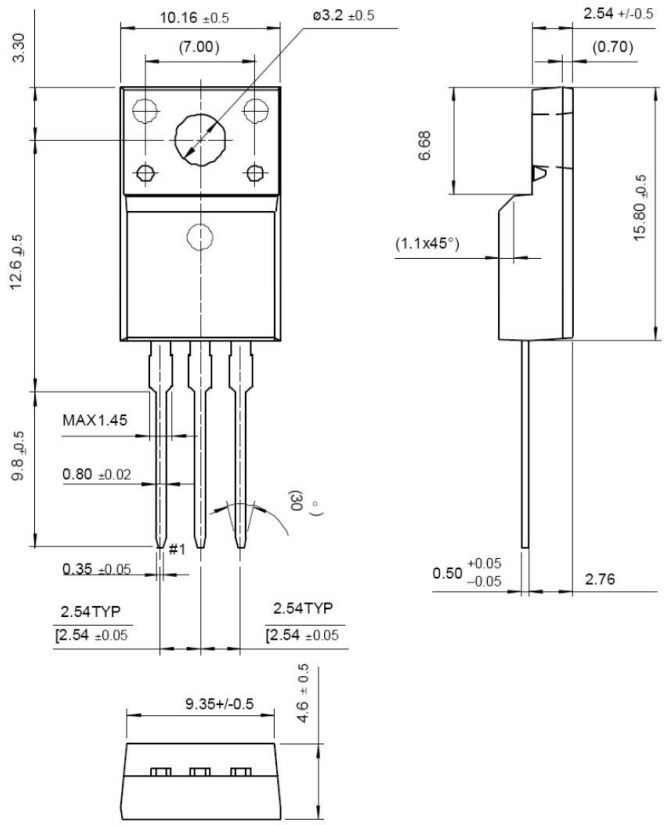
MS5N60

N-Channel Enhancement Mode Power MOSFET

Description

The MS5N60 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=650V typically @ Tj=150°C
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

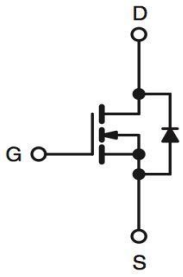
- Open Framed Power Supply
- Adapter
- STB

Packing & Order Information

50/Tube ; 1,000/Box

RoHS
COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to Source Voltage	600	V
V_{GS}	Gate to Source Voltage	±30	V
I_D	Continuous Drain Current (TC=25°C) Continuous Drain Current (TC=100°C)	4.5 2.6	A
I_{DM}	Drain Current Pulsed	18	A
E_{AS}	Single Pulsed Avalanche Energy	58.6	mJ
E_{AR}	Repetitive Avalanche Energy	10	mJ
I_{AR}	Avalanche Current	4.5	A
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 (Tc=25°C unless otherwise specified)			
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	33	W
	Derating Factor above 25 °C	0.26	W/°C
T_{STG}	Operating Junction Temperature	-55 to +150	°C
T_J	Storage Temperature	150	°C

Note:

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

2. I_{AS}=4A, V_{DD}=50V, L=8mH, V_G=10V, starting TJ=+25°C.

3. I_{SD}≤4A, dI/dt≤100A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal Characteristics					
Symbol	**Parameter**	**Value**			**Units**
		Min.	**Typ.**	**Max.**	
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	--	--	3.75	°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 = 250μA	600	--	--	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} = 600 V , V_{GS} = 0 V V_{DS} = 480 V , T_C= 125°C	--	--	1 10	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} = -10V , I_D = 2.25 A	--	2.0	2.5	Ω

Dynamic Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min**	**Typ.**	**Max.**	**Units**
Q_g	Total Gate Charge	V_{DS} = 300 V, V_{GS} = 10 V, I_D = 4.5 A	--	16	--	nC
Q_{gs}	Gate-Source Charge		--	3.3	--	nC
Q_{gd}	Gate-Drain Charge (Miller Charge)		--	6.2	--	nC

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Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 300 V, I_D = 4.5 A, V_{GS} = 10 V, R_G = 10 Ω	--	9.6	--	ns
t_r	Rise Time		--	12.2	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	22.3	--	ns
tf	Fall Time		--	14.8	--	ns
C_{ISS}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1MHz	--	700	--	pF
C_{OSS}	Output Capacitance		--	86	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	20	--	pF

