

MSF15N60

N-Channel Enhancement Mode Power MOSFET

Description

The MSF15N60 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-220F package is universally preferred for all commercial-industrial applications

Features

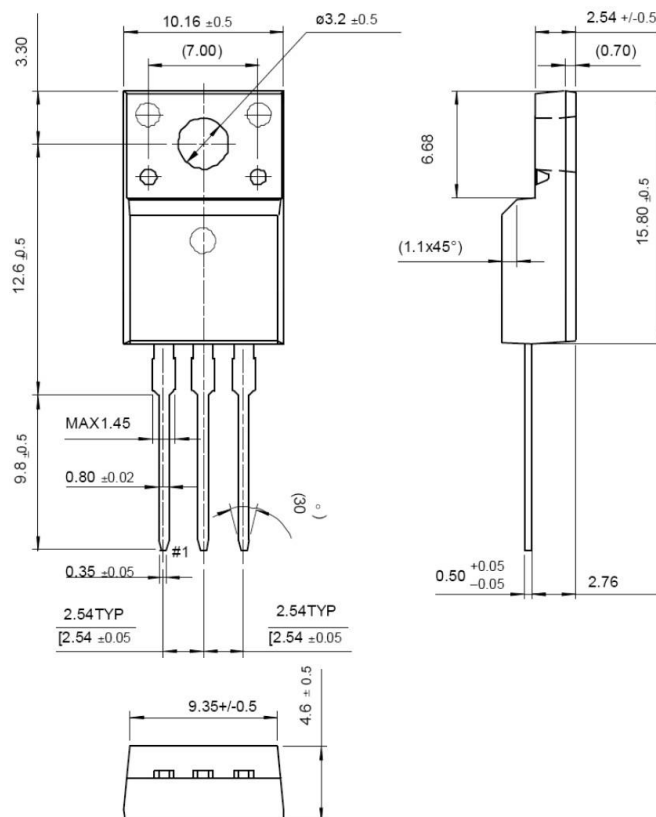
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

- Adapter
- Switching Mode Power Supply

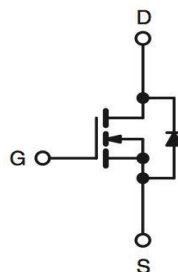
Packing & Order Information

50/Tube ; 1,000/Box



RoHS
COMPLIANT

Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current -Continuous (TC=25°C)	15	A
	Drain Current -Continuous (TC=100°C)	9.5	A
I_{DM}	Drain Current Pulsed	60	A
E_{AS}	Single Pulsed Avalanche Energy	245	mJ
I_{AR}	Avalanche Current	15	A
E_{AR}	Repetitive Avalanche Energy	24	mJ
dV/dt	Peak Diode Recovery dV/dt	9.8	V/ns

MSF15N60

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Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
P_D	Total Power Dissipation(@TC = 25 °C) 60 W	53	W
	Derating Factor above 25 °C	0.42	W/°C

- Drain current limited by maximum junction temperature

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

Symbol	Parameter	Value	Unit
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 ~ 150	W
T_J	Storage Temperature	150	°C

Note:

- 1.Repetitive rating; pulse width limited by maximum junction temperature.
2. IAS=15A, VDD=50V, L=0.5mH, RG=25Ω, starting TJ=+25°C.
3. ISD≤7.5A, dI/dt≤100A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal characteristics

Symbol	Parameter	Max.	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.58	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	

Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	--	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=7.5A$	--	0.42	0.52	Ω
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$ $T_J=150^\circ C$	600	--	--	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D=250\mu A$, Referenced to 25°C	--	0.7	--	V/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=600V, V_{GS}=0V$ $V_{DS}=480V, T_C=125^\circ C$	--	--	1 10	μA
I_{GSS}	Gate-Body Leakage , Forward	$V_{GS}=\pm 30$	--	--	±100	nA

MSF15N60

N-Channel Enhancement Mode Power MOSFET

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DS}=250\text{ V}$, $I_D=15\text{ A}$, $V_{GS}=10\text{ V}$, $R_G=9.1\Omega$	--	50	101	ns
t_r	Turn-On Time		--	78	162	ns
$t_{d(off)}$	Turn-Off Delay Time		--	120	261	ns
t_f	Turn-Off Fall Time		--	66	128	ns
Q_g	Total Gate Charge	$V_{DS}=250\text{ V}$, $I_D=15\text{ A}$, $V_{GS}=10\text{ V}$	--	36	60	nC
Q_{gs}	Gate-Source Charge		--	9	--	nC
Q_{gd}	Gate-Drain Charge (Miller Charge)		--	16	--	nC

