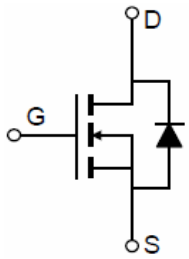
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM150N60DF

N-Channel Super Trench Power MOSFET

Description

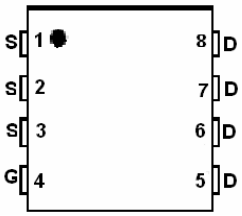
The RM150N60DF uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.



Schematic diagram

General Features

- V_{DS} =60V,I_D =150A
  $R_{DS(ON)}$ <2.3mΩ @V_{GS}=10V (TYP:1.9mΩ)
  $R_{DS(ON)}$ <3.5mΩ @V_{GS}=4.5V (TYP:3.0mΩ)
- Excellent gate charge x $R_{DS(on)}$ product
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating
- 100% UIS tested



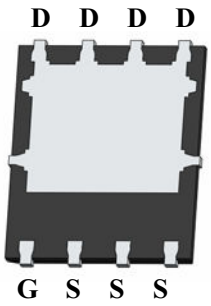
Marking and pin assignment

Application

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

100% UIS TESTED!
100% ΔVds TESTED!

Top View



Bottom View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
150N60	RM150N60DF	DFN5X6-8L	-	-	-

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_a =25℃)	I_D	150	A
Continuous Drain Current (T_a =100℃)	I_D	100	A
Pulsed Drain Current [1]	I_{DM}	450	A
Single Pulsed Avalanche Energy [2]	E_{AS}	520	mJ
Power Dissipation	P_D	140	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.89	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	45	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

Electrical Characteristics (T_C=25℃unless otherwise noted)

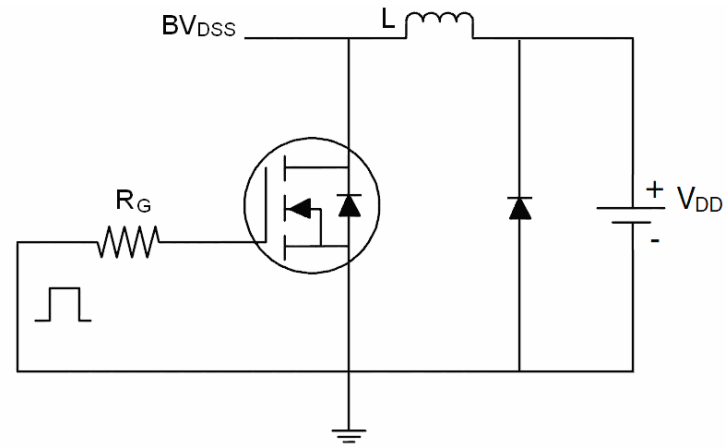
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	60	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.5	2.0	3.0	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =20A	-	1.9	2.3	mΩ
		V_{GS} =4.5V, I_D =10A	-	3.0	3.5	mΩ
Forward Threshold Voltage	g_{fs}	V_{DS} =5V, I_D =20A	-	75	-	S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =100KHz	-	6052	-	pF
Output Capacitance	C_{oss}		-	1470	-	
Reverse Transfer Capacitance	C_{rss}		-	185	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, I_D=25A, V_{GS}=10V, R_G=2Ω	-	8	-	ns
Turn-on rise time	t_r		-	15	-	
Turn-off delay time	$t_{d(off)}$		-	55	-	
Turn-off fall time	t_f		-	25	-	
Total Gate Charge	Qg	VDS=30V, ID=25A, VGS=10V	-	110	-	nC
Gate-Source Charge	Qgs		-	20	-	
Gate-Drain Charge	Qgd		-	21	-	
Reverse Recovery Chrage	Qrr	I_F=20A,di/dt=100A/us		100		nC
Reverse Recovery Time	Trr	I_F=20A,di/dt=100A/us		72		ns
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{SD}	V_{GS} =0V, I_S=10A	-	-	1.2	V
Diode Forward current(4)	I_S		-	-	150	A