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S		V_D=V_G=0, V_S = 1.3 V	--	--	1.5	A
I_{SM}			--	--	4.5	A
V_{SD}		I_S = 4.5 A , V_{GS} = 0 V	--	--	18	V
t_{rr}		V_{GS} = 0, IF = 4.5 A, dI/dt=100A/us	--	320	--	ns
Q_{rr}			--	2.8	--	uC

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

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■Characteristics Curve

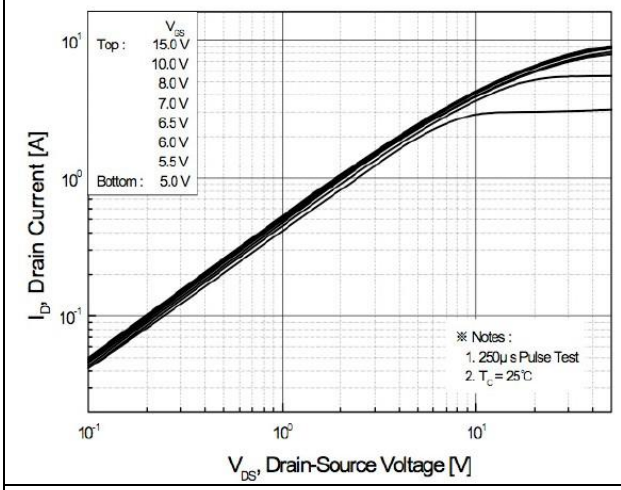

FIG.1-ON REGION CHARACTERISTICS

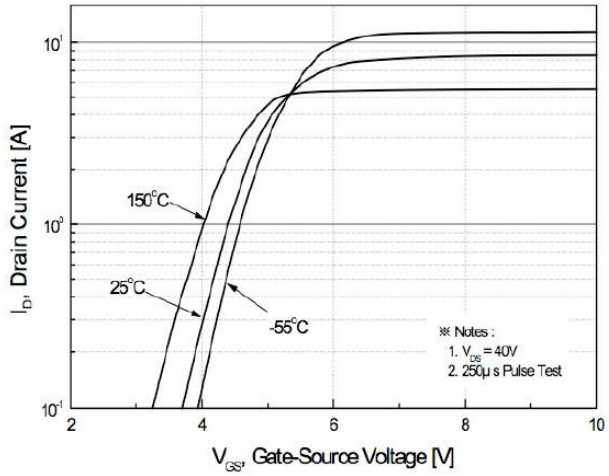

