



PFC Device Corporation

PRM021N20CT

200V Single N-Channel MOSFET

Major ratings and characteristics

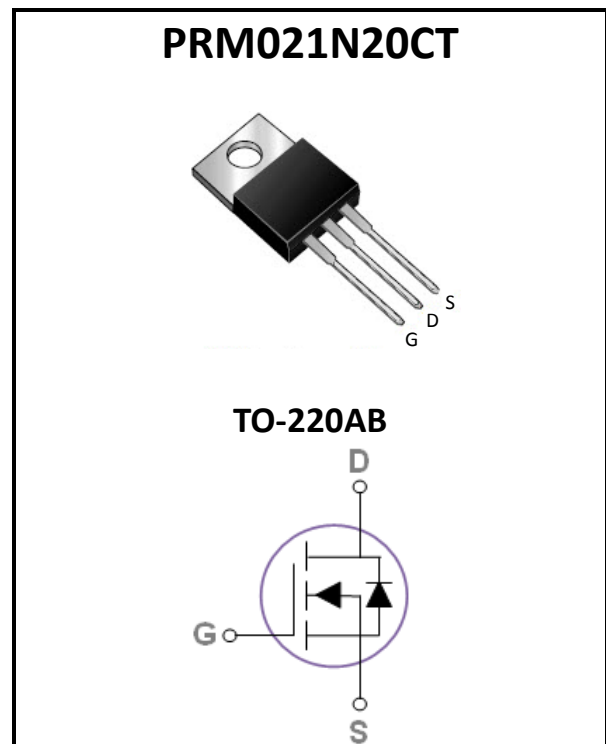
Characteristics	Values	Units
V_{DS}	200	V
I_D ($T_C=25^\circ\text{C}$)	73	A
Max. $R_{DS(ON)}$ @ $V_{GS}=10\text{V}$	21	m Ω
T_J Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

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. $R_{DS(ON)}=21\text{m}\Omega$ @ $V_{GS}=10\text{V}$
- Improved dv/dt capability
- Fast switching
- 100% E_{AS} Guaranteed
- Green Device Available

1. Characteristics

Maximum Ratings Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ\text{C}$)	73	A
	Drain Current – Continuous ($T_C=100^\circ\text{C}$)	50	A
I_{DM}	Drain Current – Pulsed ¹	260	A
E_{AS}	Single Pulse Avalanche Energy ²	33	mJ
I_{AS}	Single Pulse Avalanche Current ²	18	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	250	W
	Power Dissipation – Derate above 25°C	2	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.5	$^\circ\text{C}/\text{W}$



Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	200	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=200V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=160V, V_{GS}=0V, T_J=100^\circ\text{C}$	---	---	100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	16	21	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2.0	3.0	5.0	V
g_{fs}	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	60	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=100V, V_{GS}=10V, I_D=44A$	---	36.4	---	nC
Q_{gs}	Gate-Source Charge ^{3, 4}		---	14.1	---	
Q_{gd}	Gate-Drain Charge ^{3, 4}		---	4.6	---	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=130V, V_{GS}=10V, R_G=2.7\Omega, I_D=44A$	---	14	---	ns
T_r	Turn-On Rise Time ^{3, 4}		---	101	---	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		---	32	---	
T_f	Turn-Off Fall Time ^{3, 4}		---	80	---	
C_{iss}	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$	---	2718	---	pF
C_{oss}	Output Capacitance		---	380	---	
C_{riss}	Reverse Transfer Capacitance		---	32	---	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$	---	3.8	---	Ω

Drain-Source Diode Characteristics

V_{SD}^3	Source to Drain Diode Voltage	$V_{GS}=0V, I_S=20A$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_S=44A, di/dt=100A/\mu s$	---	107	---	ns
Q_{rr}	Reverse Recovery Charge		---	468	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.4\text{mH}, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.
5. Silicon limited.



