MSF10N80

800V N-Channel MOSFET

Description

The MSF10N80 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

- 100% EAS Test
- Rugged Gate Oxide Technology
- Extremely Low Intrinsic Capacitances
- Remarkable Switching Characteristics
- Unequalled Gate Charge: 10.5 nC (Typ.)
- Extended Safe Operating Area

Lower RDS(ON) : 5.5 Ω (Typ.) @VGS=10V

- RoHS compliant package

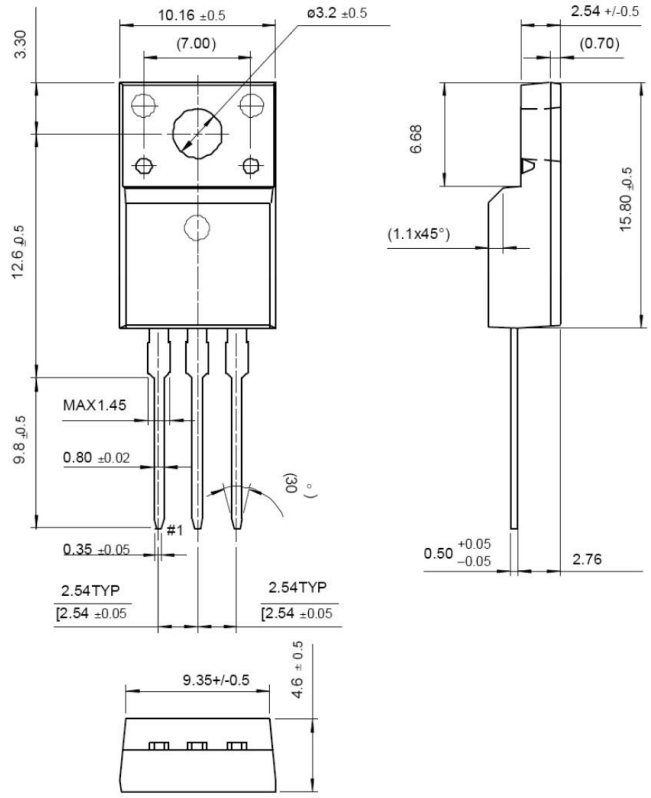
Application

- Power Factor Correction
- LCD TV Power
- Full and Half Bridge Power

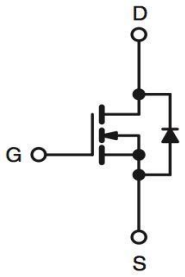
Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

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)	10	A
	Drain Current -Continuous (TC=100°C)	6.5	A
I_{DM}	Drain Current Pulsed	40	A
E_{AS}	Single Pulsed Avalanche Energy	960	mJ
E_{AR}	Repetitive Avalanche Energy	24	mJ

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Absolute Maximum Ratings (Tc=25°C unless otherwise noted)			
Symbol	**Parameter**	**Value**	**Unit**
dV/dt	Peak Diode Recovery dV/dt	4.0	V/ns
P_D	Power Dissipation (TC = 25 °C)	60	W
	- Derate above 25°C	0.48	W/°C
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

• Drain current limited by maximum junction temperature

Thermal Resistance Characteristics			
Symbol	**Parameter**	**Max.**	**Units**
$R_{\theta JC}$	Junction-to-Case	0.52	°C/W
$R_{\theta JA}$	Junction-to-Ambient	40	

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 = 5 A	--	0.9	1.1	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	--	1.0	--	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	--	2200	--	pF
C_{OSS}	Output Capacitance		--	190	--	pF
C_{RSS}	Reverse Transfer Capacitance		--	20	--	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 = 10 A, R_G = 25 Ω	--	60	--	ns
t_r	Turn-On Time		--	150	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	110	--	ns
tf	Turn-Off Fall Time		--	90	--	ns
Q_g	Total Gate Charge	V_{DS} = 640 V,I_D = 10 A, V_{GS} = 10 V	--	46	--	nC
Q_{gs}	Gate-Source Charge		--	15	--	nC
Q_{gd}	Gate-Drain Charge		--	20	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	10	A
I_{SM}	Pulsed Source-Drain Diode Forward Current		--	--	40	
V_{SD}	Source-Drain Diode Forward Voltage	I_S = 10 A , V_{GS} = 0 V	--	--	1.4	V
t_{rr}	Reverse Recovery Time	I_S = 10 A , V_{GS} = 0 V diF/dt = 100A/μs	--	730	--	ns
Q_{rr}	Reverse Recovery Charge		--	12	--	μC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=18mH, I_{AS}=10A, V_{DD}=5V, R_G=25Ω, Starting T_J=25℃
3. I_{SD}≦10A, 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

