

N-Channel Enhancement Mode Power MOSFET

Description

The RM130N30D3 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.

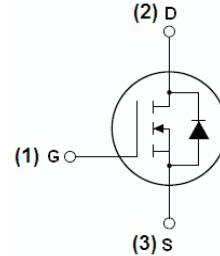
General Features

- $V_{DS} = 30V, I_D = 130A$
 $R_{DS(ON)} < 3.2m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 6.2m\Omega @ V_{GS}=4.5V$
- High density cell design for ultra low R_{dson}
- 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

- SMPS and general purpose applications
- Hard switched and high frequency circuits
- Uninterruptible power supply
- Halogen-free

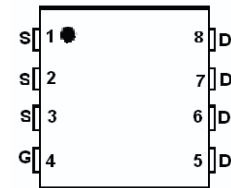
100% UIS TESTED!



Schematic diagram



Marking and pin Assignment



DFN 3x3 EP top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
DN30	RM130N30D3	DFN 3x3 EP	-	-	-

Absolute Maximum Ratings ($T_C=25^\circ C$ 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	130	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	95	A
Pulsed Drain Current	I_{DM}	570	A
Maximum Power Dissipation	P_D	45	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.5	°C
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Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.7	2.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A$	-	2.4	3.2	m Ω
		$V_{GS}=4.5V, I_D=20A$	-	4.5	6.2	
Forward Transconductance	g_{FS}	$V_{DS}=10V, I_D=20A$	20.8	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	2800	3500	4200	PF
Output Capacitance	C_{oss}		400	500	600	PF
Reverse Transfer Capacitance	C_{rss}		368	460	552	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=30A$ $V_{GS}=10V, R_{GEN}=3\Omega$	16	20	24	nS
Turn-on Rise Time	t_r		100	125	150	nS
Turn-Off Delay Time	$t_{d(off)}$		48	60	72	nS
Turn-Off Fall Time	t_f		17.6	22	26.4	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=30A,$ $V_{GS}=10V$	52	65	78	nC
Gate-Source Charge	Q_{gs}		8	10	12	nC
Gate-Drain Charge	Q_{gd}		10.4	13	15.6	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=30A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	10	A
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}, I_F = 20A$	21.6	27	32.4	nS
Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s$ (Note3)	20	25	30	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

RATING AND CHARACTERISTICS CURVES (RM130N30D3)