Notes:

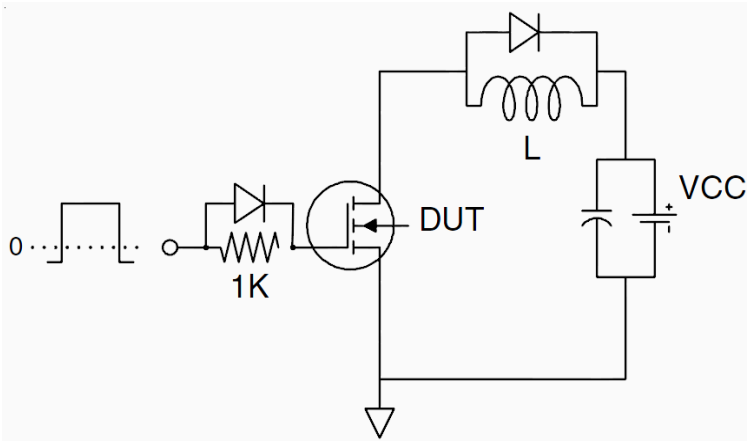
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=48V,R_G=25Ω,L=0.5Mh
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit

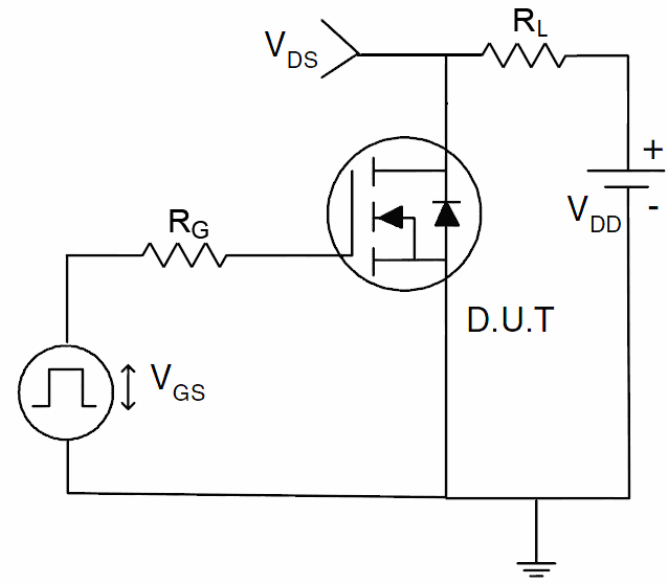
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



RATING AND CHARACTERISTICS CURVES (RM150N60DF)

