

## **N-Channel Super Trench Power MOSFET**

#### Description

The RM130N100T2 uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of  $R_{DS(ON)}$  and  $Q_g$ . This device is ideal for high-frequency switching and synchronous rectification.

# (1) GO (3) S

Schematic diagram

#### **General Features**

- $V_{DS} = 100V, I_D = 130A$  $R_{DS(ON)} < 5.4 \text{m}\Omega @ V_{GS} = 10V$
- Excellent gate charge x R<sub>DS(on)</sub> product
- Very low on-resistance R<sub>DS(on)</sub>
- Pb-free lead plating
- 100% UIS tested

# Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification
- Halogen-free

100% UIS TESTED! 100% ∆Vds TESTED!



TO-220-3L top view

#### **Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
130N100	RM130N100T2	TO-220-3L	-	-	-

#### Absolute Maximum Ratings (T<sub>C</sub>=25℃unless otherwise noted)

,				
Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V <sub>DS</sub>	100	V	
Gate-Source Voltage	V <sub>GS</sub>	±20	V	
Continuous Drain Current (T <sub>a</sub> =25℃)	I <sub>D</sub>	130	Α	
Continuous Drain Current (T <sub>a</sub> =100℃)	I <sub>D</sub>	84	А	
Pulsed Drain Current (1)	I <sub>DM</sub>	440	А	
Single Pulsed Avalanche Energy (2)	E <sub>AS</sub>	225	mJ	
Power Dissipation	P <sub>D</sub>	192	W	
Thermal Resistance from Junction to Case	R <sub>θJC</sub>	0.65	°C/W	
Junction Temperature	TJ	150	°C	
Storage Temperature	T <sub>STG</sub>	-55~ +150	°C	

## Electrical Characteristics (T<sub>C</sub>=25 ℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Туре	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	$V_{GS} = 0V, I_{D} = 250 \mu A$	100	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =100V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	2	3	4	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	4.5	5.4	mΩ
Gate Resistance	R <sub>G</sub>	f =1MHz	-	3.5	-	Ω
Dynamic characteristics			•			
Input Capacitance	C <sub>iss</sub>		-	3244	-	pF
Output Capacitance	C <sub>oss</sub>	$V_{DS}$ =50V, $V_{GS}$ =0V, f =1MHz	-	1075	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	52	-	
Switching characteristics						
Turn-on delay time	t <sub>d(on)</sub>		-	22	-	ns
Turn-on rise time	t <sub>r</sub>	$V_{DD}$ =50V, RL=2.5 $\Omega$	-	36	-	
Turn-off delay time	t <sub>d(off)</sub>	$V_{GS}$ =10V, $R_G$ =6 $\Omega$	-	49	-	
Turn-off fall time	t <sub>f</sub>		-	31	-	
Total Gate Charge	Qg	\/D0_50\/_ID_004	-	51	-	
Gate-Source Charge	Qgs	VDS=50V, ID=20A,	-	15	-	nC
Gate-Drain Charge	Qgd	- VGS=10V	-	13	-	
Source-Drain Diode characteristics						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	Is		-	-	120	Α
Reverse recovery time	Trr	Is=15A,V <sub>GS</sub> =0V,dI <sub>F</sub> /dt=100A/us		58		ns
Reverse recovery charge	Qrr	Is=15A,V <sub>GS</sub> =0V,dI <sub>F</sub> /dt=100A/us		90		nC

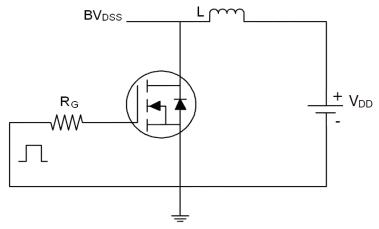
#### Notes:

- 1. Repetitive Rating: pulse width limited by maximum junction temperature
- 2. EAS Condition:T\_J=25  $^{\circ}\text{C}$  ,V\_DD=50V,R\_G=25  $^{\Omega}$  ,L=0.5mH
- 3. Pulse Test: pulse width≤300µs, duty cycle≤2%
- 4. Surface Mounted on FR4 Board,t≤10 sec

