

PRM010N12CT

PFC Device Corporation

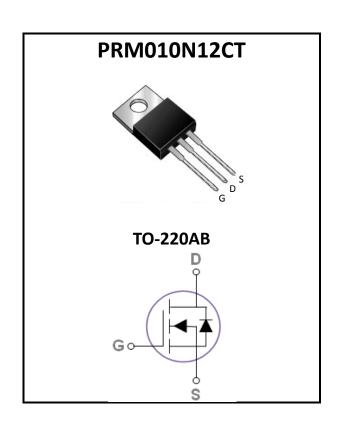
120V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	120	٧
I _D (T _C =25°C)	71.8	Α
Max. R _{DS(ON)} @V _{GS} =10V	10	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. $R_{DS(ON)}=10m\Omega@V_{GS}=10V$
- 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	120	V
V_{GS}	Gate-Source Voltage	±20	V
L	Drain Current – Continuous (T _C =25°C)	71.8	Α
I _D	Drain Current – Continuous (T _C =100°C)	45.4	Α
I _{DM}	Drain Current – Pulsed ¹	280	Α
E_{AS}	Single Pulse Avalanche Energy ²	151	mJ
I _{AS}	Single Pulse Avalanche Current ²	55	Α
D	Power Dissipation (T _C =25°C)	113	W
P _D	Power Dissipation – Derate above 25°C	0.9	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		1.1	°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	120	1		V
Ī	ı	Drain Course Leakage Current	V _{DS} =120V, V _{GS} =0V, T _J =25°C			1	uA
	I _{DSS}	Drain-Source Leakage Current	V _{DS} =120V, V _{GS} =0V, T _J =125°C			250	uA
Ī	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	1		10	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_{D}=250uA$	2.0		4.0	V
g _{fs}	Forward Transconductance	V _{DS} =3V, I _D =20A		60		S

Dynamic and switching Characteristics

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Q_{g}	Total Gate Charge ^{3, 4}		 56		
Q_{qs}	Gate-Source Charge ^{3,4}	V_{DS} =50V, V_{GS} =10V, I_{D} =20A	 20		nC
Q_{qd}	Gate-Drain Charge ^{3,4}		 7		
T _{d(on)}	Turn-On Delay Time ^{3, 4}		 26		
T _r	Turn-On Rise Time ^{3,4}	V_{DD} =50V, V_{GS} =10V, R_{G} =6 Ω I_{D} =20A	 73		
T _{d(off)}	Turn-Off Delay Time ^{3,4}		 53		ns
T _f	Turn-Off Fall Time ^{3,4}		 55		
C _{iss}	Input Capacitance		 4550		
C _{oss}	Output Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	 260		pF
C _{rss}	Reverse Transfer Capacitance		 40	-	
R_q	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	 2.8		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	1 201 di/dt 1001/up	 77		ns
Q_{rr}	Reverse Recovery Charge	I _S =20A, di/dt=100A/us	 200		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. Essentially independent of operating temperature.



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2. Characteristics Curves

Ratings and Characteristics Curves

(T_A = 25° unless otherwise specified)

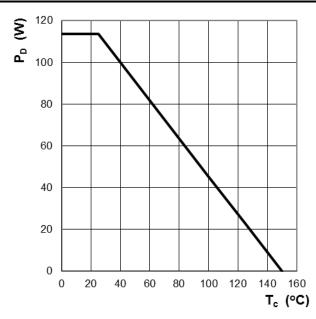


Figure 1: Power Dissipation

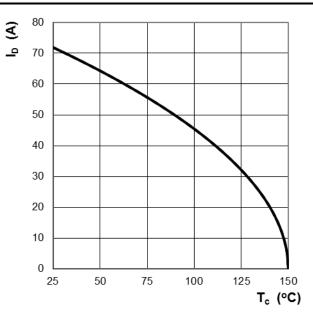


Figure 2: Continuous Drain Current vs. T_C

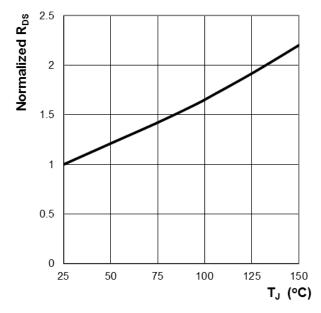


Figure 3: Normalized R_{DS(ON)} vs. T_J

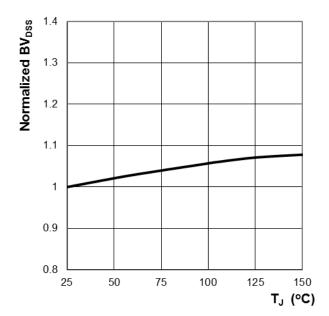


Figure 4: Normalized BV_{DSS} vs. T_J



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Ratings and Characteristics Curves

