RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM50P30DF

P-Channel Enhancement Mode Power MOSFET

Description

The RM50P30DF uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

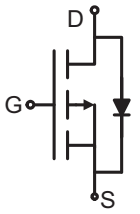
General Features

- V_{DS} =-30V,I_D =-50A
  $R_{DS(ON)}$ < 7mΩ @ V_{GS}=-10V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

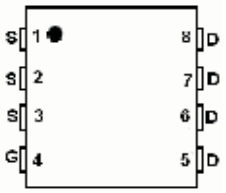
Application

- Battery and loading switching

100% UIS TESTED!



Schematic diagram



Marking and pin assignment



DFN 5x6 EP top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
50P30	RM50P30DF	DFN 5x6 EP	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-50	A
Pulsed Drain Current	I_{DM}	-70	A
Maximum Power Dissipation	P_D	35	W
Derating factor		0. 28	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	300	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	3.6	℃/W

Electrical Characteristics (TC=25℃unless otherwise noted)

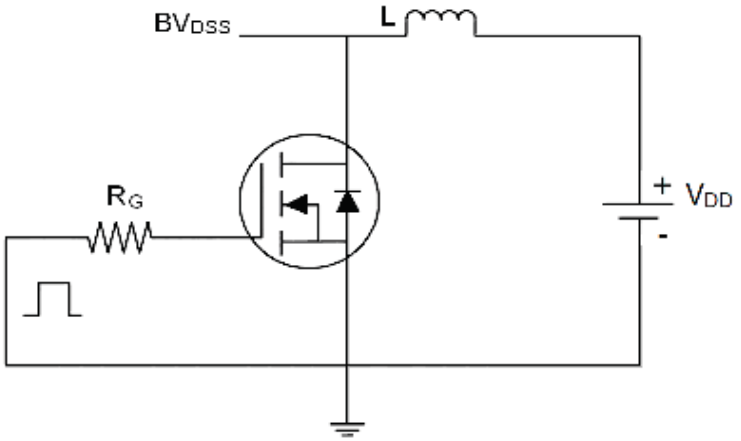
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-30V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-10A	-	4.4	7	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V,I_D=-15A	-	20	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	3590	-	PF
Output Capacitance	C_{oss}		-	695	-	PF
Reverse Transfer Capacitance	C_{rss}		-	665	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-10A V_{GS}=-10V,R_{GEN}=6Ω	-	13	-	nS
Turn-on Rise Time	t_r		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	50	-	nS
Turn-Off Fall Time	t_f		-	14	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-10A, V_{GS}=-10V	-	84	-	nC
Gate-Source Charge	Q_{gs}		-	11.7	-	nC
Gate-Drain Charge	Q_{gd}		-	25	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-10A	-	-0.85	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-50	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF = -10A di/dt = 100A/μs(Note3)	-	-	45	nS
Reverse Recovery Charge	Qrr		-	-	43	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

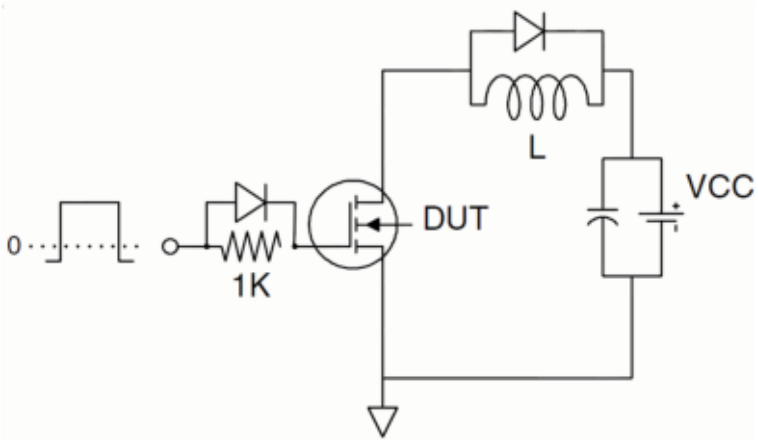
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition：Tj=25℃,V_{DD}=-15V,V_G=-10V,L=0.5mH,Rg=25Ω

