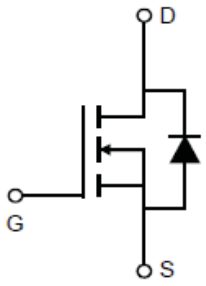
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM150N40DF

N-Channel Super Trench Power MOSFET

Description

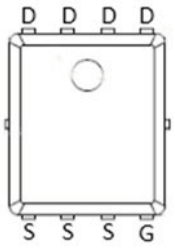
The RM150N40DF uses **Super Trench** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.



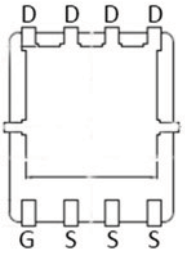
Schematic Diagram

General Features

- V_{DS} =40V,I_D =150A
  $R_{DS(ON)}$=1.6mΩ(typical) @ V_{GS}=10V
  $R_{DS(ON)}$=2.2mΩ (typical) @ V_{GS}=4.5V
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating
- 100% UIS tested



Top View



Bottom View

Application

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

100% UIS TESTED!
100% ΔVds TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
FN40	RM150N40DF	DFN5X6-8L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous **(Silicon Limited)**	I_D	150	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	106	A
Pulsed Drain Current **(Package Limited)**	I_{DM}	400	A
Maximum Power Dissipation	P_D	107	W
Derating factor		0.7	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	720	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	1.4	℃/W
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	47	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.2	1.5	2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=75A	-	1.6	2.1	mΩ
		V_{GS}=4.5V, I_D=30A	-	2.2	3.3	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=75A		80	-	S
Gate Resistance	R_g	V_{DS} =V_{GS} =0V, f =1MHz	-	1.94	-	Ω
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	3000	-	PF
Output Capacitance	C_{oss}		-	895	-	PF
Reverse Transfer Capacitance	C_{rss}		-	37	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V,I_D=75A V_{GS}=10V,R_G=1.6Ω	-	13	-	nS
Turn-on Rise Time	t_r		-	3	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	52	-	nS
Turn-Off Fall Time	t_f		-	24	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=75A, V_{GS}=10V	-	40	-	nC
Gate-Source Charge	Q_{gs}		-	8	-	nC
Gate-Drain Charge	Q_{gd}		-	7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=75A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	150	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = I_S di/dt = 100A/μs (Note3)	-	35	-	nS
Reverse Recovery Charge	Qrr		-	31	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,V_{DD}=20V,V_G=10V,L=0.5mH,Rg=25Ω

RATING AND CHARACTERISTICS CURVES (RM150N40DF)

