

MS 12N60

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

Application

- Ballast
- Inverter

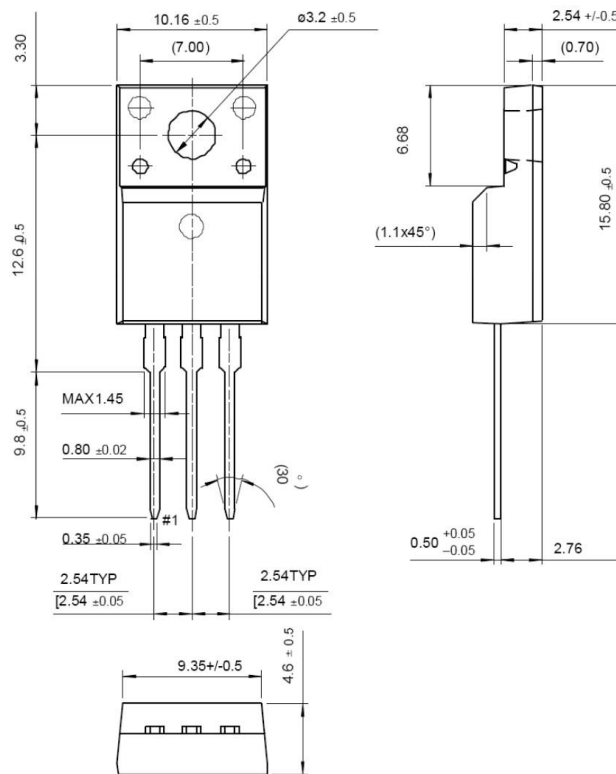
Package type : TO-220AB

Packing & Order Information

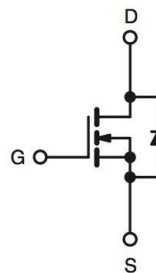
50/Tube ; 1,000/Box x



**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°C)	12	A
	Drain Current -Continuous (TC=100°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

MS 12N60

N-Channel Enhancement Mode Power MOSFET

Absolute Maximum Ratings			
Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC=25°C)	225	W
	Derating Factor above 25 °CD	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°C to +150°C.
2. Repetitive rating; pulse width limited by maximum junction temperature.
3. I_{SD}=12A, di/dt<100A/μs, V_{DD}<B_VDSS, T_J=+150°C.
4. I_{AS}=12A, V_{DD}=50V, L=11mH, R_G=25Ω, starting T_J=+25°C.

Thermal Characteristics					
Symbol	Parameter	Min.	Typ.	Max.	Units
R _θ C	Thermal Resistance, Junction-to-Case	--	--	0.56	°C/W
R _θ A	Thermal Resistance, Junction-to-Ambient	--	--	62.5	

Static Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} = 0 V , I _D = 250μA	600	660	--	V
ΔB _V DSS / ΔT _J	Breakdown Voltage Temperature coefficient	I _D = 250μA, Referenced to 25°C		0.5		V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	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	--	--	1 25	uA
I _{GSS}	Gate-Source Leakage, Forward	V _{GS} = ±30 V	--	--	±100	nA
*R _{DS(ON)}	Static Drain-Source On-state Resistance	V _{GS} = 10 V , I _D = 6.0 A	--	0.53	0.65	Ω

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
Q _g	Total Gate Charge	V _{DS} = 250 V, I _D = 12 A, V _{GS} = 10 V	--	48	63	nC
Q _{gs}	Q _{gs} Gate-Source Charge		--	8.5	--	
Q _{gd}	Q _{gd} Gate-Drain Charge(Miller Charge)		--	21	--	

