MS7N80

800V N-Channel MOSFET

Description

The MS7N80 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

- Originative New Design
- Very Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Unrivalled Gate Charge : 37nC (Typ.)
- Extended Safe Operating Area
- Lower $R_{DS(ON)}$: 1.70 Ω (Typ.) @V_{GS}=10V
- 100% Avalanche Tested
- RoHS compliant package

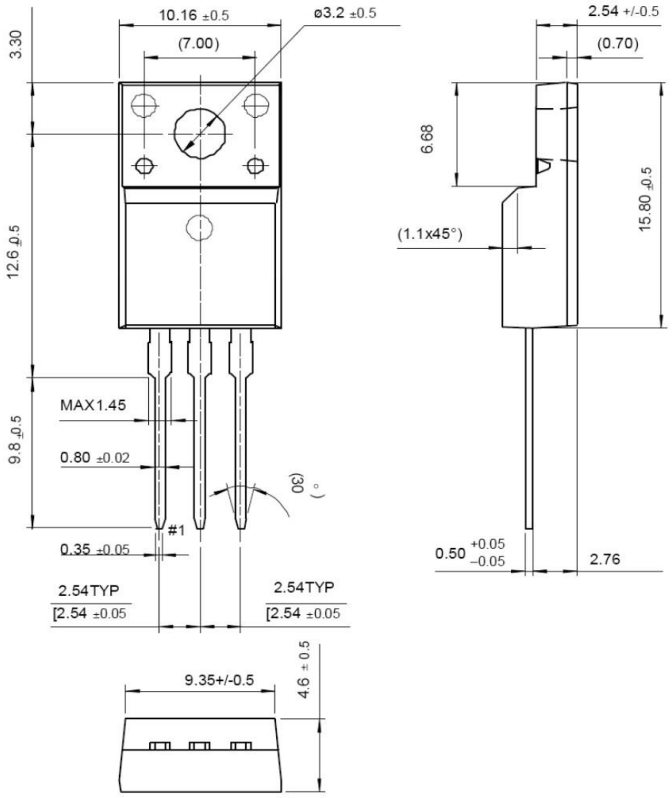
Application

- Adapter
- Switching Mode Power Supply

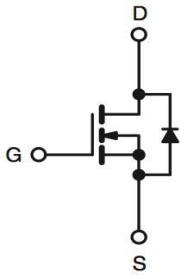
Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	800	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	7.0	A
	Drain Current -Continuous (TC=100°C)	4.2	A
I_{DM}	Drain Current Pulsed	26.5	A
E_{AS}	Single Pulsed Avalanche Energy	580	mJ
E_{AR}	Repetitive Avalanche Energy	16.8	mJ
dv/dt	Peak Diode Recovery dv/dt	4.5	V/ns

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

Symbol	Parameter	Value	Unit
P_D	Total Power Dissipation(@TC = 25 °C) 44 W	57	W
	Derating Factor above 25 °C	0.44	W/°C
T_{STG}	Operating and Storage Temperature	-55 to +150	°C
T_J	Storage Temperature	300	°C

• Drain current limited by maximum junction temperature

Thermal Resistance Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	--	--	0.75	°C/W
$R_{\theta JA}$	Junction-to-Ambient	--	--	62.5	

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	Gate Threshold Voltage	V_{DS} = V_{GS},I_D = 250μA	3.0	--	5.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V,I_D = 3.5 A	--	1.7	2.1	Ω

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D = 250μA	800	--	--	V
ΔBV_{DSS} /ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	--	0.92	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 800 V , V_{GS} = 0 V V_{DS} = 640 V , T_C = 125°C	--	--	10 100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V , V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V , V_{DS} = 0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f=1.0MHz	--	1700	--	pF
C_{OSS}	Output Capacitance		--	155	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	13	--	pF

