

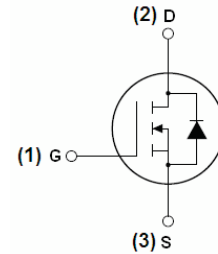
## N-Channel Enhancement Mode Power MOSFET

### General Features

- $V_{DS} = 500V, I_D = 5A$   
 $R_{DS(ON)} < 1.5\Omega @ V_{GS} = 10V$
- Low on-resistance
- Fast switching
- High input resistance
- RoHS Compliant

### Application

- Electronic ballast
- Electronic transformer
- Switch mode power supply
- Halogen-free



Schematic diagram



TO-220-3L top view

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
5N50	RMP5N50T2	TO-220-3L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	500	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Drain Current-Continuous	$I_D$	5	A
Drain Current-Continuous( $T_c = 100^\circ\text{C}$ )	$I_D(100^\circ\text{C})$	3	A
Pulsed Drain Current	$I_{DM}$	20	A
Power Dissipation	$P_{tot}$	50	W
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	280	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

## Thermal Characteristic

Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	2.5	$^{\circ}\text{C}/\text{W}$
--	-----------------	-----	-----------------------------

## Electrical Characteristics ( $T_c=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	500	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=500V, V_{GS}=0V$	-	-	25	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 30V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> <sup>(Note 3)</sup>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	-	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2.5A$	-	1.35	1.5	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=15V, I_D=2.5A$	2.4	-	-	S
<b>Dynamic Characteristics</b> <sup>(Note 4)</sup>						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	650	-	PF
Output Capacitance	$C_{oss}$		-	57	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	13	-	PF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=250V, I_D=5.0A$ $R_G=10\Omega$	-	-	-	nS
Turn-on Rise Time	$t_r$		-	-	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	nS
Turn-Off Fall Time	$t_f$		-	-	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=400V, I_D=5.0A,$ $V_{GS}=10V$	-	26	-	nC
Gate-Source Charge	$Q_{gs}$		-	4	-	nC
Gate-Drain Charge	$Q_{gd}$		-	15	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=5.0A$	-	-	1.6	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	5.0	A
Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}\text{C}, I_F = 5.0A$ $di/dt = 100A/\mu s$ <sup>(Note 3)</sup>	-	220	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	1.0	-	$\mu C$
Forward Turn-On Time	$t_{on}$	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

## Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=50V, I_{as}=5.0A, L=24mH, R_g=25 \Omega$