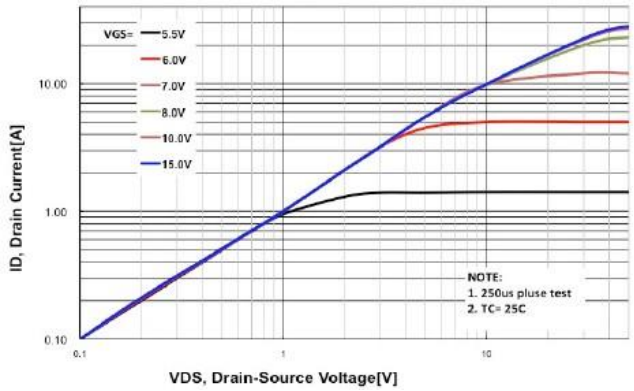

FIG.1-ON REGION CHARACTERISTICS

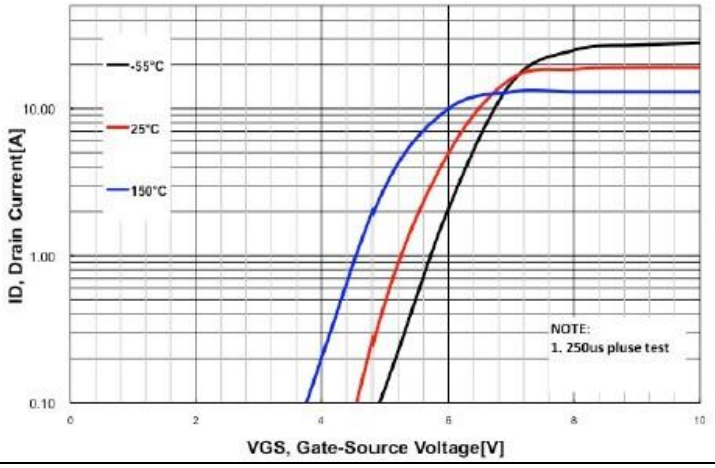

FIG.2-TRANSFER CHARACTERISTICS

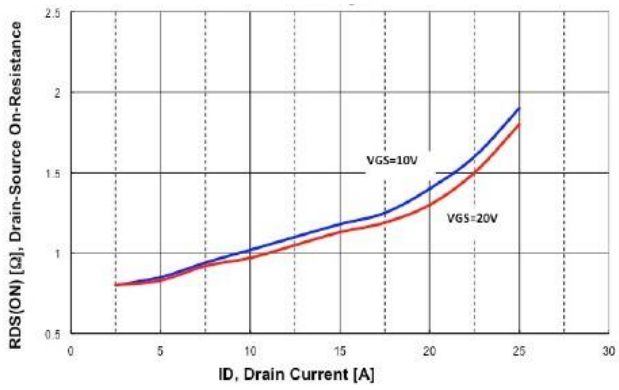

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

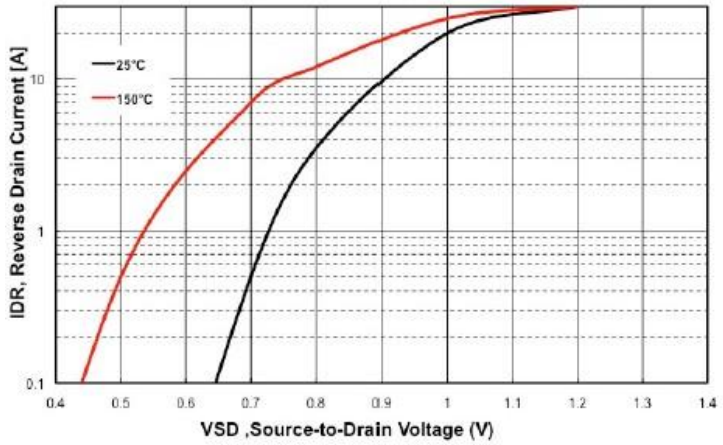

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

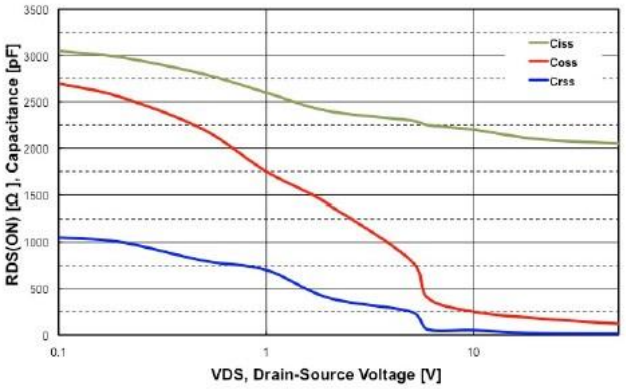

FIG.5-CAPACITANCE CHARACTERISTICS

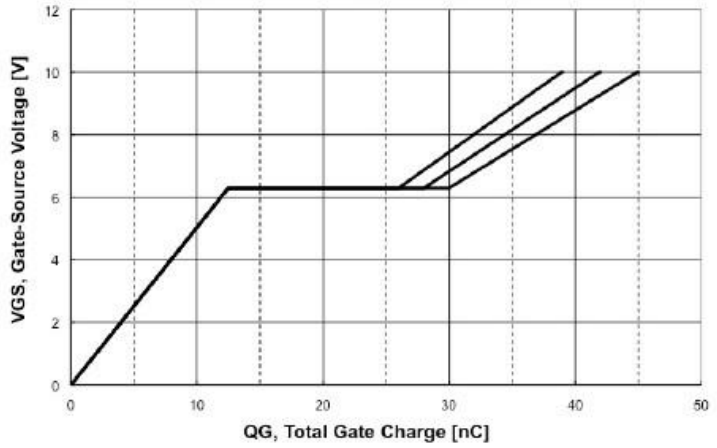

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