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Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	V_{DS} = 400 V, I_D = 7 A, R_G = 25 Ω	--	55	--	ns
t_r	Turn-On Time		--	100	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	70	--	ns
tf	Turn-Off Fall Time		--	70	--	ns
Q_g	Total Gate Charge	V_{DS} = 640 V,I_D = 10 A, V_{GS} = 7 V	--	37	--	nC
Q_{gs}	Gate-Source Charge		--	11	--	nC
Q_{gd}	Gate-Drain Charge		--	15	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	7.0	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	26	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 7 A , V_{GS} = 0 V	--	--	1.4	V
t_{rr}	Reverse Recovery Time	I_S = 7 A , V_{GS} = 0 V diF/dt=100A/μs	--	650	--	ns
Q_{rr}	Reverse Recovery Charge		--	8	--	μC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=18mH, I_{AS}=7A, V_{DD}=5V, R_G=25Ω, Starting T_J=25℃
3. I_{SD}≦7A, di/dt≦200A/μs,V_{DD}≦BV_{DSS}, Starting T_J=25℃
4. Pulse Test: Pulse Width ≦ 300μs, Duty Cycle≦ 2%
5. Essentially Independent of Operating Temperature

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■Characteristics Curve

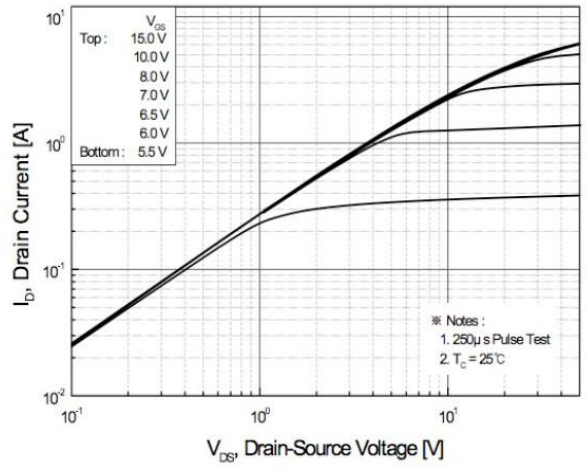

FIG.1-ON REGION CHARACTERISTICS

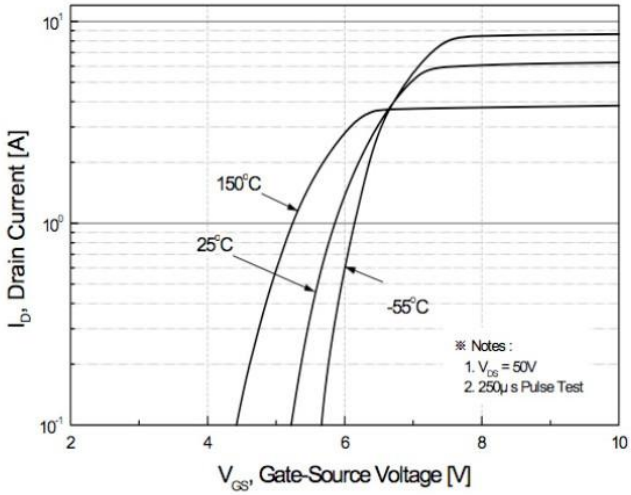

FIG.2-TRANSFER CHARACTERISTICS

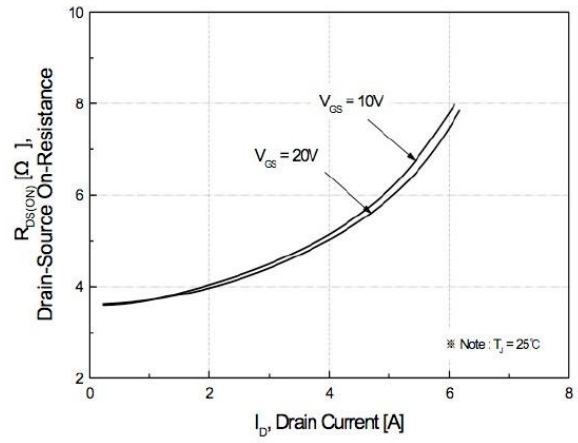

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

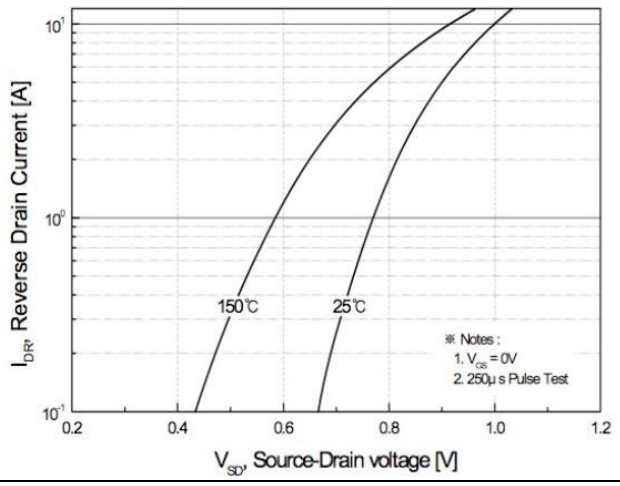

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

