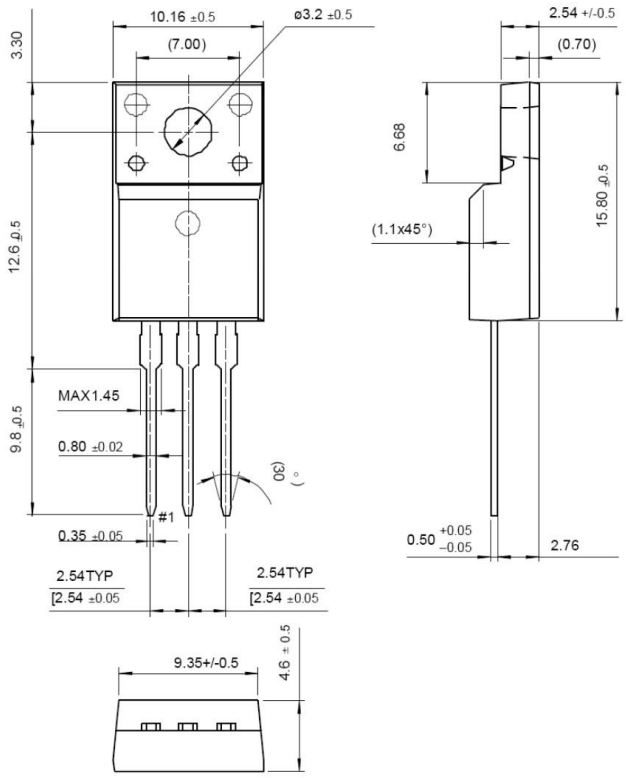
MS5N50

N-Channel Enhancement Mode Power MOSFET

Description

The MS5N50 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-220 package is universally preferred for all commercial-industrial applications



Features

- BVDSS=550V typically @ Tj=150°C
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

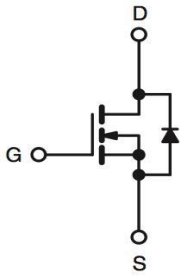
- Ballast
- Inverter

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_{DSS}	Drain to Source Voltage	500	V
V_G	Gate to Source Voltage	±30	V
I_D	Continuous Drain Current (TC=25°C) Continuous Drain Current (TC=100°C)	4.5 3.0	A
I_{DM}	Drain Current Pulsed	18	A
E_{AS}	Single Pulsed Avalanche Energy	271	mJ
E_{AR}	Repetitive Avalanche Energy	7.3	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns

• Drain current limited by maximum junction temperature

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
T_L	TL Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	300	°C
T_{PKG}	TPKG Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
P_D	Total Power Dissipation(@TC = 25 °C) 100 W	73	W
	Derating Factor above 25 °C	0.57	W/°C
T_{STG}	Operating Junction Temperature	-55 to +150	°C
T_J	Storage Temperature	150	°C

Note:

1. TJ=+25°C to +150°C.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. ISD=4.5A, dI/dt<100A/μs, VDD<BVDSS, TJ=+150°C.
4. IAS=4.5A, VDD=50V, L=15mH, RG=25Ω, starting TJ=+25°C.

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	--	1.47	°C/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	--	--	62.5	°C/W

Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V,I_D = 250 uA	500	--	--	V
		Tj = 150°C	--	550	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	--	0.6	--	V/°C
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 uA	2.0	--	4.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = 500 V , V_{GS} = 0 V V_{DS} = 400 V , T_C = 125°C	--	--	25 250	uA nA
I_{GSS}	Gate-Source Leakage,Forward	V_{GS} = ±30	--	--	±100	nA
$R_{DS(ON)}$	Static Drain-Source On-state Resis-tance	V_{GS} = -10 V , I_D = 2.7 A	--	--	1.5	Ω

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	V_{DD} = 250 V, V_{GS} = 10 V, I_D= 4.5 A	--	11	--	nC
Q_{gs}	Gate-Source Charge		--	3	--	nC
Q_{gd}	Gate-Drain Charge (Miller Charge)		--	5	--	nC

