MSF2N40

N-Channel 400V MOSFET

Description

The MSF2N40 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 ITO-220AB package is universally preferred for all commercial-industrial applications

Features

- BVDSS=400V typically @ Tj=150°C
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Application

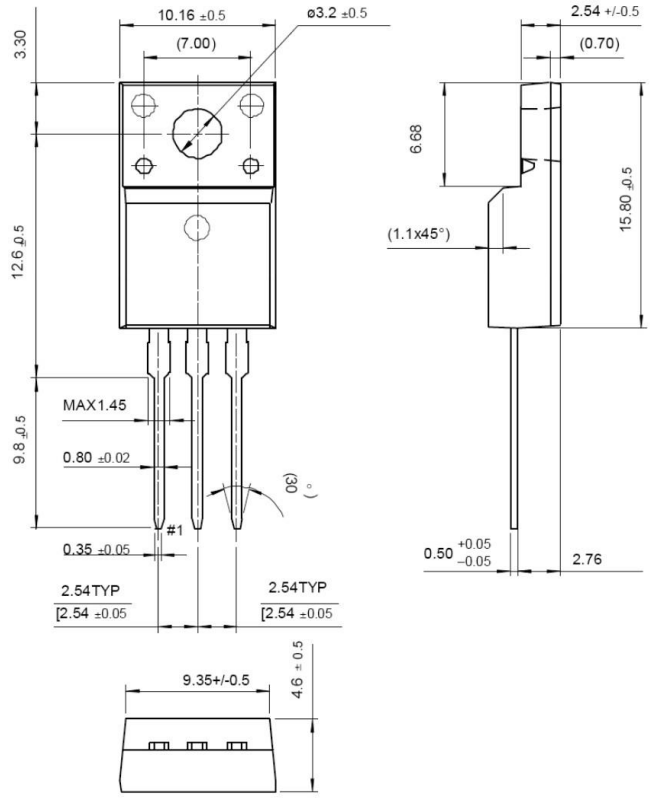
- Adapter
- Switching Mode Power Supply

Package type：ITO-220AB

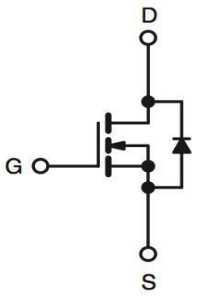
Packing & Order Information

50/Tube ; 1,000/Box

RoHS COMPLIANT



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	400	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current -Continuous (TC=25°C)	2.0	A
	Drain Current -Continuous (TC=100°C)	1.8	A
I_{DM}	Drain Current Pulsed	5.4	A
E_{AS}	Single Pulsed Avalanche Energy	100	mJ
E_{AR}	Repetitive Avalanche Energy	10	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns

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Absolute Maximum Ratings			
Symbol	Parameter	Value	Unit
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C
TPKG	Maximum Temperature for Soldering @ Package Body for 10 seconds	260	°C
P_D	Total Power Dissipation(@TC = 25 °C) 44 W	24	W
	Derating Factor above 25 °C	0.3	W/°C
T_{STG}	Operating and Storage Temperature Range	-55 to +150	°C
T_J	Storage Temperature	150	°C

Note:

1. Repetitive rating; pulse width limited by maximum junction temperature.
2. I_{AS}=5.5A, V_{DD}=50V, L=8mH, V_G=10V, starting TJ=+25°C.
3. I_{SD}≤5.5A, dI/dt≤100A/μs, VDD≤BVDSS, starting TJ=+25°C.

Thermal characteristics (Tc=25°C unless otherwise noted)			
Symbol	Parameter	Max.	Units
Rthjc	Typical thermal resistance	2.87	°C/W
$R_{\theta JA}$	Typical thermal resistance	62.5	

*When mounted on the minimum pad size recommended (PCB Mount)

Static Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
V_{GS}	V_{DS} = V_{GS},I_D = 250μA	2.0	--	4.0	V
*$R_{DS(ON)}$	V_{GS} = 10 V,I_D = 1.0 A	--	1.0	1.5	Ω
BV_{DSS}	V_{GS} = 0 V , I_D = 250μA	400	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	I_D = 250μA, Referenced to 25°C	--	0.4	--	
I_{DSS}	V_{DS} = 400 V , V_{GS} = 0 V V_{DS} = 320 V , V_{GS} = 0 V , T_C= 125°C	--	--	1 10	μA
I_{GSSF}	V_{GS} = 30 V , V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	V_{GS} = -30 V , V_{DS} = 0 V	--	--	-100	nA

Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
C_{ISS}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0MHz	--	670	870	pF
C_{OSS}		--	95	125	pF
C_{RSS}		--	16	21	pF

