



**PRM5R2N06CT**  
*PFC Device Corporation*

## 60V Single N-Channel MOSFET

### Major ratings and characteristics

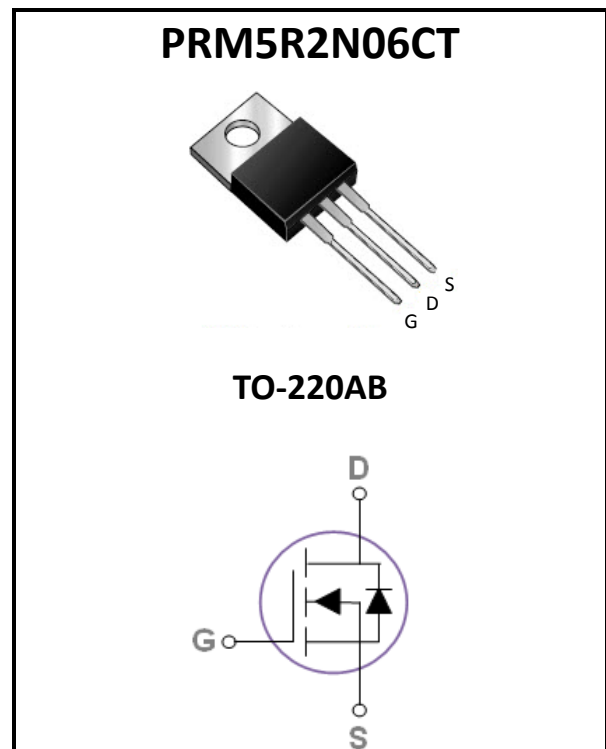
Characteristics	Values	Units
$V_{DS}$	60	V
$I_D^6$ ( $T_C=25^\circ\text{C}$ )	110	A
Max. $R_{DS(ON)}$ @ $V_{GS}=10\text{V}$	5.2	m $\Omega$
Max. $R_{DS(ON)}$ @ $V_{GS}=4.5\text{V}$	7	m $\Omega$
$T_J$ Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

### 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.  $R_{DS(ON)}=5.2\text{m}\Omega@V_{GS}=10\text{V}$
- 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	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D^5$	Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	156	A
	Drain Current – Continuous ( $T_C=100^\circ\text{C}$ )	99	A
$I_D^6$	Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )	110	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	350	A
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	80	mJ
$I_{AS}$	Single Pulse Avalanche Current <sup>2</sup>	40	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	204	W
	Power Dissipation – Derate above $25^\circ\text{C}$	1.63	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	---	0.61	$^\circ\text{C}/\text{W}$



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

### Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	250	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA

### On Characteristics

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	4.3	5.2	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	6	7	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.8	3.0	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	---	65	---	S

### Dynamic and switching Characteristics

Q <sub>g</sub>	Total Gate Charge <sup>3,4</sup>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	85	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3,4</sup>		---	15	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3,4</sup>		---	20	---	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3,4</sup>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω I <sub>D</sub> =20A	---	19	---	ns
T <sub>r</sub>	Turn-On Rise Time <sup>3,4</sup>		---	51	---	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3,4</sup>		---	67	---	
T <sub>f</sub>	Turn-Off Fall Time <sup>3,4</sup>		---	78	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	4950	---	pF
C <sub>oss</sub>	Output Capacitance		---	310	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	200	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	---	0.5	---	Ω

### Drain-Source Diode Characteristics

V <sub>SD</sub>	Source to Drain Diode Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	---	---	1.5	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =20A, di/dt=100A/us	---	20	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	7	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. L=0.1mH, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C
3. The data tested by pulsed , pulse width ≤300us, duty cycle ≤2%.
4. Essentially independent of operating temperature.
5. Silicon limited.
6. Package limited.



