

N-Channel ENHANCEMENT MODE MOSFET

General Description

RMP3N90 is an N-channel enhancement mode MOSFET, which uses the self-aligned planar process and improved terminal technology, reducing the conduction loss, enhancing the avalanche energy.

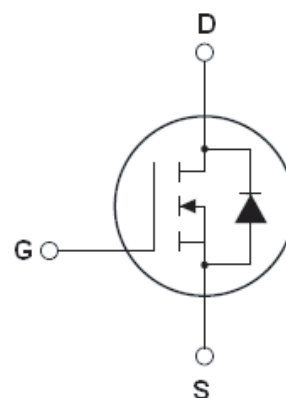
$V_{DS@T_{jmax}}$	900	V
$R_{DS(ON) TYP}$	2.8	Ω
I_D	3.0	A

Features

- Low C_{rss}
- Low gate charge
- Fast switching
- Improved ESD capability
- Improved dv/dt capability
- 100% Avalanche Tested
- ROHS compliant
- Halogen-free

Application

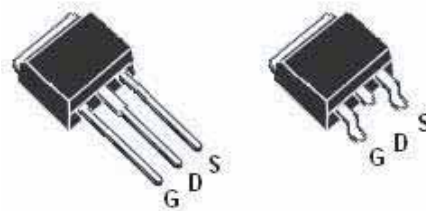
- High efficiency switch mode power supplies
- Electronic lamp ballasts
- Uninterruptible Power Supply (UPS)



Schematic diagram

Package Marking And Ordering Information

Device	Device Package	Marking
RMP3N90IP	TO-251	3N900
RMP3N90LD	TO-252	3N900



TO-251

TO-252

Table 1. Absolute Maximum Ratings ($T_c=25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DS}	900	V
Gate-Source Voltage ($V_{DS} = 0V$)	V_{GS}	± 30	V
Continuous Drain Current at $T_c=25^\circ\text{C}$	$I_{D(DC)}$	3	A
Continuous Drain Current at $T_c=100^\circ\text{C}$	$I_{D(DC)}$	1.9	A
Pulsed drain current (Note 1)	$I_{DM(pluse)}$	12	A
Maximum Power Dissipation ($T_c=25^\circ\text{C}$)	P_D	50	W
Single pulse avalanche energy (Note2)	E_{AS}	460	mJ
Avalanche current	I_{AR}	1	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55...+150	$^\circ\text{C}$

Table 2. Thermal Characteristic

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case (Maximum)	R_{thJC}	2.5	°C/W
Thermal Resistance, Junction-to-Ambient (Maximum)	R_{thJA}	83.3	°C/W

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	900	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_j$	$I_D=250\mu A$, referenced to 25°C	-	0.6	-	V/°C
Zero Gate Voltage Drain Current(Tj=25 °C)	I_{DSS}	$V_{DS}=900V, V_{GS}=0V$	-	-	1	μA
Zero Gate Voltage Drain Current(Tj=125 °C)	I_{DSS}	$V_{DS}=720V, V_{GS}=0V$	-	-	10	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	-	5.0	V
Drain-Source On-State Resistance (Note 3)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1.5A$	-	2.8	3.2	Ω
Dynamic Characteristics						
Forward Transconductance (Note 3)	g_{FS}	$V_{DS} = 40V, I_D = 1.5A$	-	2.5	-	S
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	850	-	PF
Output Capacitance	C_{oss}		-	56	-	PF
Reverse Transfer Capacitance	C_{rss}		-	14	-	PF
Total Gate Charge (Note 3)	Q_g	$V_{DS}=720V, I_D=3A,$ $V_{GS}=10V$	-	19	-	nC
Gate-Source Charge (Note 3)	Q_{gs}		-	4.2	-	nC
Gate-Drain Charge (Note 3)	Q_{gd}		-	9.1	-	nC
Switching times						
Turn-Off Delay Time (Note 3)	$t_{d(off)}$	$V_{DD}=450V, I_D=3A, R_G=25\Omega$	-	35	-	nS
Source- Drain Diode Characteristics						
Maximum Continuous Drain-Source Diode Forward Current		I_S	-	-	3	A
Forward On Voltage (Note 3)	V_{SD}	$T_j=25^\circ C, I_S=3A, V_{GS}=0V$	-	-	1.4	V
Reverse Recovery Time (Note 3)	t_{rr}	$T_j=25^\circ C, I_F=3A, di/dt=100A/\mu s$	-	570	-	nS
Reverse Recovery Charge (Note 3)	Q_{rr}		-	3.6	-	uC

