

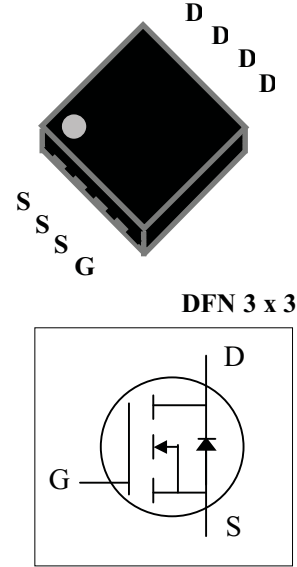
## Description

RM50N30DN series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The DFN 3 x 3 package is special for voltage conversion application using standard infrared reflow technique with the backside heat sink to achieve the good thermal performance.

- Simple Drive Requirement
- Small Size & Lower Profile
- RoHS Compliant & Halogen-Free

$BV_{DSS}$	30V
$R_{DS(ON)}$	4.1m $\Omega$
$I_D$	50A



## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
50N30	RM50N30DN	DFN 3x3	-	-	-

## Absolute Maximum Ratings@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	+20	V
$I_D@T_A=25^\circ\text{C}$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	50	A
$I_D@T_A=70^\circ\text{C}$	Drain Current <sup>3</sup> , $V_{GS}$ @ 10V	42	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	72	A
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation	25	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

## Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	4	$^\circ\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	35	$^\circ\text{C}/\text{W}$

## Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)

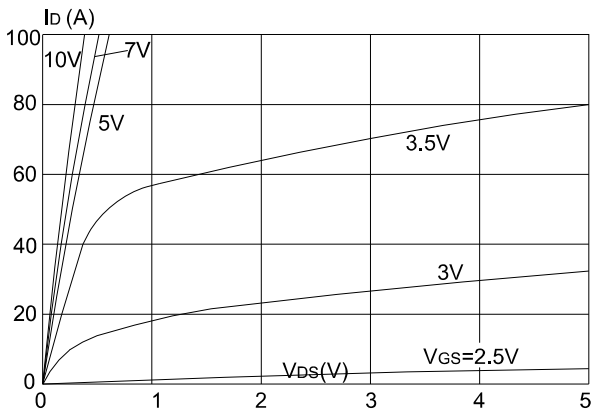
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	30	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.5	2.5	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	4.1	4.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	7.2	9.5	
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f =1MHz	-	1614	-	pF
Output Capacitance	C <sub>oss</sub>		-	245	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	215	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω	-	7.5	-	ns
Turn-on rise time	t <sub>r</sub>		-	14.5	-	
Turn-off delay time	t <sub>d(off)</sub>		-	35.2	-	
Turn-off fall time	t <sub>f</sub>		-	9.6	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	33.7	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	8.5	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	7.5	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	70	A

### Notes:

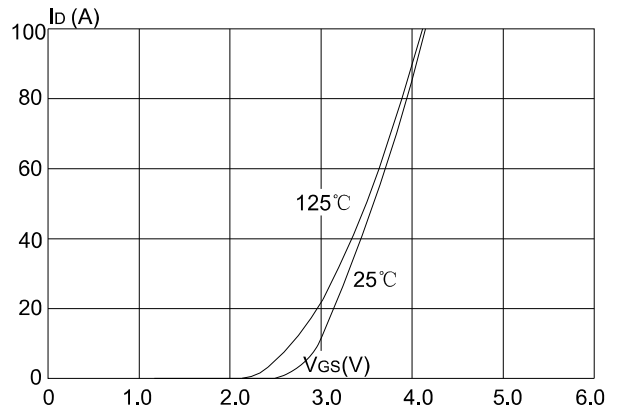
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>j</sub>=25°C, V<sub>DD</sub>=15V, R<sub>G</sub>=25 Ω, L=0.5mH, I<sub>AS</sub>=15A
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board, t≤10 sec