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

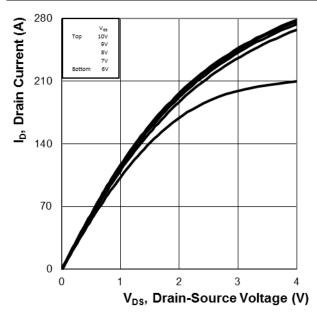


Figure 5: On-Region Characteristics

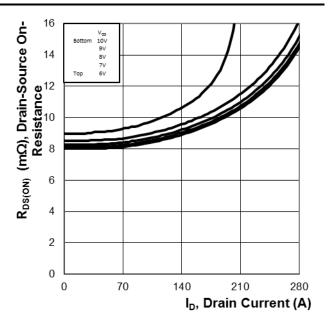


Figure 6: Typ. R_{DS} Variation vs. I_D and V_{GS}

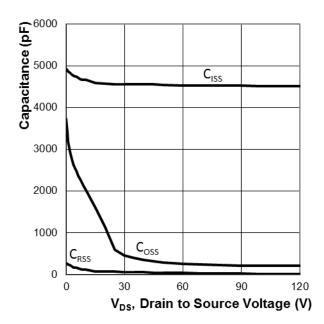


Figure 7: Typ. Capacitance Characteristics

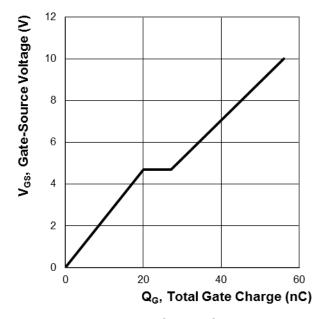


Figure 8: Typ. Gate Charge Characteristics



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Ratings and Characteristics Curves

(T_A = 25°C unless otherwise specified)

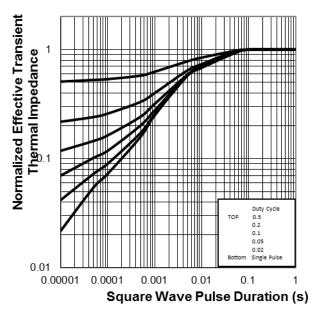


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

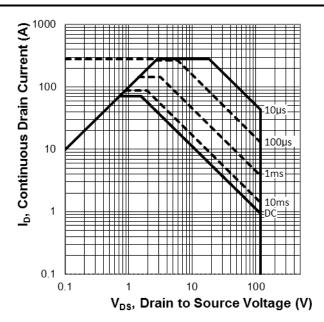


Figure 10: Maximum Safe Operation Area



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3. Marking information

Top Marking Rule

PFC PRM 010N12CT YYWW ABSH

PRM010N12CT = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

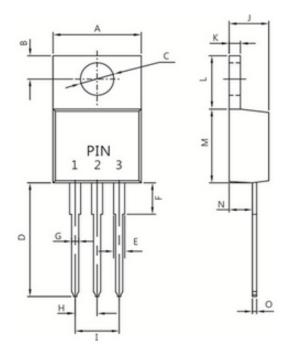
WW = Week code

ABS = Assembly code

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

4. Package information

Package Outline Dimensions millimeters



Dim.	Dim. Min.		
Α		10.50	
В	2.50	3.50	
С	3.50	4.10	
D	13.10	13.90	
Е	1.15	1.45	
F		6.35	
G	0.65	0.95	
Η	2.29	2.79	
1	4.80	5.30	
J	4.40	4.80	
K	1.14	1.40	
L	5.84	6.86	
М	8.50	9.60	
N	2.03	2.92	
0	0.30	0.64	
All Dimensions in millimeter			



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5. Ordering information

Part Number	Package	Delivery mode
PRM010N12CT	TO-220AB	50 pcs / Tube

Mechanical

Molder Plastic: UL Flammability Classification Rating 94V-0
 Device Weight: 0.07 ounces (1.96grams) - TO-220AB

Mounting Torque : Recommended 4~5 kg-cm

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