

MSF16N50

500V N-Channel MOSFET

Description

The MSF16N50 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

- RDS(on) (Typical 0.33Ω)@VGS=10V
- Gate Charge (Typical 60nC)
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)
- RoHS compliant package

Application

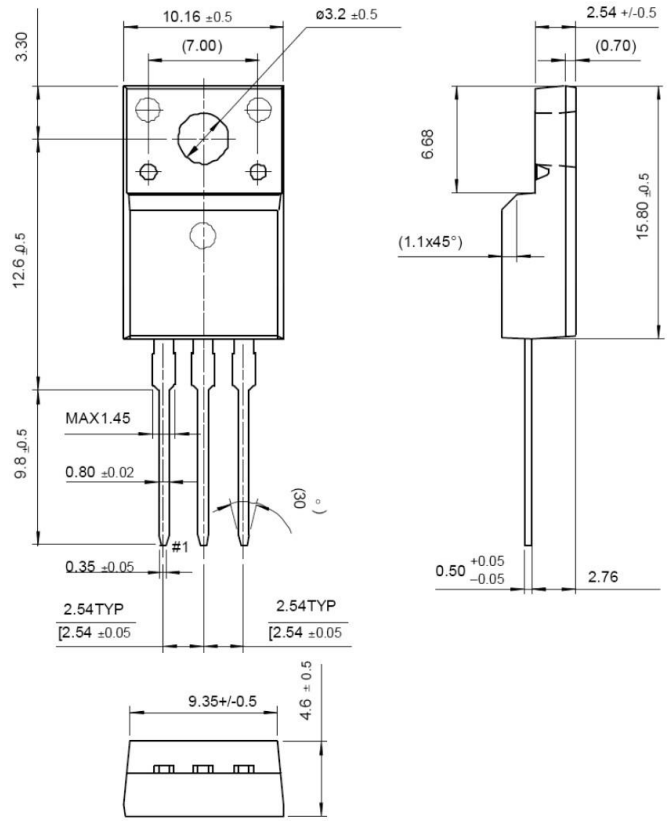
- Switching Mode Power Supply
- LCD Panel Power
- Adapter
- E-bike Charger

Packing & Order Information

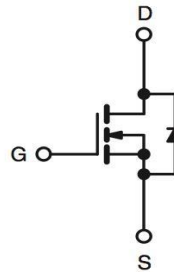
50/Tube ; 1,000/Box



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	500	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	16	A
	Drain Current -Continuous (TC=100°C)	10	A
I _{DM}	Drain Current Pulsed	64	A
E _{AS}	Single Pulsed Avalanche Energy	995	mJ
E _{AR}	Repetitive Avalanche Energy	24.5	mJ
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns

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

Symbol	Parameter	Value	Unit
P _D	Power Dissipation (TC = 25 °C)	205	W
	Derate above 25°C	2.1	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 characteristics (Tc=25°C unless otherwise noted)

Symbol	Parameter	Max.	Units
R _{θJC}	Junction-to-Case	2.8	°C/W
R _{θJA}	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} =10V, I _D =8A	--	0.33	0.38	Ω

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0 V , I _D =250μA	500	--	--	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D =250μA, Referenced to 25°C	--	0.5	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =500V , V _{GS} = 0 V V _{DS} =400V , T _C = 125°C	--	--	10 100	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} =30V , V _{DS} =0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} =-30V , V _{DS} =0 V	--	--	-100	nA

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C _{ISS}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	--	2300	--	pF
C _{OSS}	Output Capacitance		--	330	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	35	--	pF

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Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DS}=250\text{ V}, I_D=16\text{ A},$ $R_G=25\Omega$	--	5	--	ns
t_r	Turn-On Time		--	180	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	130	--	ns
t_f	Turn-Off Fall Time		--	100	--	ns
Q_g	Total Gate Charge	$V_{DS}=400\text{ V}, I_D=16\text{ A},$ $V_{GS}=10\text{ V}$	--	60	--	nC
Q_{gs}	Gate-Source Charge		--	14	--	nC
Q_{gd}	Gate-Drain Charge		--	28	--	nC

Source-Drain Diode Maximum Ratings and Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
I_S	Continuous Source-Drain Diode Forward Current		--	--	16	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	64	
V_{SD}	Source-Drain Diode Forward Voltage	$I_S=16\text{ A}, V_{GS}=0\text{ V}$	--	--	1.5	V
t_{rr}	Reverse Recovery Time	$I_S=16\text{ A}, V_{GS}=0\text{ V}$ $diF/dt=100\text{ A}/\mu\text{s}$	--	340	--	ns
Q_{rr}	Reverse Recovery Charge		--	3.4	--	μC

Notes:

1. Repeatability rating : pulse width limited by junction temperature
2. $L = 5.0\text{ mH}$, $I_{AS} = 16.0\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 16.0\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BVDSS$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially independent of operating temperature.

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