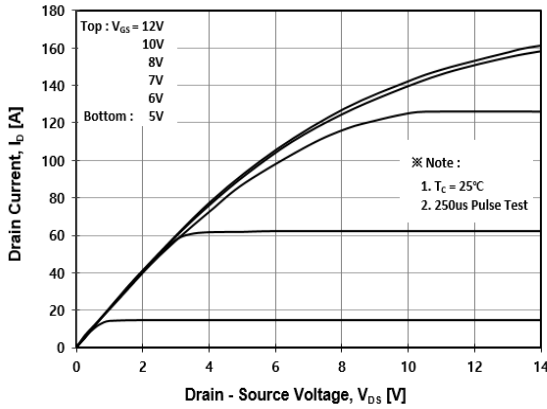


Fig. 2 Typical Transfer Characteristics

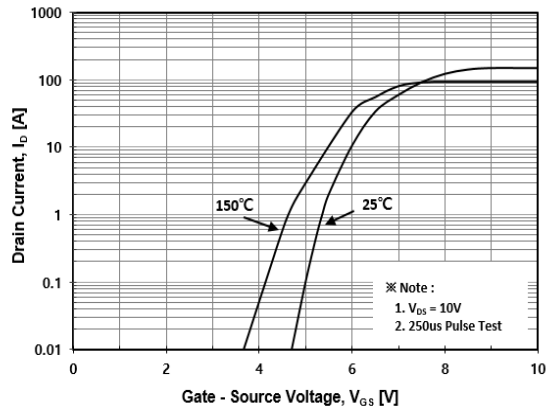


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

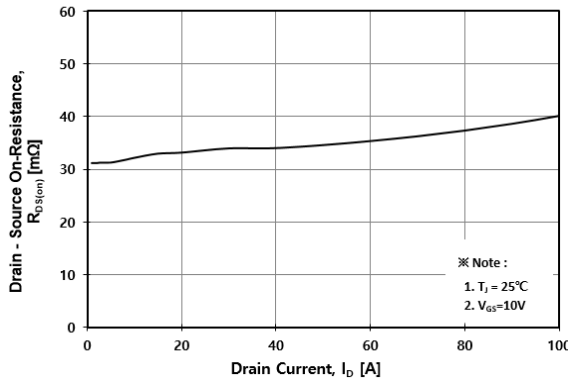


Fig. 4 Body Diode Forward Voltage Variation with Source Current

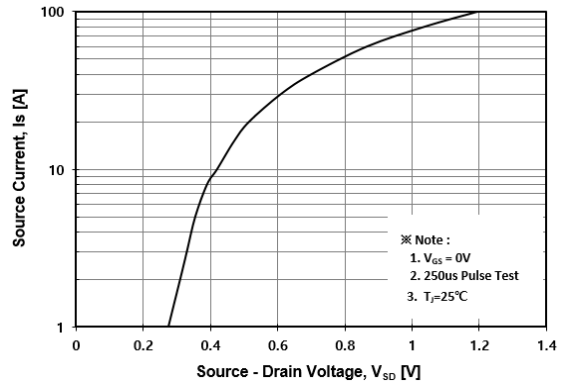


Fig. 5 Typical Capacitance Characteristics

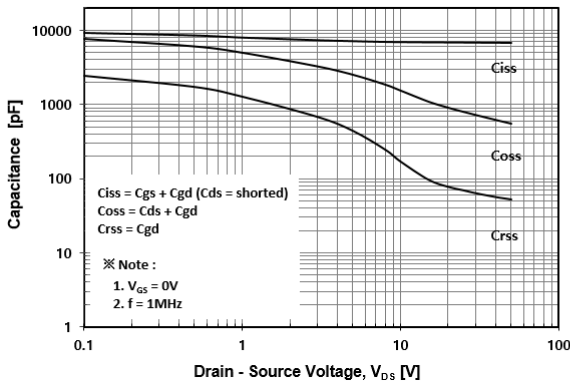


Fig. 6 Typical Total Gate Charge Characteristics