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. L=57mH, $I_{AS}=3A, V_{DD}=50V, R_G=25\Omega$, Starting $T_j=25^\circ C$

3. Pulse Test :Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

RATING AND CHARACTERISTICS CURVES (RMP3N90LD(IP))

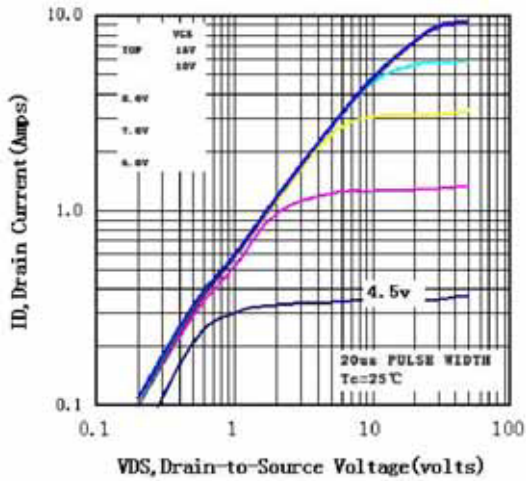


Fig1 Typical Output Characteristics, $T_c=25^\circ\text{C}$

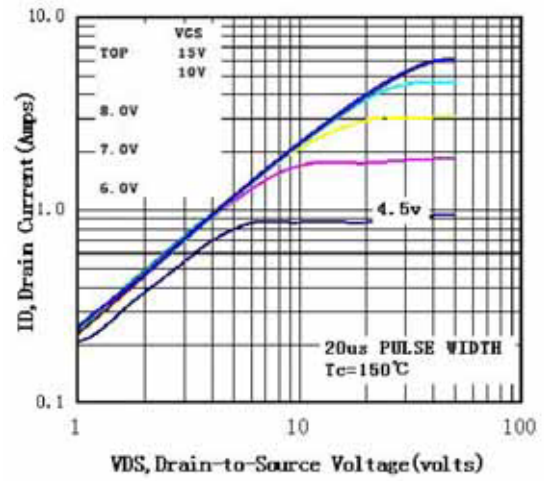