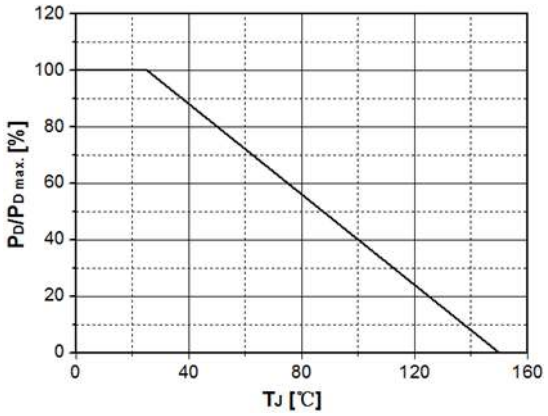


Fig.1 Power Dissipation Derating Curve

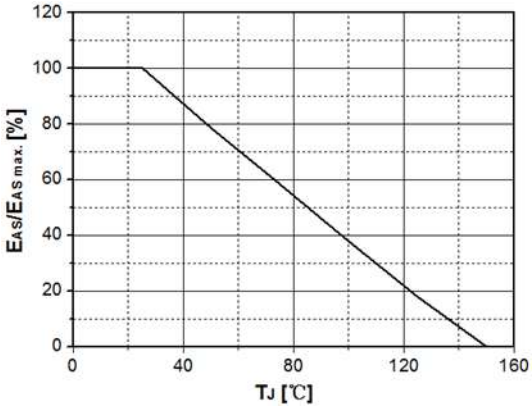


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

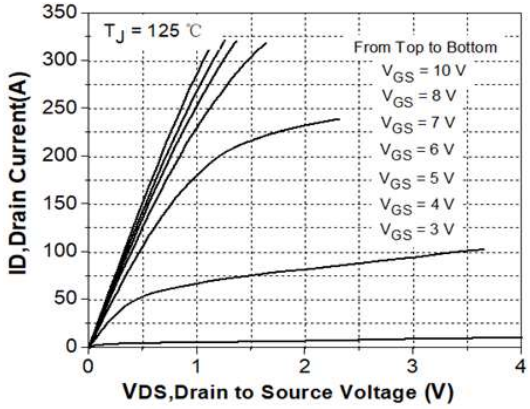


Fig.3 Typical Output Characteristics

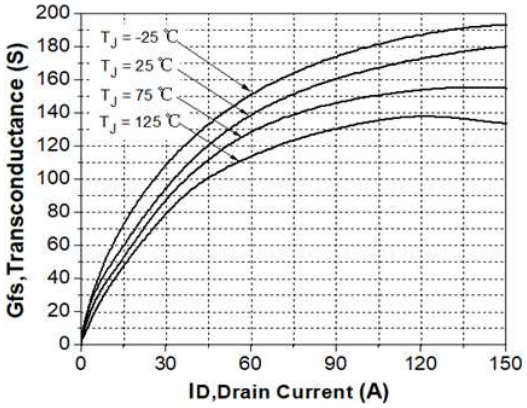


Fig. 4 Transconductance vs. Drain Current

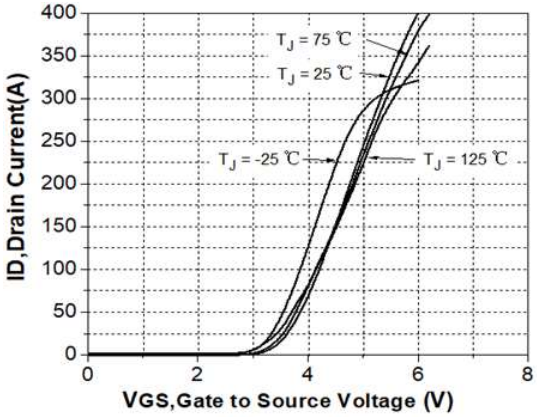


Fig.5 Typical Transfer Characteristics

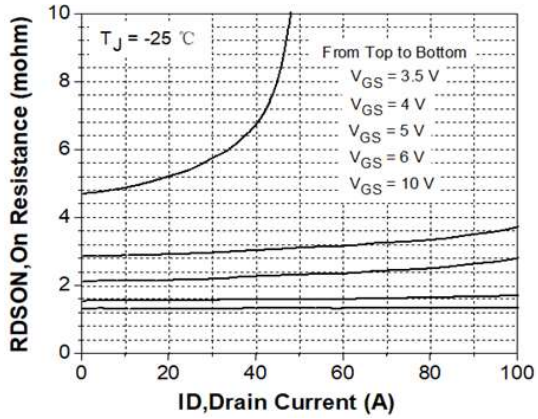


Fig. 6 State Resistance vs. Drain Current @-25℃

RATING AND CHARACTERISTICS CURVES (RM150N60DF)