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Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250 V, I_D = 4.5 A, V_{GS} = 10 V, R_G = 25 Ω	--	13	--	ns
t_r	Rise Time		--	22	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	28	--	ns
tf	Fall Time		--	20	--	ns
C_{ISS}	Input Capacitance	V_{GS} = 0 V, V_{DS} =25 V, f = 1MHz	--	460	--	pF
C_{OSS}	Output Capacitance		--	60	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	5	--	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S		I_S = 4.5 A, V_{GS} = 0V	--	--	1.5	V
I_{SM}		V_D=V_G=0, V_S = 1.3 V	--	--	4.5	A
V_{SD}			--	--	18	A
t_{rr}		V_{GS} = 0, IF = 4.5 A, dI/dt = 100A/us	--	230	--	ns
Q_{rr}			--	1.6	--	uC

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

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■Characteristics Curve

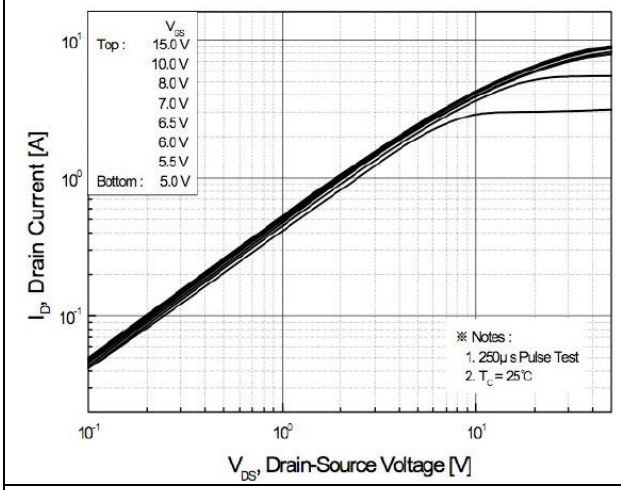

FIG.1-ON REGION CHARACTERISTICS

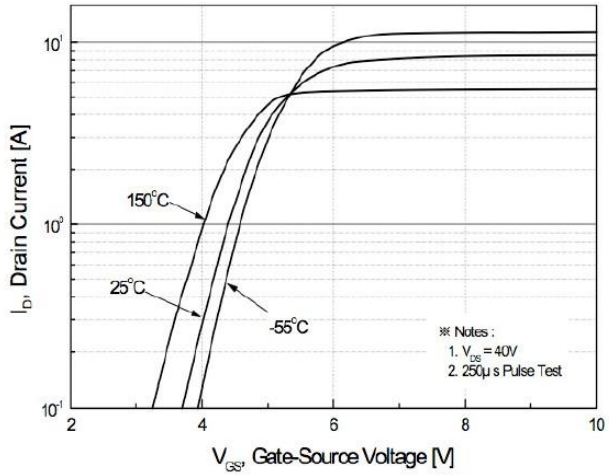

FIG.2-TRANSFER CHARACTERISTICS

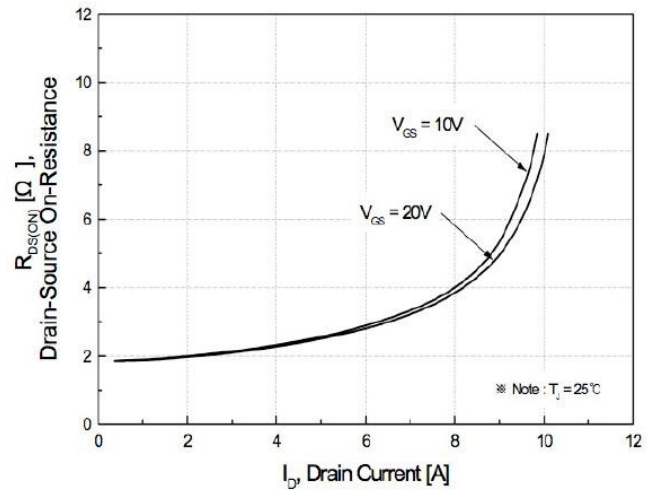

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

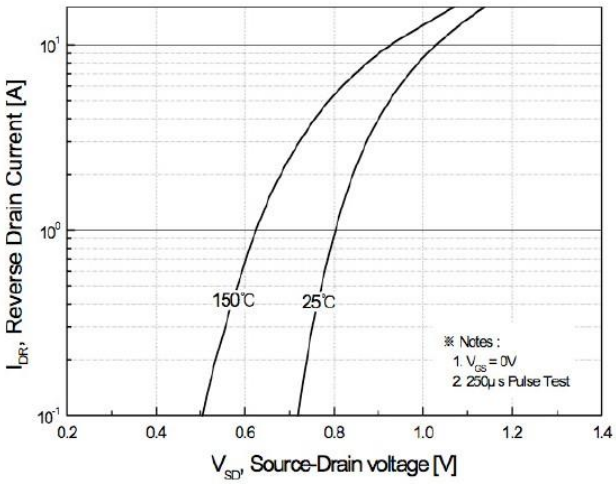

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

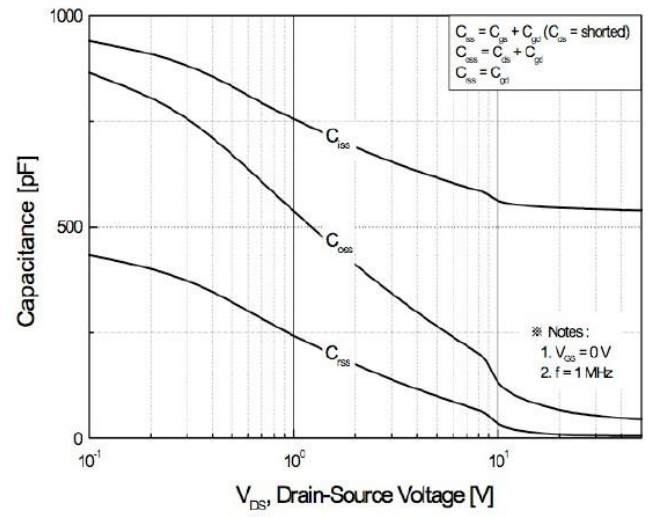

FIG.5-CAPACITANCE CHARACTERISTICS