FIG.2-TRANSFER CHARACTERISTICS

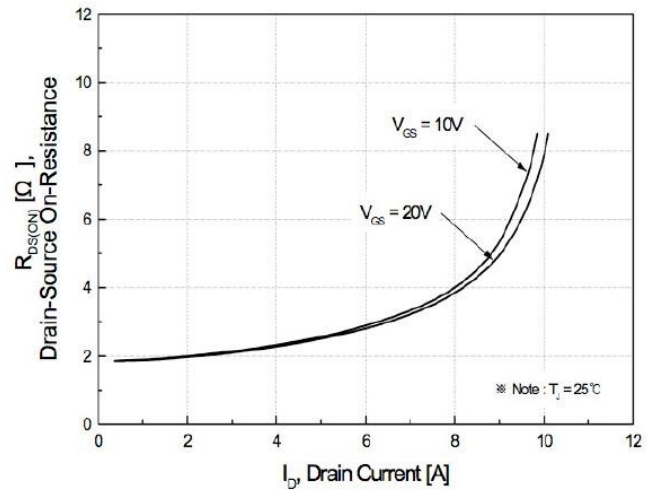

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

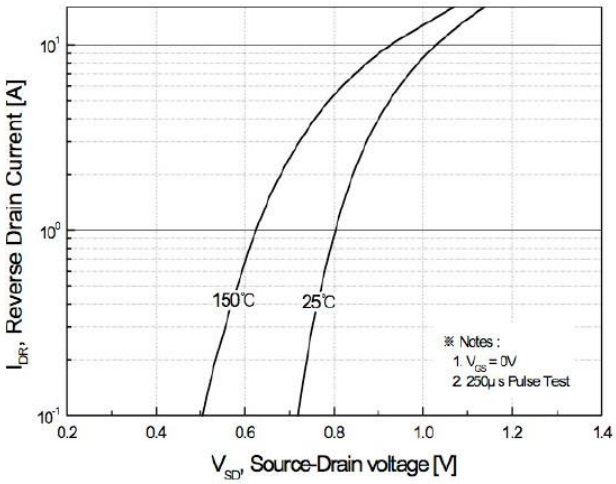

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

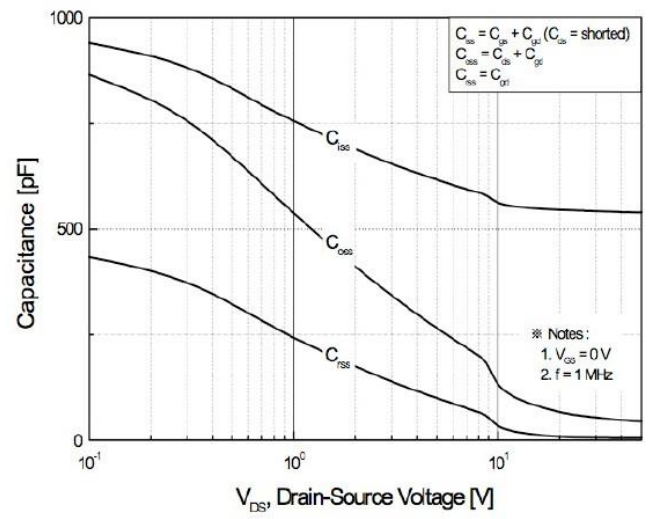

FIG.5-CAPACITANCE CHARACTERISTICS

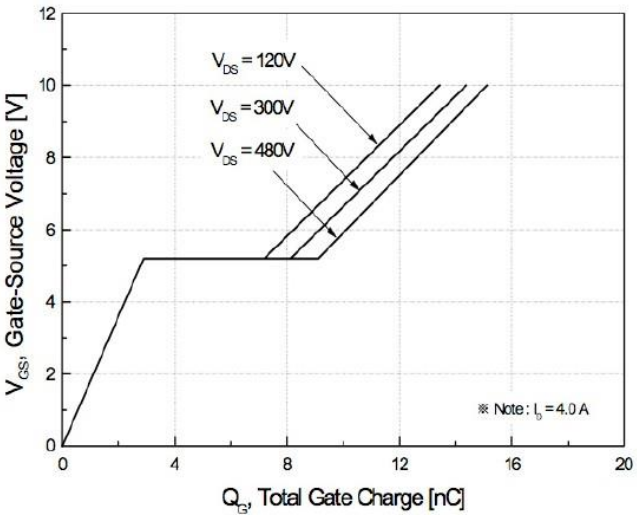

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

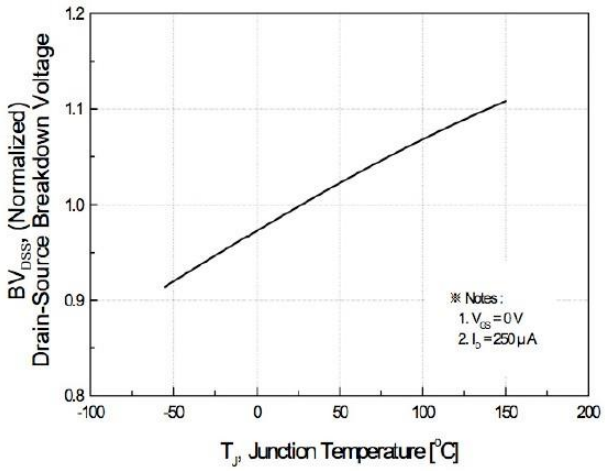