Figure 1: Output Characteristics

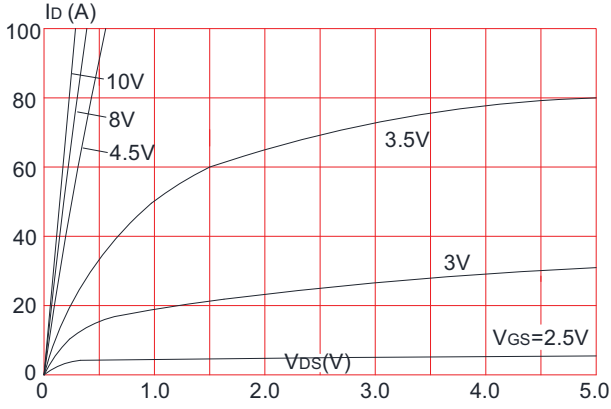


Figure 2: Typical Transfer Characteristics

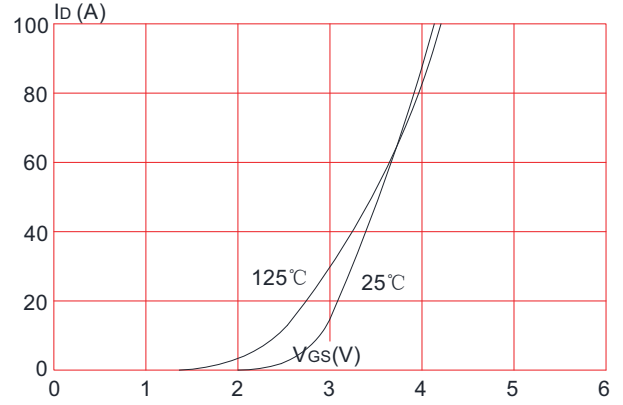


Figure 3: On-resistance vs. Drain Current

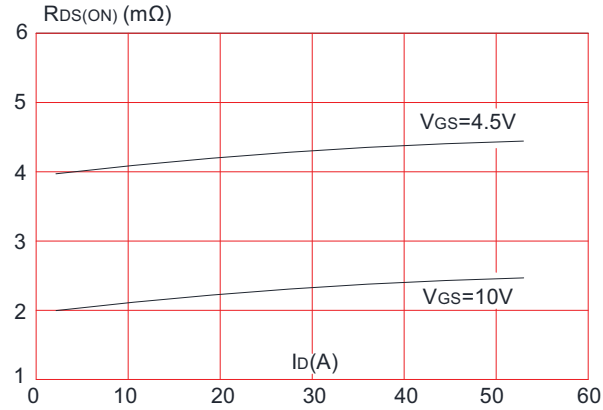


Figure 4: Body Diode Characteristics

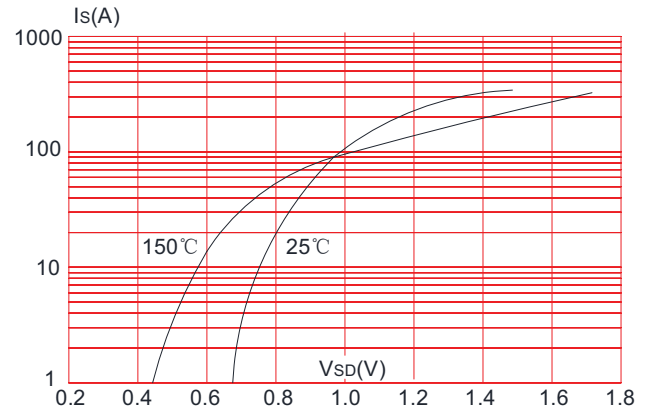


Figure 5: Gate Charge Characteristics

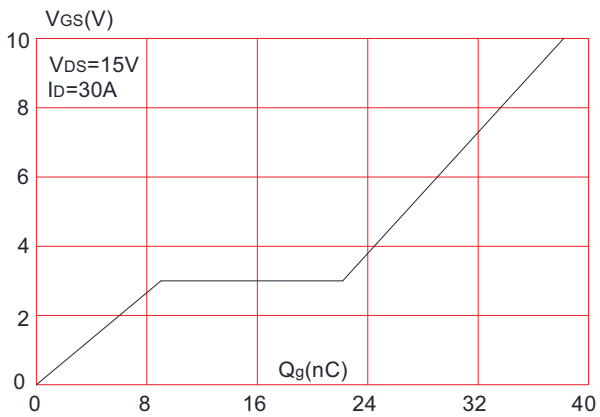
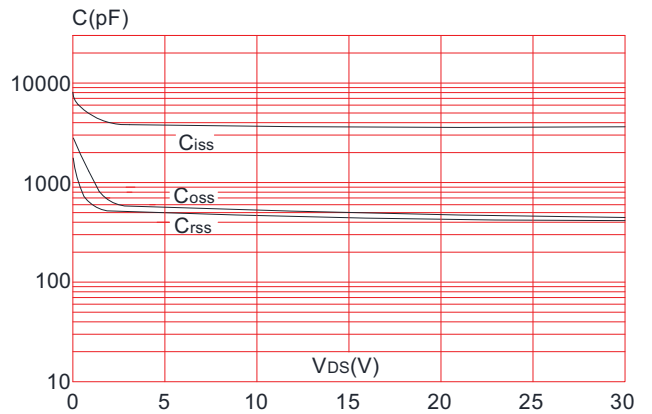


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTICS CURVES (RM130N30D3)