Fig.1 Power Dissipation Derating Curve

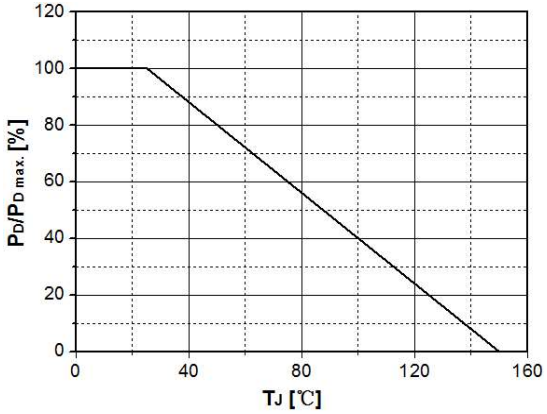


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

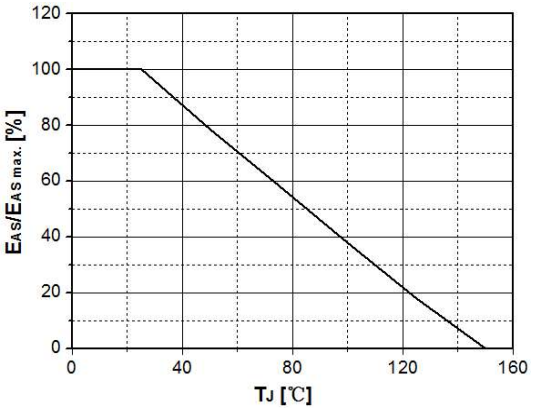


Fig.3 Typical Output Characteristics

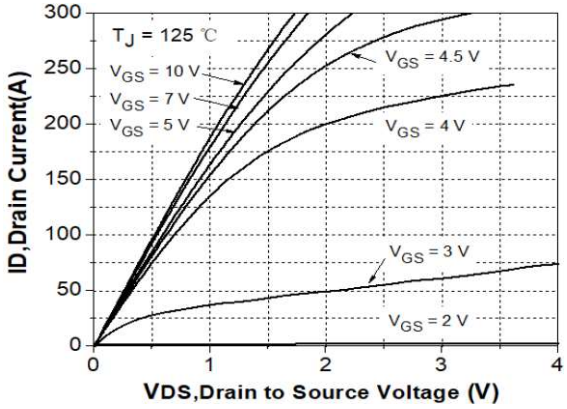


Fig. 4 Transconductance vs. Drain Current

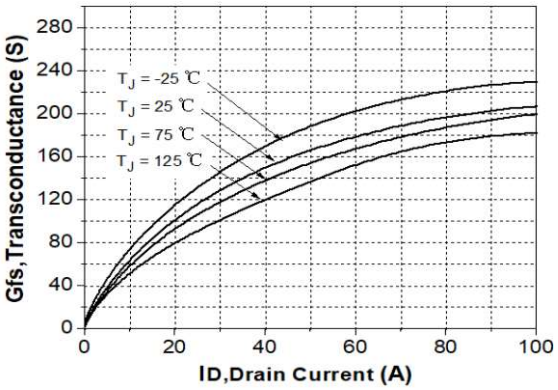


Fig.5 Typical Transfer Characteristics

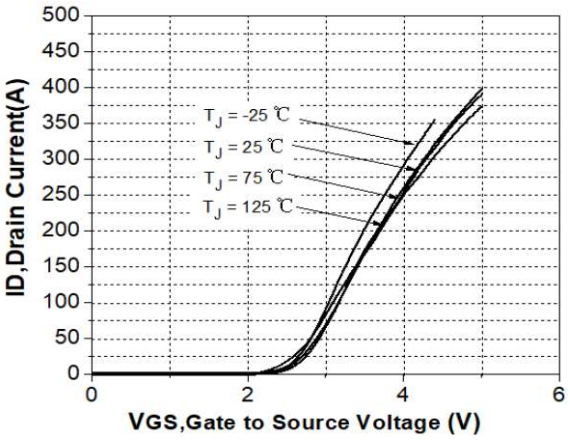
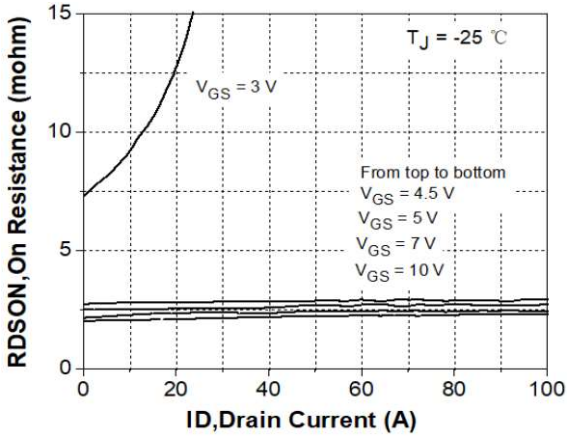


Fig. 6 On-Resistance vs. Drain Current @-25℃



RATING AND CHARACTERISTICS CURVES (RM150N40DF)