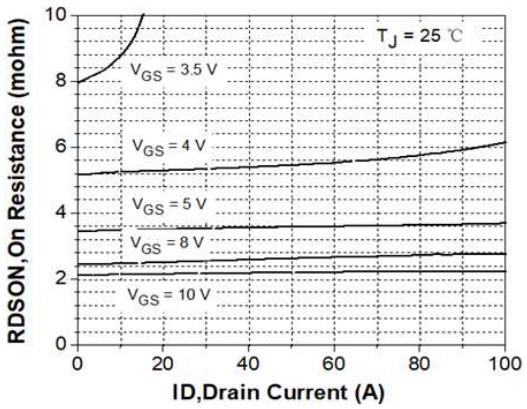


Fig.7 State Resistance vs. Drain Current @25℃

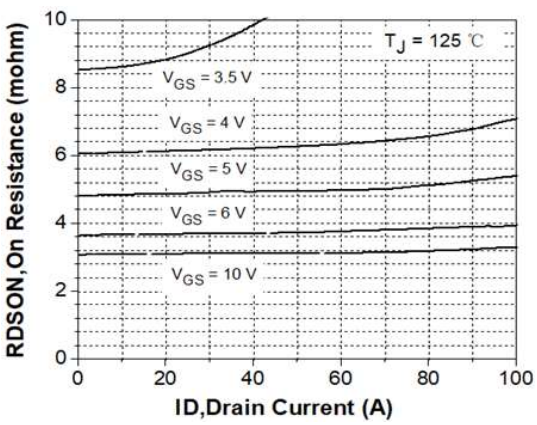


Fig. 8 State Resistance vs. Drain Current @125℃

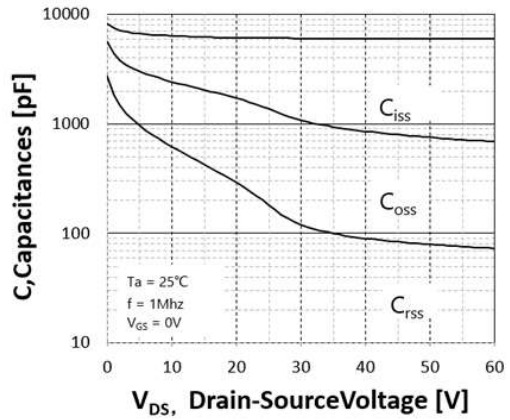


Fig.9 Typical Capacitance vs. Drain Source Voltage

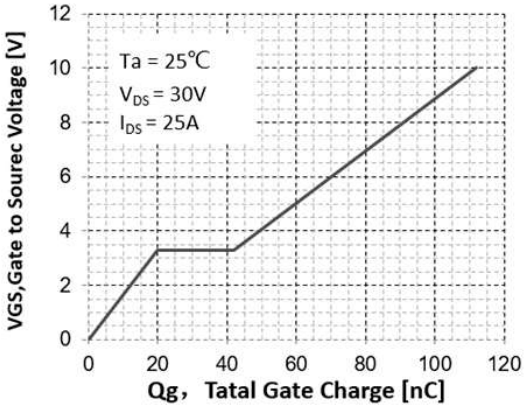


Fig.10 Dynamic Input Characteristics

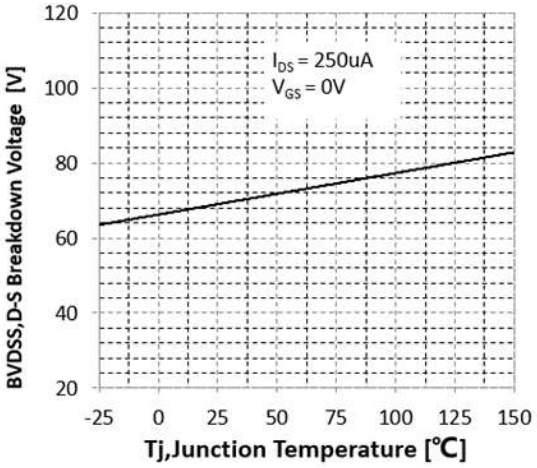


Fig.11 Breakdown Voltage vs. Junction Temperature

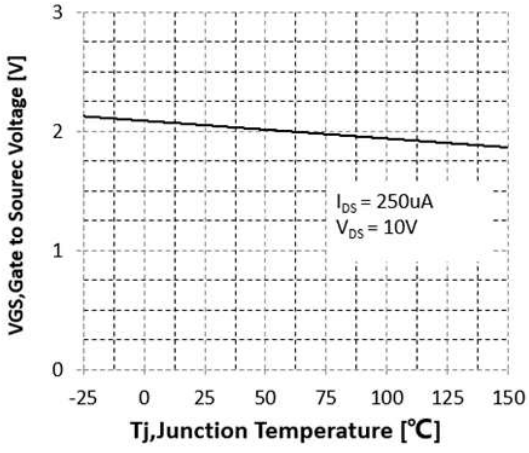
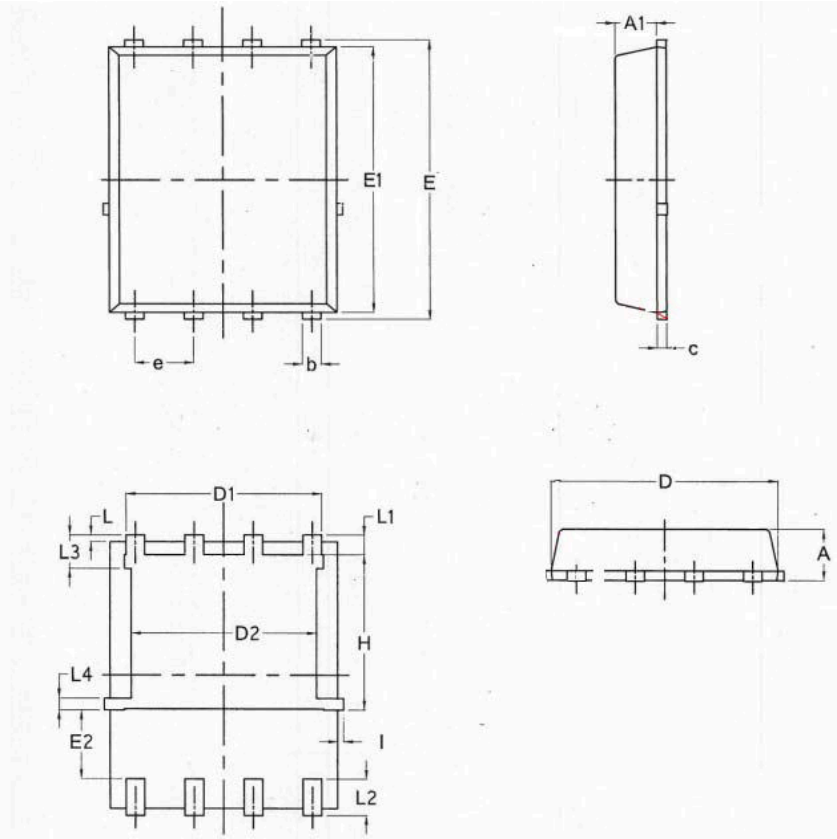


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.90	1.10	1.17	0.0354	0.0433	0.0461
A1	0.824	0.897	0.97	0.0324	0.0353	0.0382
b	0.33	0.41	0.50	0.0130	0.0161	0.0197
C	0.150	0.20	0.250	0.0059	0.0079	0.0098
D	4.80	4.90	5.00	0.1890	0.1929	0.1969
D1	3.91	4.22	4.36	0.1539	0.1661	0.1717
D2	3.85	4.00	4.15	0.1516	0.1575	0.1634
E	5.90	6.05	6.15	0.2323	0.2382	0.2421
E1	5.65	5.76	5.85	0.2224	0.2268	0.2303
E2	1.10	/	/	0.0433	/	/
e	1.27 BSC			0.050 BSC		
L	0.05	0.15	0.25	0.0020	0.0059	0.0098
L1	0.38	0.425	0.50	0.0150	0.0167	0.0197
L2	0.51	0.785	0.86	0.0201	0.0309	0.0339
L3	0.55	0.70	0.85	0.0217	0.0276	0.0335
L4	0.10	0.25	0.40	0.0039	0.0098	0.0157
H	3.25	3.35	3.58	0.1280	0.1319	0.1409
I	0	/	0.18	0	/	0.0071

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.