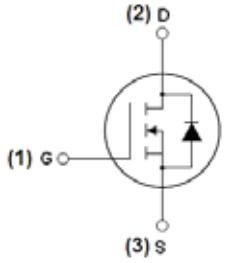
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

RM50P30D3

P-Channel Enhancement Mode Power MOSFET

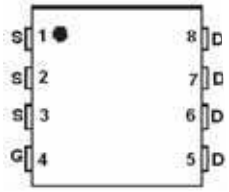
Description

The RM50P30D3 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.



Schematic diagram

pin assignment



DFN 3x3 EP top view

General Features

- V_{DS} =-30V,I_D =-50A
  $R_{DS(ON)}$ <8.7mΩ @V_{GS}=-10V
  $R_{DS(ON)}$ <13.5mΩ @V_{GS}=-4.5V
- 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

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM50P30D3

100% UIS TESTED!
100% ∆Vds TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
50P30	RM50P30D3	DFN 3X3	-	-	-

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
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	-32	A
Pulsed Drain Current	I_{DM}	-200	A
Maximum Power Dissipation	P_D	38	W
Single pulse avalanche energy (Note 5)	E_{AS}	125	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	2.3	℃/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	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,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	-	-2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-30A	-	7.3	8.7	mΩ
		V_{GS}=-4.5V, I_D=-15A	-	11	13.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-18A	-	25	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz	-	3448	-	PF
Output Capacitance	C_{oss}		-	508	-	PF
Reverse Transfer Capacitance	C_{rss}		-	421	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-15A,R_L=1Ω V_{GS}=-10V,R_G=3.3Ω	-	9.4	-	nS
Turn-on Rise Time	t_r		-	10.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	117	-	nS
Turn-Off Fall Time	t_f		-	24	-	nS
Total Gate Charge	Q_g	V_{DS}=-15V,I_D=-15A, V_{GS}=-4.5V	-	30	-	nC
Gate-Source Charge	Q_{gs}		-	10	-	nC
Gate-Drain Charge	Q_{gd}		-	10.4	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S =-1A	-	-	-1	V
Diode Forward Current (Note 2)	I_S		-	-	-50	A

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. E_{AS} condition : Tj=25℃,V_{DD}=20V,V_G=10V,L=1mH,Rg=25Ω，

RATING AND CHARACTERISTICS CURVES (RM50P30D3)

