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

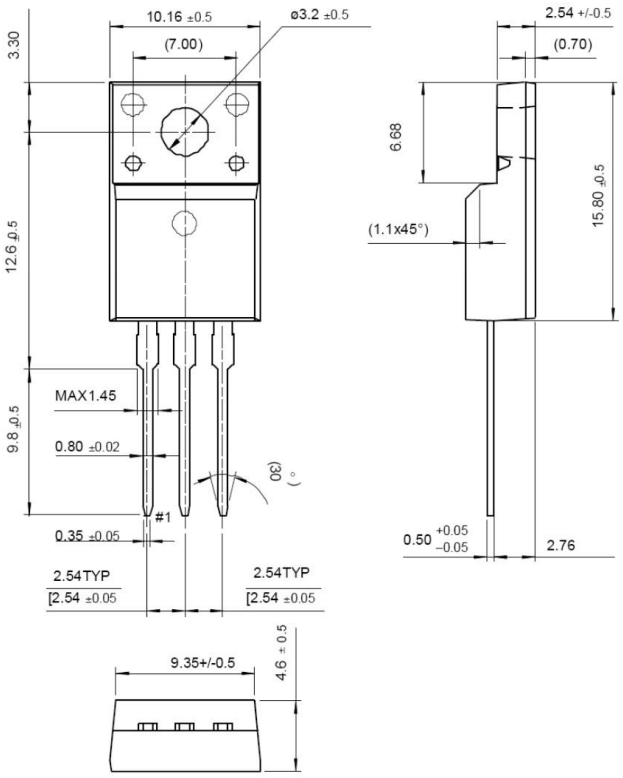
- Ballast
- Inverter

Package type：TO-220AB

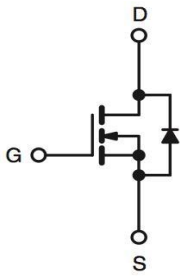
Packing & Order Information

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

MS5N50

N-Channel Enhancement Mode Power MOSFET

MS5N50

N-Channel Enhancement Mode Power MOSFET

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

MS5N50

N-Channel Enhancement Mode Power MOSFET

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%

MS5N50

N-Channel Enhancement Mode Power MOSFET

■Characteristics Curve

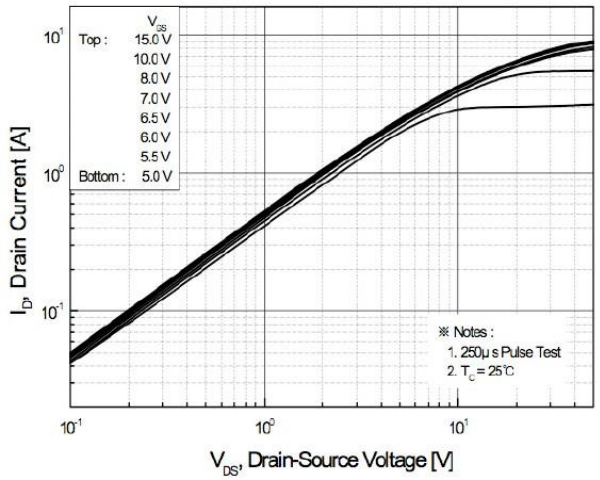


FIG.1-ON REGION CHARACTERISTICS

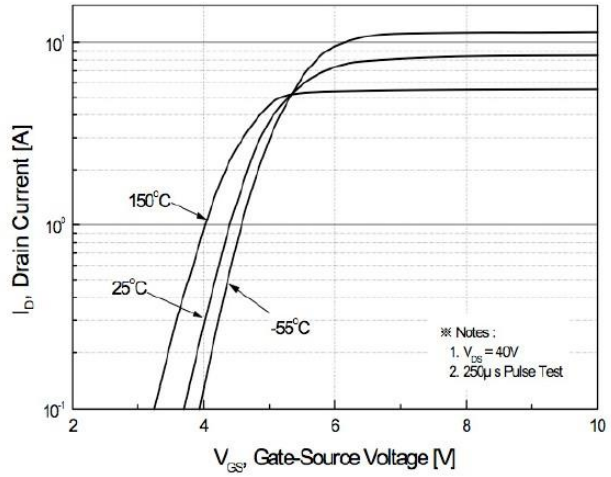


FIG.2-TRANSFER CHARACTERISTICS

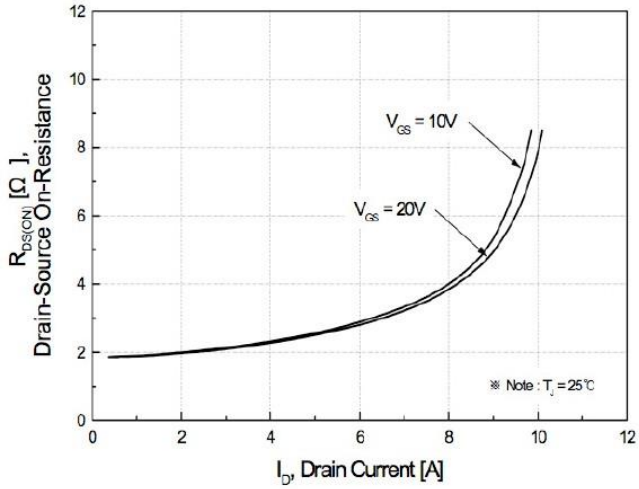


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

