

N-Channel Enhancement Mode Power MOSFET

Description

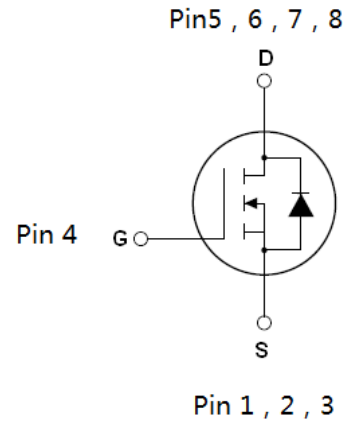
The RM80N30DF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. This device is suitable for use as a load switch or in PWM applications.

General Features

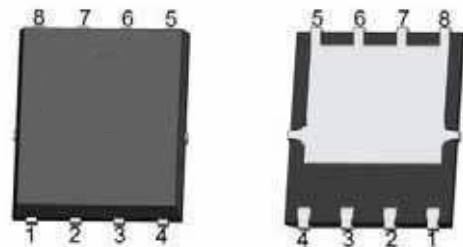
- $V_{DS} = 30V, I_D = 81A$
 $R_{DS(ON)} < 9m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management
- Halogen-free



Schematic diagram



Top View

Bottom View

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
80N30	RM80N30DF	DFN5X6-8L	Ø330mm	12mm	2500 units

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	81	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	51	A
Pulsed Drain Current	I_{DM}	160	A
Maximum Power Dissipation	P_D	59	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	150	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.1	$^\circ C/W$
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Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
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 = 30 A	-	-	5.5	mΩ
		V _{GS} =4.5V, I _D = 15A	-	-	9	mΩ
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	2295	-	PF
Output Capacitance	C _{OSS}		-	267	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	210	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, I _D =15A, V _{GS} =10V, R _{GEN} =3.3Ω	-	7.8	-	nS
Turn-on Rise Time	t _r		-	15	-	nS
Turn-Off Delay Time	t _{d(off)}		-	37.3	-	nS
Turn-Off Fall Time	t _f		-	10.6	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =15A, V _{GS} =4.5V	-	20	-	nC
Gate-Source Charge	Q _{gs}		-	7.6	-	nC
Gate-Drain Charge	Q _{gd}		-	7.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =1A	-	-	1.0	V
Diode Forward Current ^(Note 2)	I _S	V _G =V _D =0V ,Force Current	-	-	81	A
Pulsed Source Current	I _{Sm}	V _G =V _D =0V ,Force Current	-	-	160	A

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

RATING AND CHARACTERISTICS CURVES (RM80N30DF)