Fig.7 On-Resistance vs. Drain Current @25℃

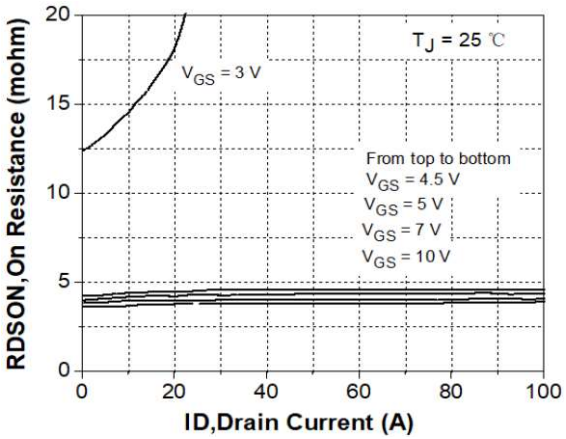


Fig. 8 On-Resistance vs. Drain Current @125℃

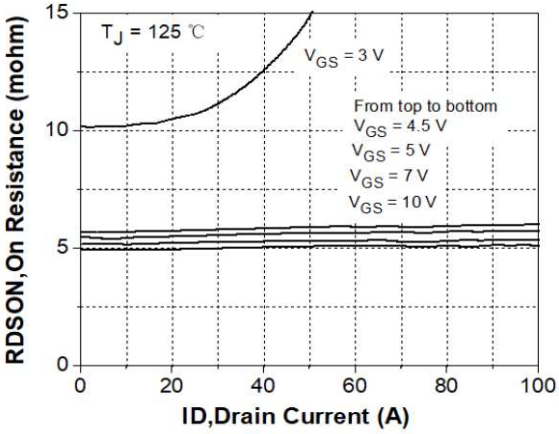


Fig.9 Typical Capacitance vs. Drain Source Voltage

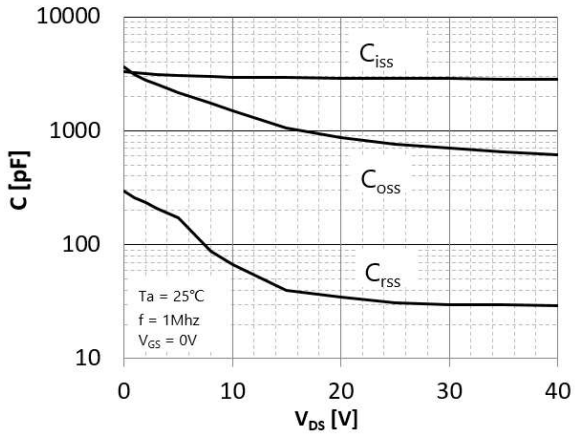


Fig.10 Dynamic Input Characteristics

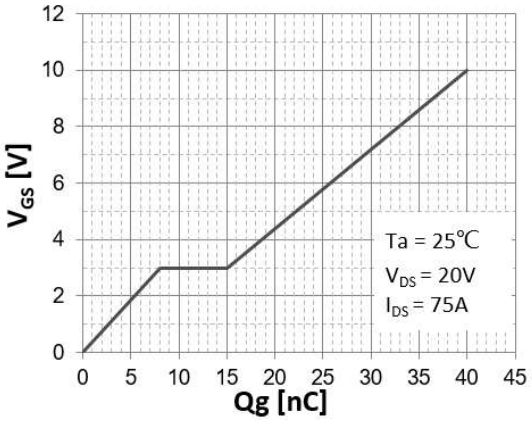


