MSF20N50

N-Channel Enhancement Mode Power MOSFET

Description

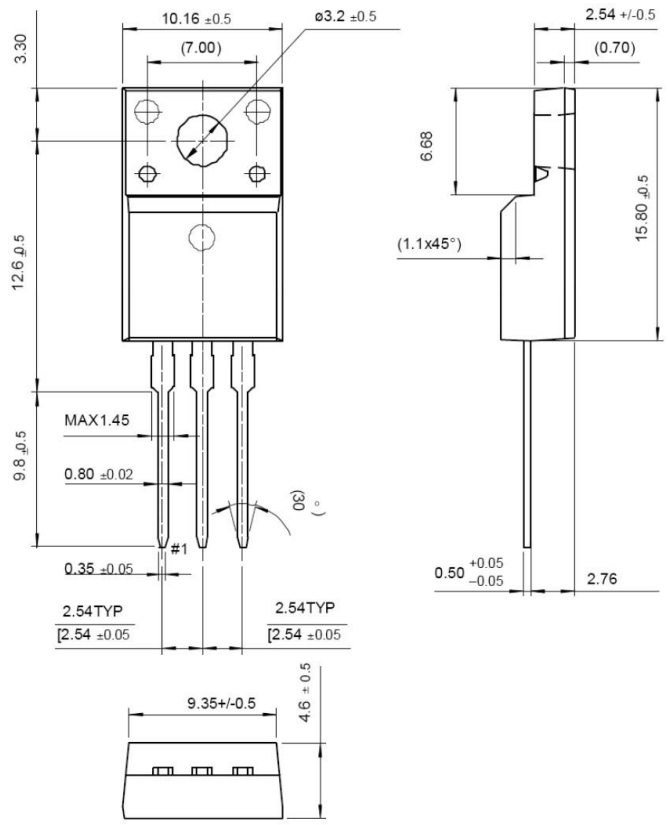
The MSF20N50 is a N-channel enhancement-mode MOSFET , providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness. The TO-220F package is universally preferred for all commercial-industrial applications

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

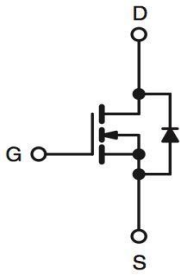


Packing & Order Information

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
Tj, Tstg	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
Rthjc	Typical thermal resistance	3.3	°C/W
$R_{\theta JA}$		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
$\Delta BV_{DSS}/\Delta T_J$	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
tf	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}	IF=18A , V_{GS}=0	--	--	1.5	V
t_{rr}	IF=18A , V_{GS}=0 , dIF/dt=100A/μs	--	550	--	ns
Q_{rr}		--	7.2	--	uC

NOTE:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L= 5.5mH,IAS= 20.0A,VDD=50V,RG=25Ω,Starting TJ=25°C
3. ISD ≤ 20.0 A, di/dt ≤ 200A/μs, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature

