

# MS14N60

## 900V N-Channel MOSFET

### Description

The MS14N60 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

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

### Application

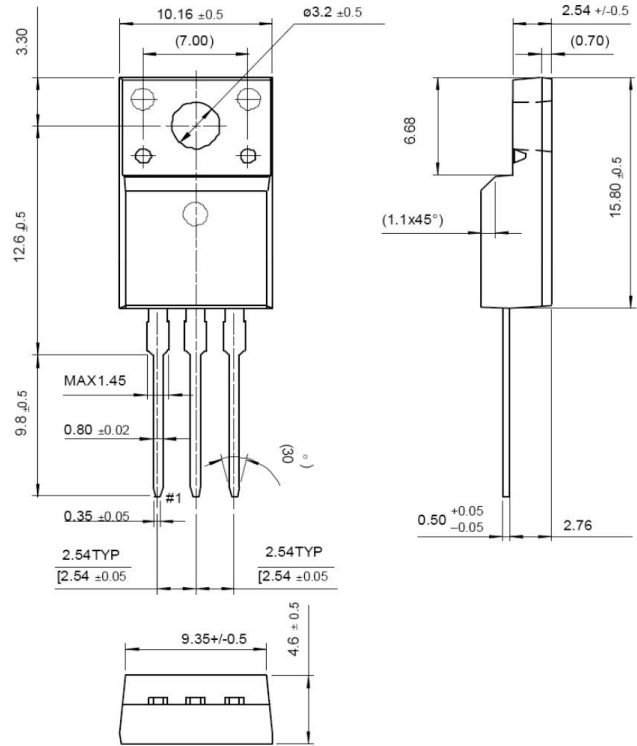
- Adapter
- Switching Mode Power Supply

### Packing & Order Information

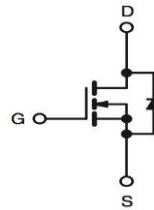
50/Tube ; 1,000/Box



**RoHS  
COMPLIANT**



### Graphic symbol



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	600	V
V <sub>GS</sub>	Gate-Source Voltage	±30	V
I <sub>D</sub>	Drain Current -Continuous (TC=25°C)	14	A
	Drain Current -Continuous (TC=100°C)	8.4	A
I <sub>DM</sub>	Drain Current -Pulsed	56	A
I <sub>AR</sub>	Avalanche Current	14	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy	53	mJ
E <sub>AR</sub>	Repetitive Avalanche Energy	16	mJ
dV/dt	Peak Diode Recovery dV/dt	4.5	V/ns
T <sub>J</sub>	Storage Temperature	150	°C
P <sub>D</sub>	Power Dissipation (TC=25°C)	60	W
	Derate above 25C	0.35	W/°C

- Drain current limited by maximum junction temperature

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

Symbol	Parameter	Value	Unit
T <sub>STG</sub>	Operating Junction and Storage Temperature	-55 to +150	°C
T <sub>L</sub>	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	°C

#### Note:

1. Repetitive rating; pulse width limited by maximum junction temperature.
2. I<sub>AS</sub>=14A, V<sub>DD</sub>=50V, L=0.5mH, R<sub>G</sub>=25Ω, starting T<sub>J</sub>=+25°C.
3. I<sub>SD</sub>≤7.5A, dI/dt≤100A/μs, V<sub>DD</sub>≤BV<sub>DSS</sub>, starting T<sub>J</sub>=+25°C.

#### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
R <sub>θJC</sub>	Thermal Resistance , Junction-to-Case	--	2.58	°C/W
R <sub>θJA</sub>	Thermal Resistance , Junction-to-Ambient	--	62.5	

#### Static Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2.0		4.0	V
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0 V , I <sub>D</sub> = 250μA	600	--	--	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temperature Coefficient	I <sub>D</sub> = 250μA, Referenced to 25°C	--	0.7	--	V/°C
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 600 V , V <sub>GS</sub> = 0 V V <sub>DS</sub> = 480 V , T <sub>C</sub> = 125°C	--	--	1 10	uA
I <sub>GSS</sub>	Gate-Body Leakage Current, Forward	V <sub>DS</sub> = ±30	--	--	±100	nA
*R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = 10 V , I <sub>D</sub> = 8.4 A	--	--	0.55	Ω

#### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f=1.0MHz	--	2222	--	pF
C <sub>OSS</sub>	Output Capacitance		--	180	--	pF
C <sub>RSS</sub>	Reverse Transfer Capacitance		--	17	--	pF
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> = 250 V, I <sub>D</sub> = 14 A, V <sub>GS</sub> = 10 V , R <sub>G</sub> = 9.1 Ω	--	16	--	ns
t <sub>r</sub>	Turn-On Time		--	30	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	48	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	34	--	ns

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### Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$Q_g$	Total Gate Charge	$V_{DD} = 250\text{ V}, I_D = 14\text{ A},$ $V_{GS} = 10\text{ V}$	--	40	--	nC
$Q_{gs}$	Gate-Source Charge		--	10	--	nC
$Q_{gd}$	Gate-Drain Charge		--	15	--	nC

### Source-Drain Diode

Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$I_S$		$V_D = V_G = 0,$ $V_S = 1.3\text{ V}$	--	--	14	A
$I_{SM}$			--	--	56	
$V_{SD}$		$I_S = 14\text{ A}, V_{GS} = 0\text{ V}$	--	--	1.5	V
$t_{rr}$		$I_S = 14\text{ A}, V_{GS} = 0\text{ V}$ $diF/dt = 100\text{ A}/\mu\text{s}$	--	393	--	ns
$Q_{rr}$			--	3529	--	$\mu\text{C}$

\*Pulse Test : Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

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