

MS12N60

N-Channel Enhancement Mode Power MOSFET

Description

The MS12N60 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=6600V typically @ $T_j=150^{\circ}\text{C}$
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

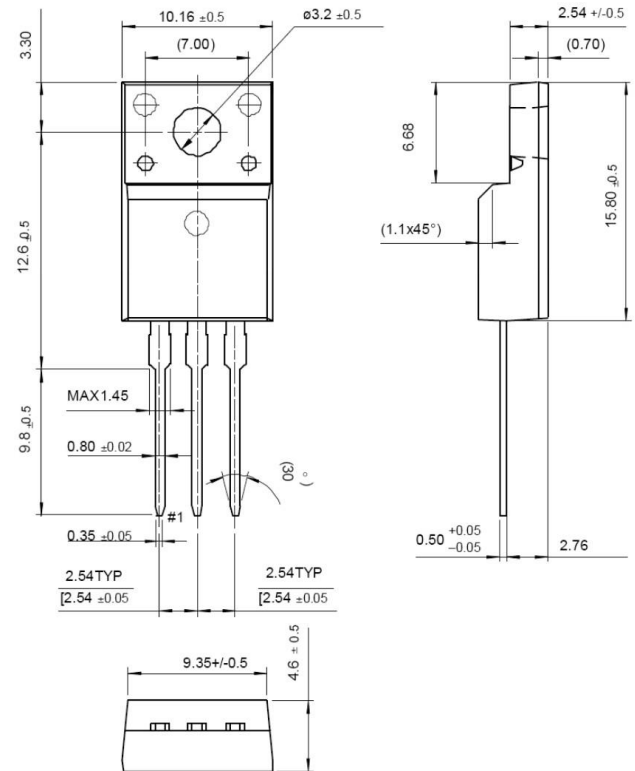
- Ballast
- Inverter

Packing & Order Information

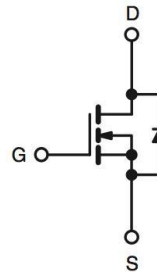
50/Tube ; 1,000/Box x



RoHS
COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current -Continuous ($TC=25^{\circ}\text{C}$)	12	A
	Drain Current -Continuous ($TC=100^{\circ}\text{C}$)	7.2	A
I_{DM}	Pulsed Drain Current	48	A
E_{AS}	Single Pulsed Avalanche Energy	870	mJ
E_{AR}	Repetitive Avalanche Energy	22.5	mJ
I_{AR}	Avalanche Current	12.0	A
dV/dt	Peak Diode Recovery dV/dt	3.5	V/ns

- 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)	225	W
	Derating Factor above 25 °C	1.78	W
T_L	Maximum Temperature for Soldering @ Lead at 0.125 in(0.318mm) from case for 10 seconds	300	°C
T_{STG}	Operating Junction Temperature	-55 to +150	°C
T_J	Storage Temperature	150	°C

NOTE:

1. $T_J=+25^{\circ}\text{C}$ to $+150^{\circ}\text{C}$.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. $I_{SD}=12\text{A}$, $dI/dt<100\text{A}/\mu\text{s}$, $V_{DD}<BVDSS$, $T_J=+150^{\circ}\text{C}$.
4. $I_{AS}=12\text{A}$, $V_{DD}=50\text{V}$, $L=11\text{mH}$, $R_G=25\Omega$, starting $T_J=+25^{\circ}\text{C}$.

Thermal Characteristics					
Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	--	--	0.56	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	--	--	62.5	

Static Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 250\mu\text{A}$	600	660	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature coefficient	$I_D = 250\mu\text{A}$, Referenced to 25°C		0.5		V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0	--	4.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$ $V_{DS} = 400\text{ V}$, $T_C = 125^{\circ}\text{C}$	--	--	1 25	μA
I_{GSS}	Gate-Source Leakage, Forward	$V_{GS} = \pm 30\text{ V}$	--	--	± 100	nA
$*R_{DS(ON)}$	Static Drain-Source On-state Resis-tance	$V_{GS} = 10\text{ V}$, $I_D = 6.0\text{ A}$	--	0.53	0.65	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q_g	Total Gate Charge	$V_{DS} = 250\text{ V}$, $I_D = 12\text{ A}$, $V_{GS} = 10\text{ V}$	--	48	63	nC
Q_{gs}	Qgs Gate-Source Charge		--	8.5	--	
Q_{gd}	Qgd Gate-Drain Charge(Miller Charge)		--	21	--	

