

MSW9N90

900V N-Channel MOSFET

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Value	Unit
V _{DSS}	Drain-Source Voltage	900	V
V _{GS}	Gate-Source Voltage	±30	V
I _D	Drain Current -Continuous (TC=25°C)	9	A
	Drain Current -Continuous (TC=100°C)	5.7	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	V/ns
P _D	Power Dissipation (TC = 25 °C)	280	W
	- Derate above 25°C	2.22	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 Resistance Characteristics

Symbol	Parameter	Max.	Units
R _{θJC}	Junction-to-Case	0.45	°C/W
R _{θJA}	Junction-to-Ambient	40	

On Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
V _{GS}	V _{DS} = V _{GS} , I _D = 250μA	3.0	--	5.0	V
*R _{DS(ON)}	V _{GS} = 10 V, I _D = 4.5 A	--	1.05	1.4	Ω

Off Characteristics

Symbol	Test Conditions	Min	Typ.	Max.	Units
BV _{DSS}	V _{GS} = 0 V, I _D = 250μA	900	--	--	V
ΔBV _{DSS} / ΔT _J	I _D = 250μA, Referenced to 25°C	--	0.99	--	V/°C
I _{DSS}	V _{DS} = 900 V, V _{GS} = 0 V V _{DS} = 720 V, V _C = 125°C	--	--	10 100	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

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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}	$I_S = 9 \text{ A}, V_{GS} = 0 \text{ V}$		--	550	--	ns
Q_{rr}	$diF/dt = 100\text{A}/\mu\text{s}$		--	6.5	--	μC

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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