

## Preliminary MSW9N90

### 900V N-Channel MOSFET

#### Description

This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics. These devices are well suited for high efficiency switch mode power supplies.

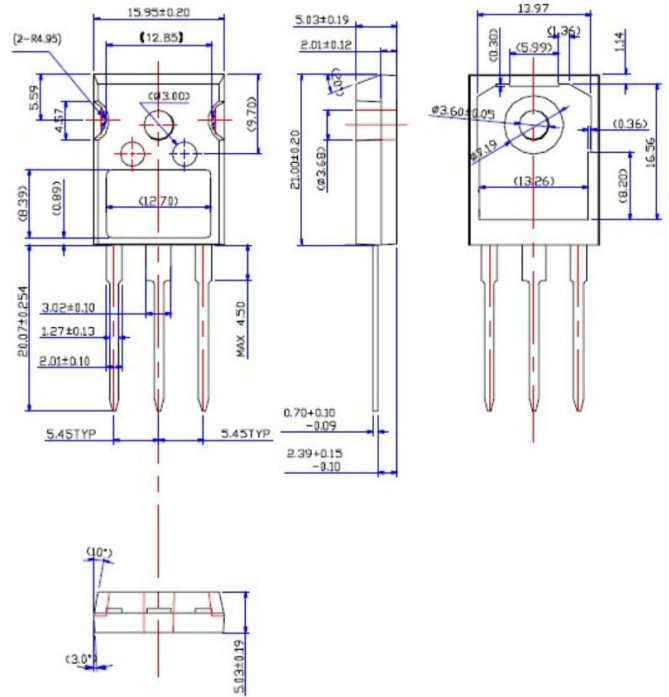
#### Features

- RDS(on) (Max 1.4 Ω)@VGS=10V
- Gate Charge (Typical 45nC)
- Improved dv/dt Capability, High Ruggedness
- 100% Avalanche Tested
- Maximum Junction Temperature Range (150°C)
- RoHS compliant package

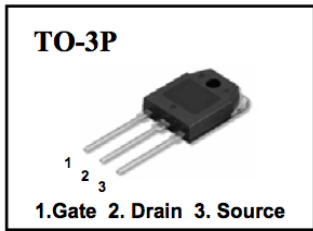
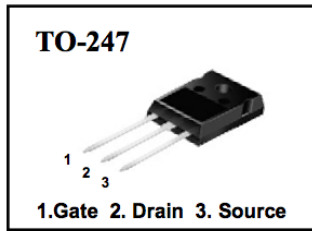
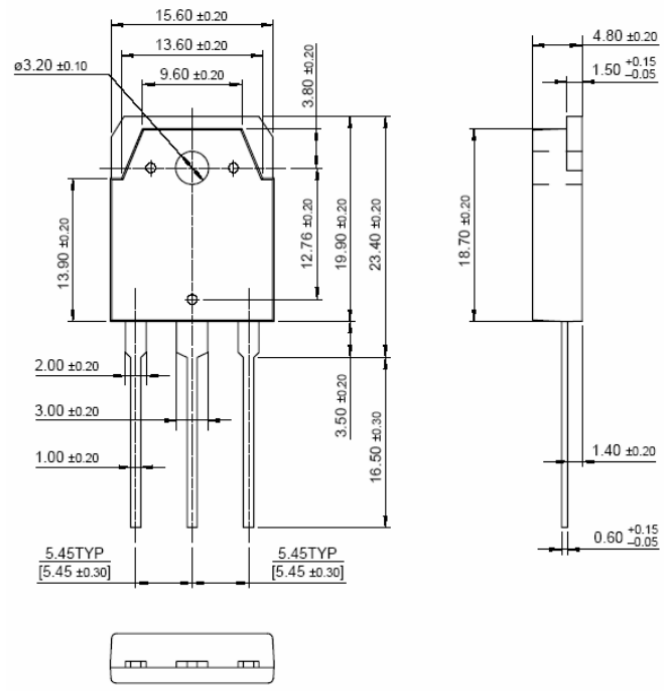
#### Packing & Order Information

30/Tube ; 540/Box

#### TO-247

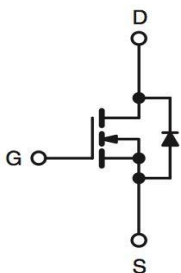


#### TO-3P



**RoHS**  
COMPLIANT

#### Graphic symbol



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MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	900	V
V <sub>GS</sub>	Gate-Source Voltage	±30	V
I <sub>D</sub>	Drain Current -Continuous (TC=25°C)	9	A
	Drain Current -Continuous (TC=100°C)	5.7	A
I <sub>DM</sub>	Drain Current Pulsed	36	A
E <sub>AS</sub>	Single Pulsed Avalanche Energy	900	mJ
E <sub>AR</sub>	Repetitive Avalanche Energy	28	mJ
dV/dt	Peak Diode Recovery dV/dt	4	V/ns
P <sub>D</sub>	Power Dissipation (TC = 25 °C)	280	W
	- Derate above 25°C	2.22	W/°C
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 to +150	°C
T <sub>L</sub>	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 <sub>θJC</sub>	Junction-to-Case	0.45	°C/W
R <sub>θJA</sub>	Junction-to-Ambient	40	

### On Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V <sub>GS</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	3.0	--	5.0	V
*R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4.5 A	--	1.05	1.4	Ω

### Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
BV <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	900	--	--	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> = 250μA, Referenced to 25°C	--	0.99	--	V/°C
I <sub>DSS</sub>	V <sub>DS</sub> = 900 V, V <sub>GS</sub> = 0 V	--	--	10	μA
	V <sub>DS</sub> = 720 V, V <sub>C</sub> = 125°C	--	--	100	
I <sub>GSSF</sub>	V <sub>GS</sub> = 30 V, V <sub>DS</sub> = 0 V	--	--	100	nA
I <sub>GSSR</sub>	V <sub>GS</sub> = -30 V, V <sub>DS</sub> = 0 V	--	--	-100	nA

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Switching Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$t_{d(on)}$	$V_{DS} = 450\text{ V}, I_D = 9\text{ A},$ $R_G = 25\ \Omega$	--	50	--	ns
$t_r$		--	120	--	ns
$t_{d(off)}$		--	100	--	ns
$t_f$		--	80	--	ns
$Q_g$	$V_{DS} = 720\text{ V}, I_D = 9\text{ A},$ $V_{GS} = 10\text{ V}$	--	45	--	nC
$Q_{gs}$		--	14	--	nC
$Q_{gd}$		--	18	--	nC

Dynamic Characteristics					
Symbol	Test Conditions	Min	Typ.	Max.	Units
$C_{ISS}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $F = 1.0\text{MHz}$	--	2200	--	pF
$C_{OSS}$		--	180	--	pF
$C_{RSS}$		--	15	--	pF

Source-Drain Diode Maximum Ratings and Characteristics						
Symbol	Parameter	Test Conditions	Min	Typ.	Max.	Units
$I_S$			--	--	9	A
$I_{SM}$			--	--	36	
$V_{SD}$	$I_S = 9\text{ A}, V_{GS} = 0\text{ V}$		--	--	1.5	V
$t_{rr}$	$I_S = 9\text{ A}, V_{GS} = 0\text{ V}$ $diF/dt = 100\text{A}/\mu\text{s}$		--	550	--	ns
$Q_{rr}$			--	6.5	--	$\mu\text{C}$

### Notes;

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2.  $L = 21\text{mH}, I_{AS} = 9\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega,$  Starting  $T_J = 25^\circ\text{C}$
3.  $I_{SD} \leq 9\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS},$  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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