

N-Channel Enhancement Mode Power MOSFET

Description

The RM60N30DF 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

- $V_{DS} = 30V, I_D = 58A$
 $R_{DS(ON)} < 14m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)} < 8.5m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

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

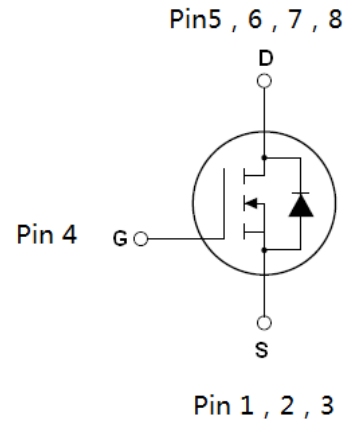
Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
A3004	RM60N30DF	DFN5X6-8L	Ø330mm	12mm	2500 units

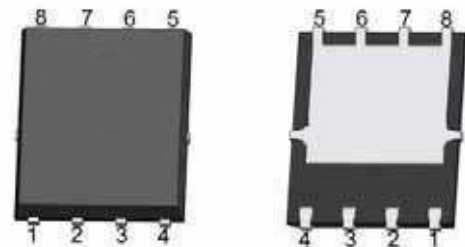
Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	58	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D(100^\circ C)$	38	A
Pulsed Drain Current	I_{DM}	115	A
Maximum Power Dissipation	P_D	46	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	57.8	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	2.7	$^\circ C/W$
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Schematic diagram



Top View

Bottom View

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	1.5	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D = 30 A	-	6.5	8.5	mΩ
		V _{GS} =4.5V, I _D = 15A	-	11	14	mΩ
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	1317	1844	PF
Output Capacitance	C _{OSS}		-	163	228	PF
Reverse Transfer Capacitance	C _{RSS}		-	131	183	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	-	4.6	9.2	nS
Turn-on Rise Time	t _r		-	12.2	22	nS
Turn-Off Delay Time	t _{d(off)}		-	26.6	53	nS
Turn-Off Fall Time	t _f		-	8	16	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =15A, V _{GS} =4.5V	-	12.6	17.6	nC
Gate-Source Charge	Q _{gs}		-	4.2	5.9	nC
Gate-Drain Charge	Q _{gd}		-	5.1	7.1	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	-	-	58	A
Pulsed Source Current	I _{Sm}	V _G =V _D =0V ,Force Current	-	-	115	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 (RM60N30DF)