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

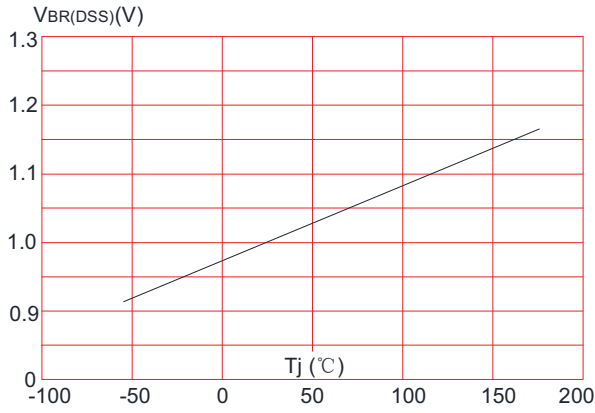


Figure 8: Normalized on Resistance vs. Junction Temperature

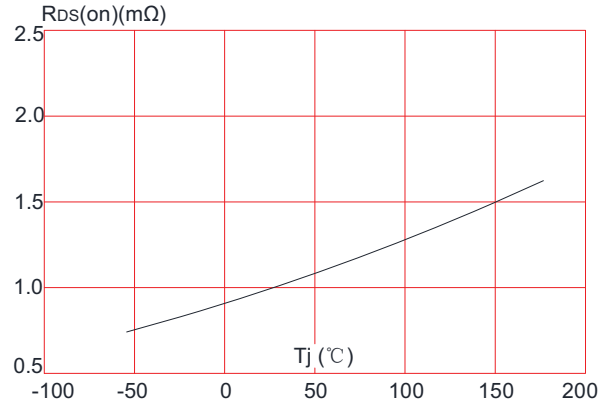


Figure 9: Maximum Safe Operating Area

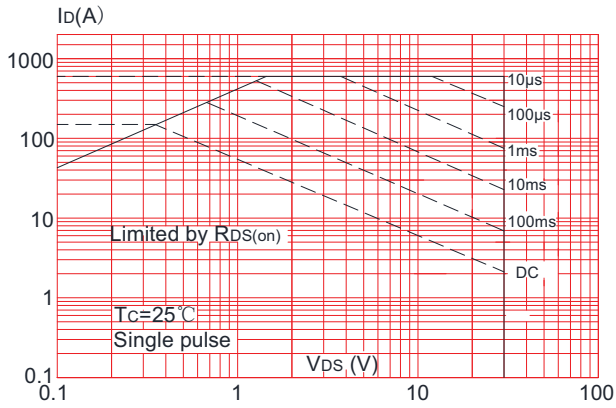


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

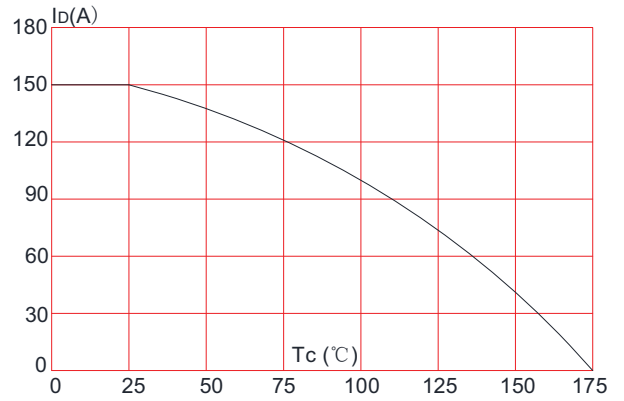