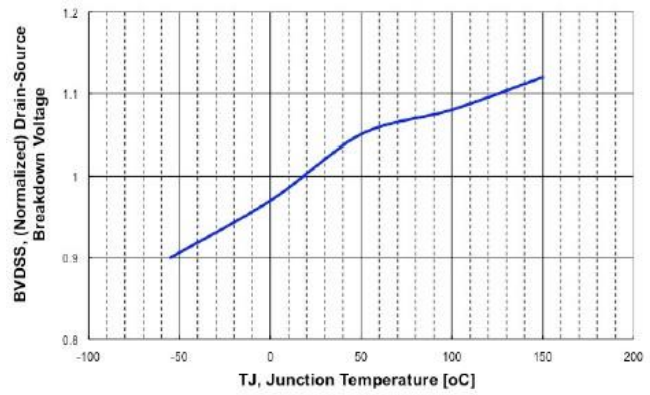

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

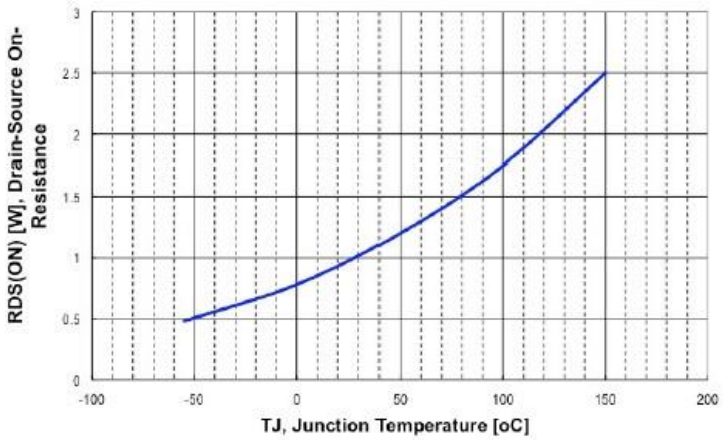

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

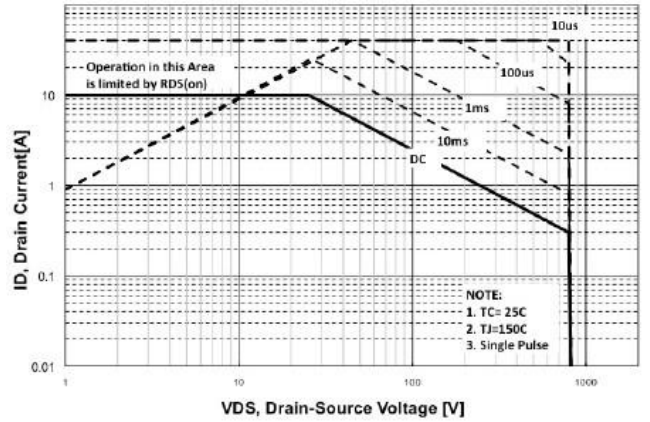

FIG.9-MAXIMUM SAFE OPERATING AREA

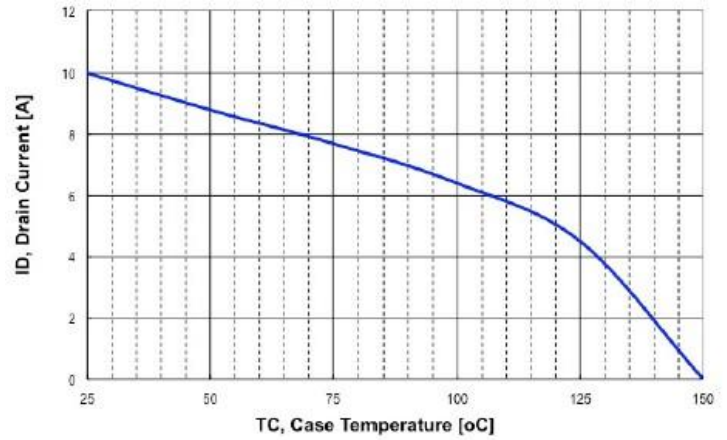

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

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■Characteristics Test Circuit & Waveform