MS 12N60

N-Channel Enhancement Mode Power MOSFET

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 $\leq 2\%$

MS 12N60

N-Channel Enhancement Mode Power MOSFET

Characteristics Curve

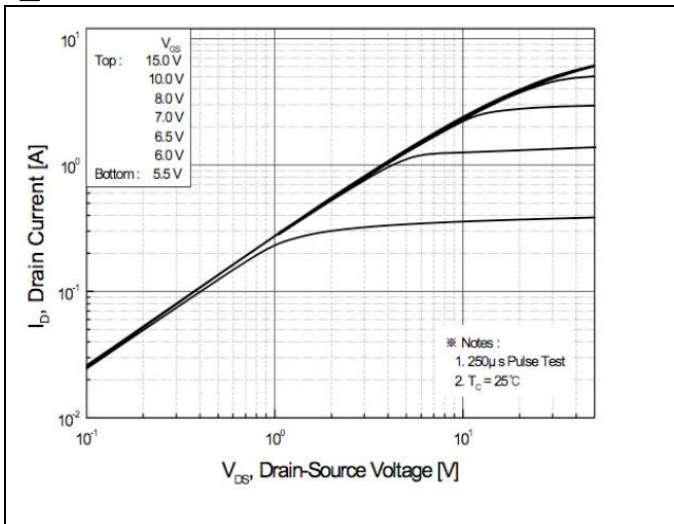


FIG.1-ON REGION CHARACTERISTICS

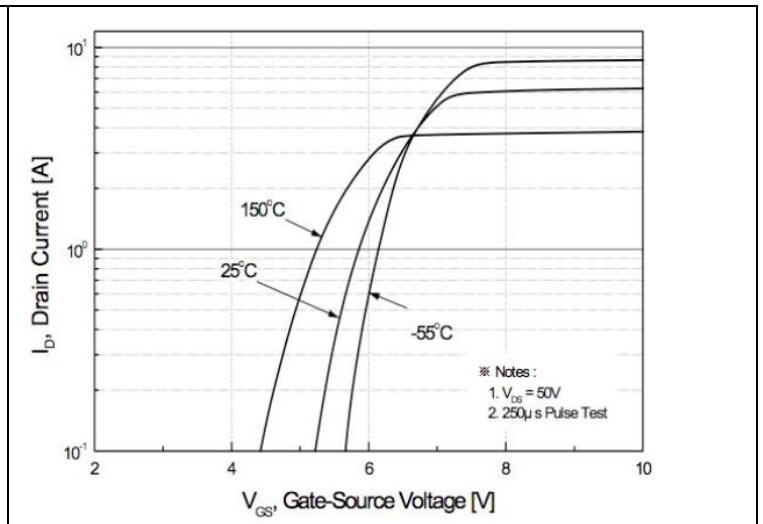


FIG.2-TRANSFER CHARACTERISTICS

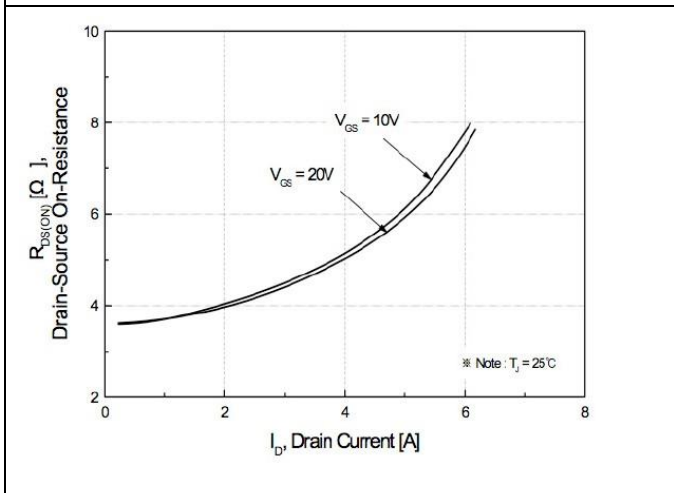