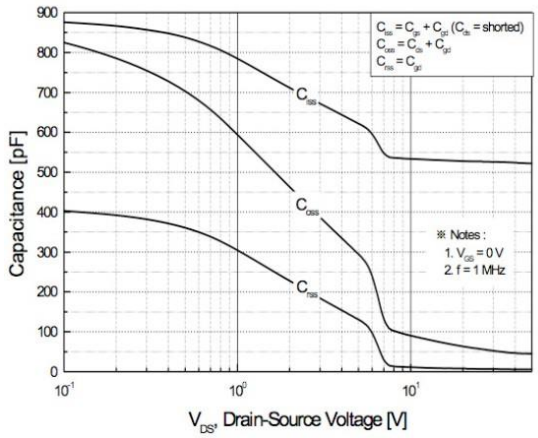

FIG.5-CAPACITANCE CHARACTERISTICS

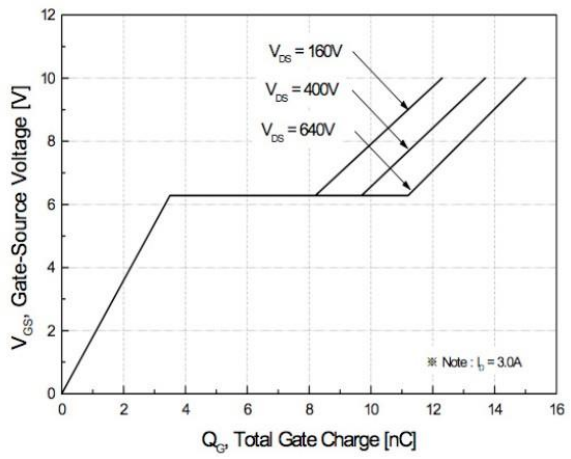

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

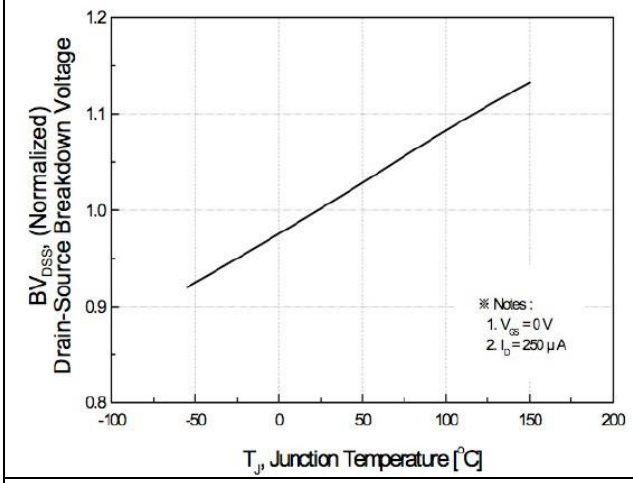

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

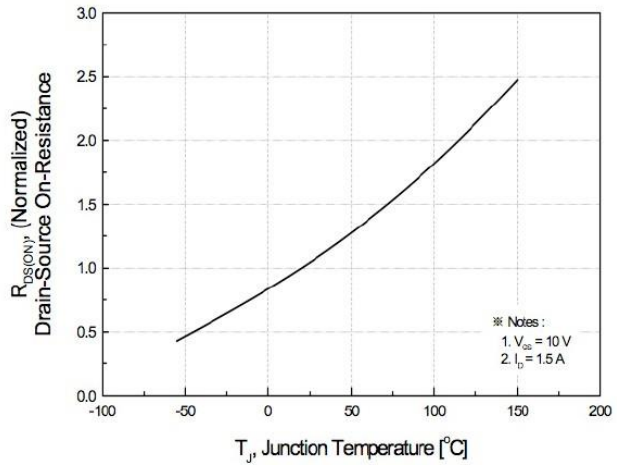

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

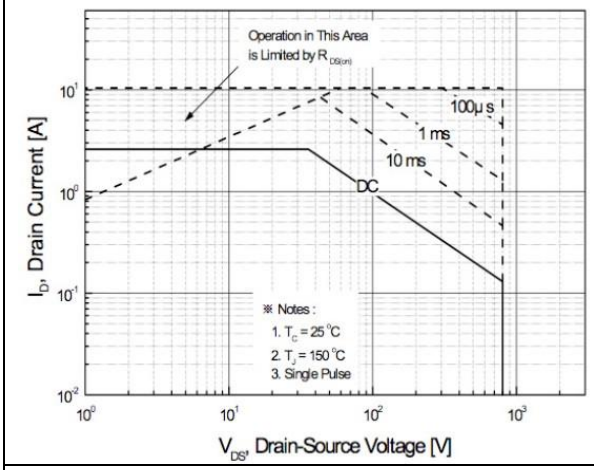

FIG.9-MAXIMUM SAFE OPERATING AREA

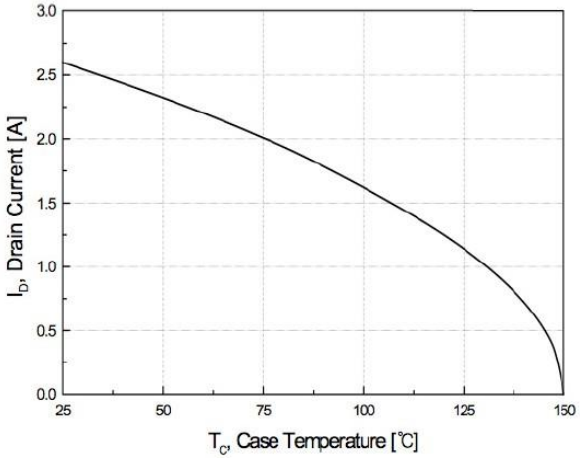

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

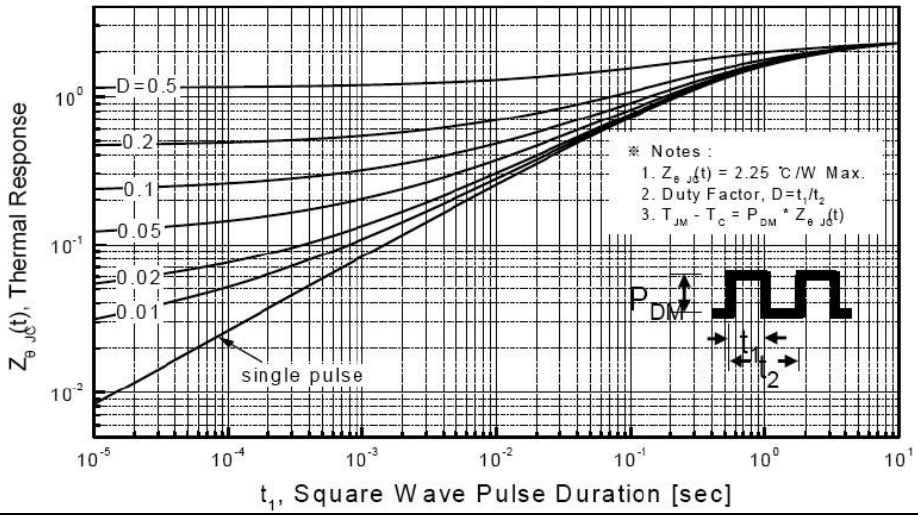

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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