# RATING AND CHARACTERISTICS CURVES ( RM50N30DN )

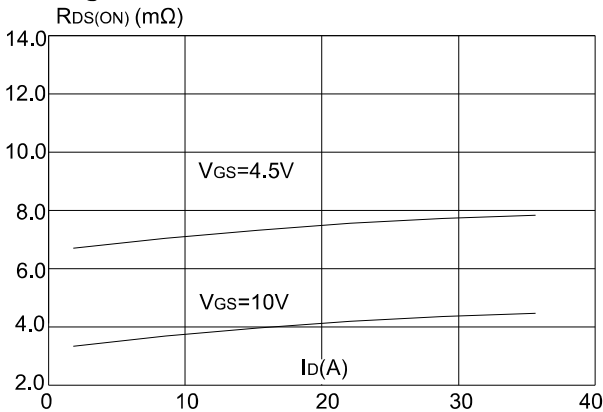
**Figure 1: Output Characteristics**



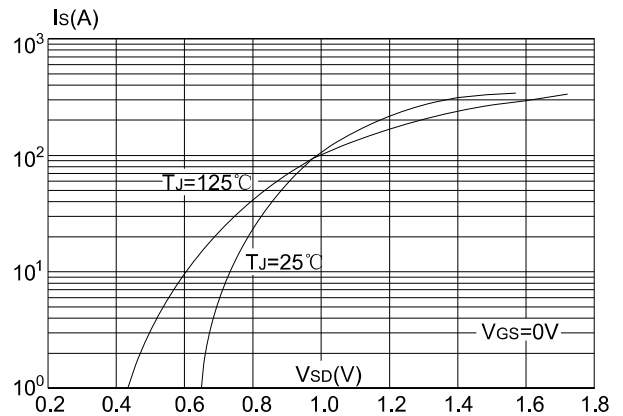
**Figure 2: Typical Transfer Characteristics**



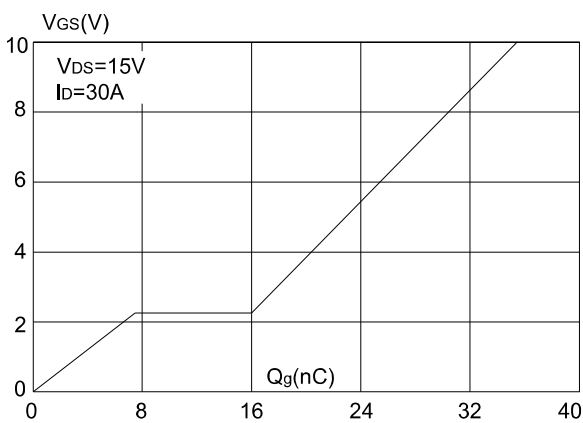
**Figure 3: On-resistance vs. Drain Current**



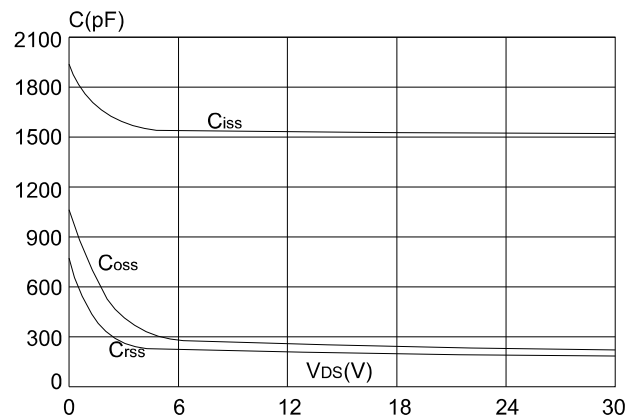
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