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

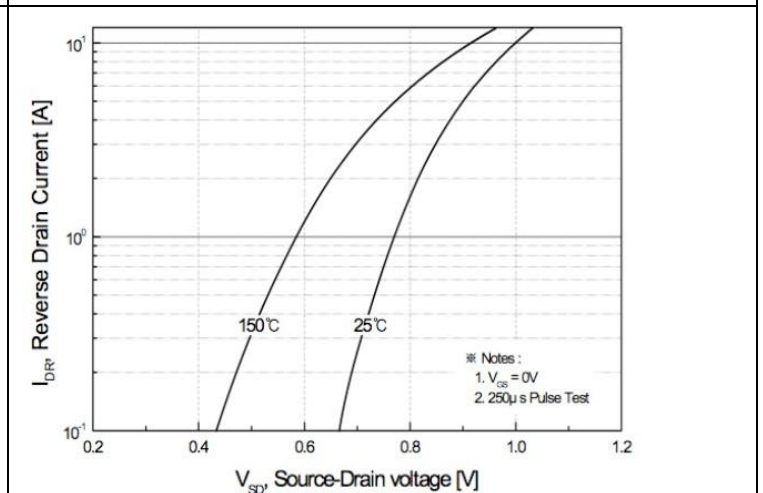


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

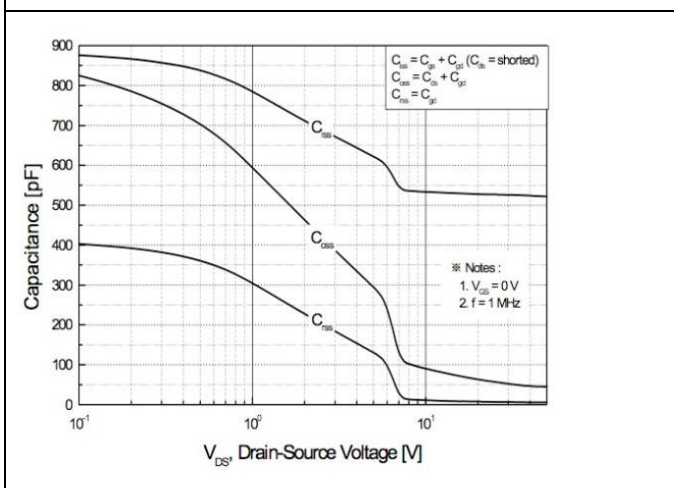


FIG.5-CAPACITANCE CHARACTERISTICS

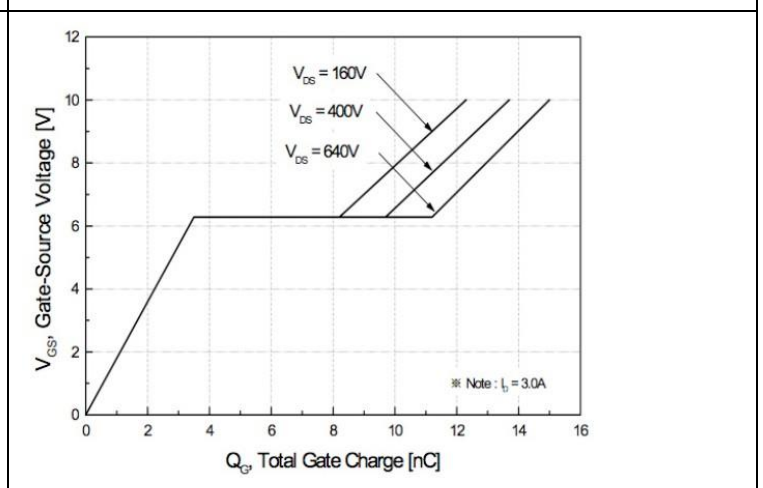


FIG.6-GATE CHARGE CHARACTERISTICS

MS 12N60

N-Channel Enhancement Mode Power MOSFET

Characteristics Curve

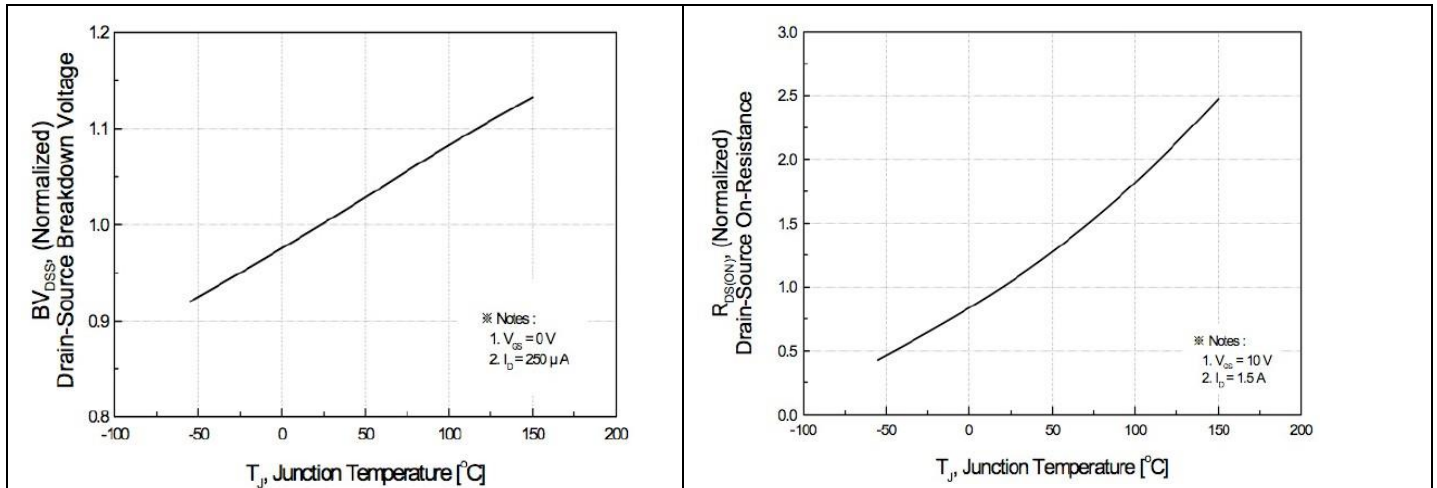