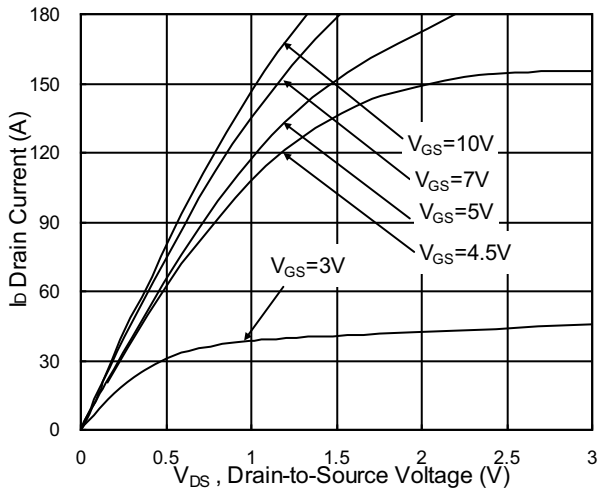


Fig.1 Typical Output Characteristics

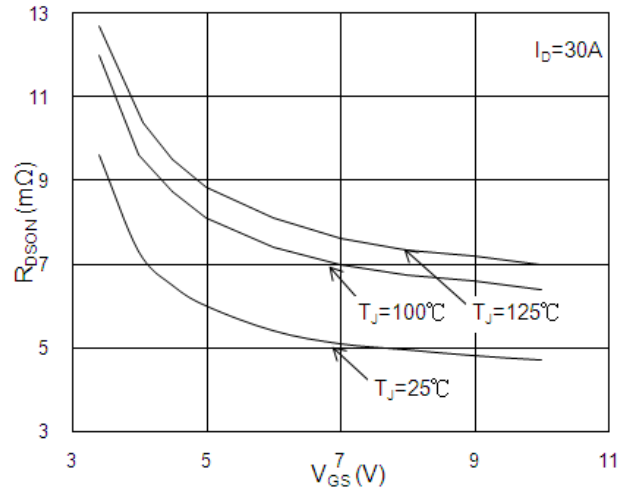


Fig.2 On-Resistance vs. G-S Voltage

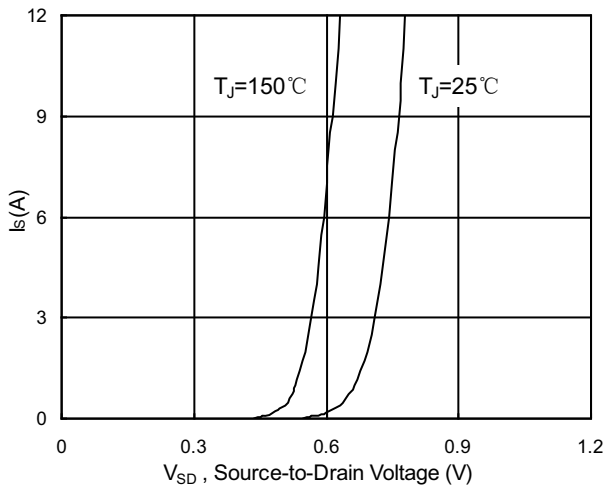


Fig.3 Forward Characteristics of Reverse

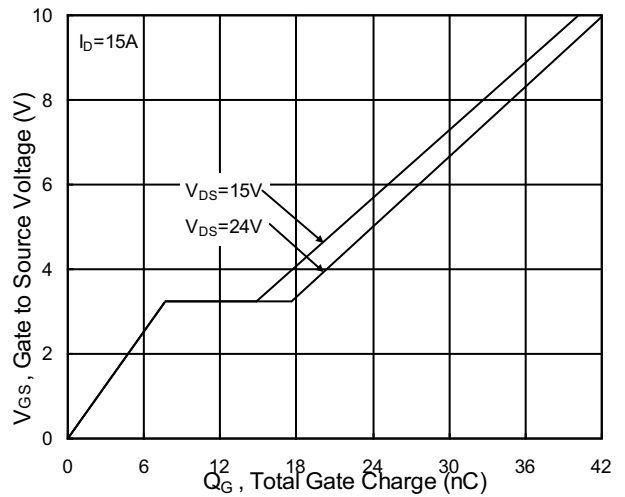


Fig.4 Gate-Charge Characteristics

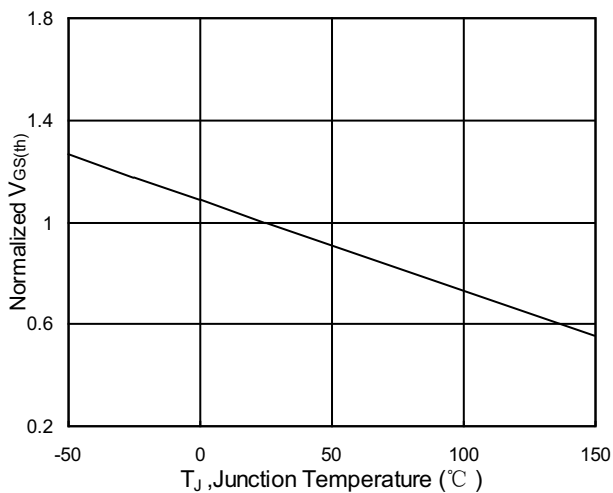


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

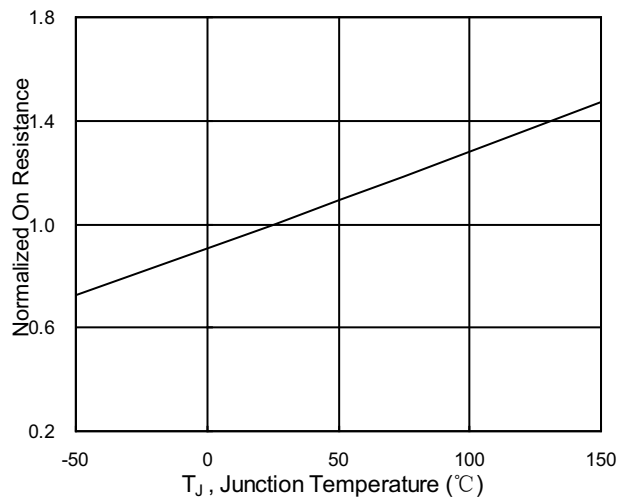


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

RATING AND CHARACTERISTICS CURVES (RM80N30DF)