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■Characteristics Curve

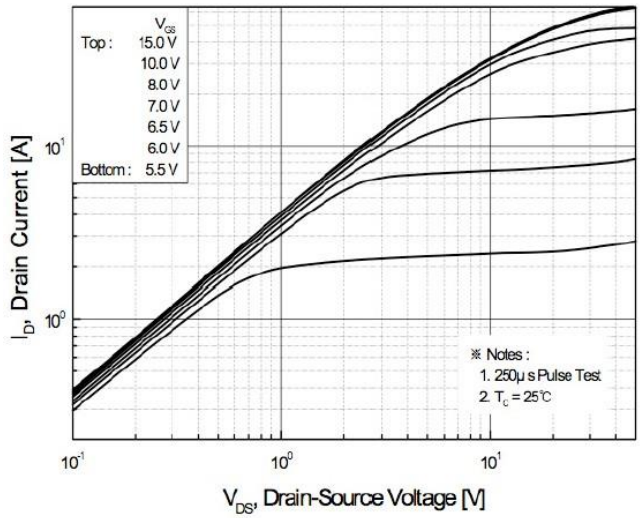

FIG.1-ON REGION CHARACTERISTICS

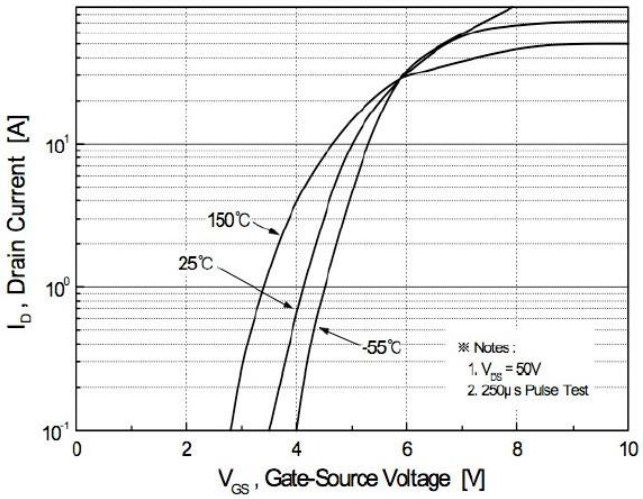

FIG.2-TRANSFER CHARACTERISTICS

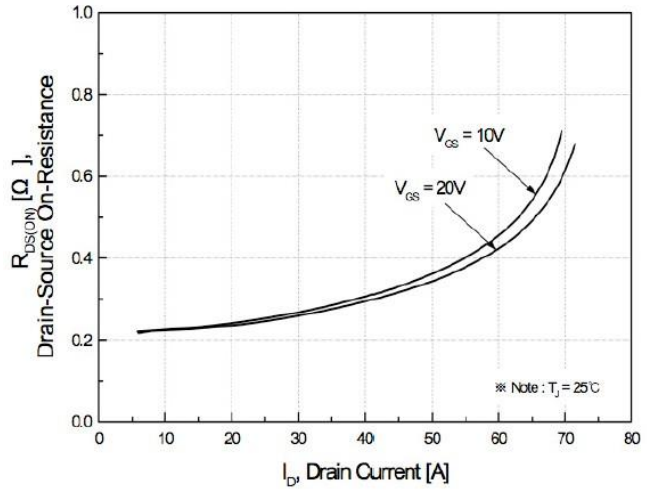

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

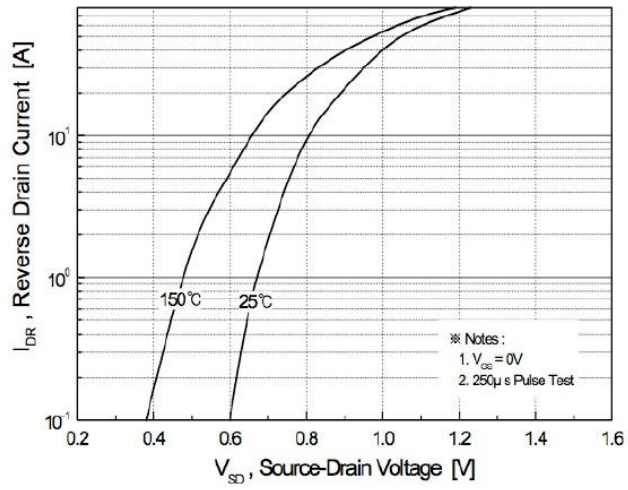

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

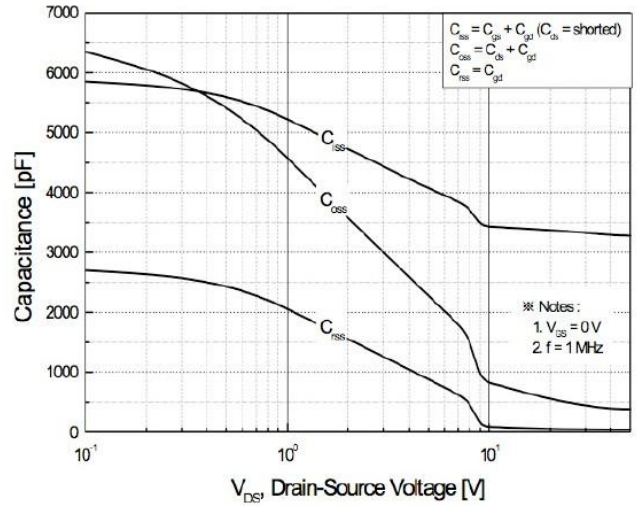

FIG.5-CAPACITANCE CHARACTERISTICS

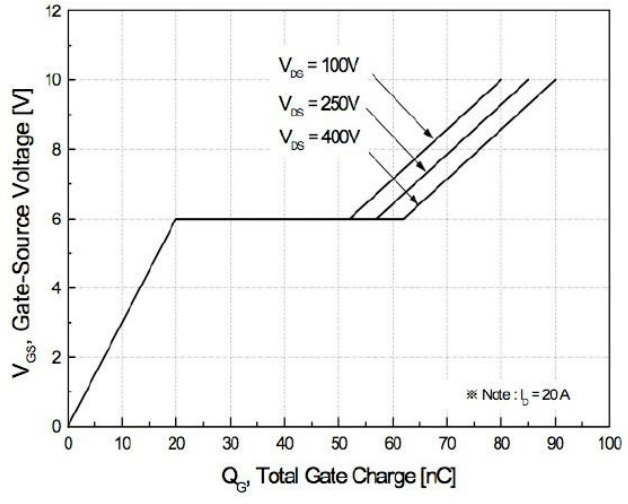