Fig2 Typical Output Characteristics, $T_c=150^\circ\text{C}$

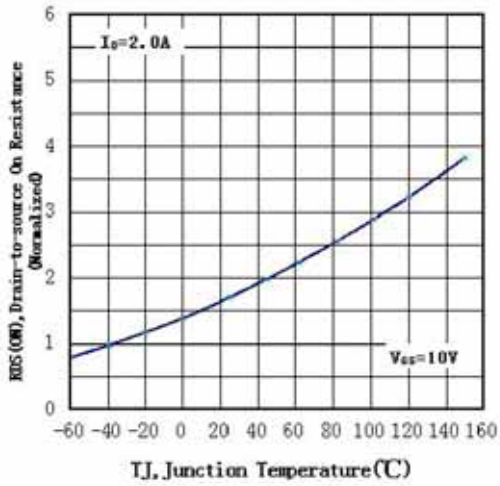


Fig3 Normalized Resistance Vs. Temperature

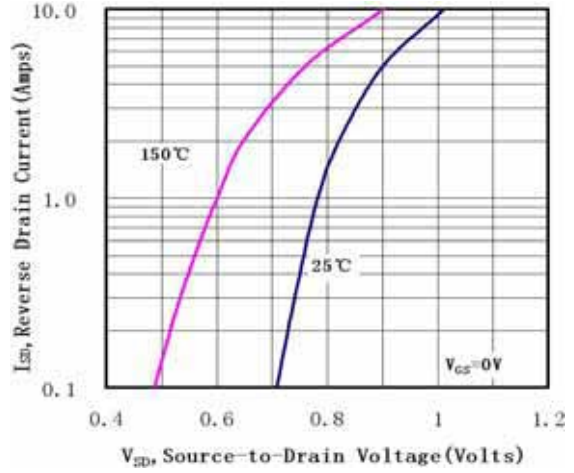


Fig4 Typical Source-Drain Diode Forward Voltage

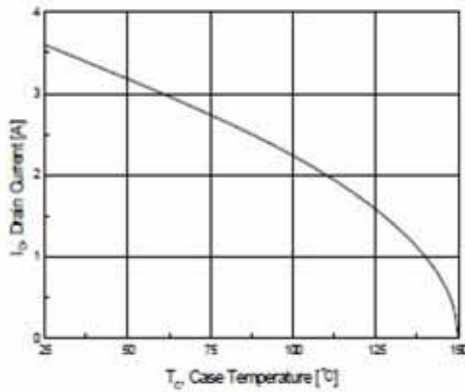


Fig5 Maximum Drain Current Vs. Case Temperature

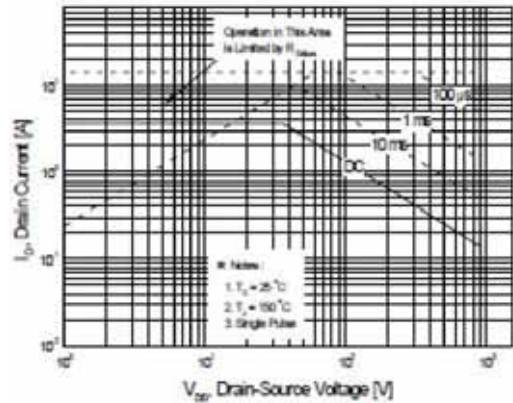
