

MSF20N50

N-Channel Enhancement Mode Power MOSFET

Description

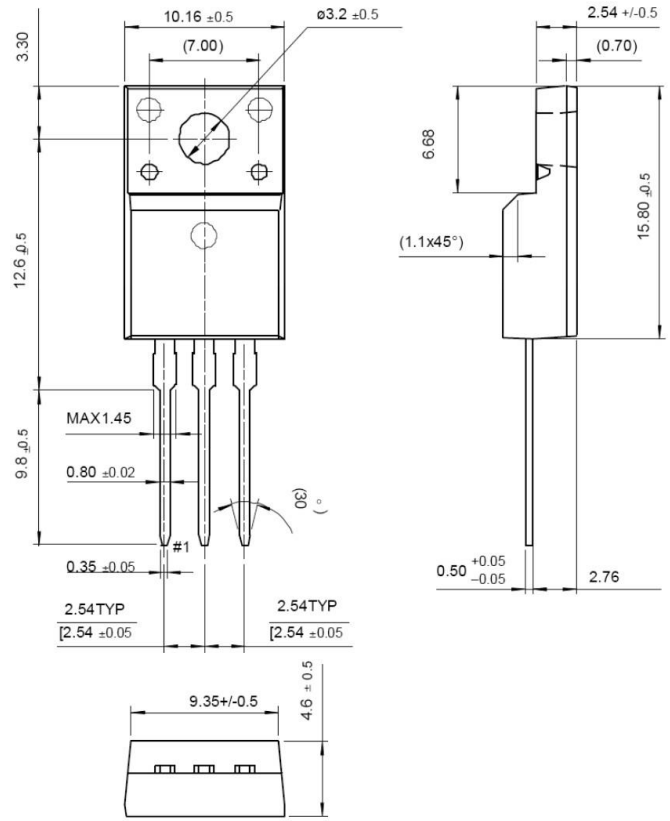
The MSF20N50 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220F package is universally preferred for all commercial-industrial applications

Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

- Switching Mode Power Supply
- LCD Panel Power
- Adapter
- E-bike Charger



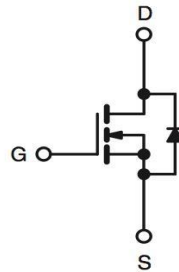
Packing & Order Information

50/Tube ; 1,000/Box



RoHS
COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Continuous Drain Current (TC=25°C)	20	A
	Continuous Drain Current (TC=100°C)	13	A
I_{DM}	Drain Current Pulsed	80	A
E_{AS}	Single Pulsed Avalanche Energy	1100	mJ
E_{AR}	Repetitive Avalanche Energy	28	mJ
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns
T_j, T_{stg}	Operating Junction and Storage Temperature	-55~+150	°C

- Drain current limited by maximum junction temperature

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC=25°C)	40	W
	Power Dissipation (TC=100°C)	0.35	W

NOTE:

1. Repetitive rating; pulse width limited by maximum junction temperature.

Thermal characteristics

Symbol	Parameter	Max.	Units
R _{thjc}	Typical thermal resistance	3.3	°C/W
R _{θJA}		62.5	

Static Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V _{GS}	V _{DS} = V _{GS} , I _D =250μA	2.0		4.0	V
*R _{DS(ON)}	V _{GS} =10V, I _D =9.0A	--	0.21	0.26	mΩ
BV _{DSS}	V _{GS} =0 V, I _D =250μA	500	--	--	V
ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.5		
I _{DSS}	V _{DS} =500V, V _{GS} = 0 V V _{DS} =400V, V _{GS} = 0 V, T _J = 125°C	--	--	1 10	uA
I _{GSSF}	V _{DS} =30V, V _{Ds} =0 V			100	nA
I _{GSSR}	V _{DS} =-30V, V _{Ds} =0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C _{ISS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	2700	--	pF
C _{OSS}	Output Capacitance		--	400	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	40	--	pF
t _{d(on)}	Turn-On Time	V _{DS} =250 V, I _D =20A, R _G =25Ω	--	100	--	ns
t _r	Turn-On Time		--	400	--	ns
t _{d(off)}	Turn-Off Delay Time		--	100	--	ns
t _f	Turn-Off Fall Time		--	100	--	ns
Q _g	Total Gate Charge	V _{DS} =400V, I _D =20A, V _{GS} =10 V	--	70	--	nC
Q _{gs}	Gate-Source Charge		--	18	--	nC
Q _{gd}	Gate-Drain Charge (Miller Charge)		--	35	--	nC