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Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	V_{DS} = 200 V, I_D = 5.5 A, R_G = 25 Ω	--	20	50	ns
t_r		--	50	110	ns
$t_{d(off)}$		--	90	190	ns
tf		--	55	120	ns
Q_g	V_{DS} = 320 V, I_D = 5.5 A, V_{GS} = 10 V	--	25	33	nC
Q_{gs}		--	5.0	--	
Q_{gd}		--	10.0	--	

Source-Drain Diode Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
I_S		--	--	2	A
I_{SM}		--	--	2.5	
V_{SD}	I_S = 2 A , V_{GS} = 0 V	--	--	1.5	V
t_{rr}	I_S = 2 A , V_{GS} = 0 V diF/dt = 100A/μs	--	220	--	ns
Q_{rr}		--	2	--	nC

Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS}=2A, V_{DD}=50V, R_G=25W, Starting T_J=25℃
3. I_{SD}≦2A, di/dt≦300A/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

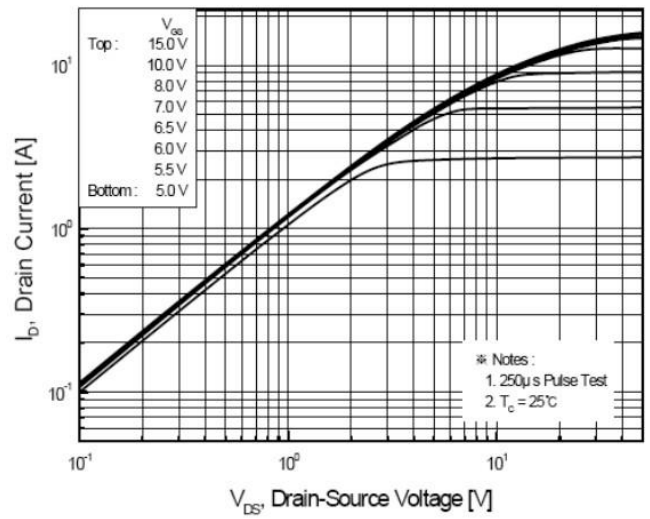

FIG.1-ON REGION CHARACTERISTICS

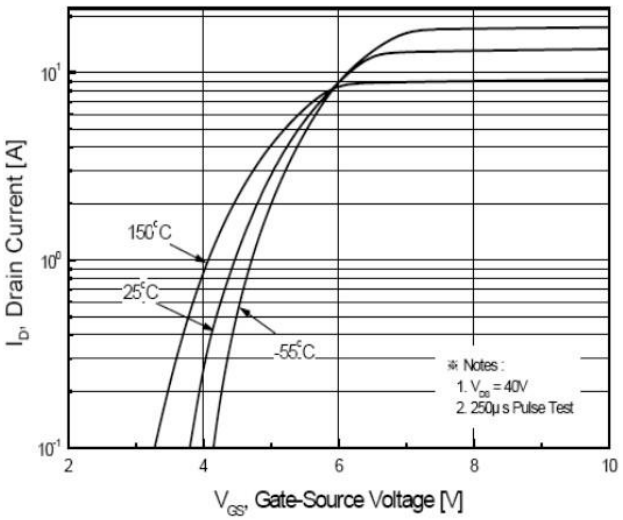

FIG.2-TRANSFER CHARACTERISTICS

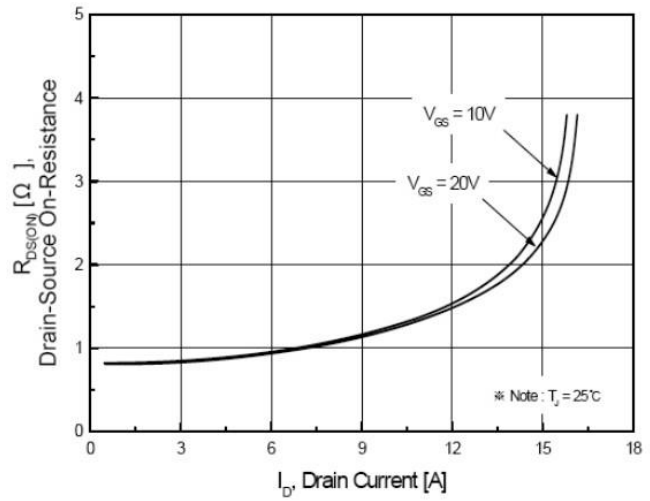

FIG.3-ON RESISTANCE VARIATION VS DRAIN CURRENT AND GATE VOLTAGE

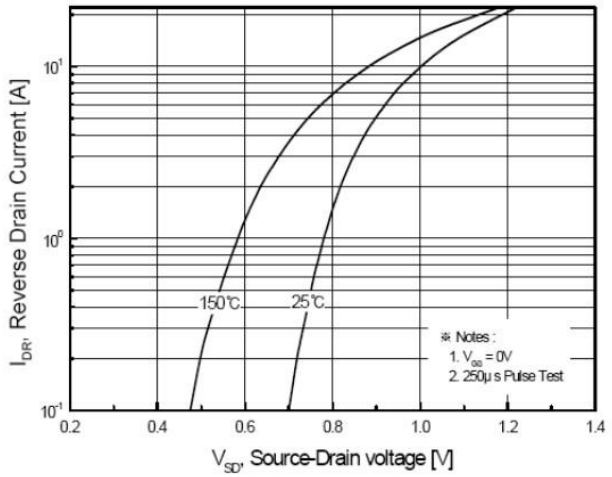

FIG.4-BODY DIODE FORWARD VOLTAGE VARIATION WITH SOURCE CURRENT AND TEMPERATURE

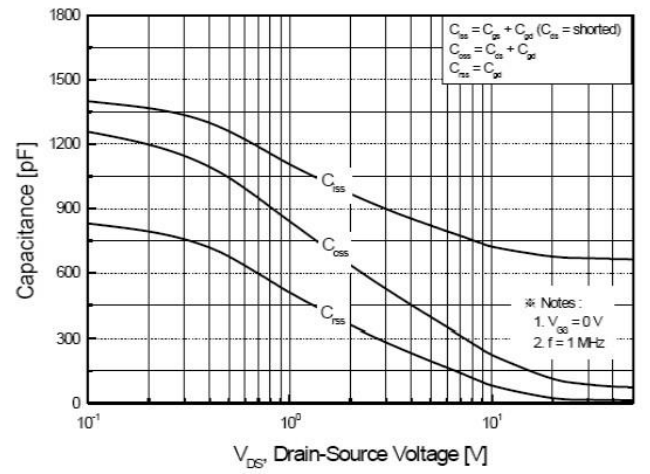

FIG.5-CAPACITANCE CHARACTERISTICS

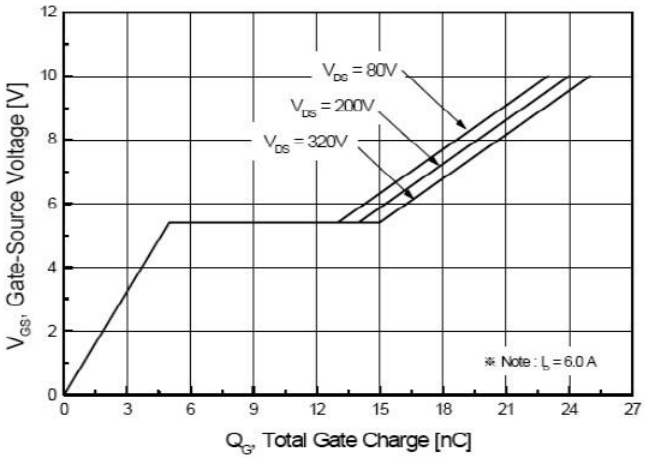