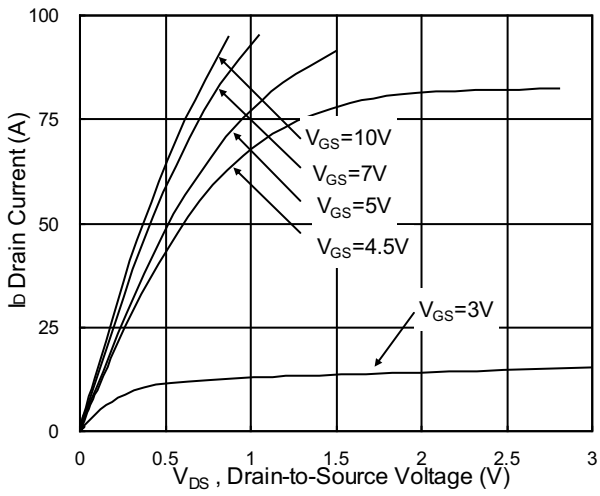


Fig.1 Typical Output Characteristics

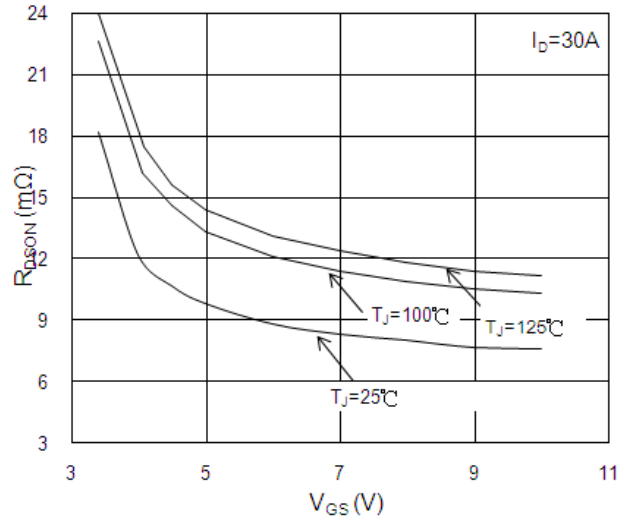


Fig.2 On-Resistance vs. Gate-Source

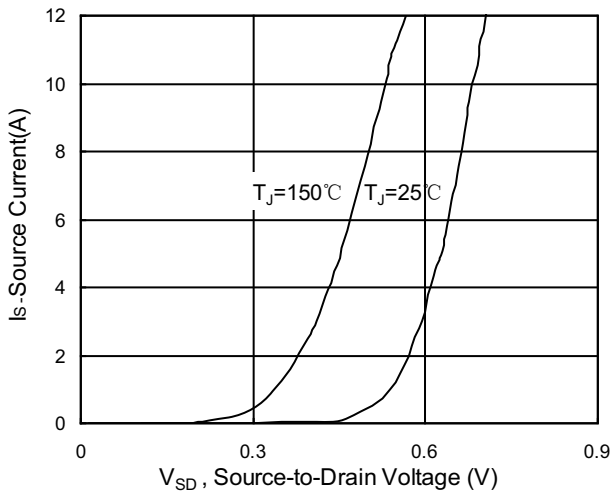


Fig.3 Forward Characteristics of reverse

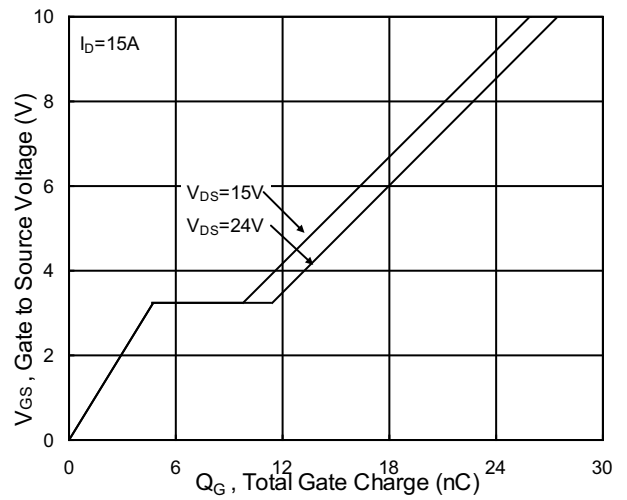


Fig.4 Gate-Charge Characteristics

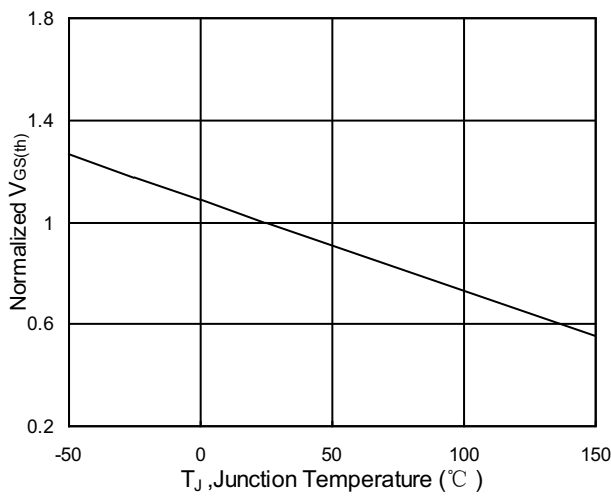


Fig.5 Normalized V_{GS(th)} vs. T_J

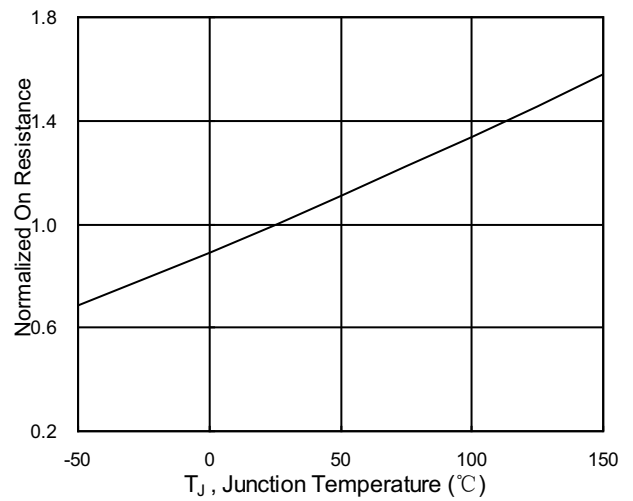


Fig.6 Normalized R_{DS(on)} vs. T_J

RATING AND CHARACTERISTICS CURVES (RM60N30DF)