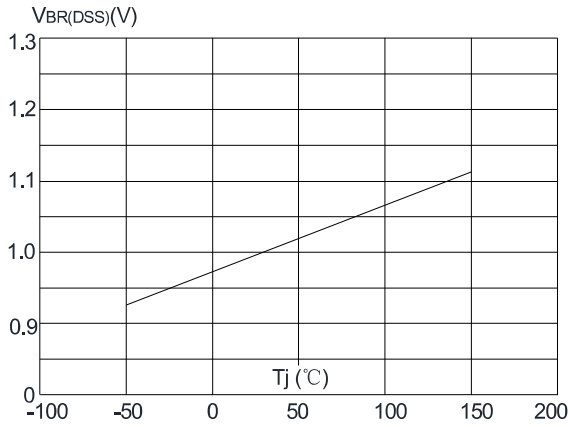


**Figure 6: Capacitance Characteristics**

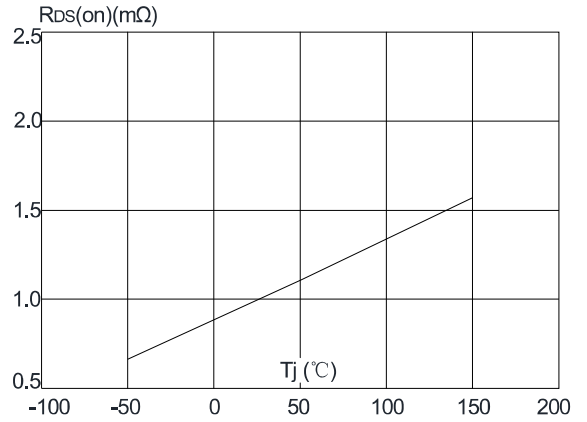


# RATING AND CHARACTERISTICS CURVES ( RM50N30DN)

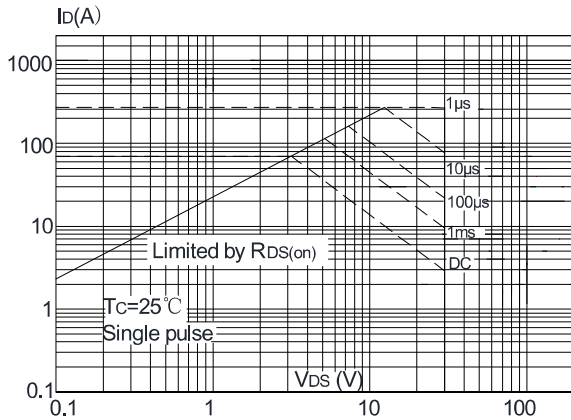
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



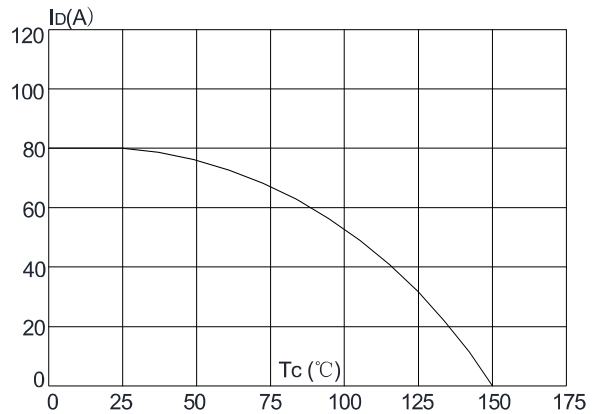
**Figure 8:** Normalized on Resistance vs. Junction Temperature



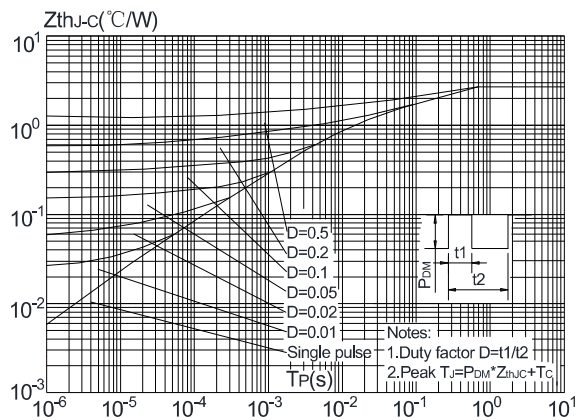
**Figure 9:** Maximum Safe Operating Area