FIG.6-GATE CHARGE CHARACTERISTICS

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■Characteristics Curve

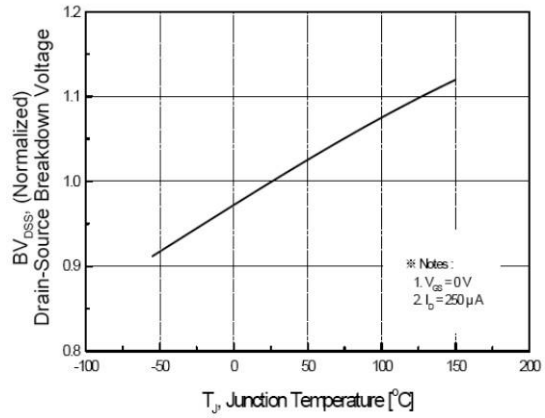

FIG.7-BREAKDOWN VOLTAGE VARIATION VS TEMPERATURE

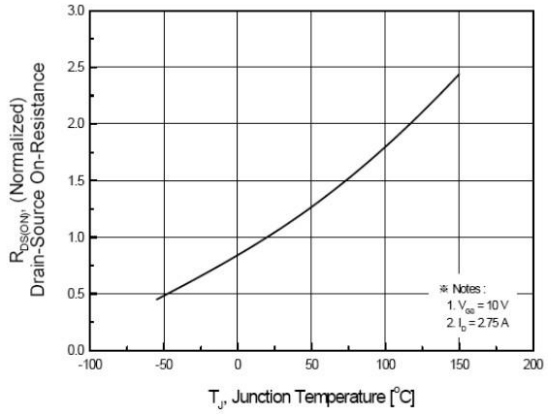

FIG.8-ON-RESISTANCE VARIATION VS TEMPERATURE

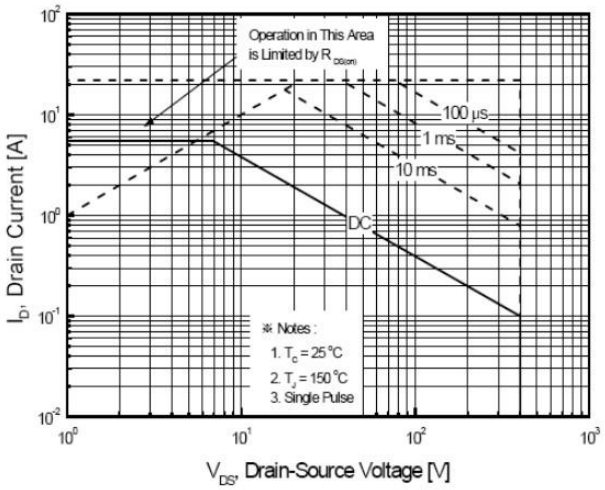

FIG.9-MAXIMUM SAFE OPERATING AREA

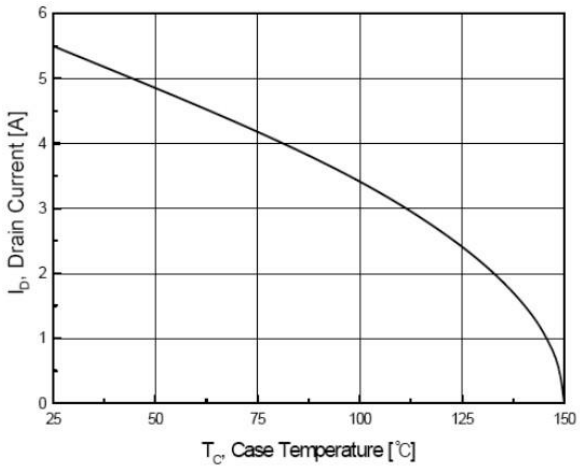

FIG.10-MAXIMUM DRAIN CURRENT VS CASE TEMPERATURE

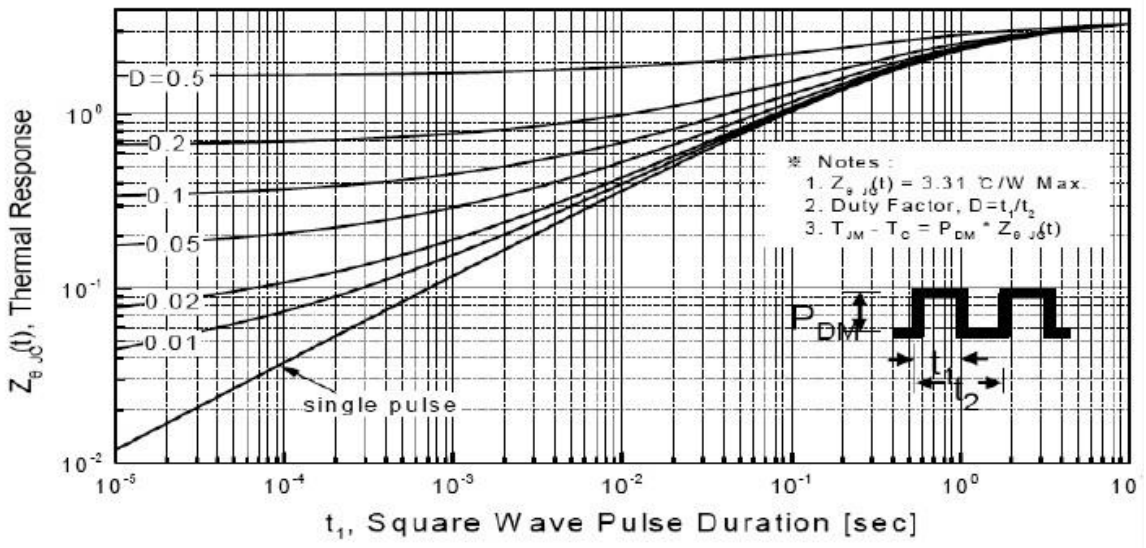

FIG.11-TRANSIENT THERMAL RESPONSE CURVE

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