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	Input Capacitance	$V_{DS}=25\text{ V}$, $V_{GS}=0\text{ V}$, $f=1.0\text{ MHz}$	--	2270	3000	pF
C_{OSS}	Output Capacitance		--	300	405	pF
C_{RSS}	Reverse Transfer Capacitance		--	23	37	pF

Source-Drain Diode Maximum Ratings and Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S		$V_D=V_G=0$, $V_S=1.3\text{ V}$	--	--	14	A
I_{SM}			--	--	60	
V_{SD}		$I_S=12\text{ A}$, $V_{GS}=0\text{ V}$	--	--	1.4	V
t_{rr}		$I_S=12\text{ A}$, $V_{GS}=0\text{ V}$ $diF/dt=100\text{ A}/\mu\text{s}$	--	600	--	ns
Q_{rr}			--	7.2	--	μC

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■ Characteristics Curve

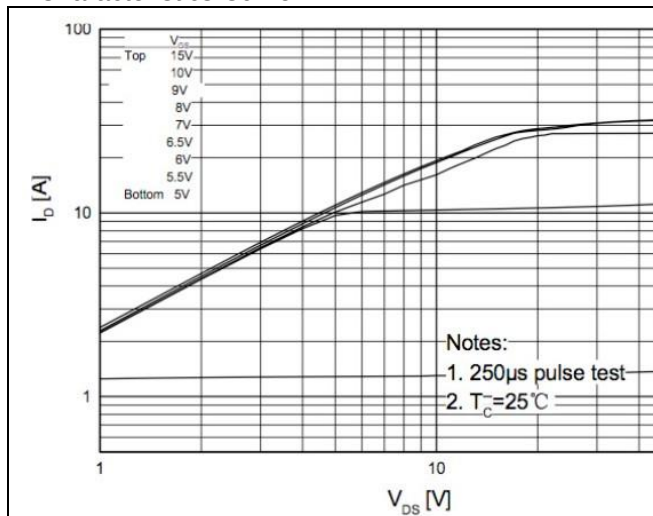


FIG.1-ON REGION CHARACTERISTICS

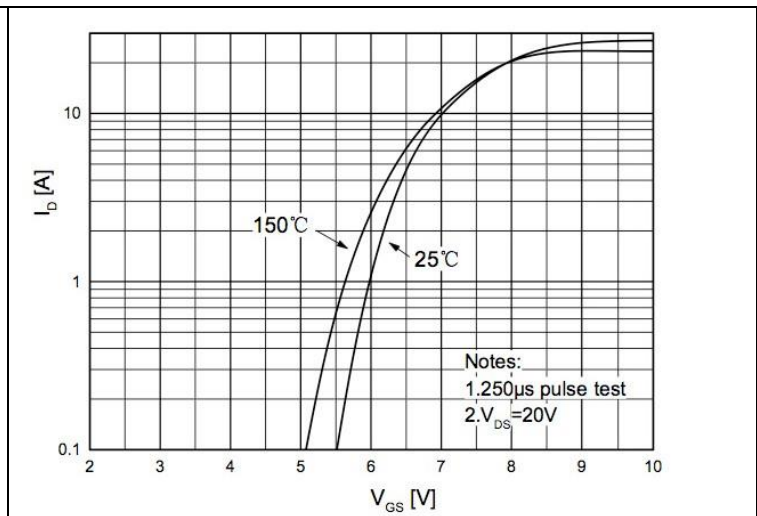


FIG.2-TRANSFER CHARACTERISTICS

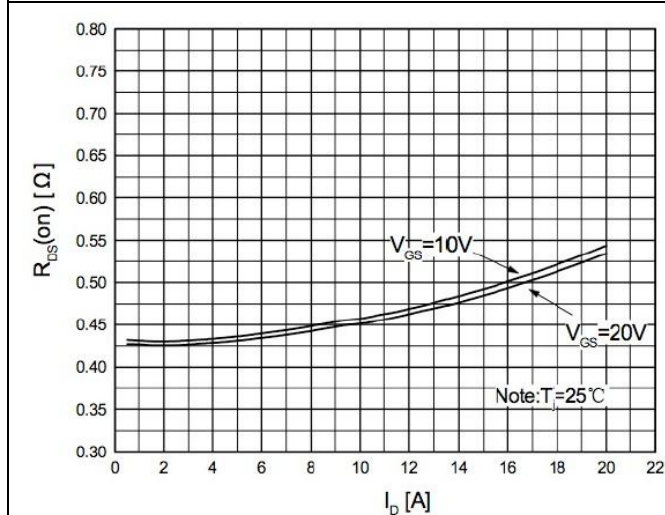


FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

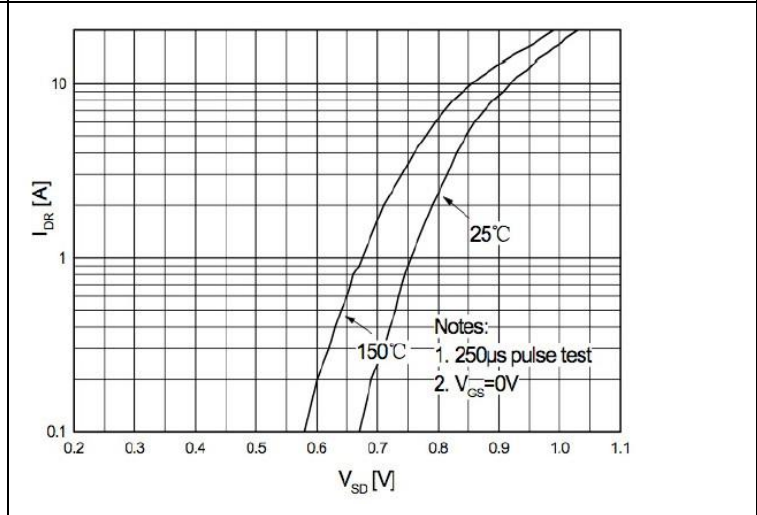


FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

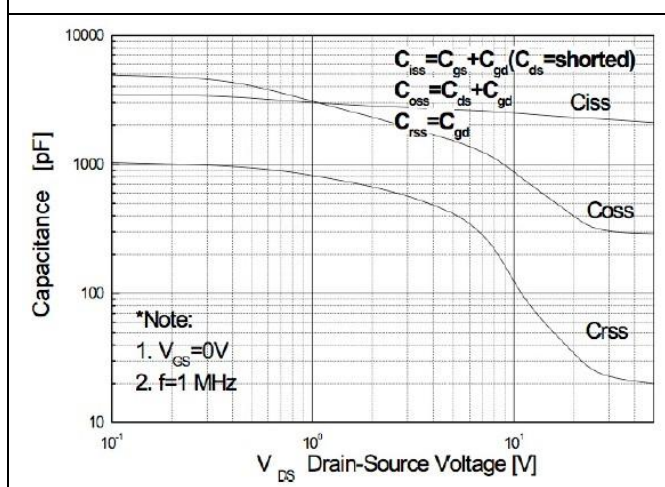


FIG.5-CAPACITANCE CHARACTERISTICS

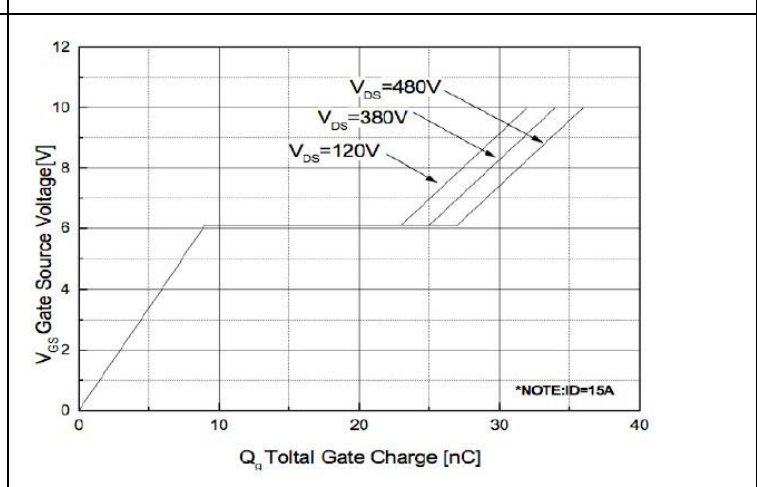


FIG.6-GATE CHARGE CHARACTERISTICS

MSF15N60

