

MS9N90

N-Channel 900V MOSFET

Description

The MS9N90 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-220AB package is universally preferred for all commercial-industrial applications

Features

- $R_{DS(on)}$ (Max 1.4 Ω)@ $V_{GS}=10V$
- Gate Charge (Typical 47nC)
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)
- RoHS compliant package

Application

- Adapter
- Switching Mode Power Supply

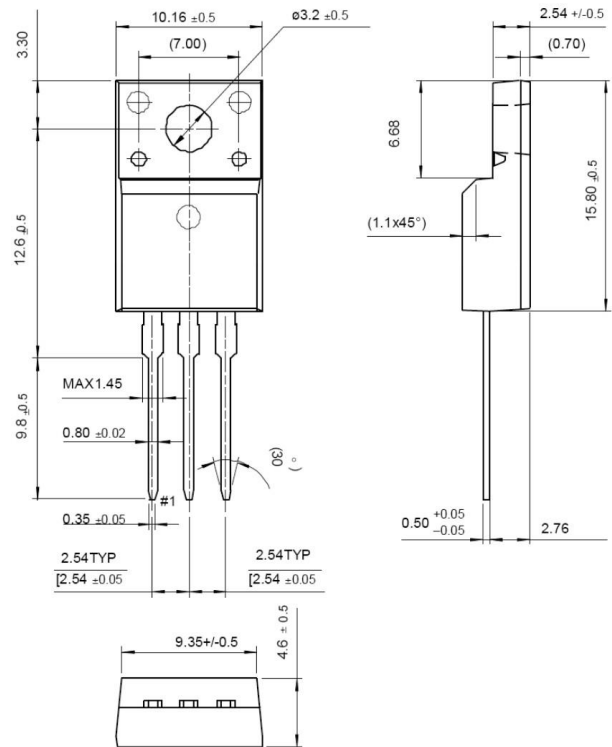
Package type : TO-220AB

Packing & Order Information

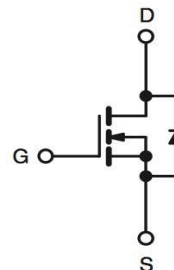
50/Tube ; 1,000/Box



**RoHS
COMPLIANT**



Graphic symbol



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	900	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current -Continuous ($T_C=25^\circ\text{C}$)	9	A
	Drain Current -Continuous ($T_C=100^\circ\text{C}$)	6	A
I_{DM}	Drain Current -Pulsed	36	A
E_{AS}	Single Pulsed Avalanche Energy	900	mJ
E_{AR}	Repetitive Avalanche Energy	28	mJ
dV/dt	Peak Diode Recovery dV/dt	4.0	V/ns
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	280	W
	- Derate above 25C	2.22	W/ $^\circ\text{C}$
T_J/T_{STG}	Operating Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

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

Symbol	Parameter	Value	Unit
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	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	--	0.75	°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} = 10 V, I _D = 4.5 A	--	1.10	1.40	Ω

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250μA	900	--	--	V
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temperature Coefficient	I _D = 250μA, Referenced to 25°C	--	1.05	--	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 900 V, V _{GS} = 0 V V _{DS} = 720 V, V _C = 125°C	--	--	10 100	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{DS} = 30 V, V _{GS} = 0 V	--	--	100	μA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{DS} = -30 V, V _{GS} = 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		--	180	--	pF
C _{RSS}	Reverse Transfer Capacitance		--	15	--	pF

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Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	Turn-On Time	$V_{DS} = 450\text{ V}, I_D = 9\text{ A},$ $R_G = 25\ \Omega$	--	60	--	ns
t_r	Turn-On Time		--	130	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	110	--	ns
t_f	Turn-Off Fall Time		--	80	--	ns
Q_g	Total Gate Charge	$V_{DS} = 720\text{ V}, I_D = 10\text{ A},$ $V_{GS} = 9\text{ V}$	--	47	--	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		--	--	9.0	A
I_{SM}	ISM Pulsed Source-Drain Diode Forward Current		--	--	35	
V_{SD}	Source-Drain Diode Forward Voltage	$I_S = 9\text{ A}, V_{GS} = 0\text{ V}$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$I_S = 9\text{ A}, V_{GS} = 0\text{ V}$ $diF/dt = 100\text{ A}/\mu\text{s}$	--	550	--	ns
Q_{rr}	Reverse Recovery Charge		--	6.5	--	μC

Notes :

1. Repeativity rating : pulse width limited by junction temperature
2. $L = 21\text{ mH}, I_{AS} = 9.0\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 9.0\text{ A}, di/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} \leq BVDSS$, 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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