Test Circuit

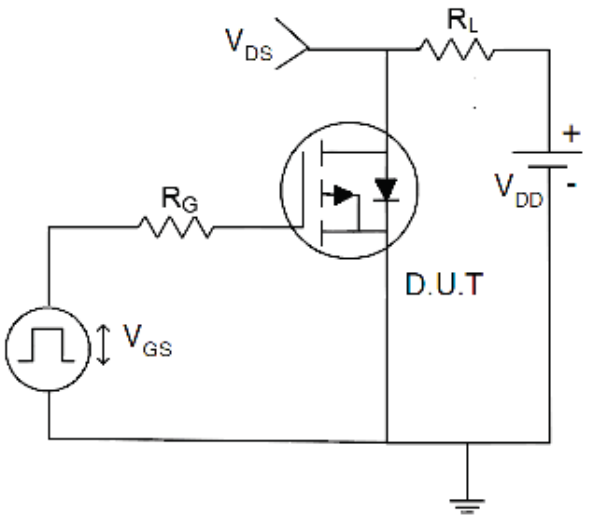
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit



3) Switch Time Test Circuit



RATING AND CHARACTERISTICS CURVES (RM50P30DF)

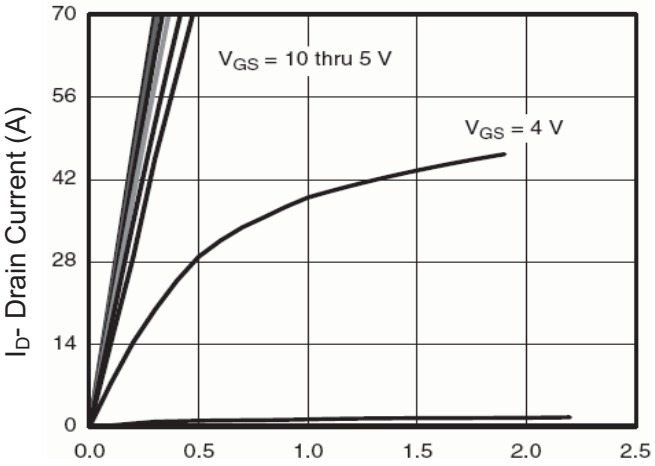


Figure 1 Output Characteristics

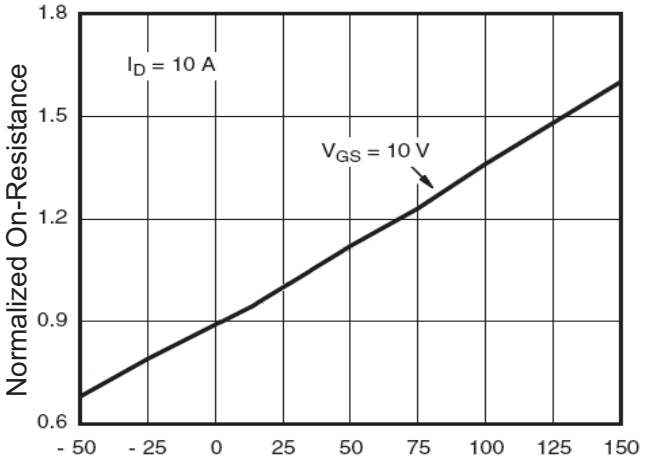