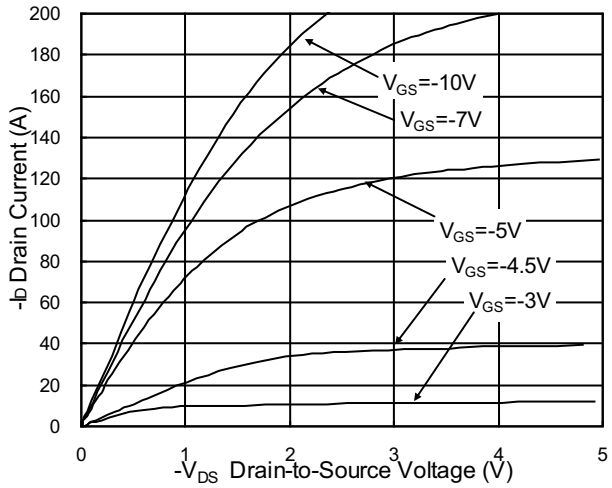


Fig.1 Typical Output Characteristics

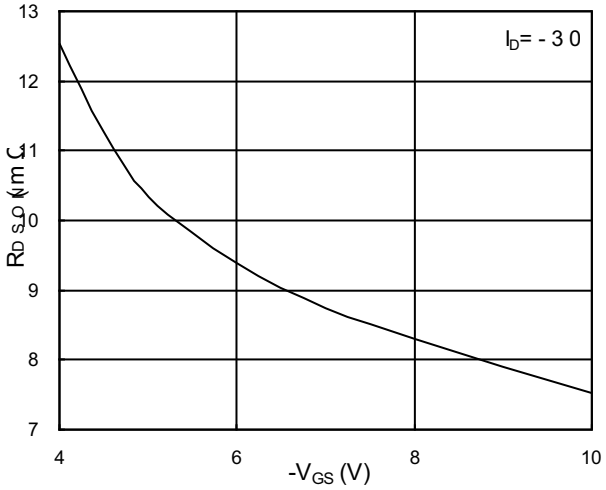


Fig.2 On-Resistance v.s Gate-Source

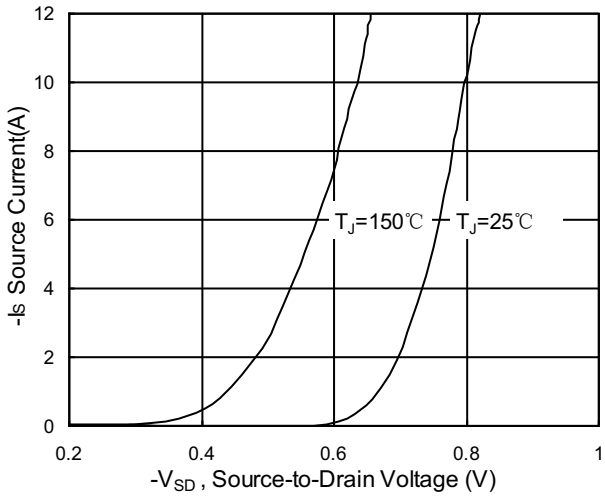


Fig.3 Forward Characteristics Of Reverse

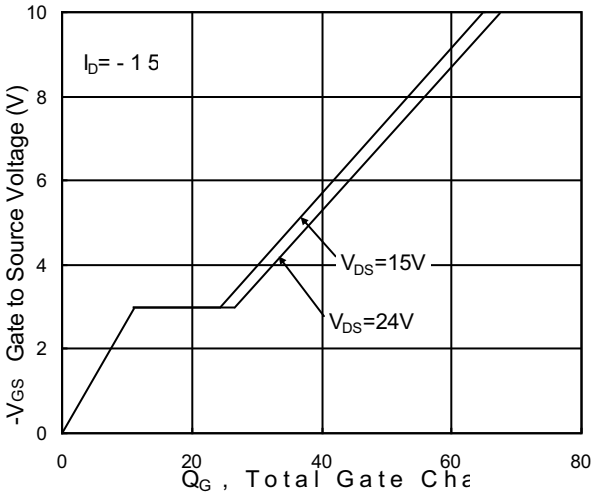


Fig.4 Gate-Charge Characteristics

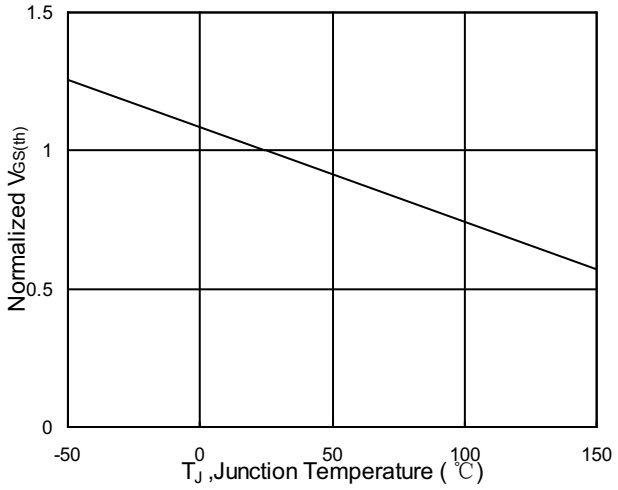


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

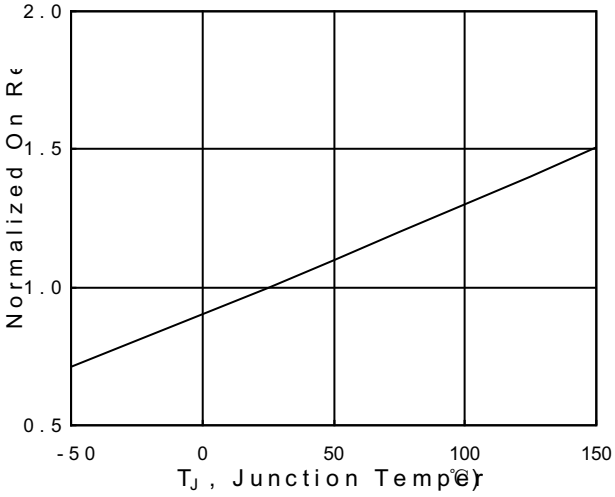


Fig.6 Normalized R_{DSON} v.s T_J

RATING AND CHARACTERISTICS CURVES (RM50P30D3)

