

PRM020N10N5

PFC Device Corporation

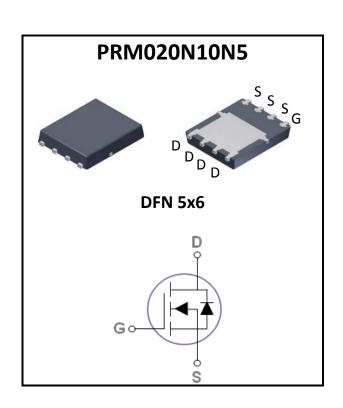
100V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	100	٧
I _D (T _C =25°C)	27.8	Α
Max. R _{DS(ON)}	20	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.



Typical Applications

- Charger Adapter
- Power Tools
- LED Lighting

Features

- Max. $R_{DS(ON)}=20m\Omega@V_{GS}=10V$
- 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	100	V
V_{GS}	Gate-Source Voltage	±20	V
1	Drain Current – Continuous (T _C =25°C)	27.8	Α
I _D	Drain Current – Continuous (T _C =100°C)	17.6	Α
I_{DM}	Drain Current – Pulsed ¹	100	А
E_{AS}	Single Pulse Avalanche Energy ²	45	mJ
I_{AS}	Single Pulse Avalanche Current ²	30	Α
D	Power Dissipation (T _C =25°C)	35.7	W
P_D	Power Dissipation – Derate above 25°C	0.28	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		3.5	°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	100			V
-	Drain Course Leekees Current	V _{DS} =100V, V _{GS} =0V, T _J =25°C			1	uA
I _{DSS}	Drain-Source Leakage Current	V _{DS} =100V, V _{GS} =0V, T _J =125°C			250	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA

On Characteristics

D	R _{DS(ON)} Static Drain-Source On-Resistance	V _{GS} =10V, I _D =15A			20	$m\Omega$
$R_{DS(ON)}$		V _{GS} =4.5V, I _D =7A			25	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250uA$	1.0		3.0	V
g_{fs}	Forward Transconductance	V _{DS} =5V, I _D =15A	1	34	ł	S

Dynamic and switching Characteristics

Qq	Total Gate Charge ^{3, 4}		 37.5	
Q_{qs}	Gate-Source Charge ^{3, 4}	V _{DS} =50V, V _{GS} =10V, I _D =20A	 7.5	 nC
Q_{gd}	Gate-Drain Charge ^{3, 4}		 10	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}		 16	
T _r	Turn-On Rise Time ^{3, 4}	V_{DD} =50V, V_{GS} =10V, R_{G} =6 Ω	 80	 nc
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		 33	 ns
T_f	Turn-Off Fall Time ^{3, 4}		 89	
C _{iss}	Input Capacitance		 2100	
C _{oss}	Output Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	 230	 pF
C_{rss}	Reverse Transfer Capacitance		 100	
R_{g}	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	 1.1	 Ω

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	V _{GS} =0V, I _S =20A	 	1.5	V
t _{rr}	Reverse Recovery Time	1 20 A di/dt 100 A/up	 37		ns
Q _{rr}	Reverse Recovery Charge	I _S =20A, di/dt=100A/us	 40		nC

Note:

- 1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
- 2. V_{DD} =50V, V_{GS} =10V, L=0.1mH, I_{AS} =30A, 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. Essentially independent of operating temperature.

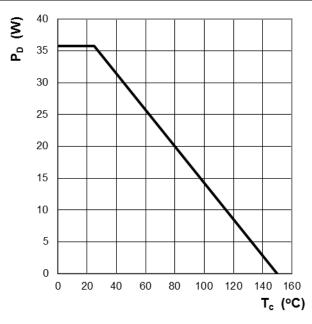


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2. Characteristics Curves

Ratings and Characteristics Curves

(T_A = 25° unless otherwise specified)



30 25 20 15 10 5 0 25 50 75 100 125 150 T_c (°C)