2. Characteristics Curves

Ratings and Characteristics Curves

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

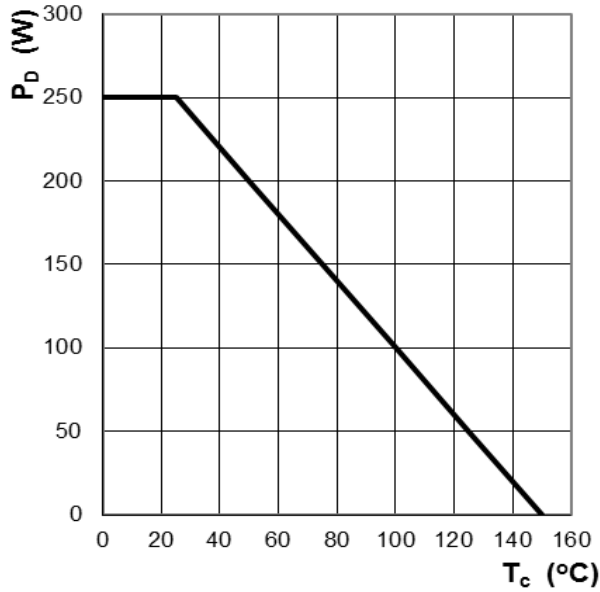


Figure 1: Power Dissipation

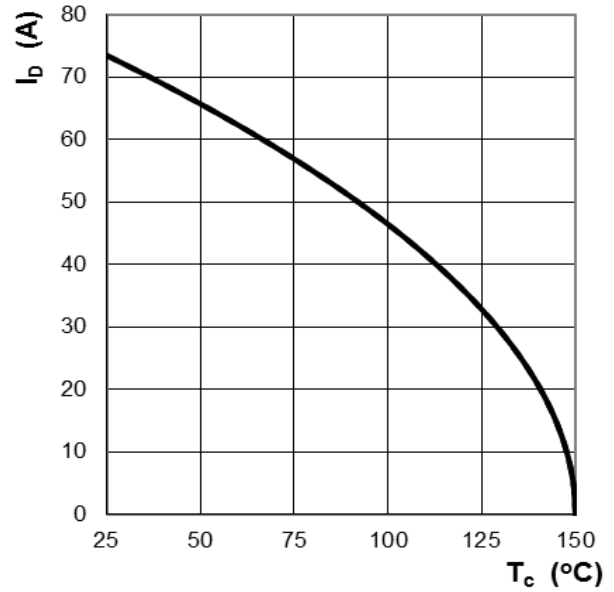


Figure 2: Continuous Drain Current vs. T_c

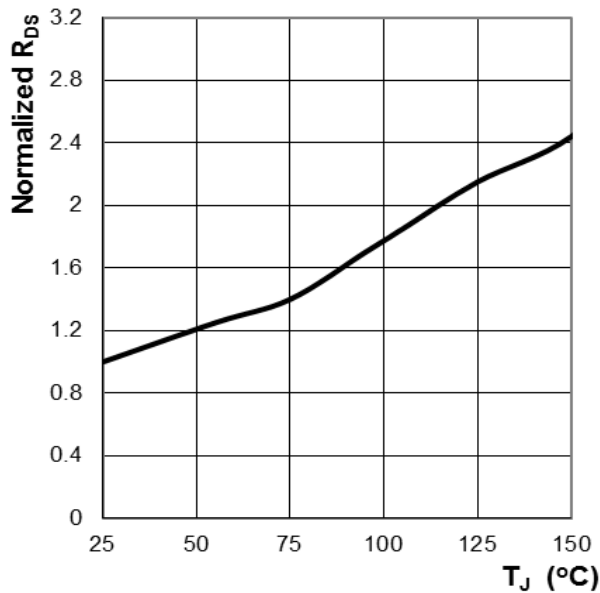


Figure 3: Normalized $R_{DS(on)}$ vs. T_j

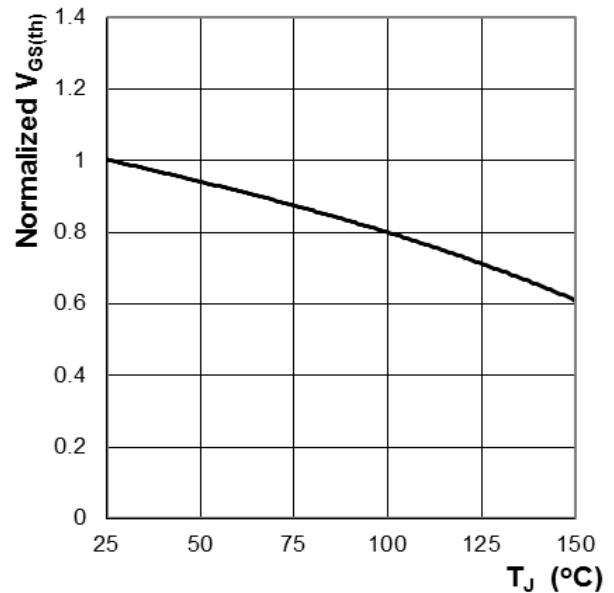


Figure 4: Normalized $V_{GS(th)}$ vs. T_j



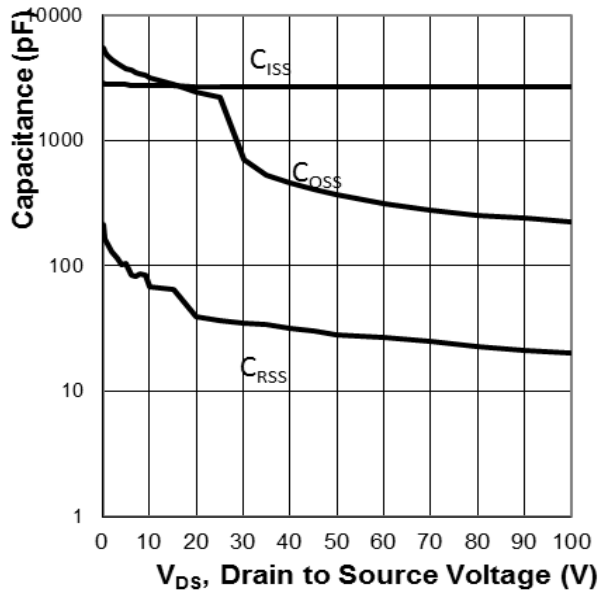


Figure 7: Typ. Capacitance Characteristics

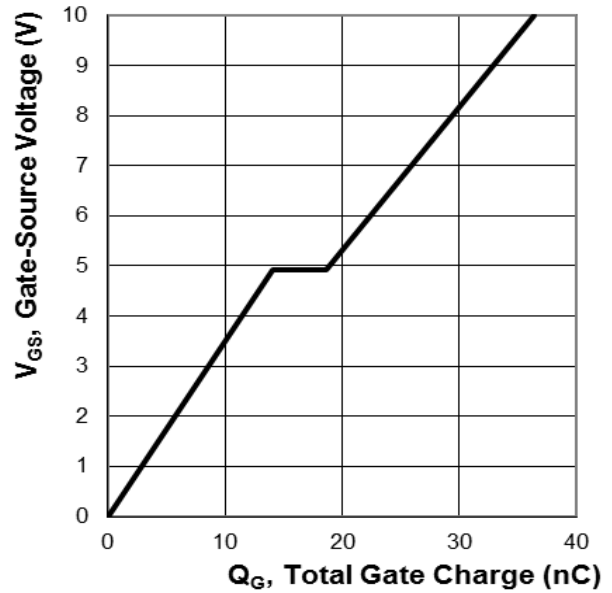


Figure 8: Typ. Gate Charge Characteristics

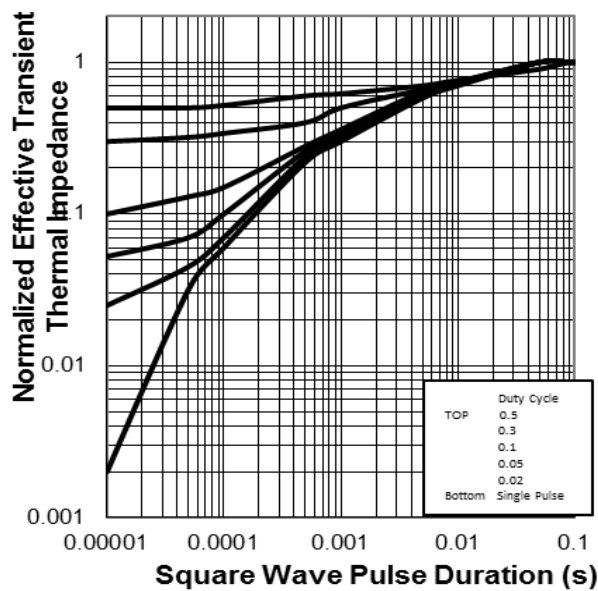