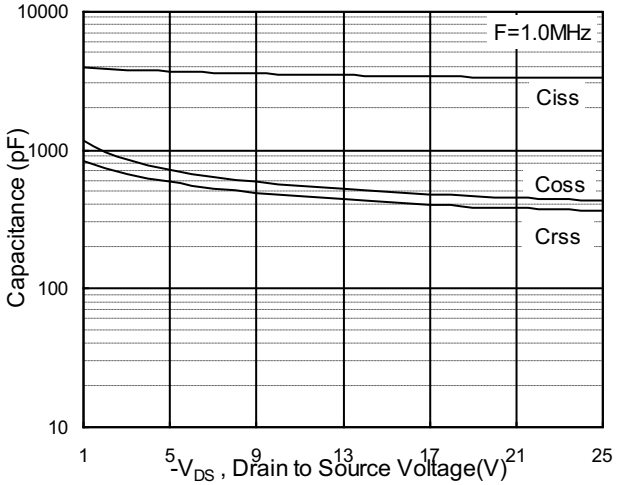


Fig.7 Capacitance

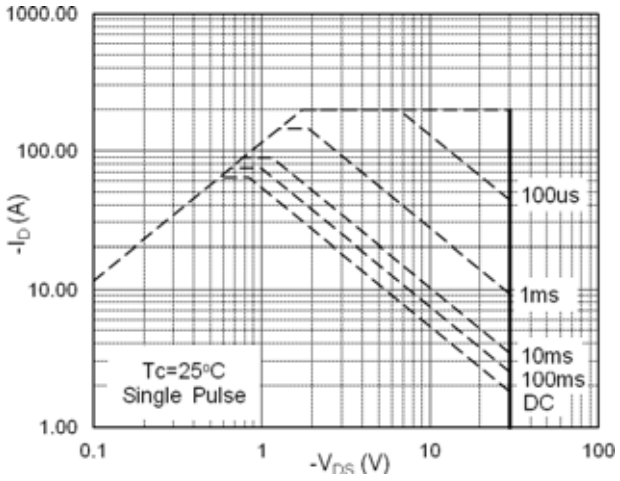


Fig.8 Safe Operating Area

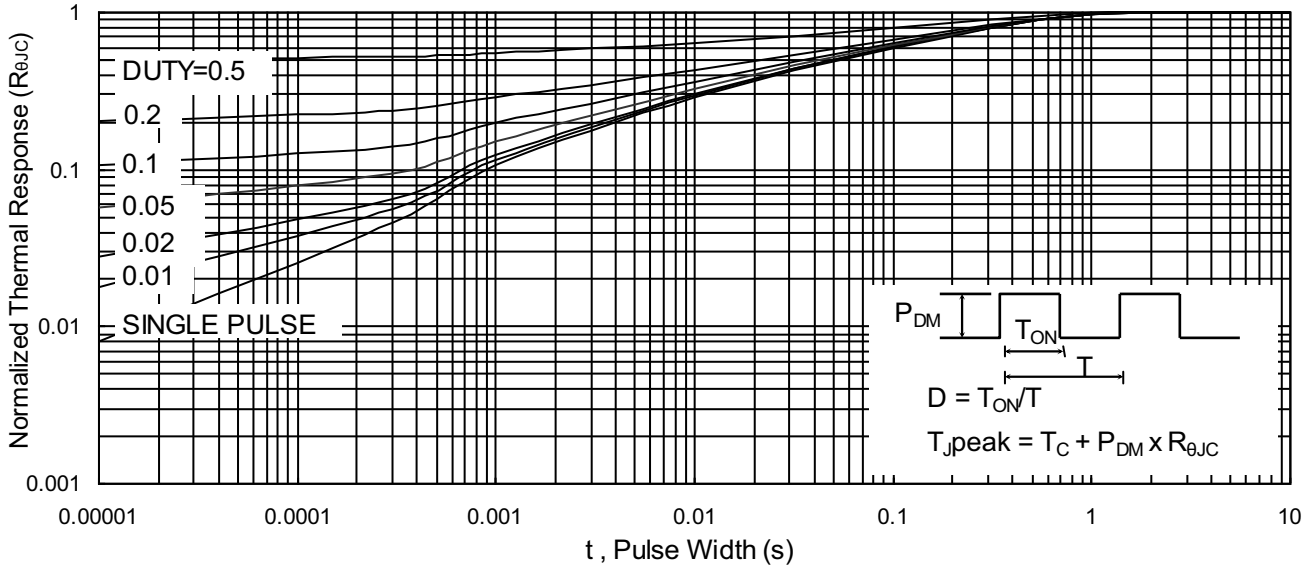
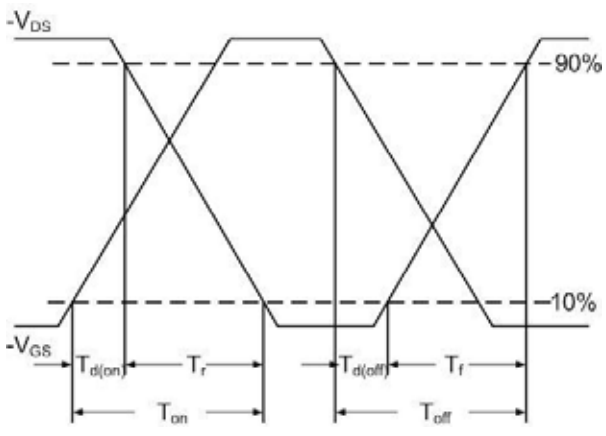