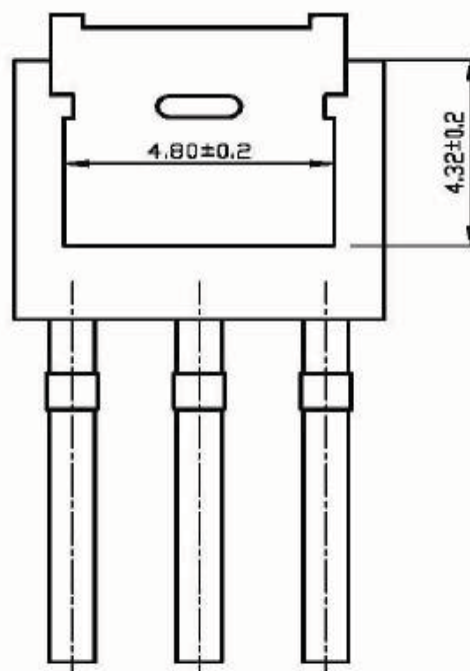
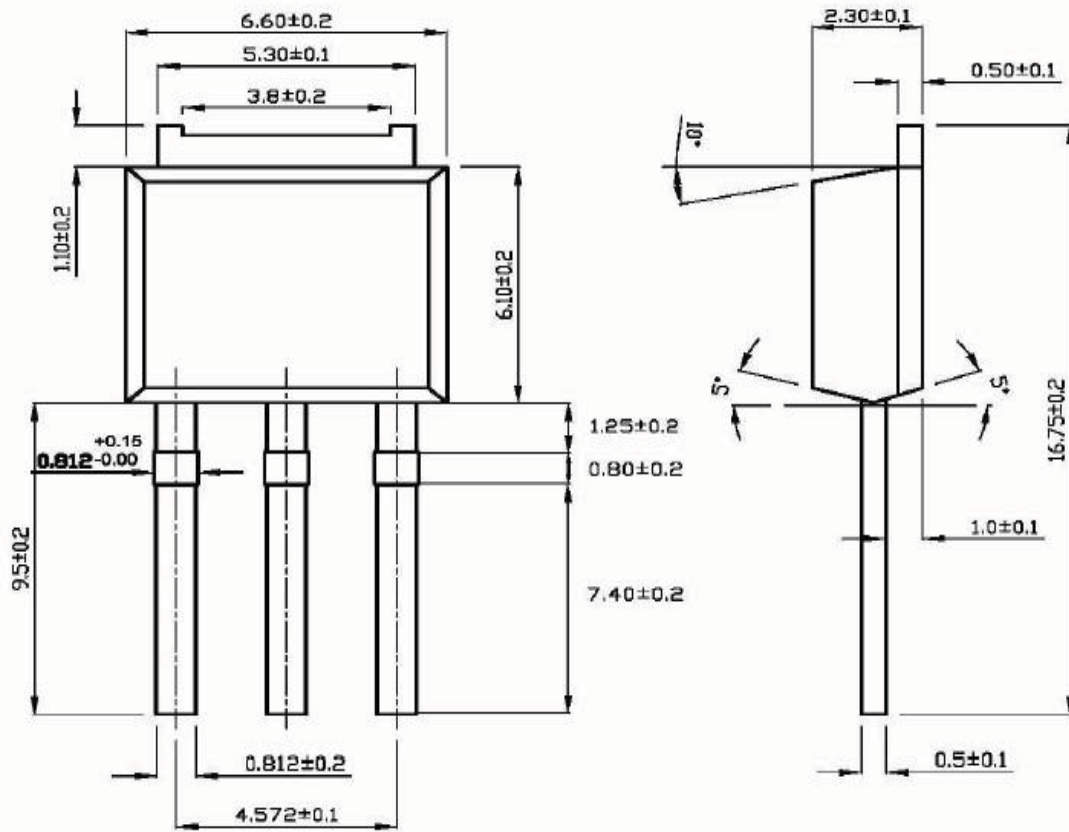
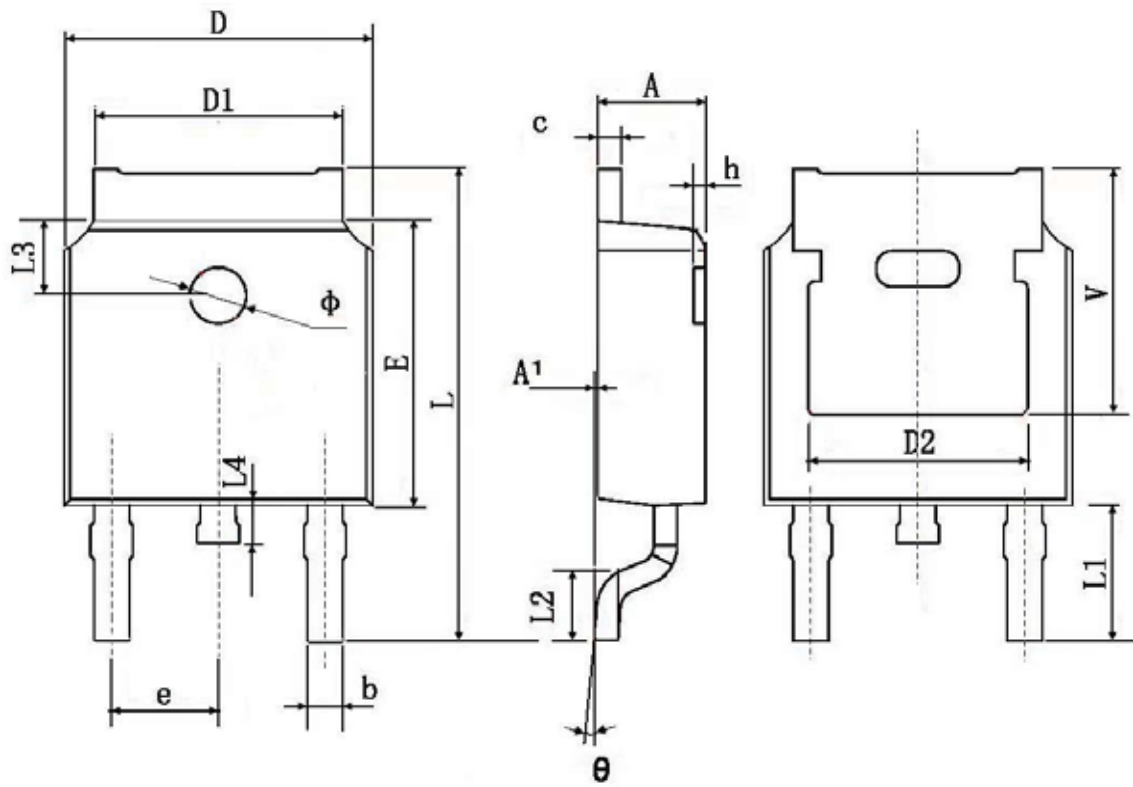


Fig6 Maximum Safe Operating Area

TO-251 Package Information



TO-252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
phi	1.100	1.300	0.043	0.051
theta	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	

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