Fig.11 Breakdown Voltage vs. Junction Temperature

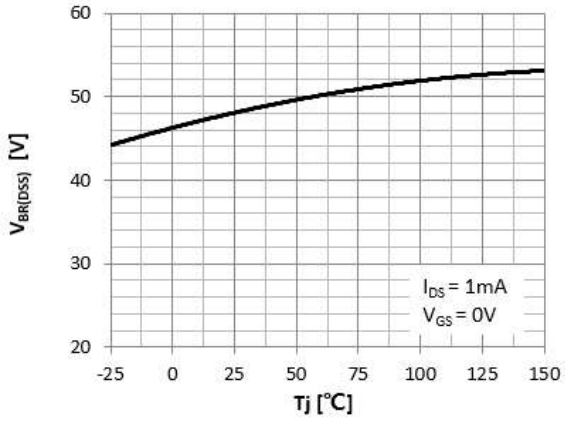
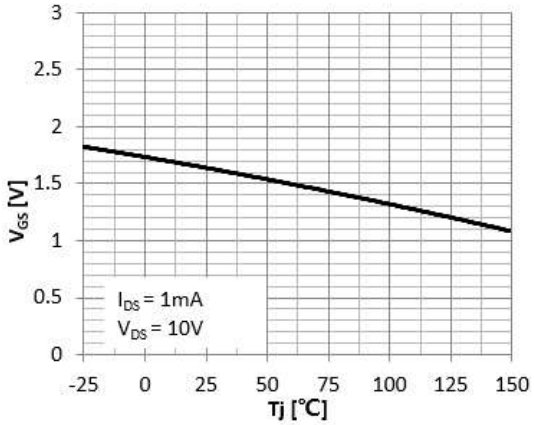


Fig. 12 Gate Threshold Voltage vs. Junction Temperature



RATING AND CHARACTERISTICS CURVES (RM150N40DF)

Figure 13: On-Resistance vs. Junction Temperature

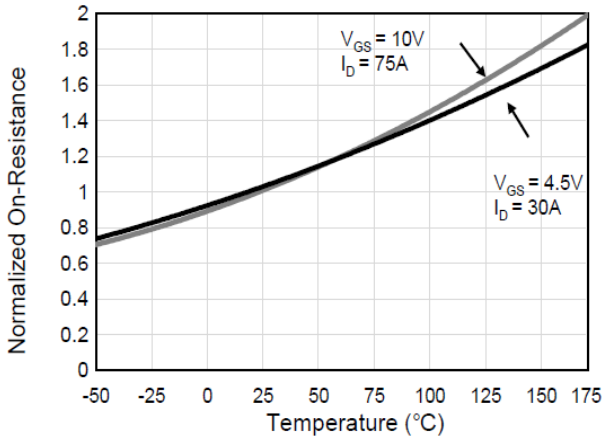
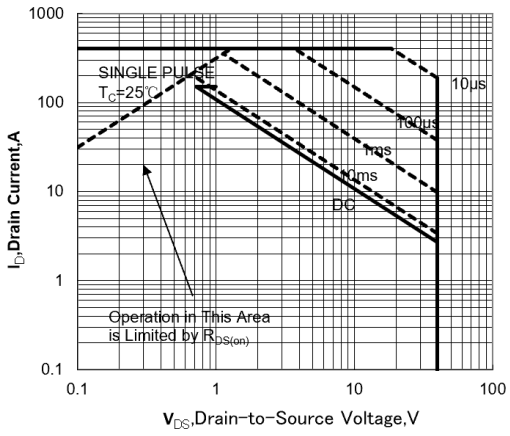