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

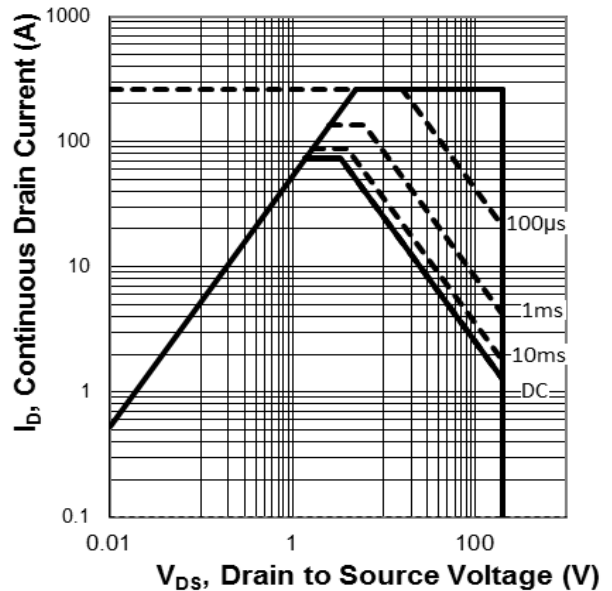
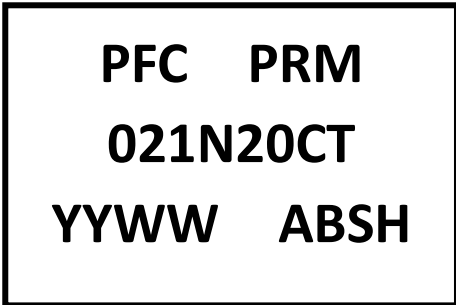


Figure 10: Maximum Safe Operation Area



3. Marking information

Top Marking Rule



PRM021N20CT = 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

TO-220AB

Dim.	Min.	Max.
A	-----	10.50
B	2.50	3.50
C	3.50	4.10
D	13.10	13.90
E	1.15	1.49
F	-----	4.50
G	0.65	0.95
H	2.29	2.79
I	4.80	5.30
J	4.40	4.80
K	1.14	1.40
L	5.84	6.86
M	8.50	9.60
N	2.03	2.92
O	0.30	0.64

All Dimensions in millimeter



5. Ordering information

Part Number	Package	Delivery mode
PRM021N20CT	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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