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Source-Drain Diode Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	20	A
I_{SM}		--	--	80	
V_{SD}	$I_F=18A, V_{GS}=0$	--	--	1.5	V
t_{rr}	$I_F=18A, V_{GS}=0, di/dt=100A/\mu s$	--	550	--	ns
Q_{rr}		--	7.2	--	μC

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L=5.5mH, I_{AS}=20.0A, V_{DD}=50V, R_G=25\Omega, \text{Starting } T_J=25^\circ C$
3. $I_{SD} \leq 20.0A, di/dt \leq 200A/\mu s, V_{DD} \leq BVDSS, \text{Starting } T_J = 25^\circ C$
4. Pulse Test : Pulse Width $\leq 300\mu s, \text{Duty Cycle} \leq 2\%$
5. Essentially Independent of Operating Temperature

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■ Characteristics Curve

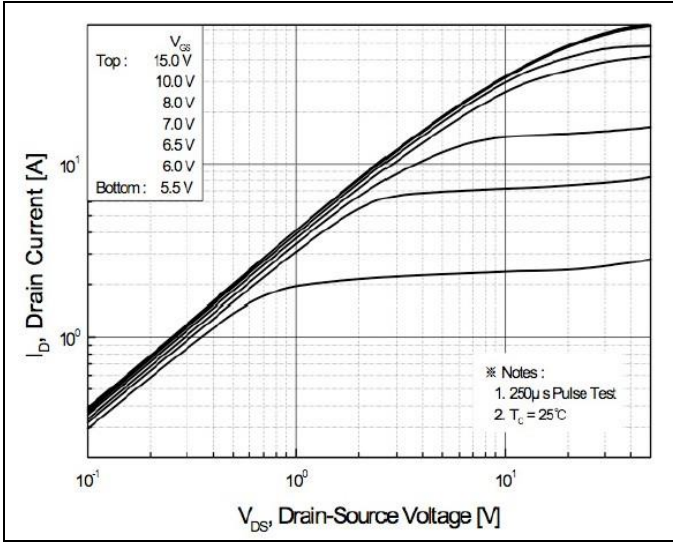


FIG.1-ON REGION CHARACTERISTICS

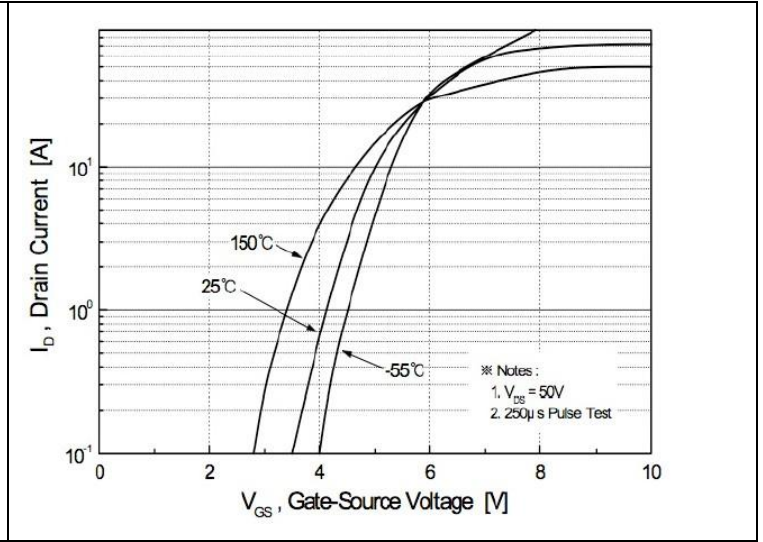


FIG.2-TRANSFER CHARACTERISTICS

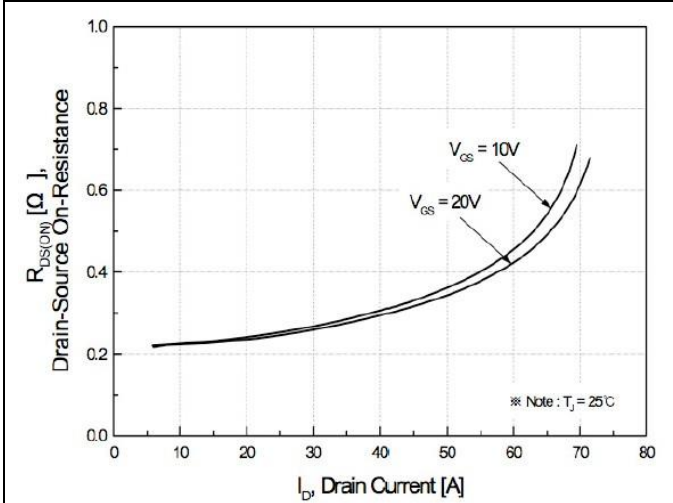