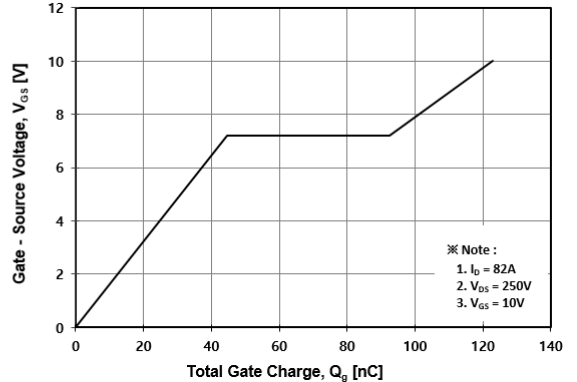


Fig. 7 Breakdown Voltage Variation vs. Temperature

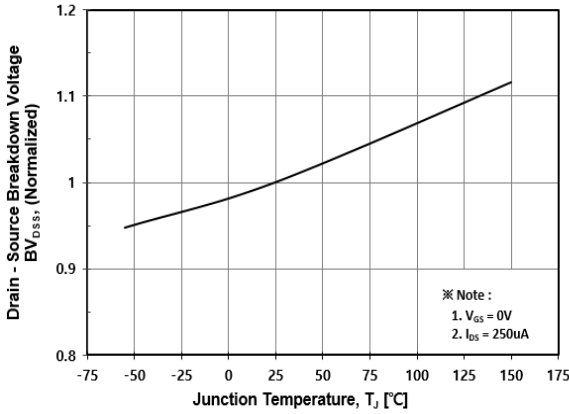


Fig. 8 On-Resistance Variation vs. Temperature

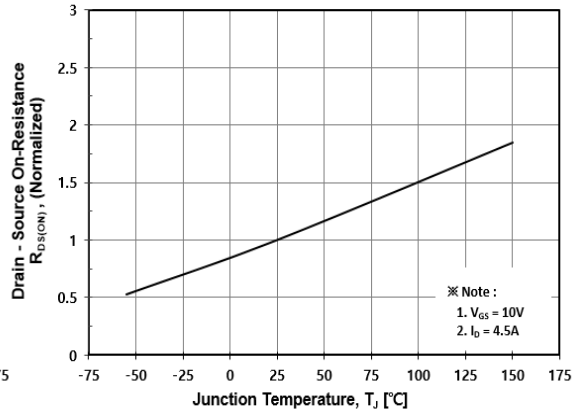


Fig. 9 Maximum Drain Current vs. Case Temperature

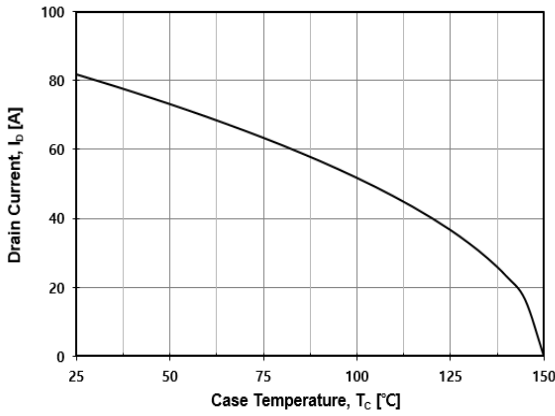


Fig. 10 Maximum Safe Operating Area

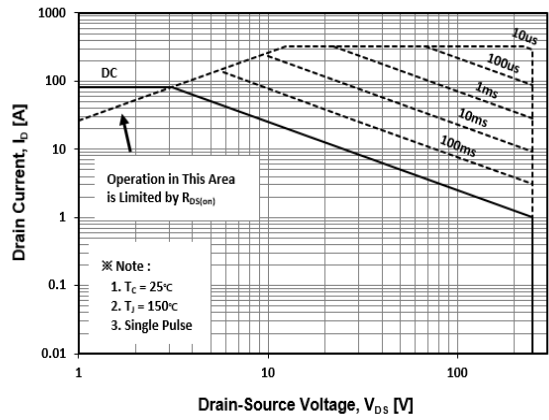


Fig. 11 Transient Thermal Impedance