Figure 4 Rdson-Junction Temperature

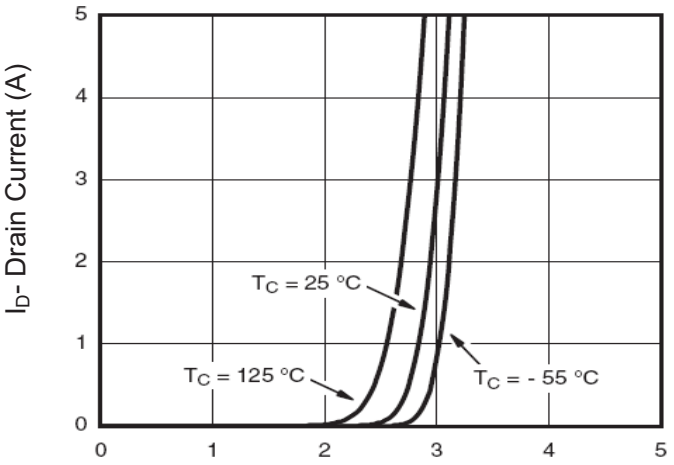


Figure 2 Transfer Characteristics

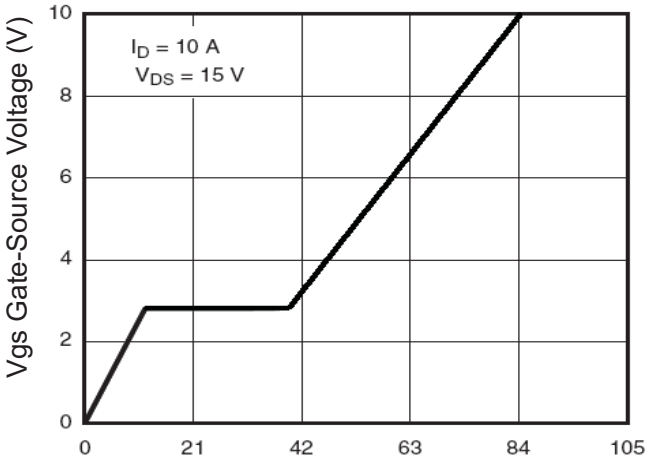


Figure 5 Gate Charge

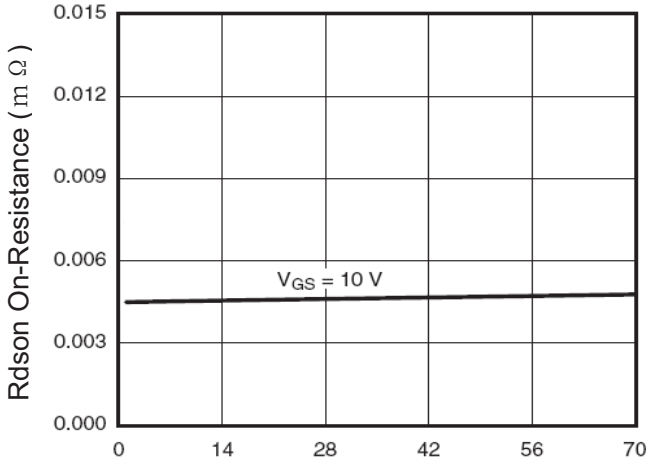


Figure 3 Rdson- Drain Current

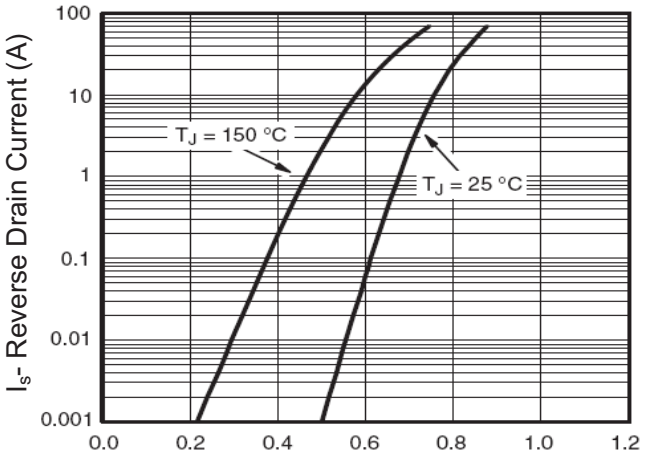
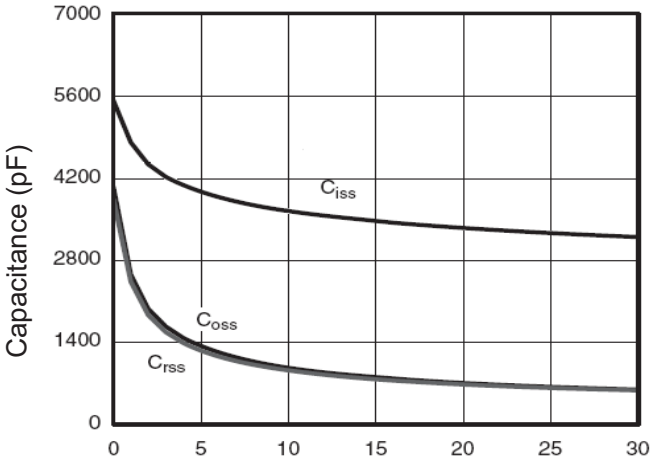