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

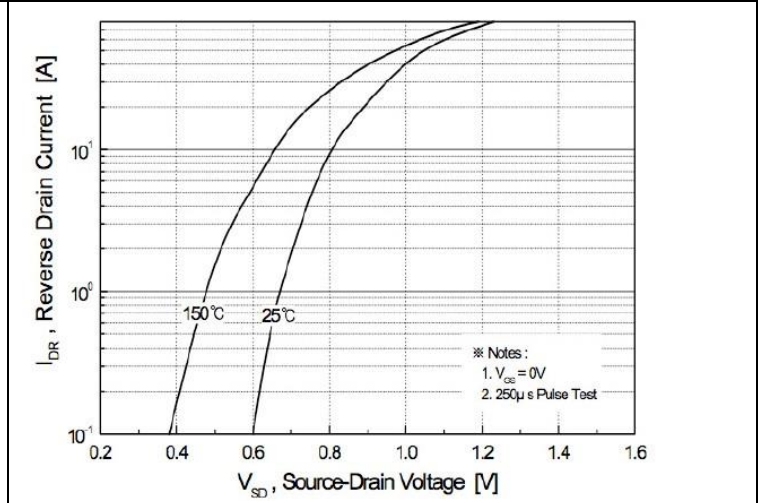


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

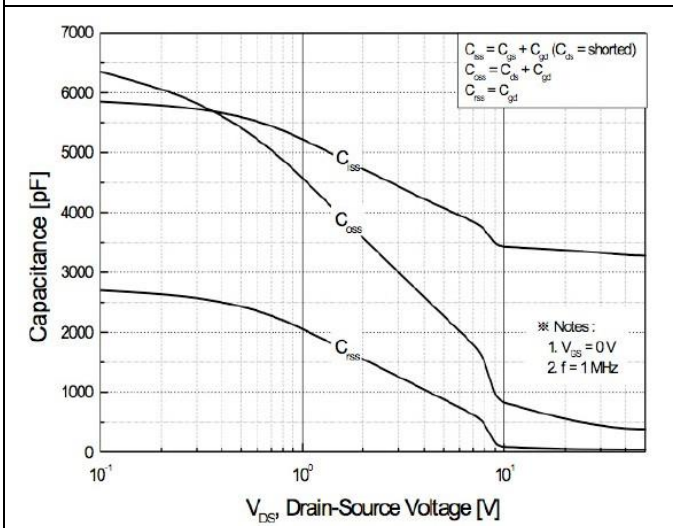


FIG.5-CAPACITANCE CHARACTERISTICS

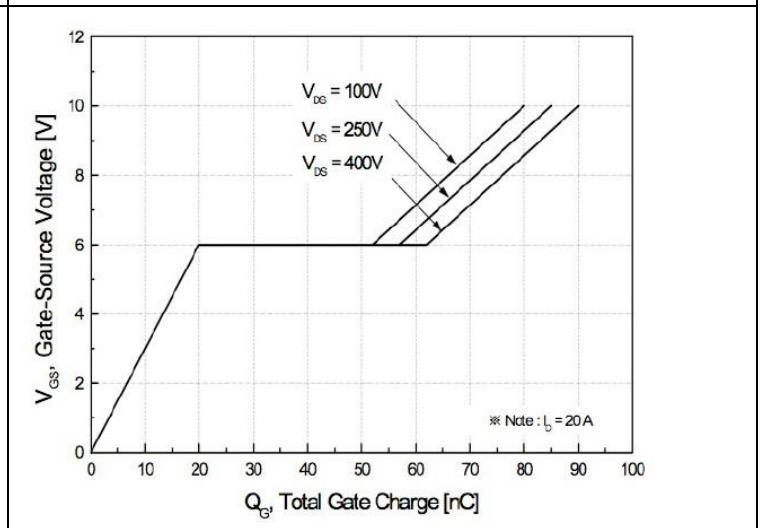


FIG.6-GATE CHARGE CHARACTERISTICS

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Characteristics Curve

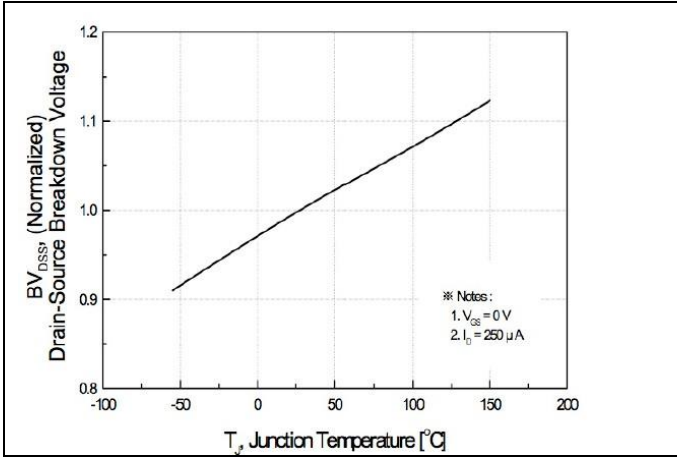