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

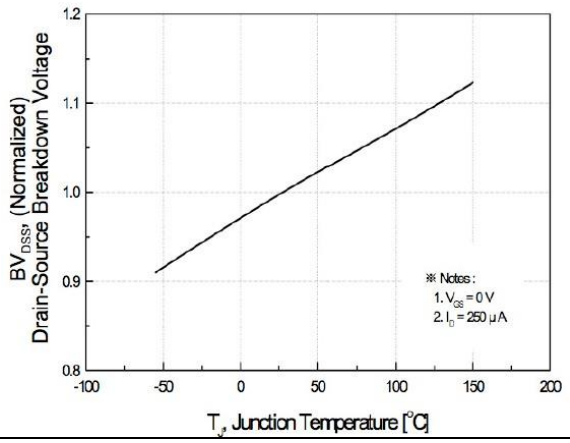

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

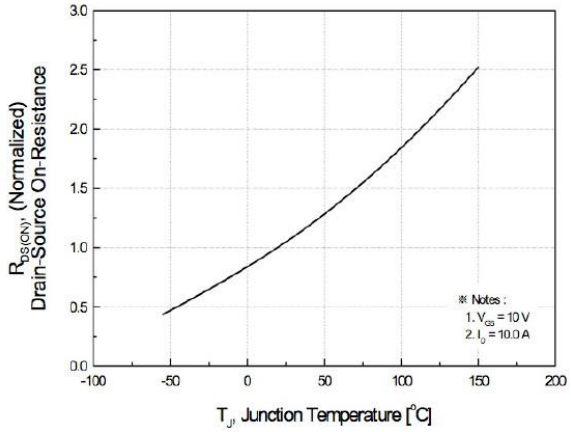

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

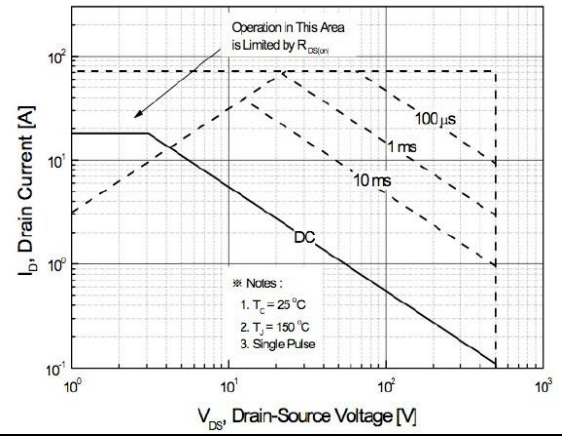

FIG.9-MAXIMUM SAFE OPERATING AREA

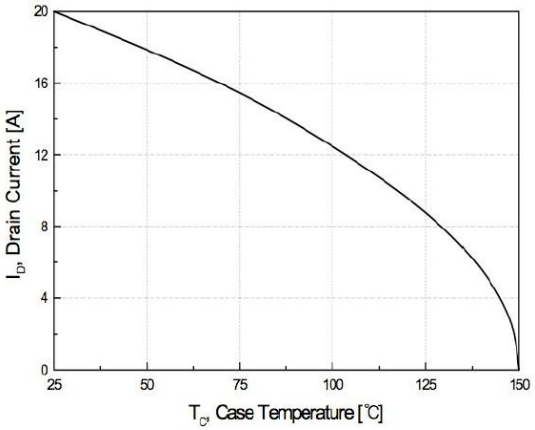

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

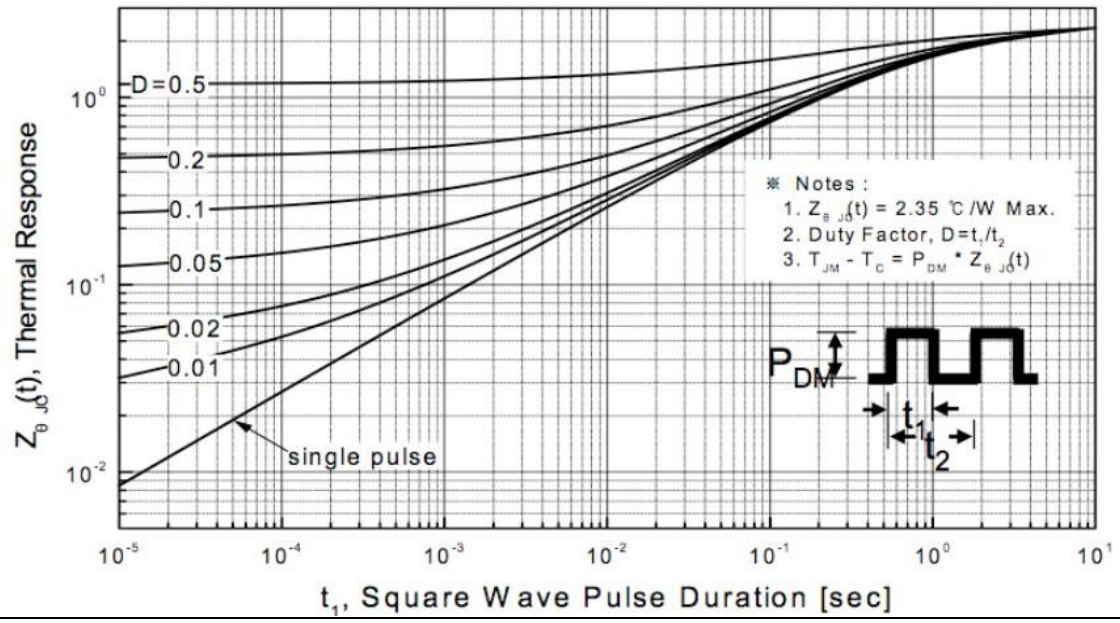

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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