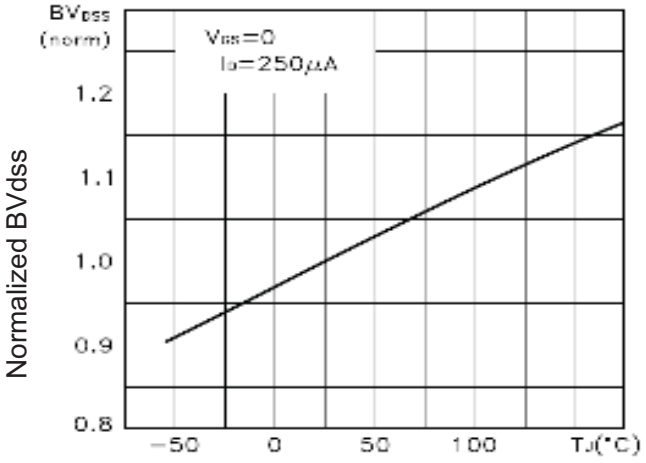
Figure 6 Source- Drain Diode Forward

RATING AND CHARACTERISTICS CURVES (RM50P30DF)



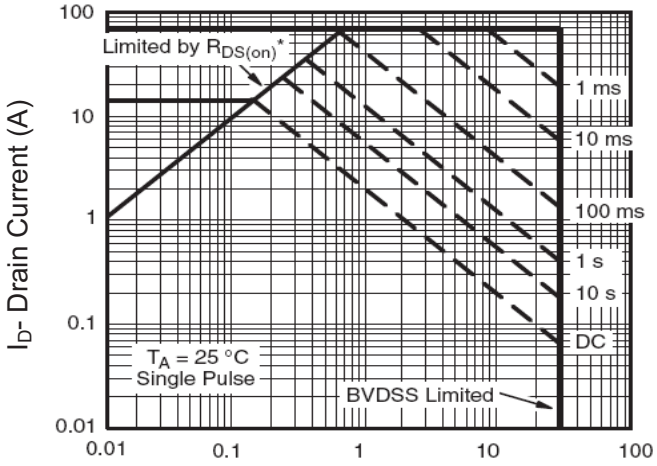
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



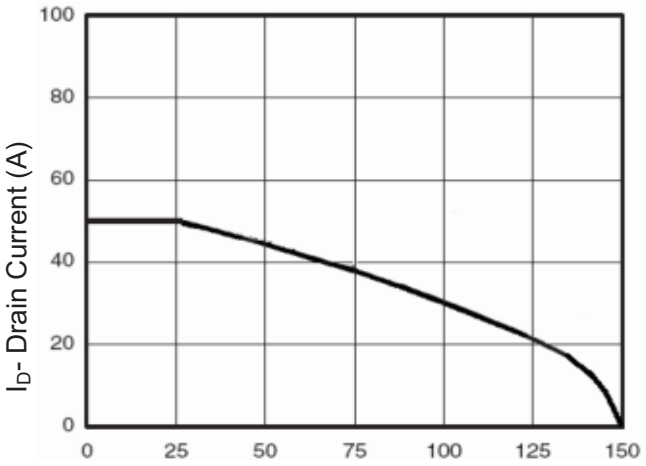
T_J-Junction Temperature(℃)