## RATING AND CHARACTERISTICS CURVES (RMP5N50T2 )

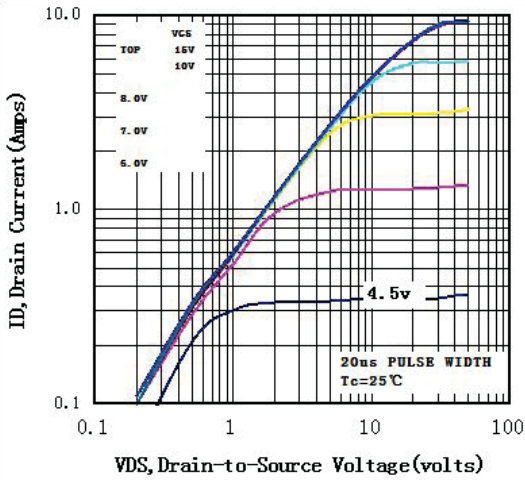


Fig1 Typical Output Characteristics,  $T_c=25^\circ\text{C}$

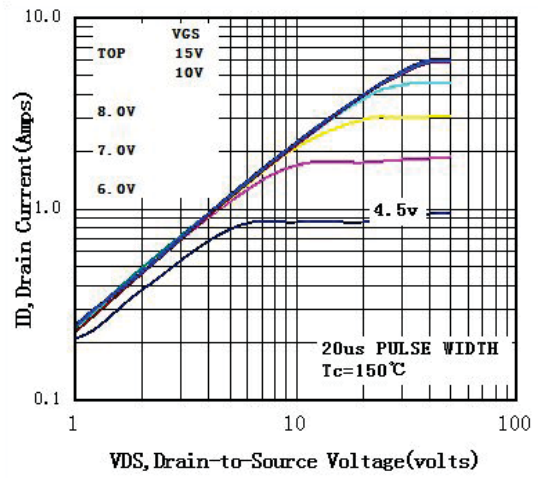


Fig2 Typical Output Characteristics,  $T_c=150^\circ\text{C}$

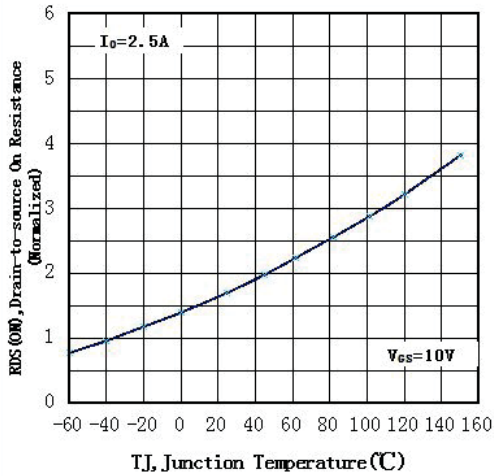


Fig3 Normalized Resistance Vs. Temperature

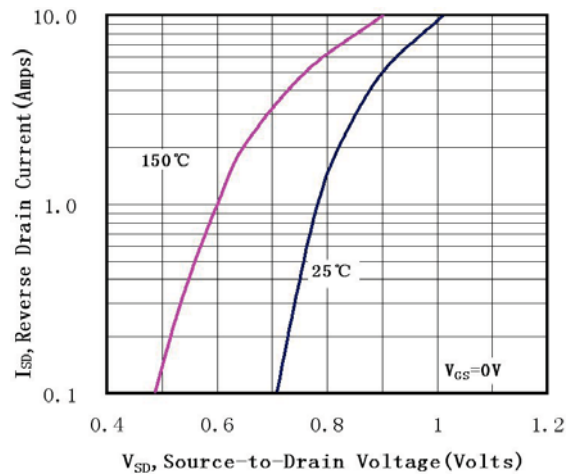


Fig4 Typical Source-Drain Diode Forward Voltage

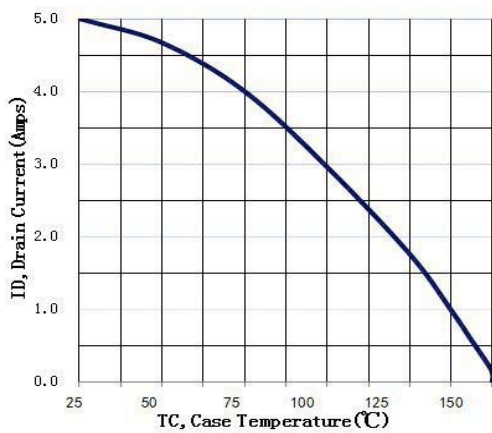


Fig5 Maximum Drain Current Vs. Case Temperature

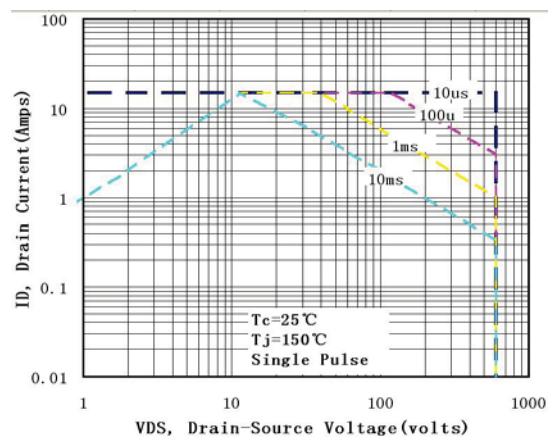
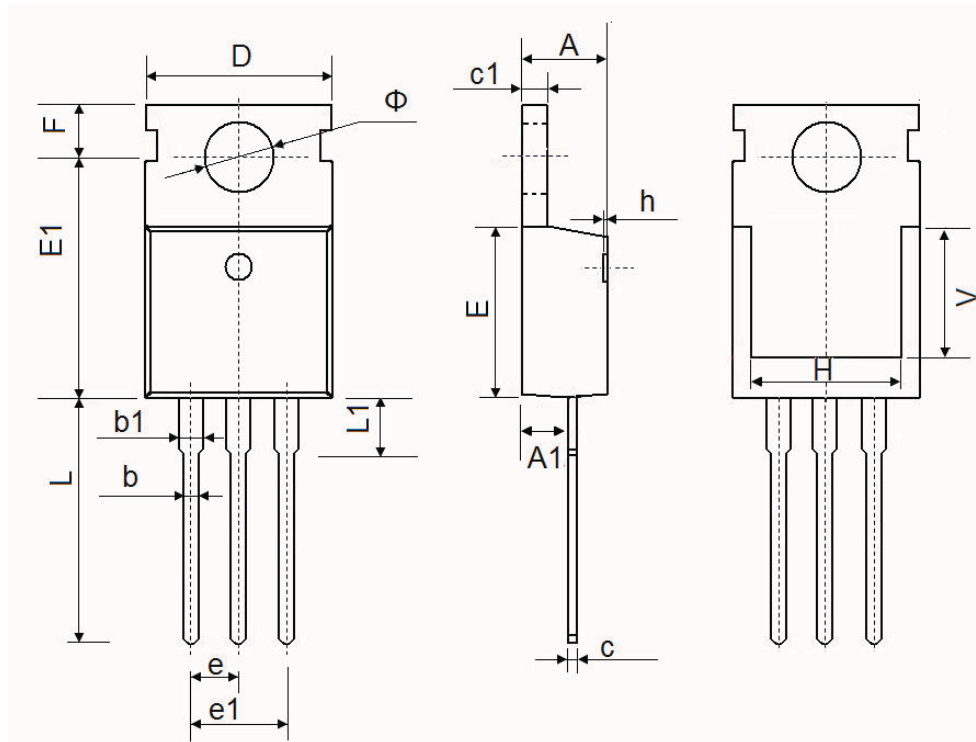


Fig6 Maximum Safe Operating Area

## TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150

## DISCLAIMER NOTICE

Rectron Inc reserves the right to make changes without notice to any product specification herein, to make corrections, modifications, enhancements or other changes. Rectron Inc or anyone on its behalf assumes no responsibility or liability for any errors or inaccuracies. Data sheet specifications and its information contained are intended to provide a product description only. "Typical" parameters which may be included on RECTRON data sheets and/ or specifications can and do vary in different applications and actual performance may vary over time. Rectron Inc does not assume any liability arising out of the application or use of any product or circuit.

Rectron products are not designed, intended or authorized for use in medical, life-saving implant or other applications intended for life-sustaining or other related applications where a failure or malfunction of component or circuitry may directly or indirectly cause injury or threaten a life without expressed written approval of Rectron Inc. Customers using or selling Rectron components for use in such applications do so at their own risk and shall agree to fully indemnify Rectron Inc and its subsidiaries harmless against all claims, damages and expenditures.