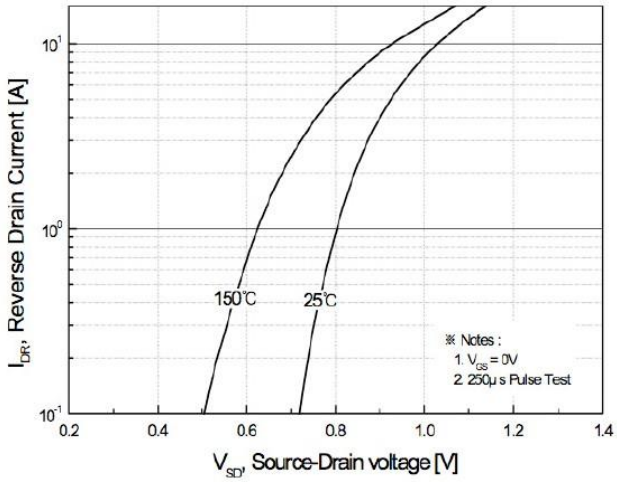


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

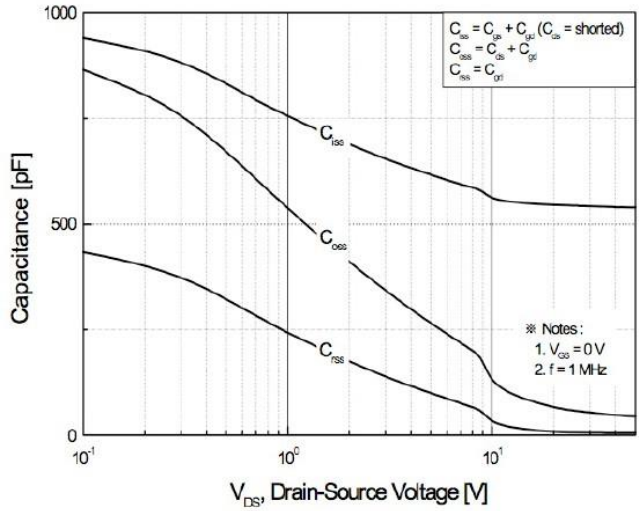


FIG.5-CAPACITANCE CHARACTERISTICS

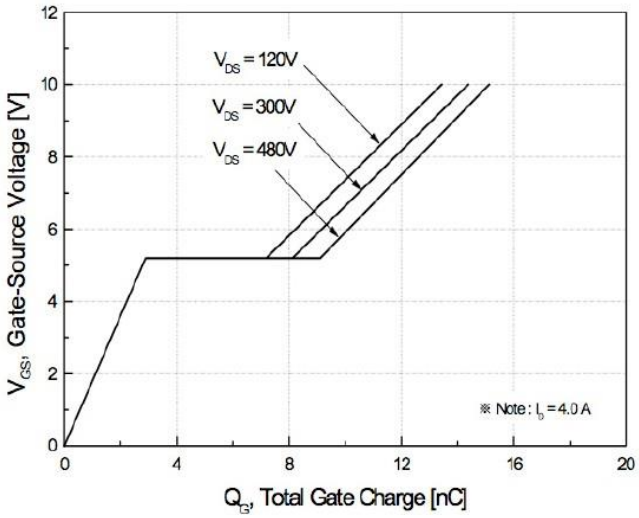


FIG.6-GATE CHARGE CHARACTERISTICS

MS5N50

N-Channel Enhancement Mode Power MOSFET

■Characteristics Curve

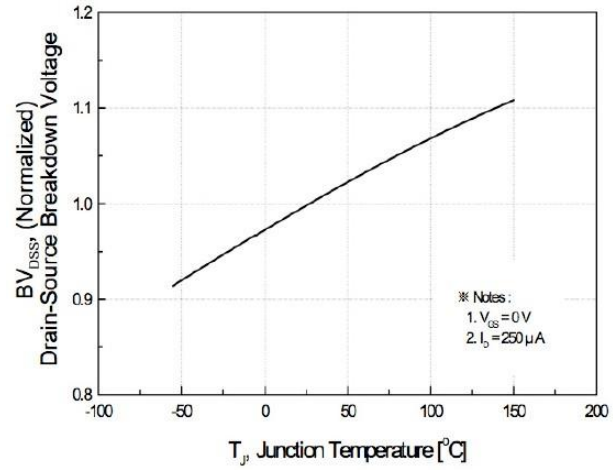


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

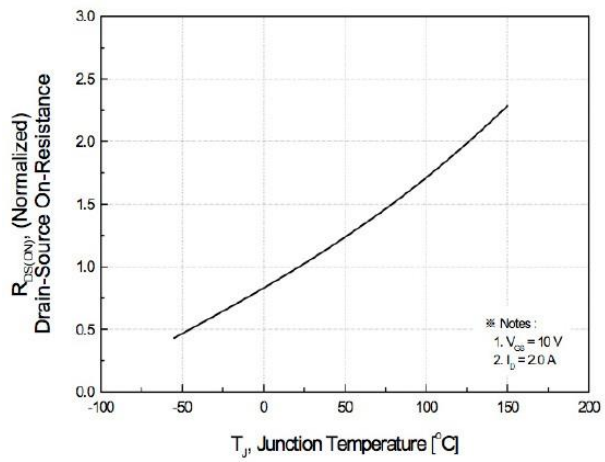


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

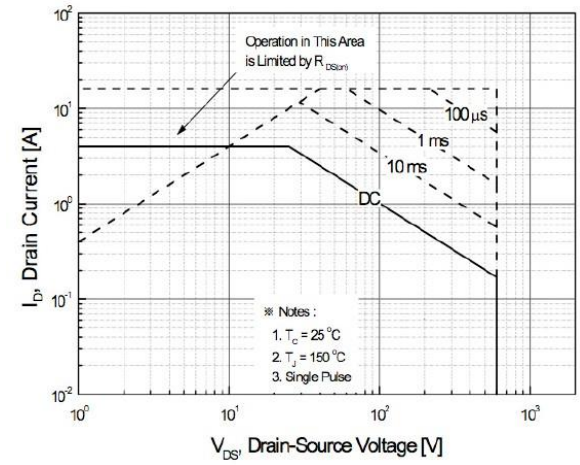


FIG.9-MAXIMUM SAFE OPERATING AREA

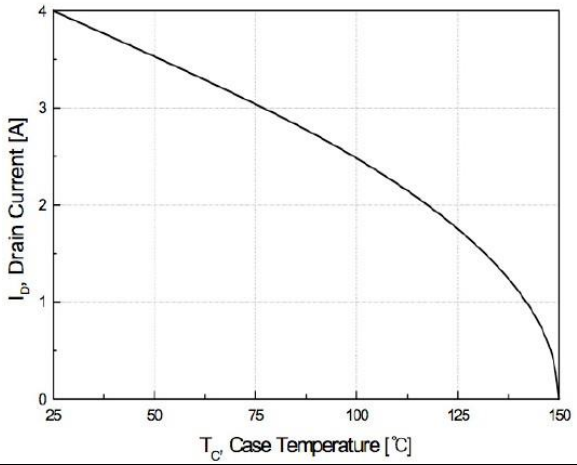


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

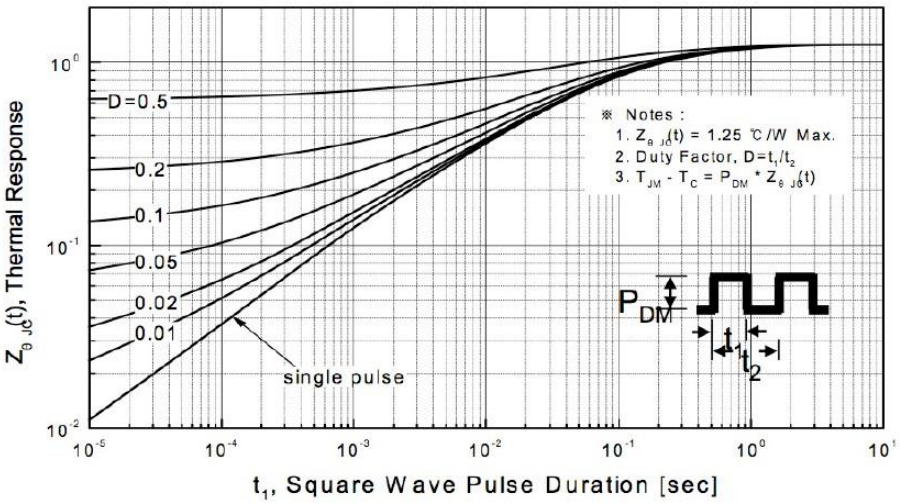


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

MS5N50

N-Channel Enhancement Mode Power MOSFET

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Bruckewell Technology Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Bruckewell”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Bruckewell makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Bruckewell disclaims

(i) Any and all liability arising out of the application or use of any product.

(ii) Any and all liability, including without limitation special, consequential or incidental damages.

(iii) Any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Bruckewell’s knowledge of typical requirements that are often placed on Bruckewell products in generic applications.

Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time.

Product specifications do not expand or otherwise modify Bruckewell’s terms and conditions of purchase, including but not limited to the warranty expressed therein.