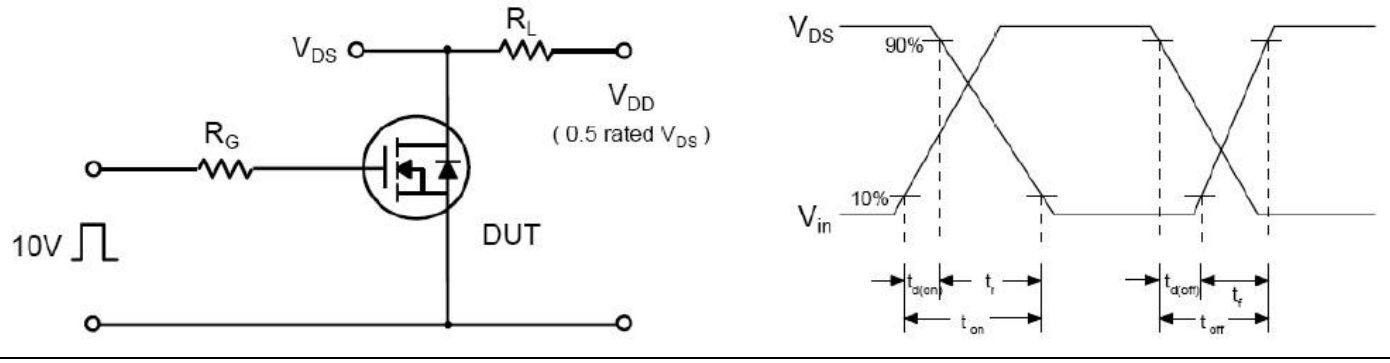

Fig 12. Resistive Switching Test Circuit & Waveforms

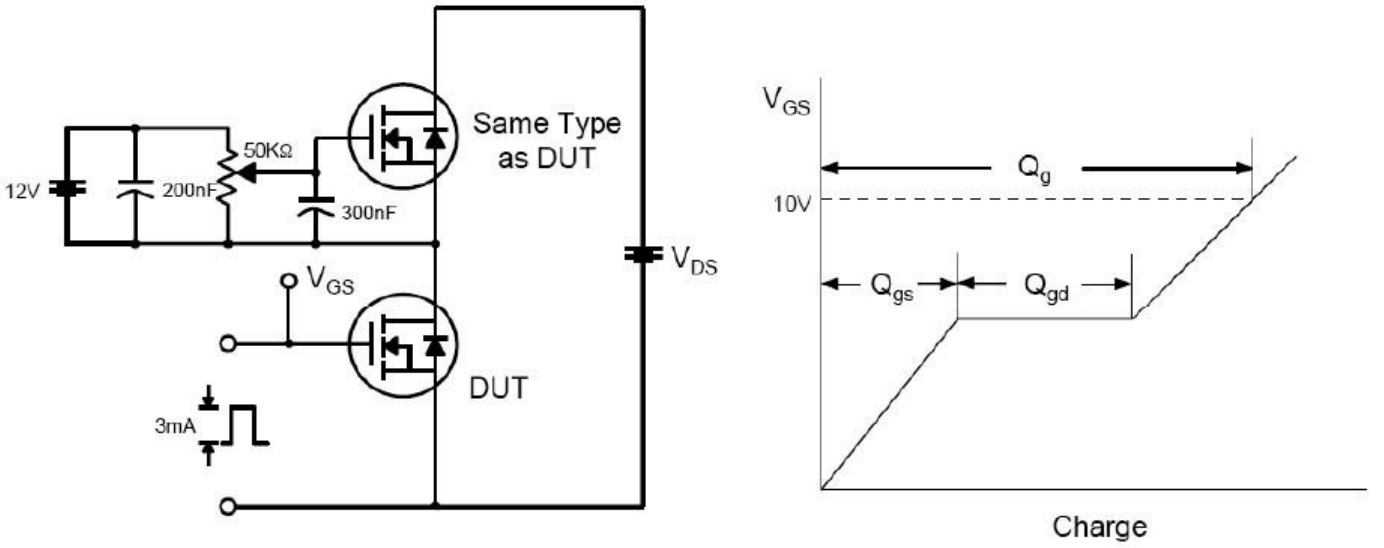

Fig 13. Gate Charge Test Circuit & Waveform