Figure 1: Power Dissipation

Figure 2: Continuous Drain Current vs. T_C

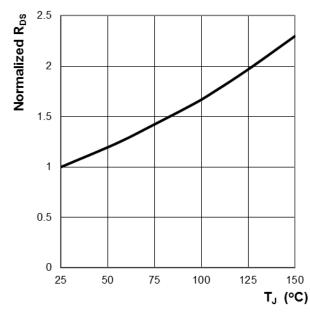


Figure 3: Normalized R_{DS(ON)} vs. T_J

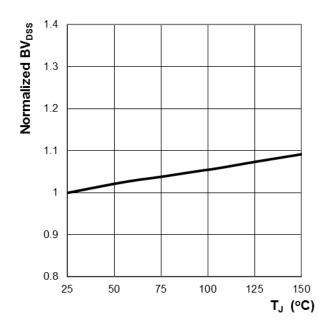


Figure 4: Normalized BV_{DSS} vs. T_J



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Ratings and Characteristics Curves

(T_A = 25° unless otherwise specified)

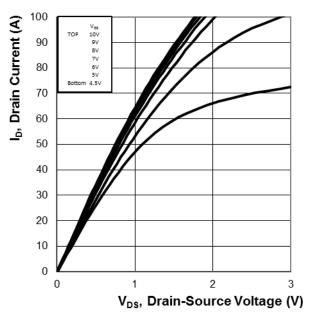


Figure 5: On-Region Characteristics

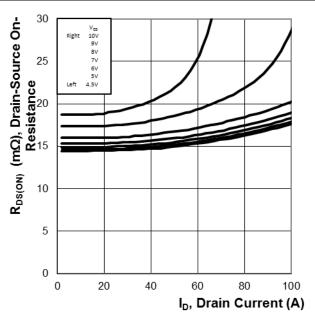


Figure 6: Typ. R_{DS} Variation vs. I_D and V_{GS}

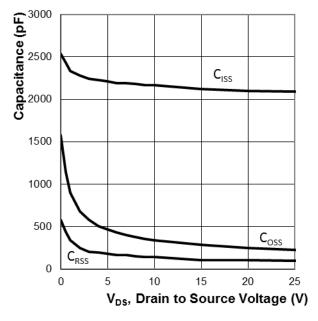


Figure 7: Typ. Capacitance Characteristics

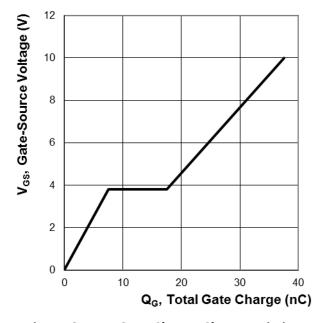


Figure 8: Typ. Gate Charge Characteristics



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Ratings and Characteristics Curves

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

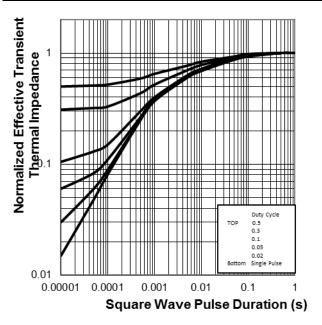


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

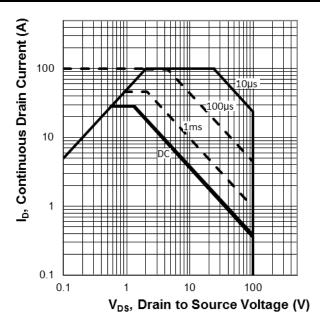


Figure 10: Maximum Safe Operation Area



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3. Marking information

Top Marking Rule

PFC PRM
020N10N5
YYWW ABSH

PRM020N10N5 = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

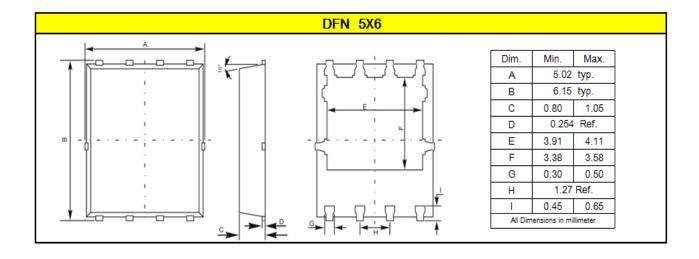
WW = Week code

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
PRM020N10N5	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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