FIG. 7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

FIG. 8-ON-RESISTANCE VARIATION VS TEMPERATURE

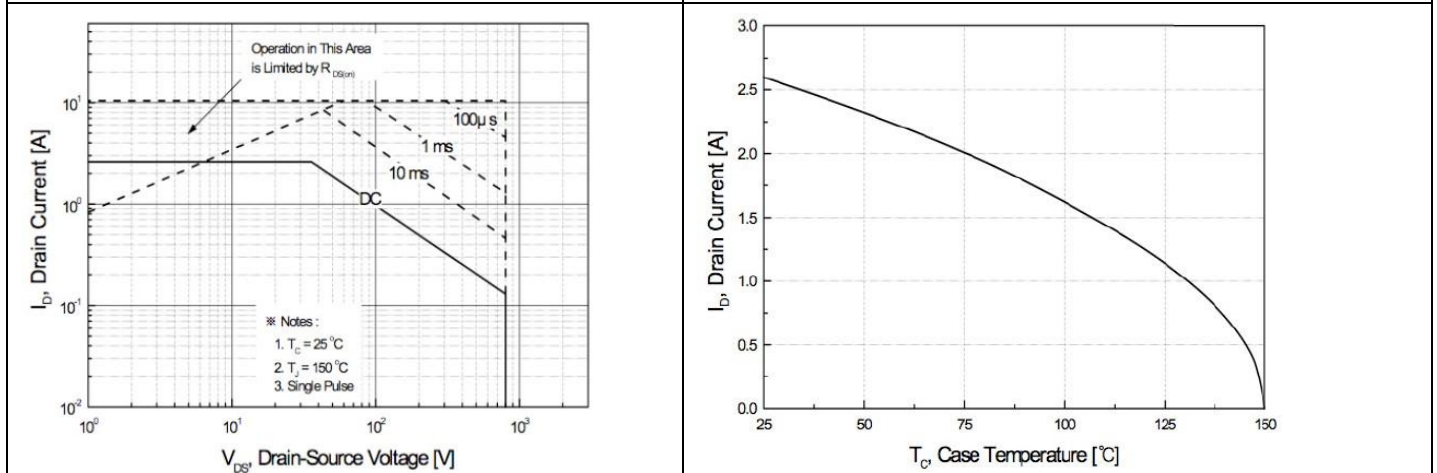


FIG. 9-MAXIMUM SAFE OPERATING AREA

FIG. 10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

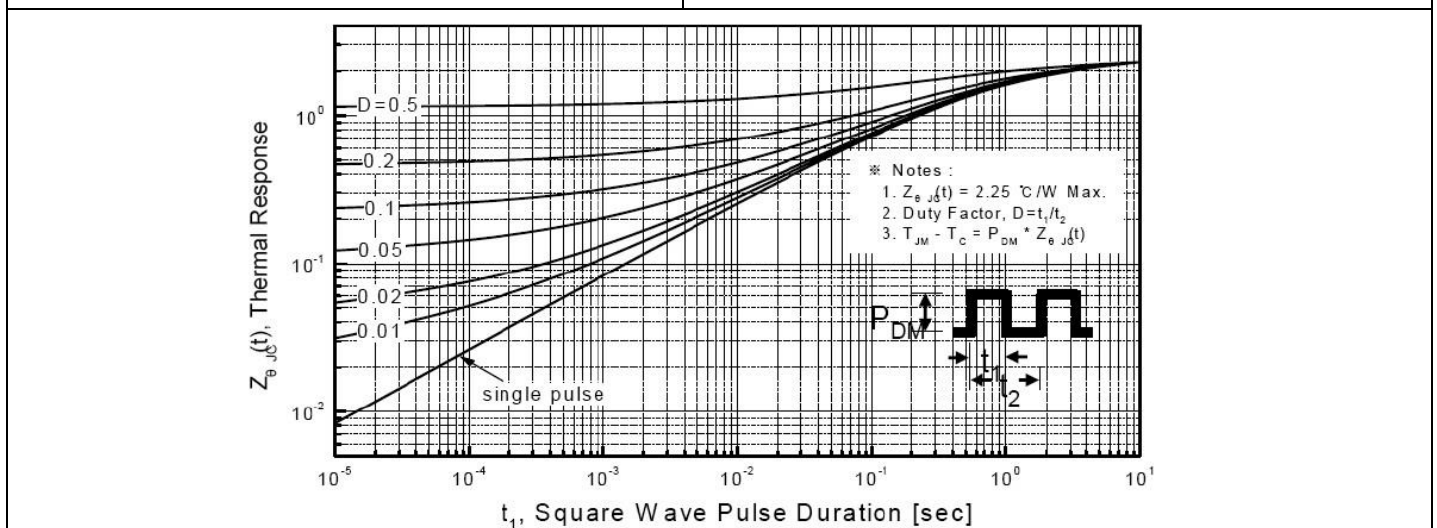


FIG. 11-TRANSIENT THERMAL RESPONSE CURVE

MS 12N60

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.