Figure 9 BV_{DSS} vs Junction Temperature



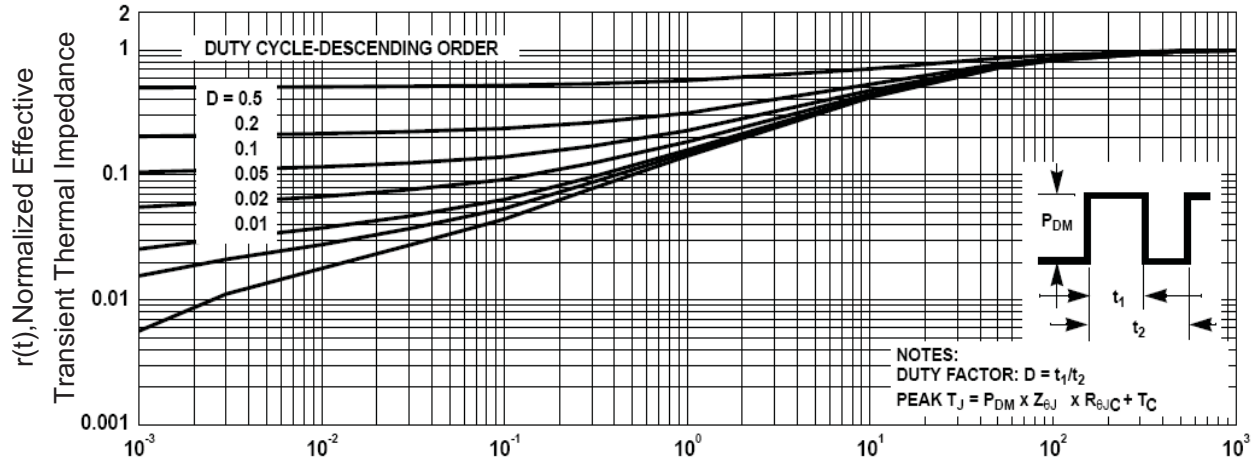
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



T_J-Junction Temperature(℃)

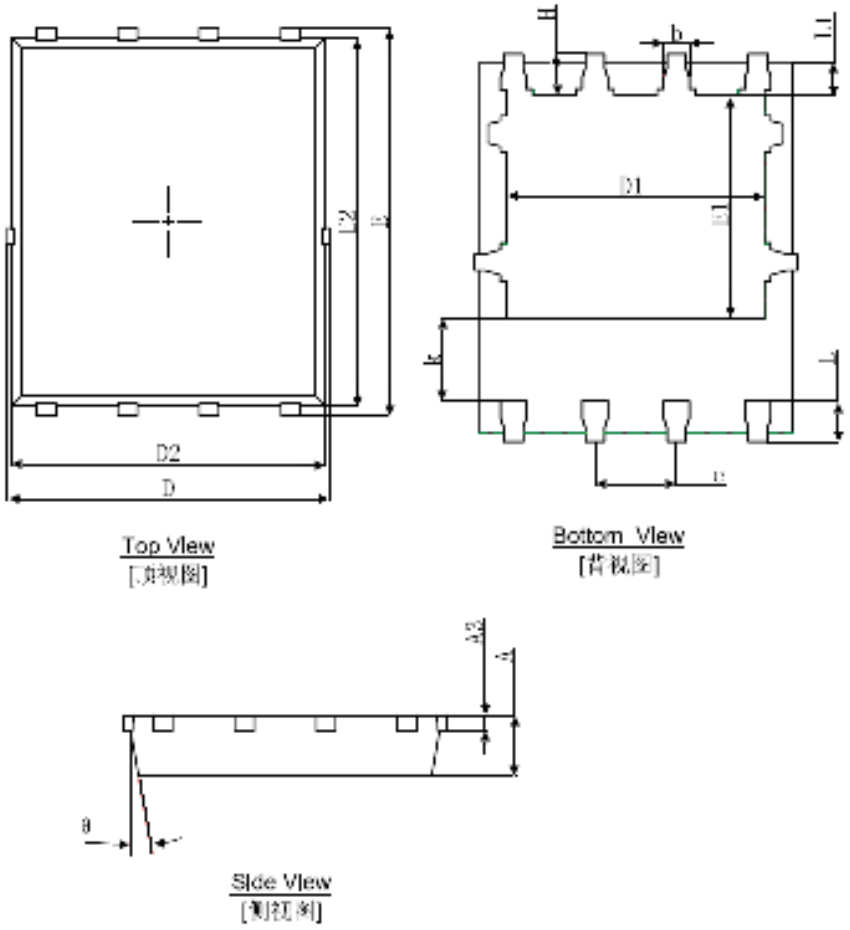
Figure 10 ID Current Derating vs Junction Temperature



Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
K	1.190	1.390	0.047	0.055
b	0.035	0.450	0.014	0.018
e	1.270(TYP.)		0.050(TYP.)	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°

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