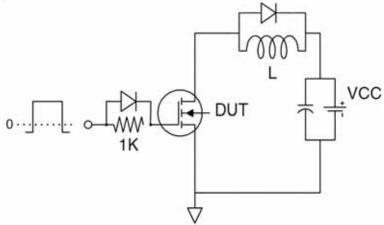


#### **Test Circuit**

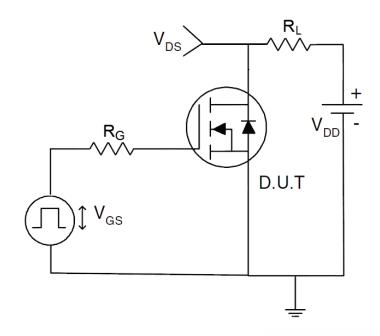
# 1) E<sub>AS</sub> test Circuit



# 2) Gate charge test Circuit

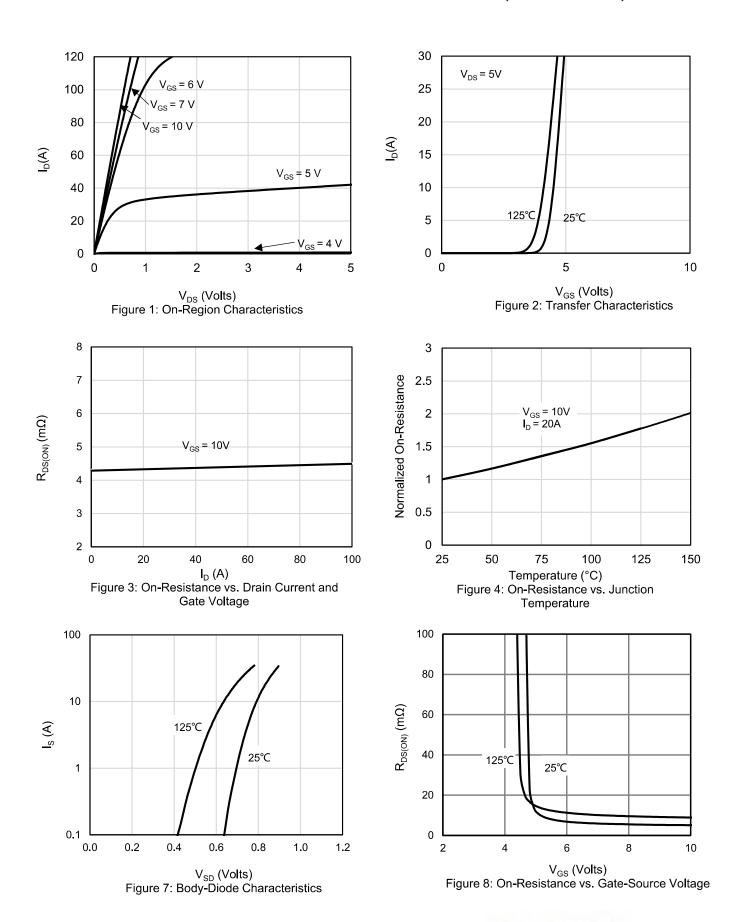


## 3) Switch Time Test Circuit

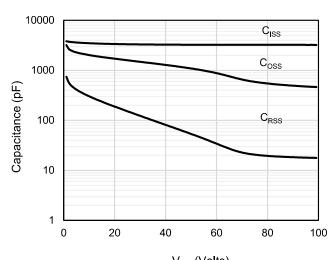




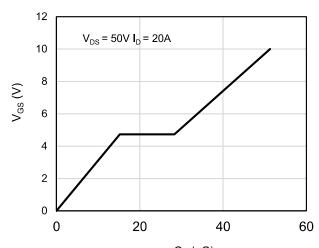
# RATING AND CHARACTERISTICS CURVES (RM130N100T2)



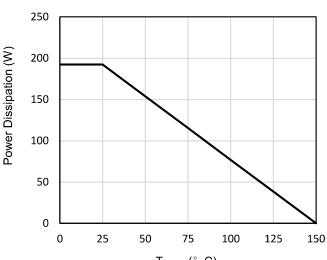
## **RATING AND CHARACTERISTICS CURVES (RM130N100T2)**



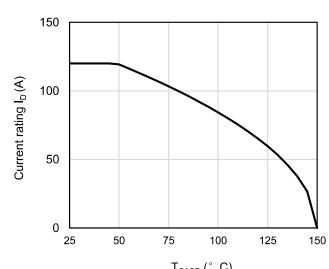
 $V_{DS}$  (Volts) Figure 9: Capacitance Characteristics



 $\rm Q_{\rm g}$  (nC) Figure 10: Gate-Charge Characteristics



 $T_{CASE}$  (° C) Figure 11: Power De-rating



 $T_{CASE}$  (° C) Figure 12: Current De-rating

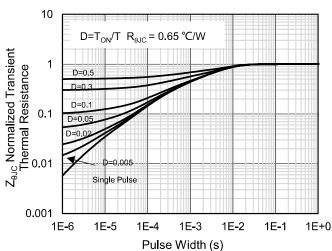


Figure 13: Normalized Maximum Transient
Thermal Impedance

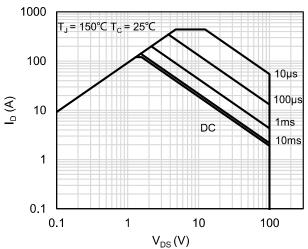
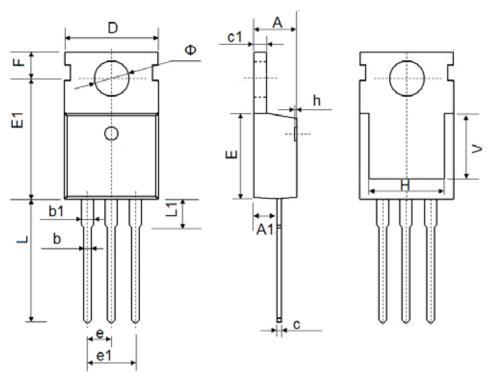


Figure 14: Maximum Forward Biased Safe
Operating Area

# **TO-220-3L Package Information**



Symbol	Dimensions	In Millimeters	Dimensions In Inches		
	Min.	Max.	Min.	Max.	
А	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	
С	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	
Е	8.9500	9.750	0.352	0.384	
E1	12.650	12.950	0.498	0.510	
е	2.540 TYP.		0.100 TYP.		
e1	4.980	5.180	0.196	0.204	
F	2.650	2.950	0.104	0.116	
Н	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.		
Ф	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.