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

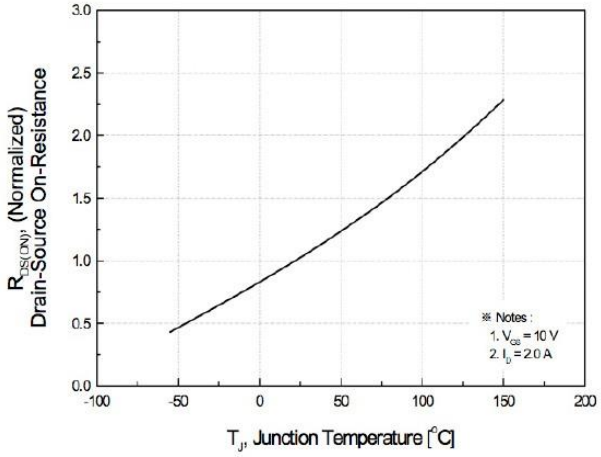

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

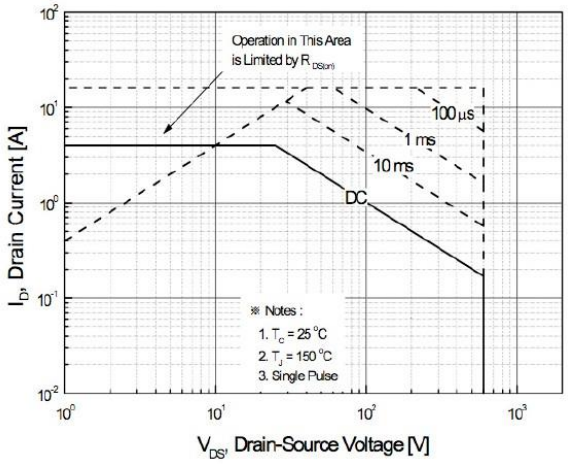

FIG.9-MAXIMUM SAFE OPERATING AREA

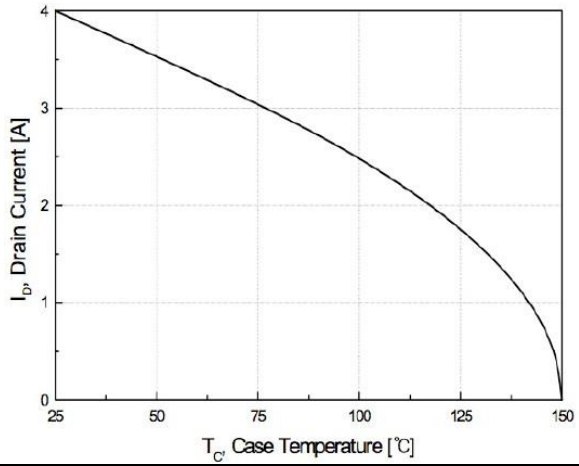

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

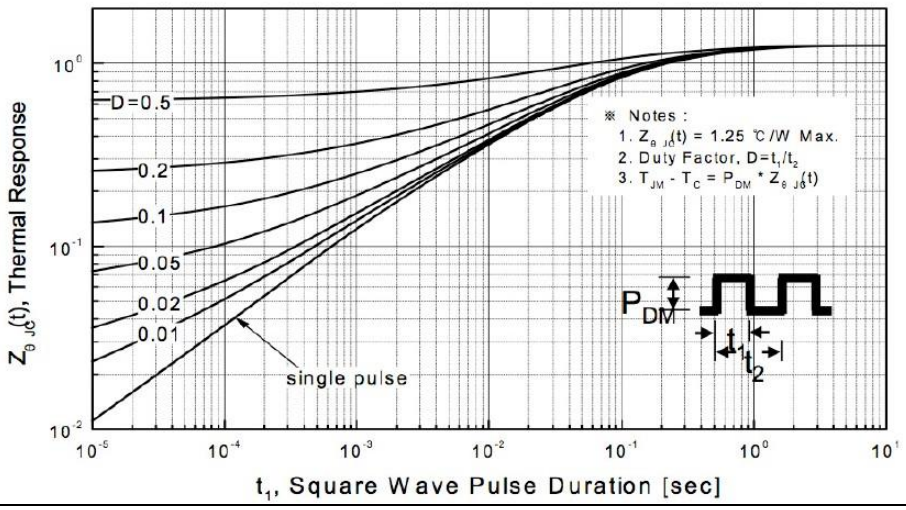

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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