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■ Characteristics Curve

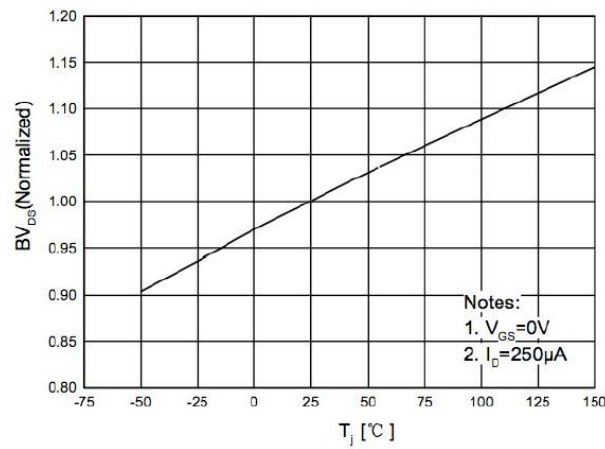


FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

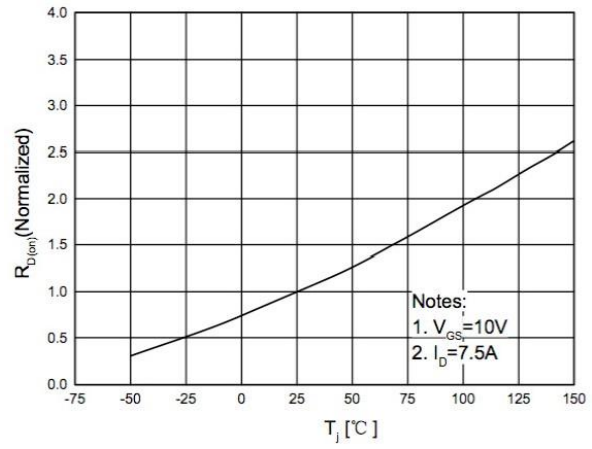


FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

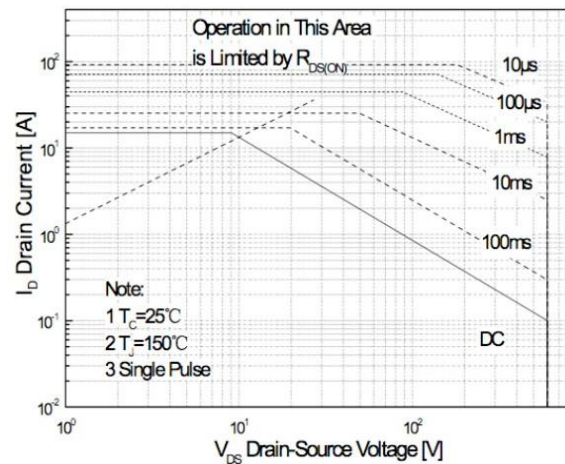


FIG.9-MAXIMUM SAFE OPERATING AREA

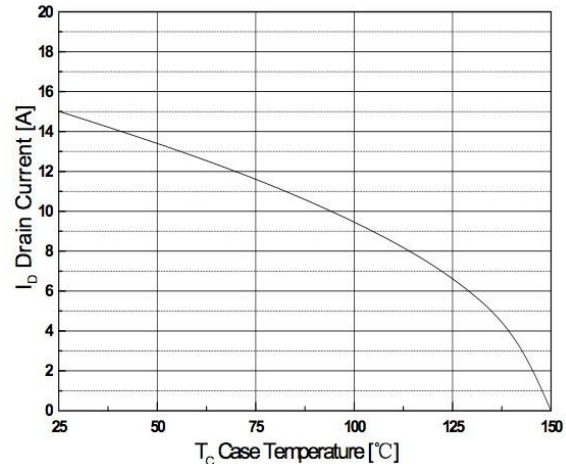


FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

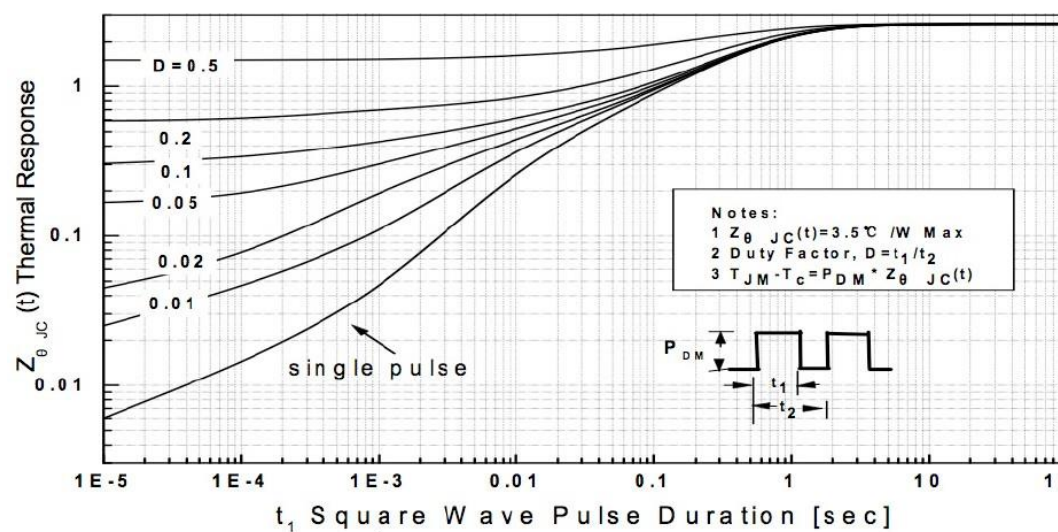


FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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