

PRM2R4N03N5

PFC Device Corporation

30V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	30	٧
$I_D^5 (T_C=25^{\circ}C)$	60	Α
Max. R _{DS(ON)} @V _{GS} =10V	2.4	mΩ
Max. R _{DS(ON)} @V _{GS} =4.5V	4	mΩ
T _J Operating Junction Temperature	-55 to +150	°C

General Description

The N-Channel enhancement mode power field effect transistor is using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. The device is well suited for high efficiency fast switching applications.

PRM2R4N03N5 DFN 5x6

Typical Applications

- Charger Adapter
- Power Tools
- LED Lighting

Features

- Max. R_{DS(ON)}=2.4mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% E_{AS} Guaranteed
- Green Device Available

1. Characteristics

Maximum Ratings Characteristics

($T_A = 25$ °C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
l _D ⁴	Drain Current – Continuous (T _C =25°C)	138	Α
'D	Drain Current – Continuous (T _C =100°C)	87	Α
I_D^5	Drain Current – Continuous (T _C =25°C)	60	Α
I _{DM}	Drain Current – Pulsed ¹	240	Α
E _{AS}	Single Pulse Avalanche Energy ²	80	mJ
I _{AS}	Single Pulse Avalanche Current ²	40	Α
В	Power Dissipation (T _C =25°C)	78	W
P _D	Power Dissipation – Derate above 25°C	0.62	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Тур.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient		62	°C/W
$R_{ heta JC}$	Thermal Resistance Junction to Case		1.6	°C/W



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Electrical Characteristics

(T_J = 25 °C unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30			V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C			1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA

On Characteristics

R _{DS(ON)} Static Drain-Source On-Resistance	V _{GS} =10V, I _D =20A			2.4	mΩ	
R _{DS(ON)}		V _{GS} =4.5V, I _D =10A	1	ł	4	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_{D}=250uA$	1.0	1	2.5	V
gfs	Forward Transconductance	V _{DS} =5V, I _D =20A		85		S

Dynamic and switching Characteristics

	.				
Q_{g}	Total Gate Charge ^r		 90		
Q_{qs}	Gate-Source Charge	V _{DS} =15V, V _{GS} =10V, I _D =20A	 14		nC
Q_{qd}	Gate-Drain Charge		 22		
$T_{d(on)}$	Turn-On Delay Time		 24		
T _r	Turn-On Rise Time	V_{DD} =15V, V_{GS} =10V, R_{G} =6 Ω	 131	ł	20
$T_{d(off)}$	Turn-Off Delay Time		 84	-	ns
T _f	Turn-Off Fall Time		 135		
C _{iss}	Input Capacitance		 4900		
C _{oss}	Output Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	 850	-	pF
C _{rss}	Reverse Transfer Capacitance		 580	-	
R_{q}	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	 0.8		Ω

Drain-Source Diode Characteristics

V _{SD} ^{3,}	Source to Drain Diode Voltage	V_{GS} =0V, I_{S} =20A	 	1.5	V
t _{rr}	Reverse Recovery Time	1 20A di/dt 100A/up	 35		ns
Q _{rr}	Reverse Recovery Charge	I _S =20A, di/dt=100A/us	 22		nC

Note:

- 1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
- 2. L=0.1mH, R_G=25 Ω ,Starting T_J=25 $^{\circ}$ C
- 3. The data tested by pulsed, pulse width \leq 300us, duty cycle \leq 2%...
- 4. Silicon limited.
- 5. Package limited.

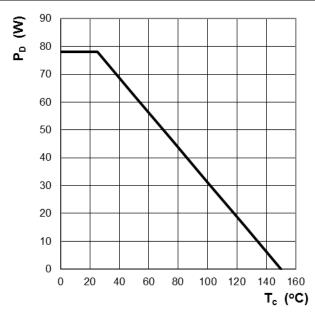


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2. Characteristics Curves

Ratings and Characteristics Curves

($T_A = 25^{\circ}C$ unless otherwise specified)



160 140 120 100 80 60 40 20 25 50 75 100 125 150 T_c (°C)