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

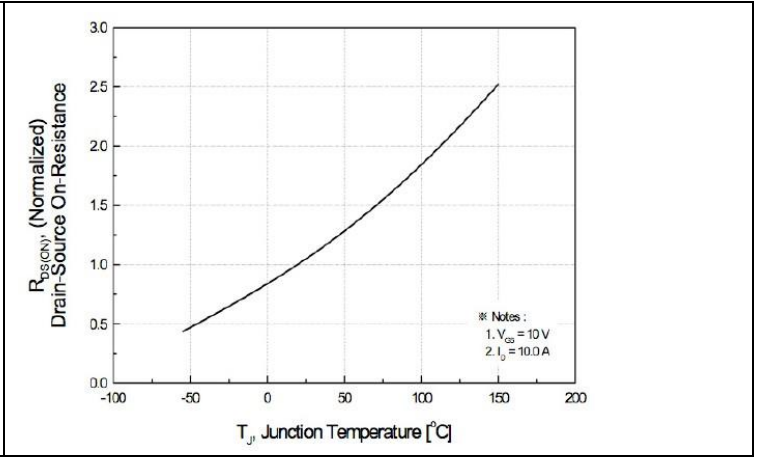


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

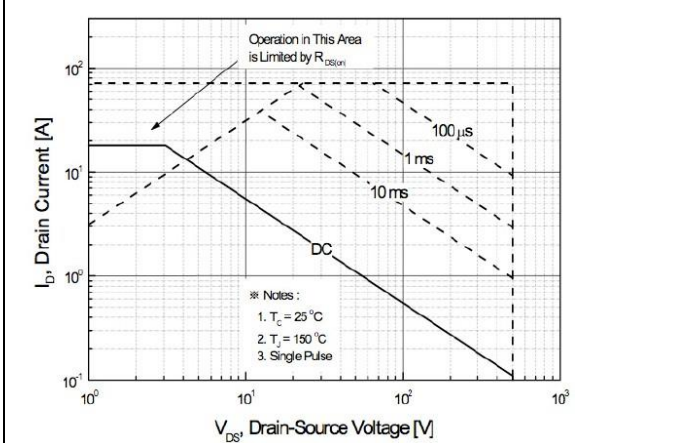


FIG.9-MAXIMUM SAFE OPERATING AREA

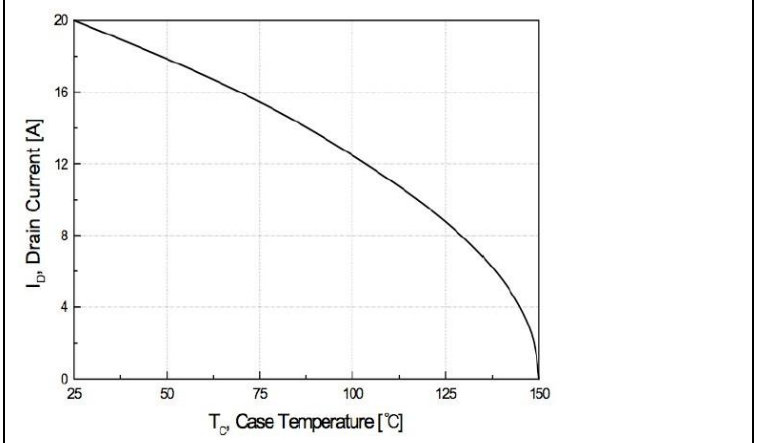


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

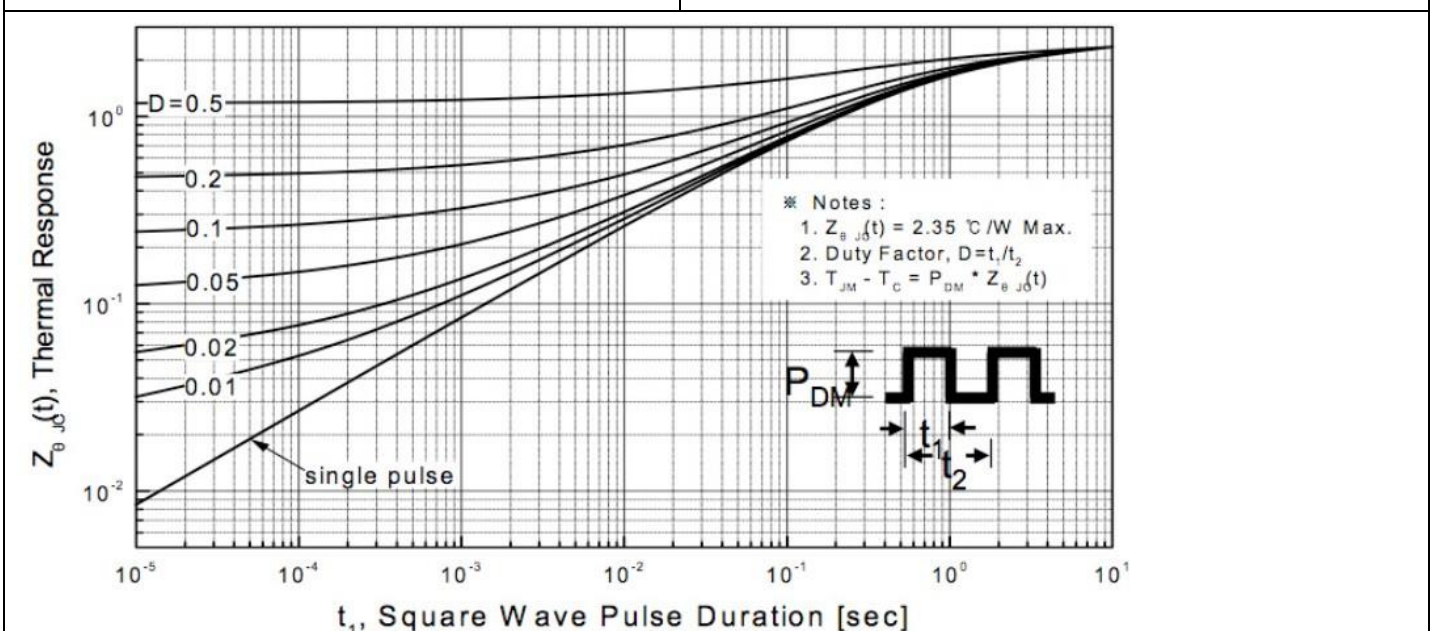


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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