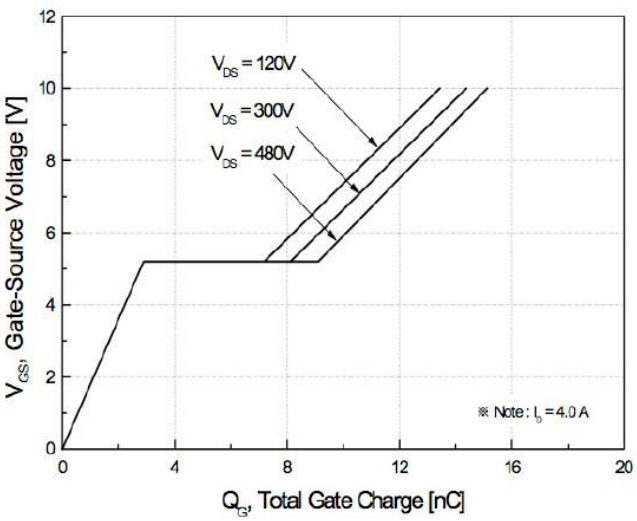

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

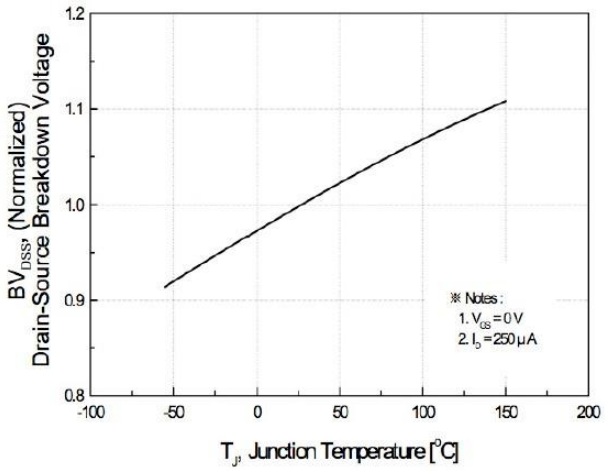

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

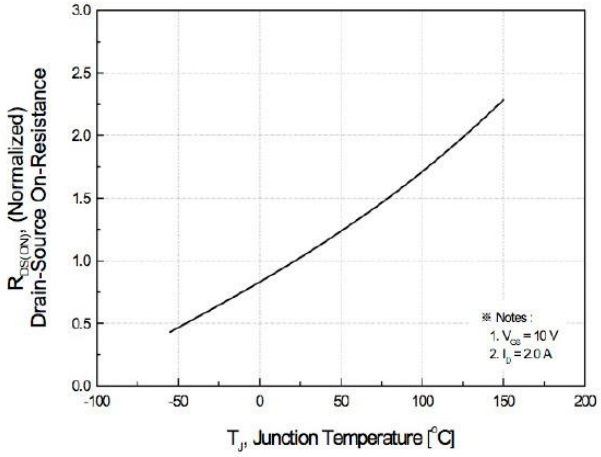

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

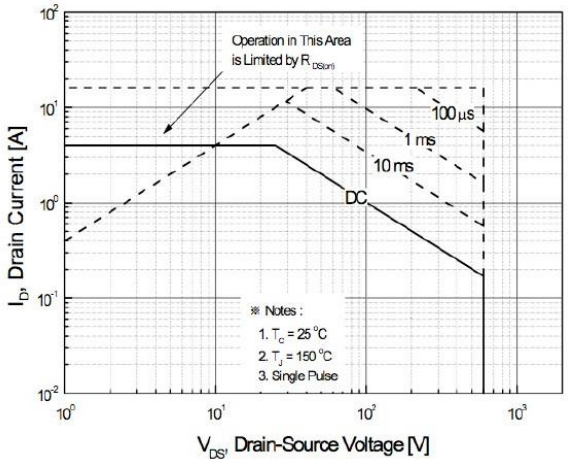

FIG.9-MAXIMUM SAFE OPERATING AREA

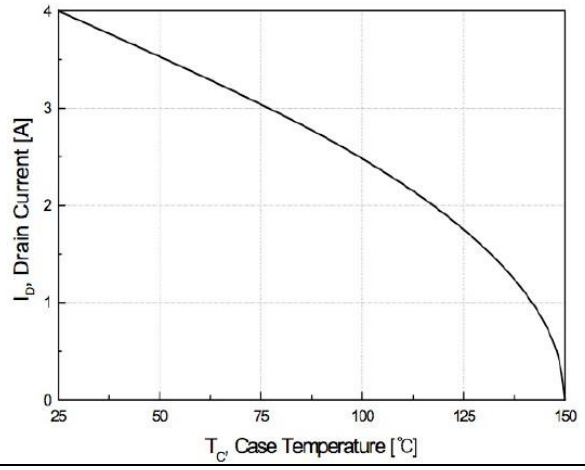

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

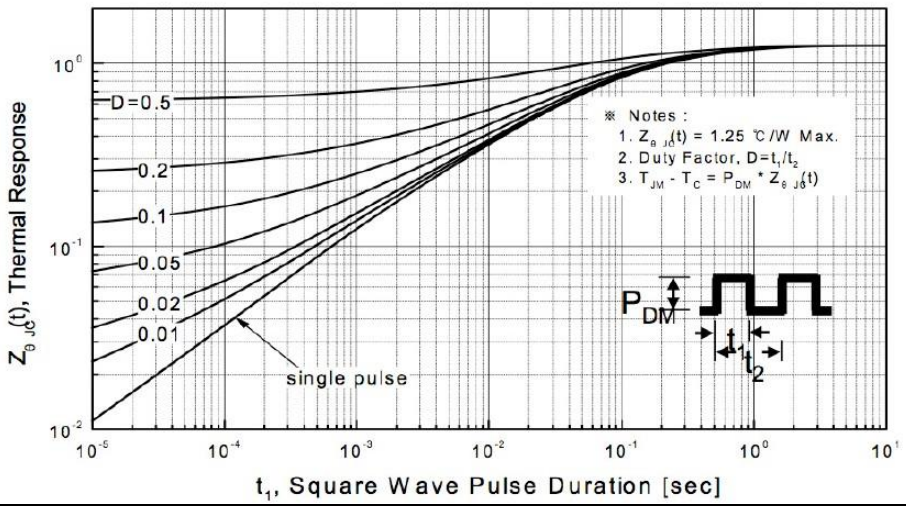

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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