Figure 1: Power Dissipation

Figure 2: Continuous Drain Current vs. T_C

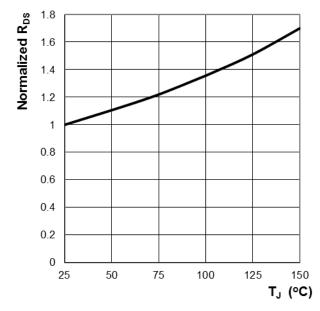


Figure 3: Normalized R_{DS(ON)} vs. T_J

Figure 4: Normalized V_{GS(th)} vs. T_J



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Ratings and Characteristics Curves

(T_A = 25° unless otherwise specified)

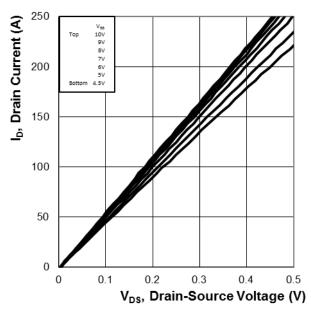


Figure 5: On-Region Characteristics

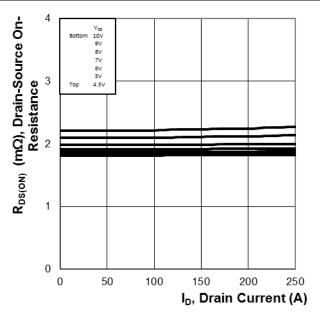


Figure 6: Typ. R_{DS} Variation vs. I_D and V_{GS}

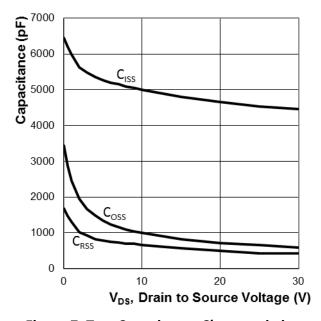


Figure 7: Typ. Capacitance Characteristics

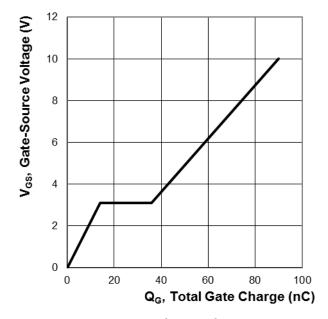


Figure 8: Typ. Gate Charge Characteristics



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Ratings and Characteristics Curves

(T_A = 25°C unless otherwise specified)

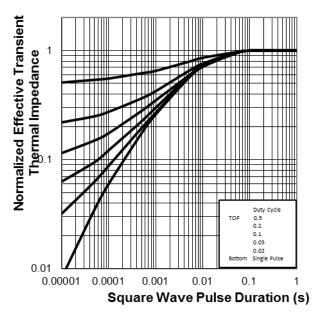


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

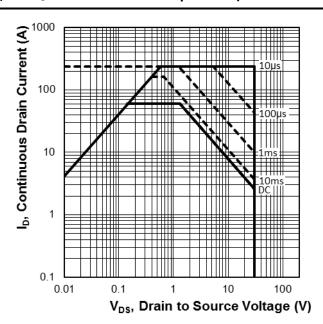


Figure 10: Maximum Safe Operation Area



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3. Marking information

Top Marking Rule

PFC PRM
2R4N03N5
YYWW ABSH

PRM2R4N03N5 = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

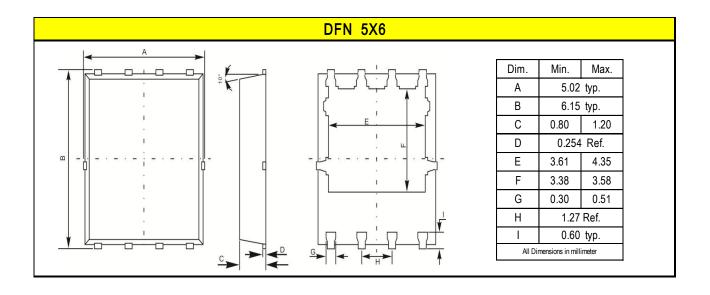
WW = Week code

ABS = Assembly code

H = Halogen Free (N/A = common molding compound)

4. Package information

Package Outline Dimensions millimeters





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5. Ordering information

Part Number	Package	Delivery mode
PRM2R4N03N5	DFN 5X6	3000 pcs / 13" diameter reel

Mechanical

Molder Plastic: UL Flammability Classification Rating 94V-0
 Device Weight: 0.003 ounces (0.093grams) – DFN 5x6

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