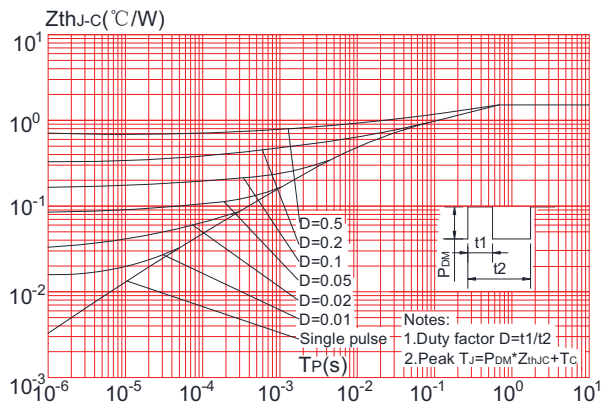
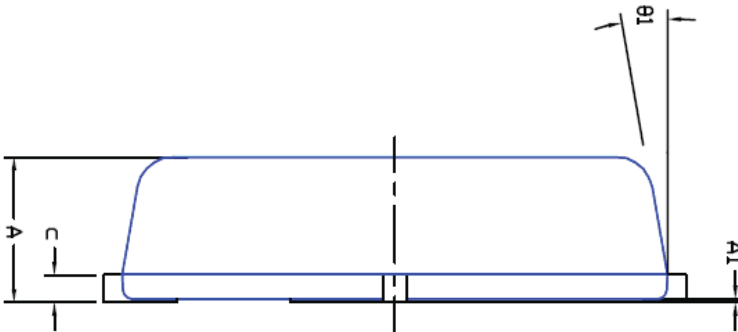
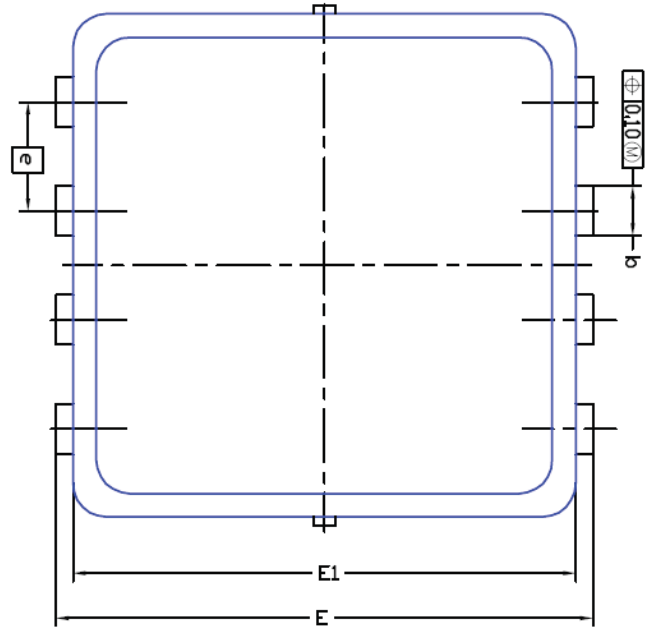
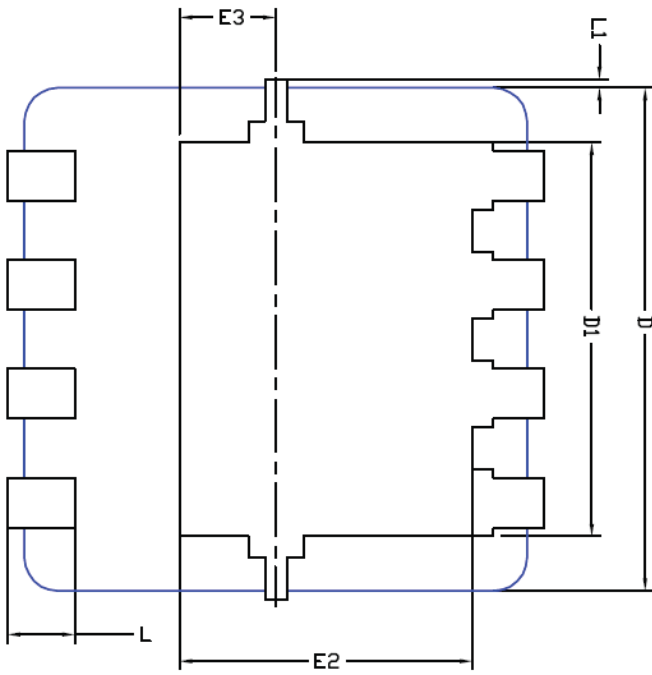


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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
θ_1	0°	10°	12°	0°	10°	12°

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