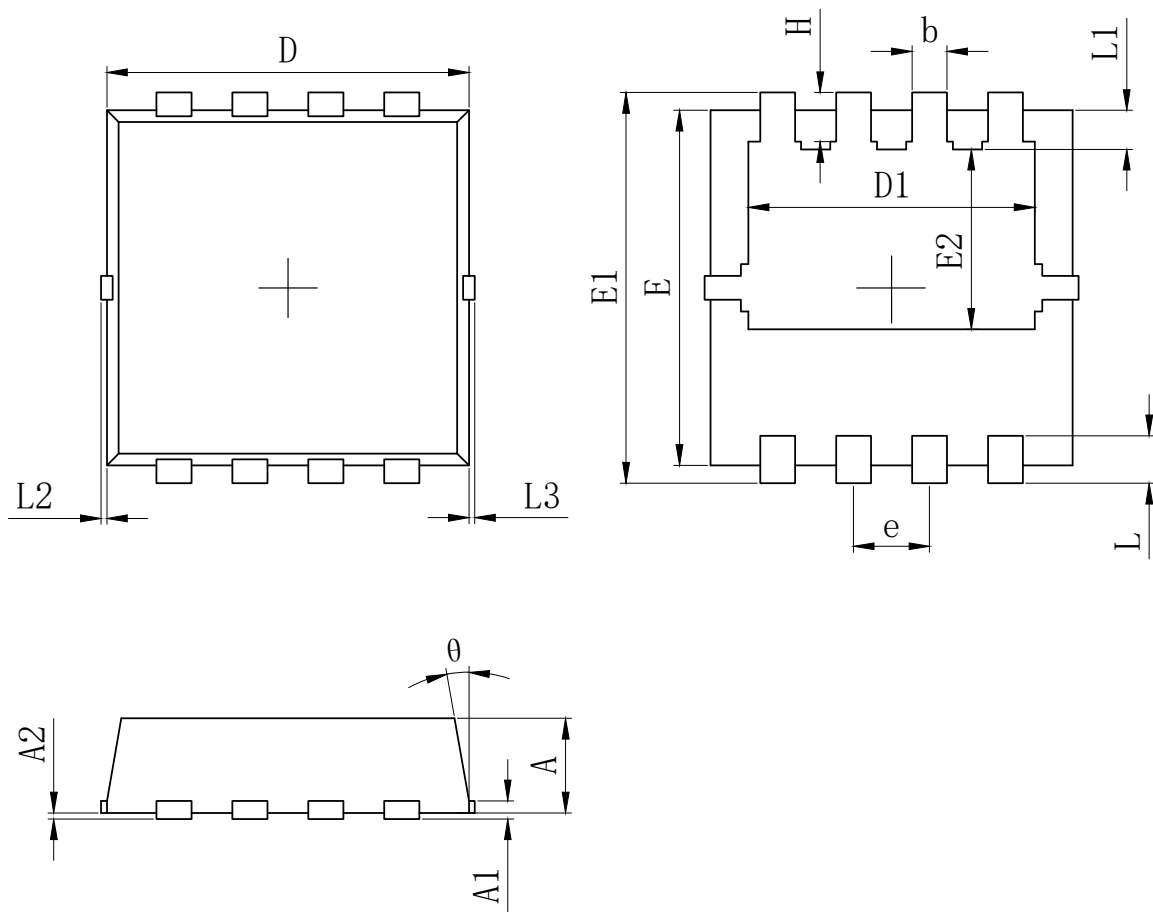
**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



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



## Package Mechanical Data



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.700	0.800	0.900
A1	0.152 REF.		
A2	0~0.05		
D	3.000	3.100	3.200
D1	2.300	2.450	2.600
E	2.900	3.000	3.100
E1	3.150	3.300	3.450
E2	1.320	1.520	1.720
b	0.200	0.300	0.400
e	0.550	0.650	0.750
L	0.300	0.400	0.500
L1	0.180	0.330	0.480
L2	0~0.100		
L3	0~0.100		
H	0.315	0.415	0.515
$\theta$	8°	10°	12°

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