Figure 14: Maximum Forward Biased Safe Operating Area



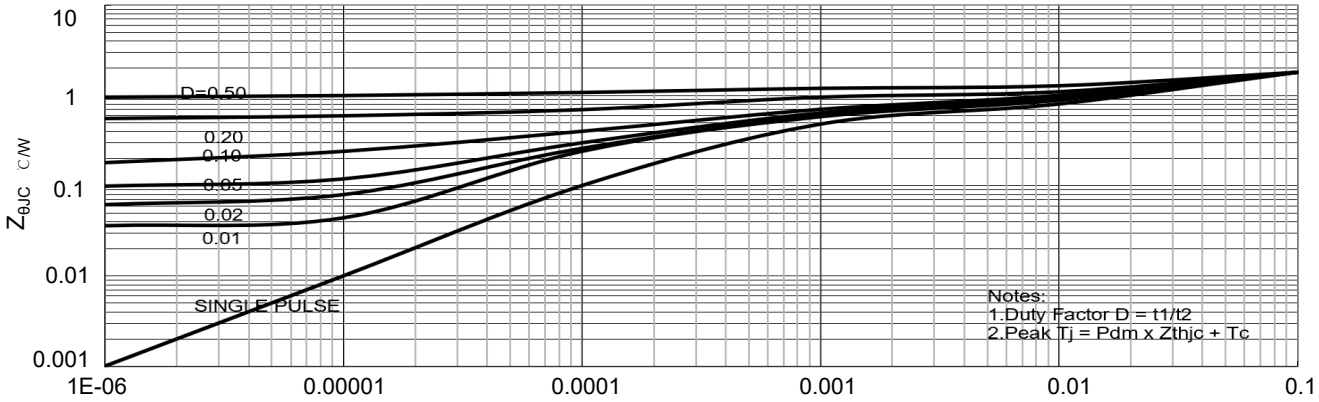
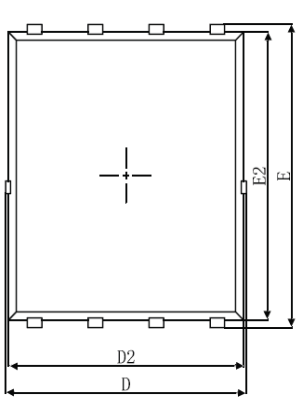
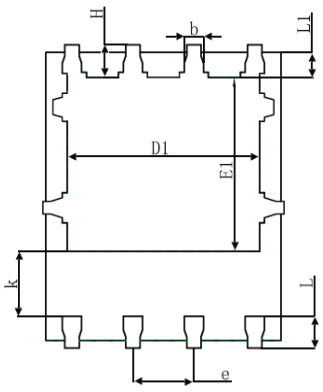


Figure 15: Maximum Continuous Drain Current vs Case Temperature

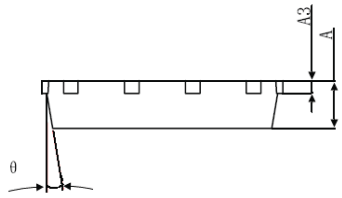
DFN5X6-8L Package Information



Top View
[顶视图]

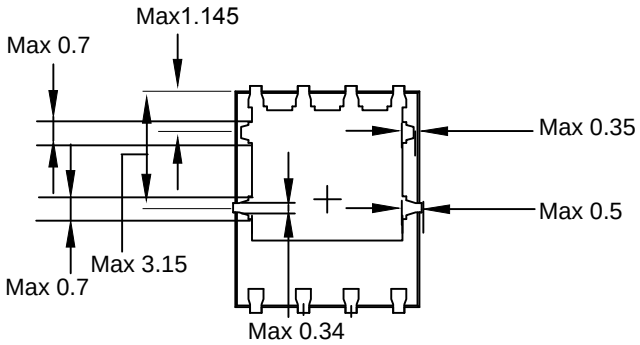


Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	0.9	1.1	0.035	0.043
A3	0.15	0.34	0.006	0.013
D	-	5.1	-	0.201
E	5.9	6.1	0.232	0.240
D1	3.91	4.11	0.154	0.162
E1	3.375	3.475	0.133	0.137
D2	4.8	5.0	0.189	0.197
E2	5.7	5.8	0.224	0.228
k	1.2	1.27	0.047	0.050
b	0.25	0.35	0.010	0.014
e	1.27 TYP		0.05 TYP	
L	0.55	0.75	0.022	0.030
L1	0.424	0.576	0.017	0.023
H	0.55	0.75	0.022	0.030
θ	8°	12°	8°	12°



Unit:mm

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