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Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{DS} = 325 \text{ V}$, $I_D = 12 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 25 \Omega$	--	30	70	ns
t_r	Rise Time		--	85	180	ns
$t_{d(off)}$	Turn-off Delay Time		--	140	280	ns
t_f	Fall Time		--	90	190	ns
C_{ISS}	Input Capacitance	$V_{DS} = 25 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1.0\text{MHz}$	--	1760	2290	pF
C_{OSS}	Coss Output Capacitance		--	182	235	pF
C_{RSS}	Crss Reverse Transfer Capacitance		--	21	28	pF

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S		$V_D = V_G = 0$, $V_S = 1.3 \text{ V}$	--	--	12	A
I_{SM}			--	--	48	
V_{SD}		$I_F = 12 \text{ A}$, $V_{GS} = 0$	--	--	1.5	V
t_{rr}		$I_F = 12 \text{ A}$, $V_{GS} = 0$, $dI_F/dt = 100\text{A}/\mu\text{s}$	--	460	--	ns
Q_{rr}			--	4.9	--	uC

*Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

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■Characteristics Curve

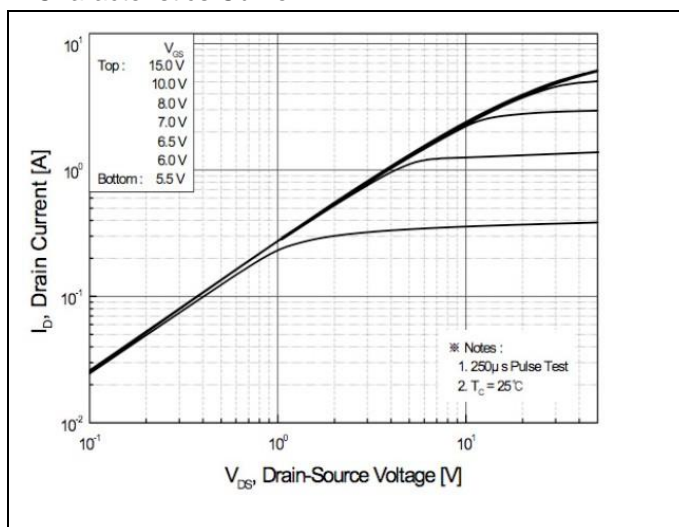


FIG.1-ON REGION CHARACTERISTICS

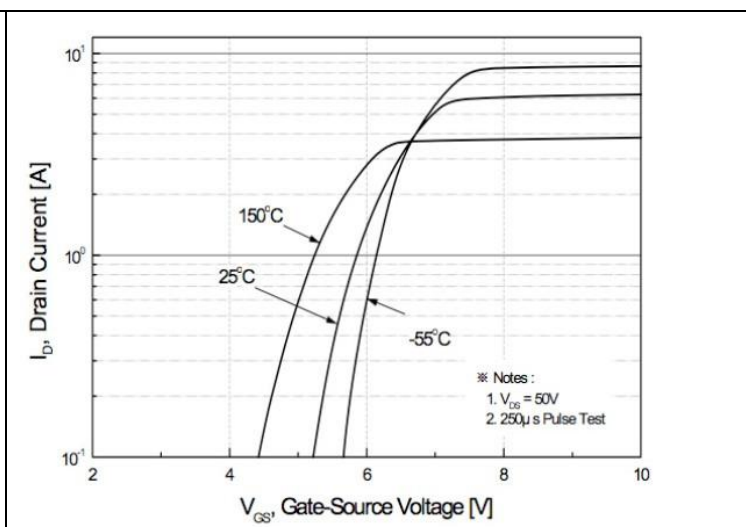


FIG.2-TRANSFER CHARACTERISTICS

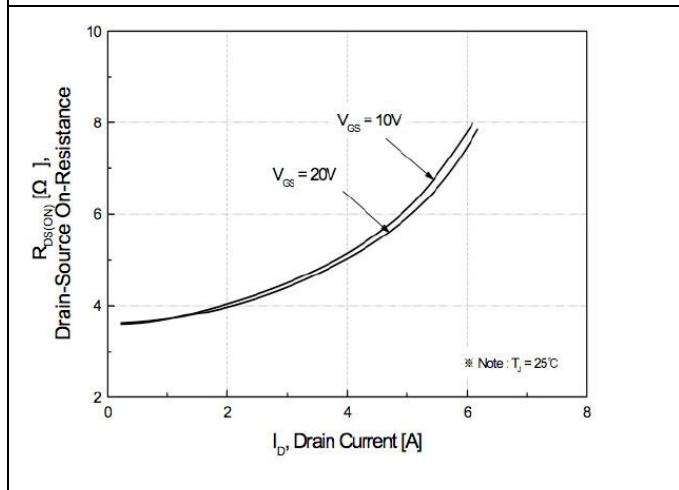


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

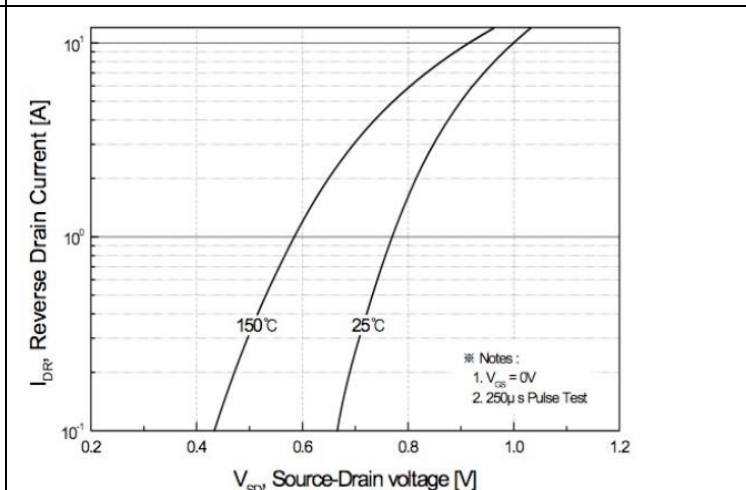


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

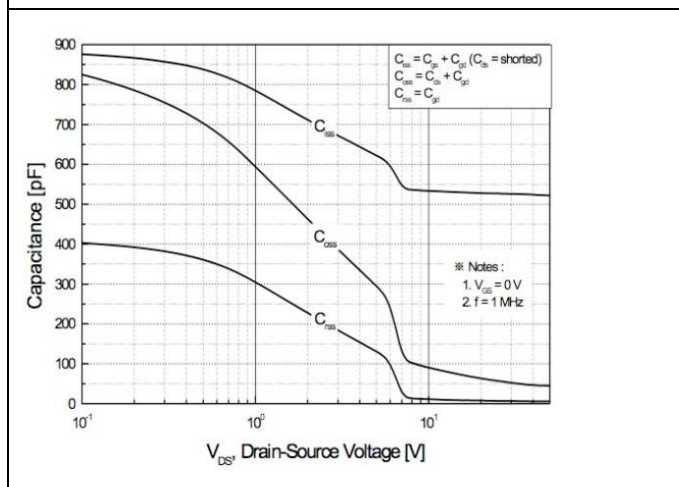


FIG.5-CAPACITANCE CHARACTERISTICS