Fig.9 Normalized Maximum Transient Thermal Impedance



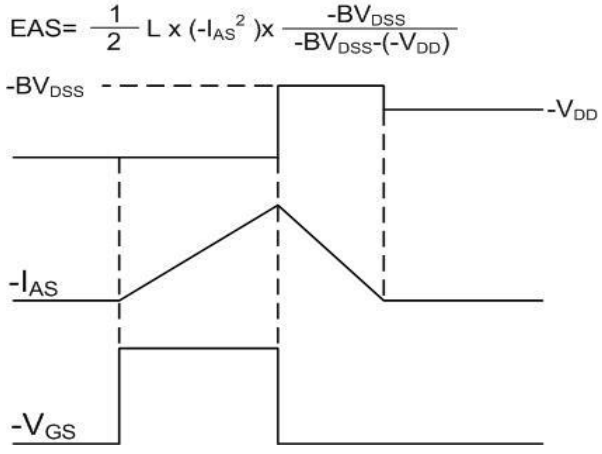
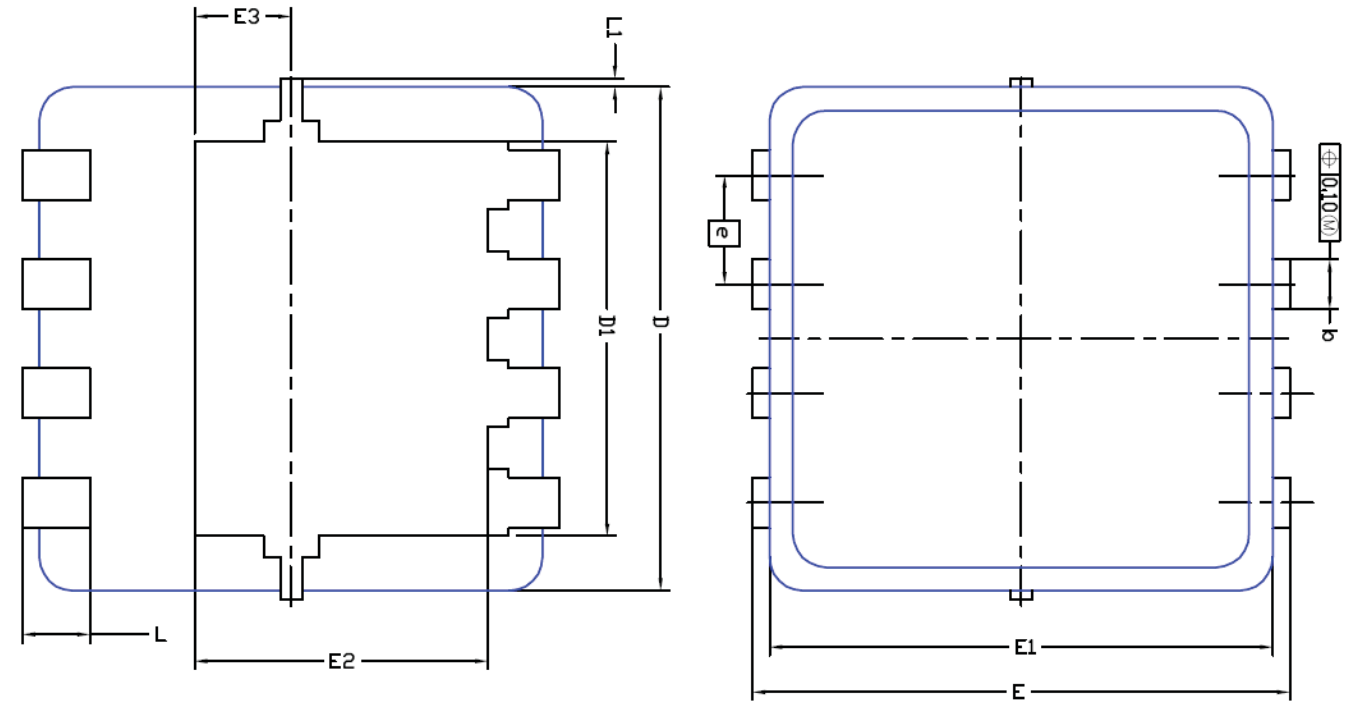
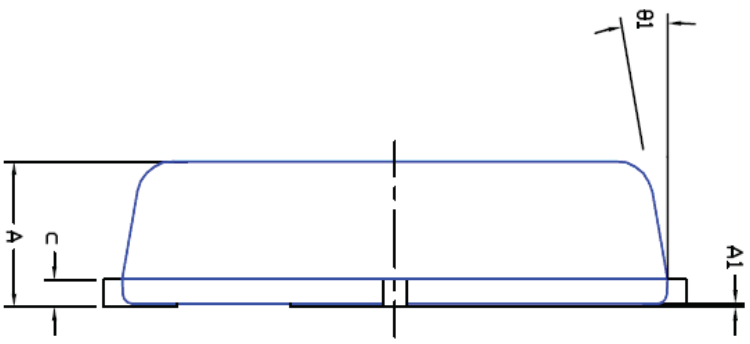