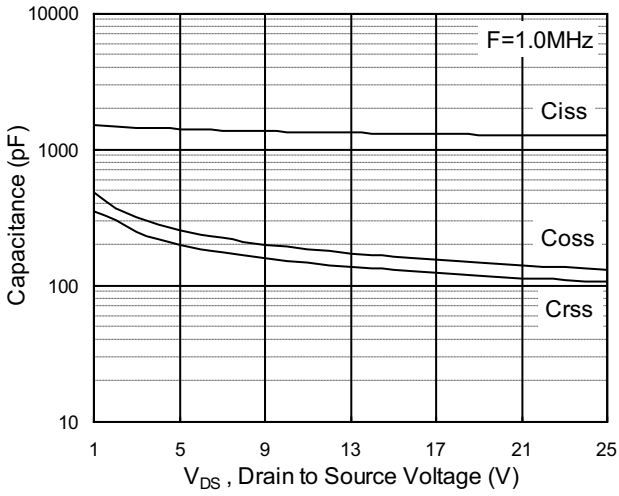


Fig.7 Capacitance

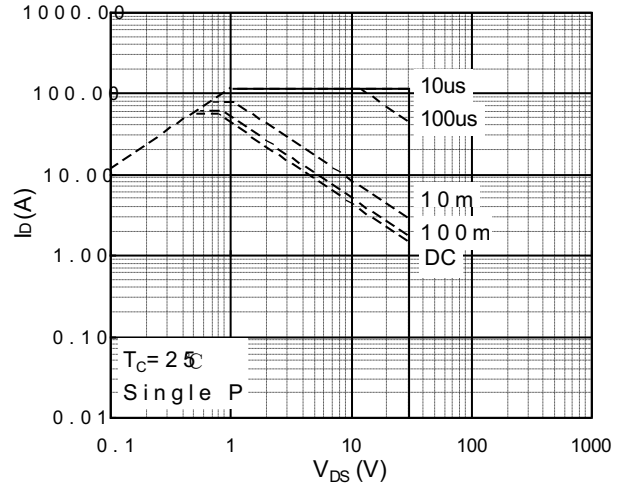


Fig.8 Safe Operating Area

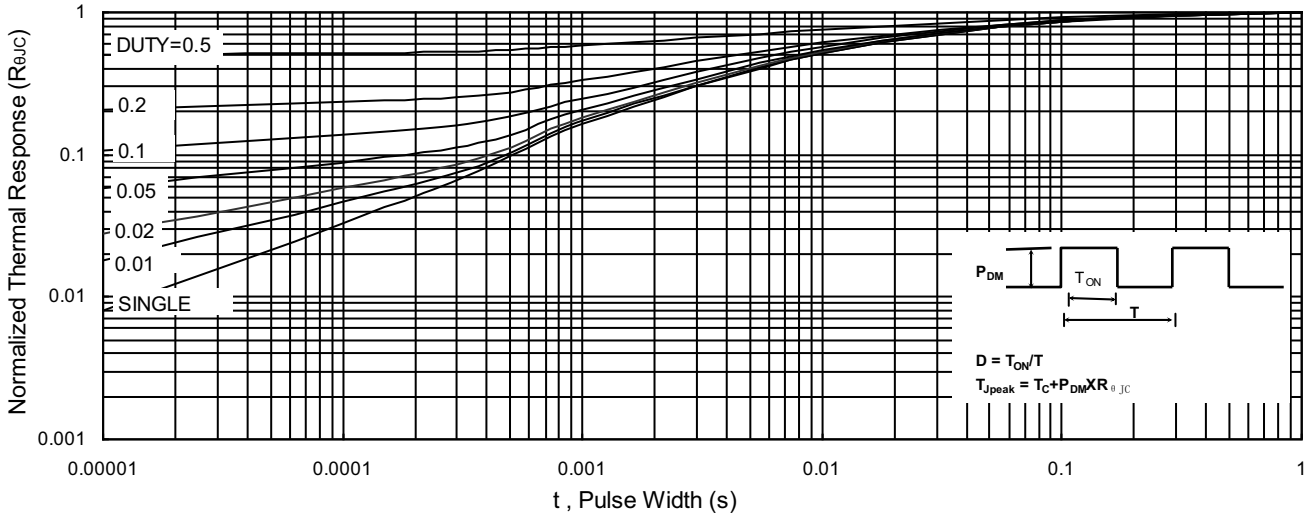


Fig.9 Normalized Maximum Transient Thermal Impedance

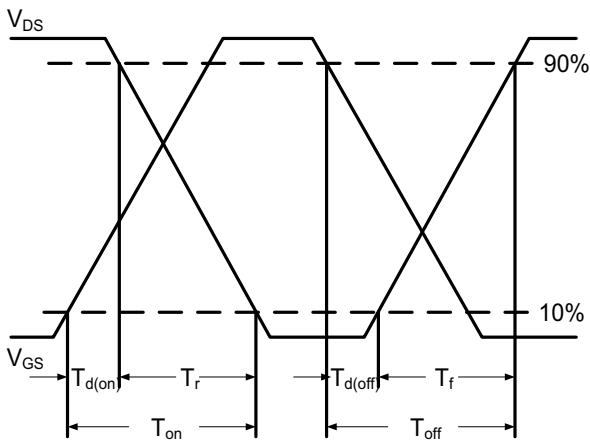


Fig.10 Switching Time Waveform

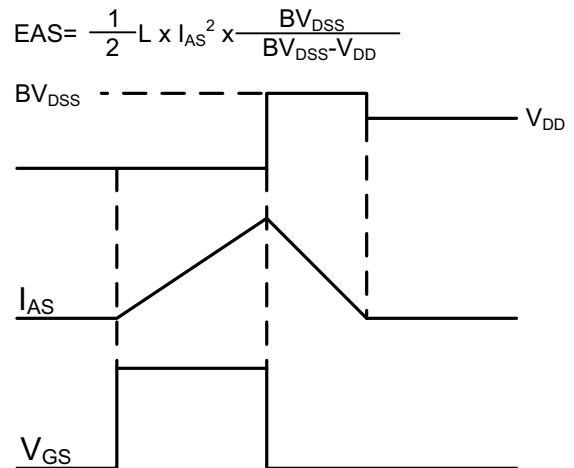