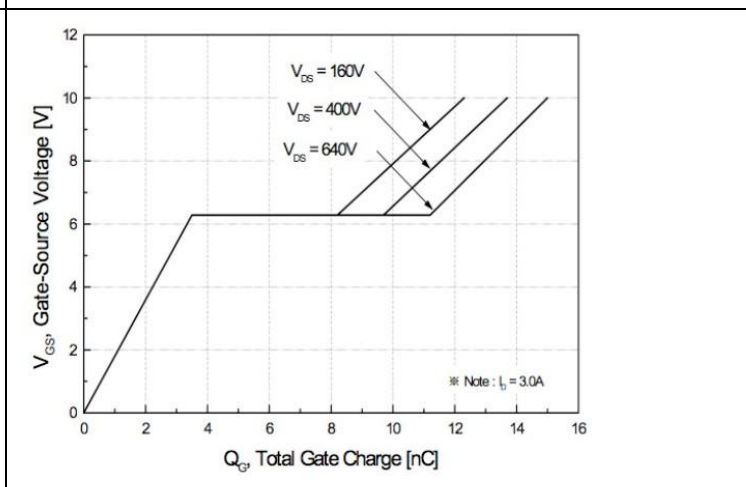
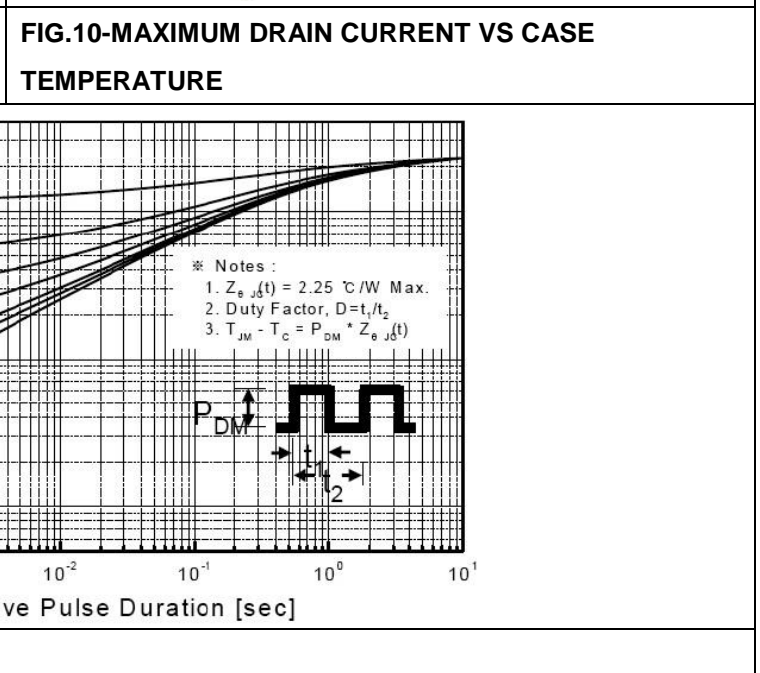
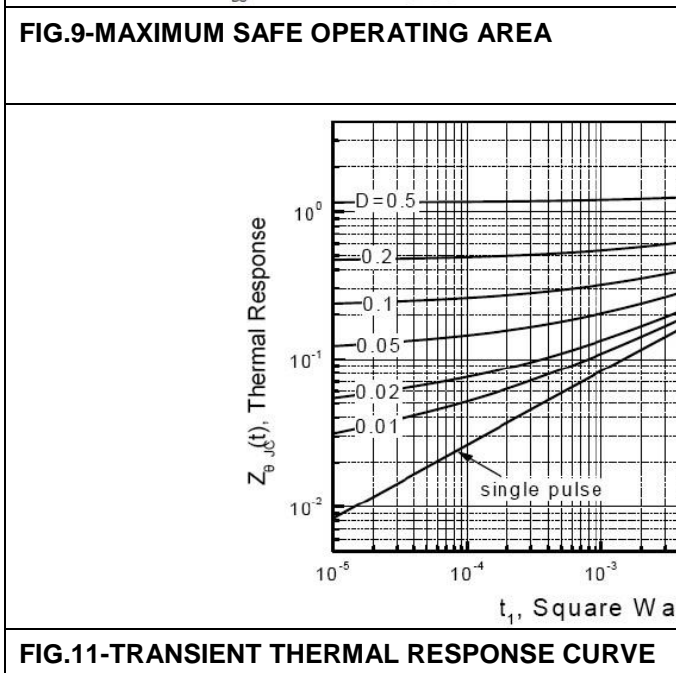
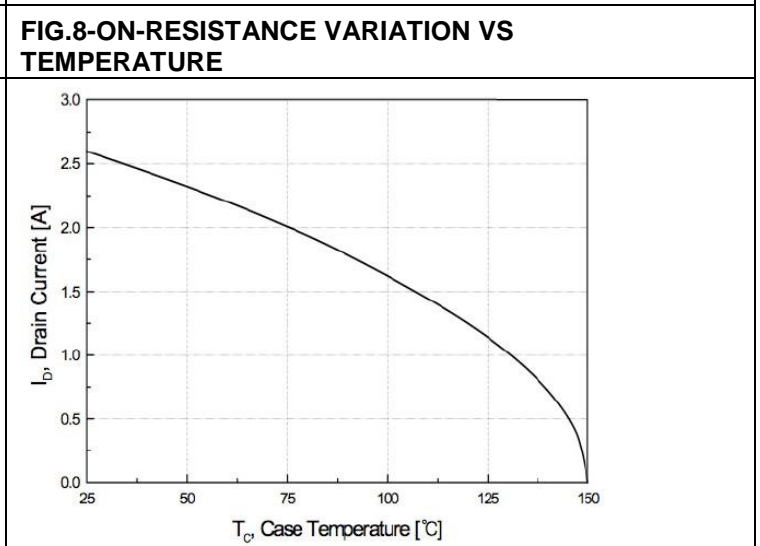
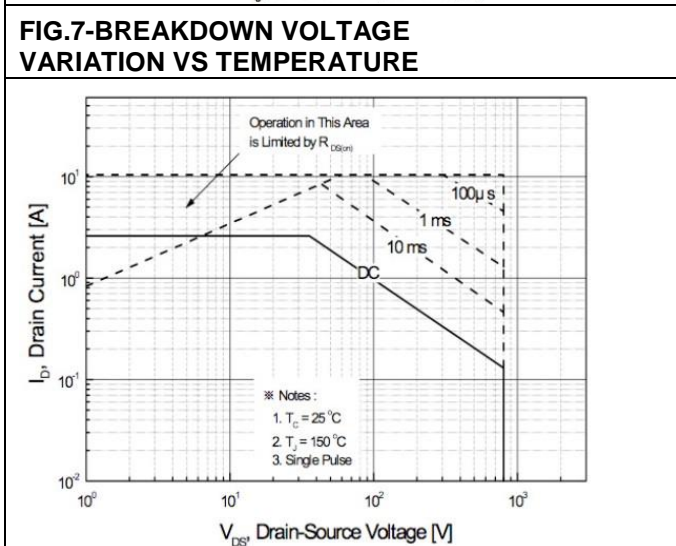
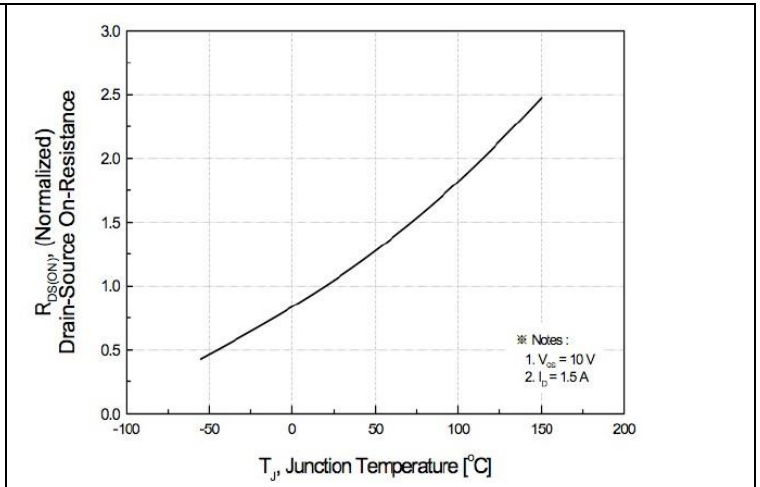
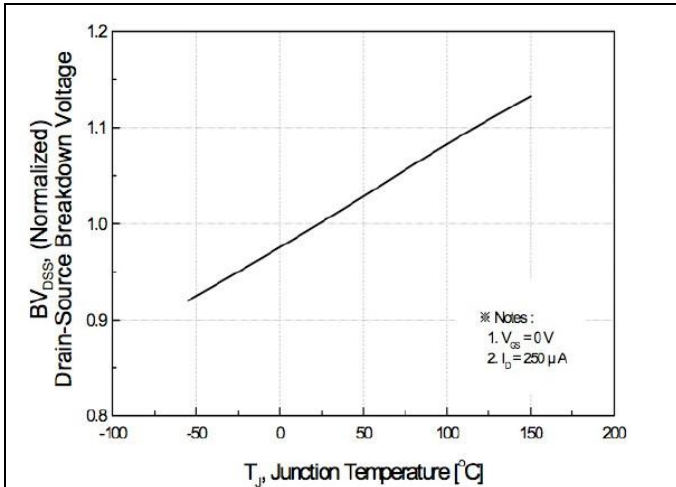


FIG.6-GATE CHARGE CHARACTERISTICS

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■ Characteristics Curve



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