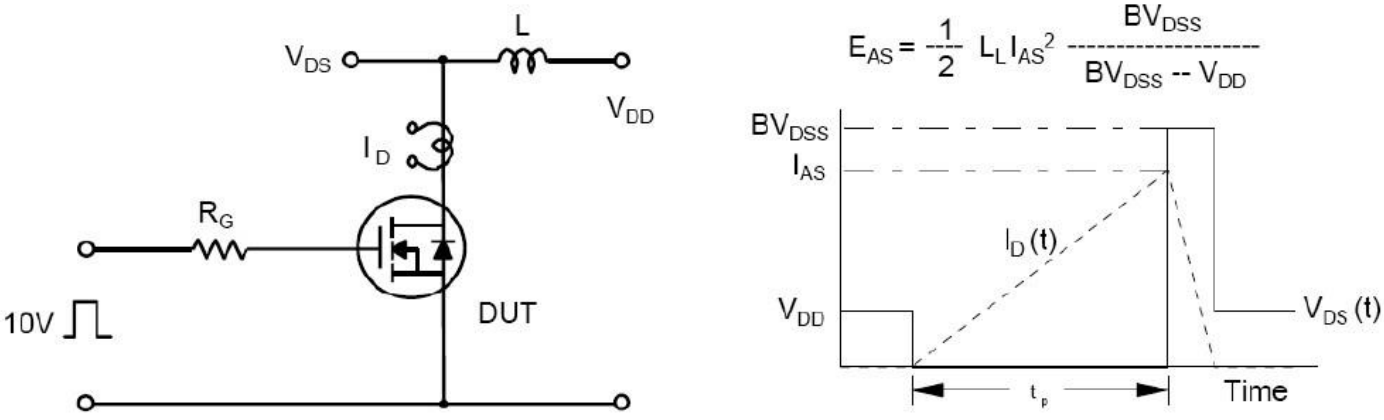

Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

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