Fig.10 Switching Time Waveform

Fig.11 Unclamped Inductive Switching Waveform

DFN3X3 EP Package Information





DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.80	0.900	0.0276	0.0315	0.0354
A1	0.00	---	0.05	0.000	---	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.10	0.152	0.25	0.004	0.006	0.010
D	3.00 BSC			0.118 BSC		
D1	2.35 BSC			0.093 BSC		
E	3.20 BSC			0.126 BSC		
E1	3.00 BSC			0.118 BSC		
E2	1.75 BSC			0.069 BSC		
E3	0.575 BSC			0.023 BSC		
e	0.65 BSC			0.026 BSC		
L	0.30	0.40	0.50	0.0118	0.0157	0.0197
L1	0	---	0.100	0	---	0.004
θ1	0°	10°	12°	0°	10°	12°

Package	Tube (pcs/tube)	Tube (pcs/inner box)	Tube (pcs/cartoon)	Tape&Reel (pcs/reel)	Tape&Reel (pcs/inner box)	Tape&Reel (pcs/cartoon)
DFN5x6/DFN3x3	100	10,000	100,000	2,500	5,000	40,000
DFN1006	——	——	——	10,000	10,000	400,000
SOP-8	100	10,000	100,000	4,000	4,000	64,000
TSSOP-8	100	32,000	128,000	3,000	6,000	48,000
SOT-23-3L	——	——	——	3,000	30,000	120,000
SOT-23-6L	——	——	——	3,000	30,000	120,000
SOT-23(6R)	——	——	——	3,000	30,000	120,000
SOT-363	——	——	——	3,000	30,000	120,000
SOT-523	——	——	——	3,000	30,000	120,000
SOT223	——	——	——	2,500	2,500	20,000
TO-220	50	1,000	5,000	——	——	——
TO-220F	50	1,000	10,000	——	——	——
TO-247	30	300	1,200	——	——	——
TO-251	80	4,000	40,000	——	——	——
TO-251S(4R)	80	4,000	40,000	——	——	——
TO-252-2L(4R)	80	4,000	40,000	2,500	2,500	25,000
TO-263-2L	50	1,000	10,000	800	800	8,000
TO-3P	30	300	3,000	——	——	——
TO-92	——	——	——	1,000(袋装)	10,000	100,000

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