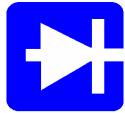
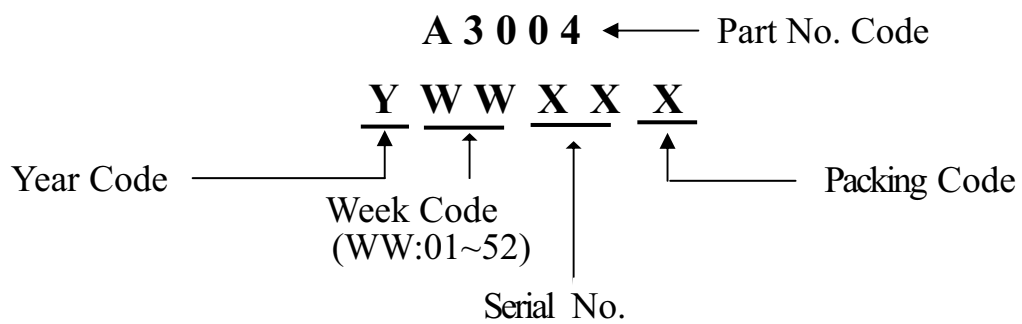


Fig.11 Unclamped Inductive Switching Waveform



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Marking on the body



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	20,000
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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