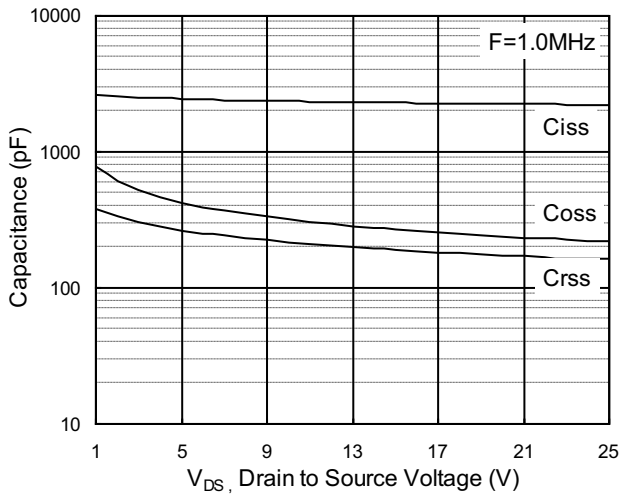


Fig.7 Capacitance

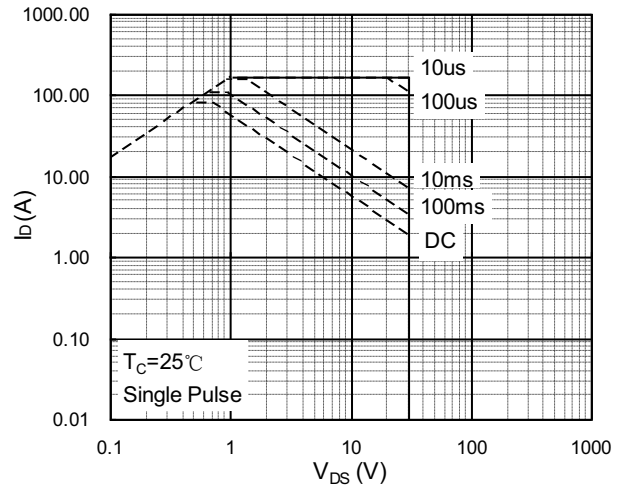


Fig.8 Safe Operating Area

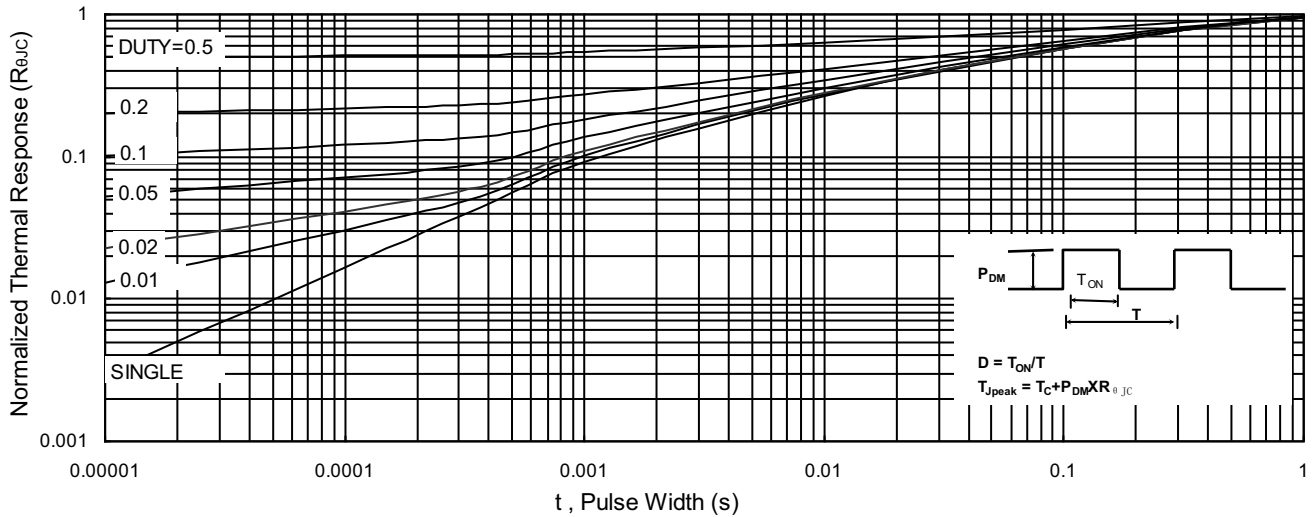


Fig.9 Normalized Maximum Transient Thermal Impedance

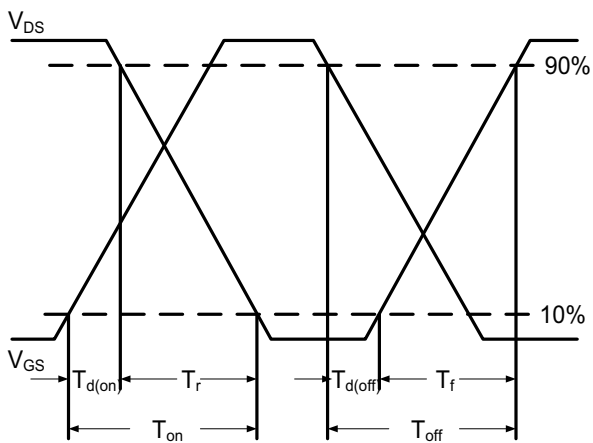


Fig.10 Switching Time Waveform

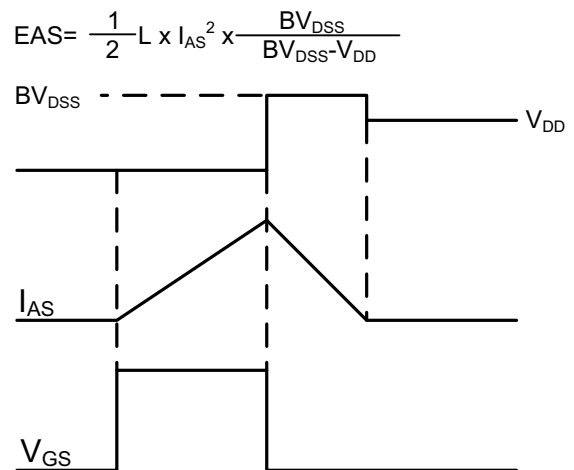
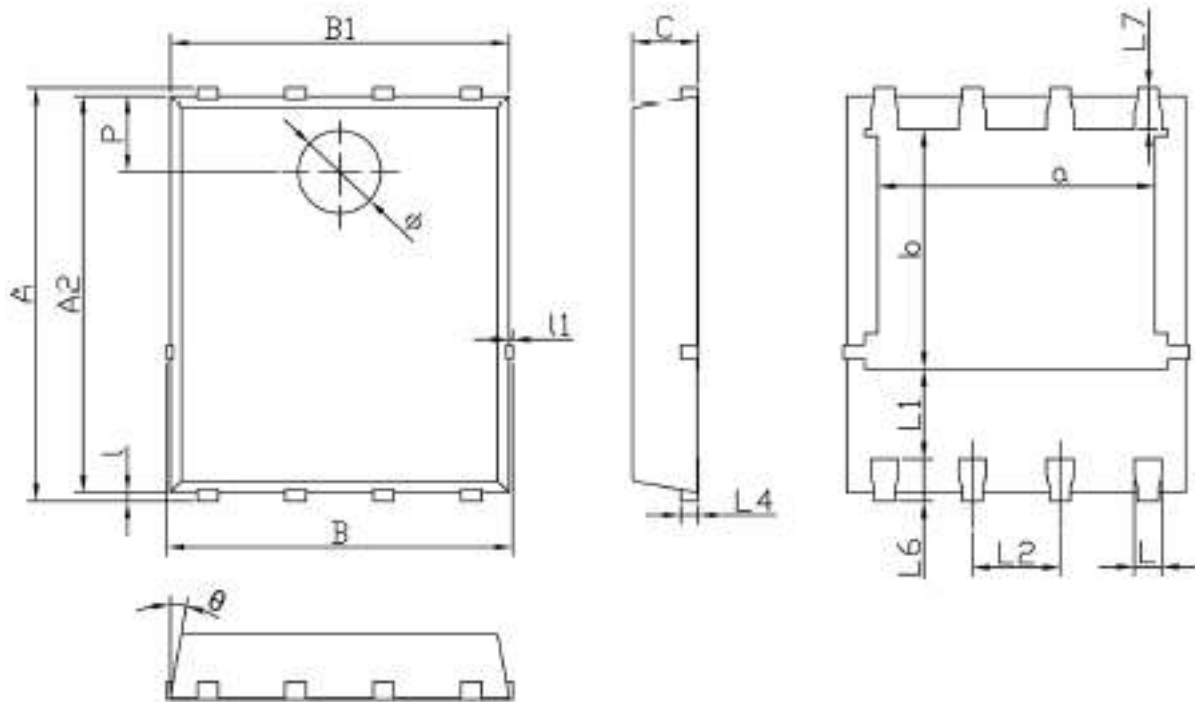


Fig.11 Unclamped Inductive Switching Waveform

DFN5X6-8L Package Information



Dimensions In Millimeterer			
Symbol	MIN	TYP	MAX
A	5.90	6.00	6.10
a	3.91	4.01	4.11
A2	5.70	5.75	5.80
B	4.90	5.00	5.10
b	3.37	3.47	3.57
D1	4.00	4.20	5.00
C	0.90	0.95	1.00
L	0.35	0.40	0.45
l	0.06	0.13	0.20
L1	1.10	-	-
l1	-	-	0.10
L2	1.17	1.27	1.37
L4	0.21	0.26	0.34
L6	0.51	0.61	0.71
L7	0.51	0.61	0.71
P	1.00	1.10	1.20
α	8°	10°	12°
φ	1.10	1.20	1.30

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