2. Characteristics Curves

Ratings and Characteristics Curves

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

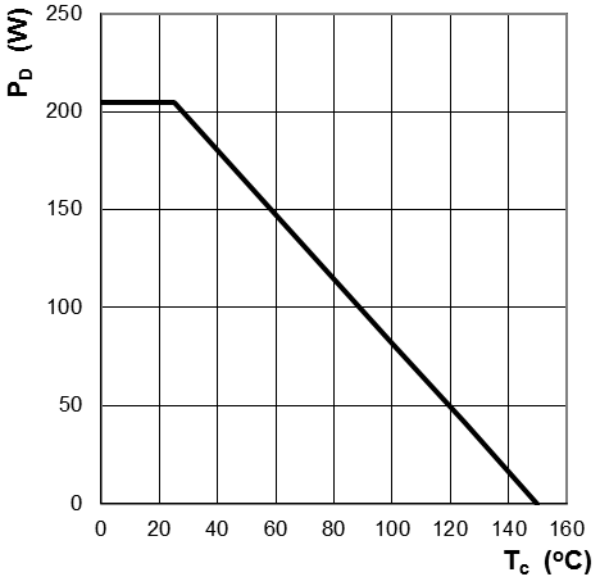


Figure 1: Power Dissipation

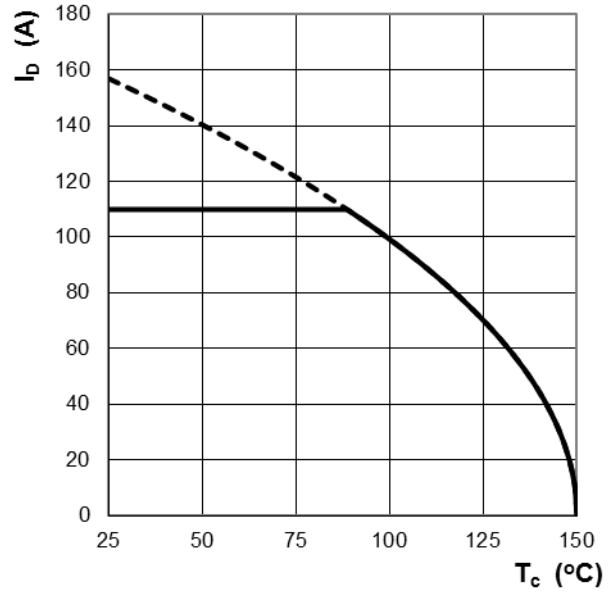


Figure 2: Continuous Drain Current vs.  $T_c$

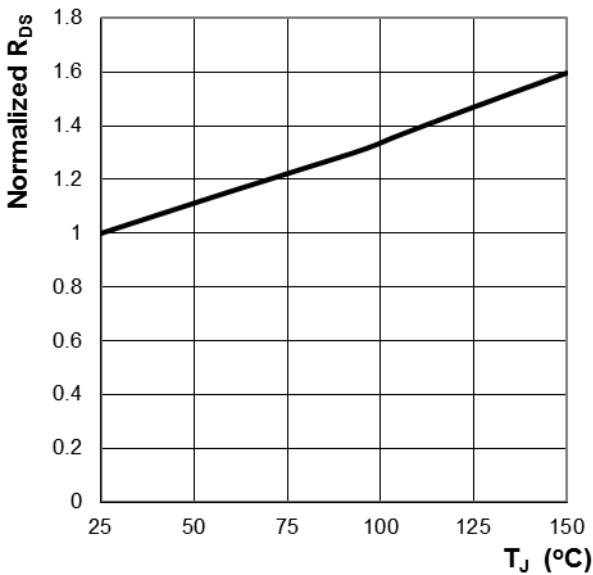


Figure 3: Normalized  $R_{DS(ON)}$  vs.  $T_J$

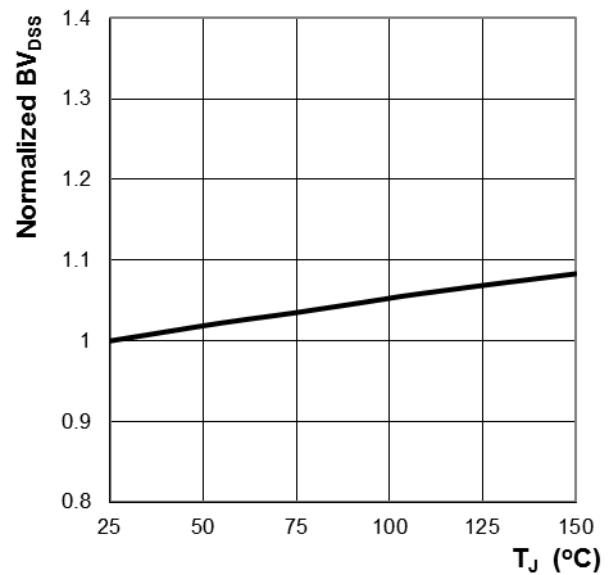


Figure 4: Normalized  $BV_{DSS}$  vs.  $T_J$



Ratings and Characteristics Curves

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

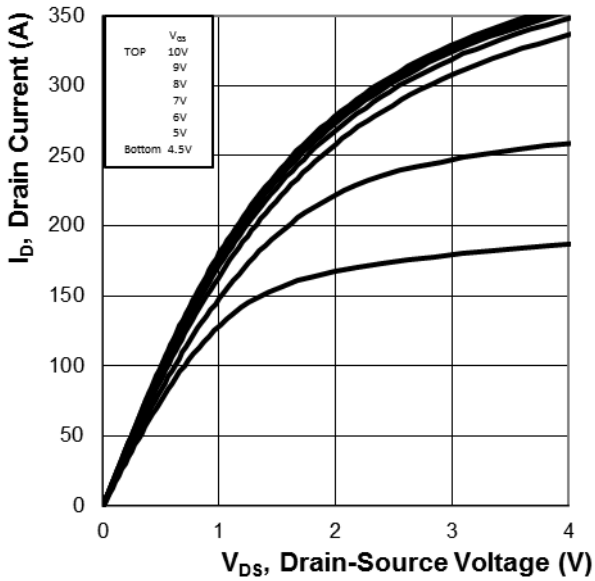


Figure 5: On-Region Characteristics

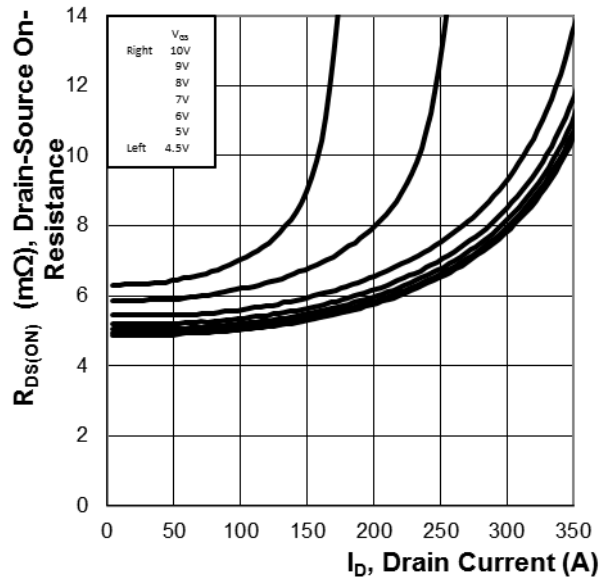


Figure 6: Typ.  $R_{DS}$  Variation vs.  $I_D$  and  $V_{GS}$

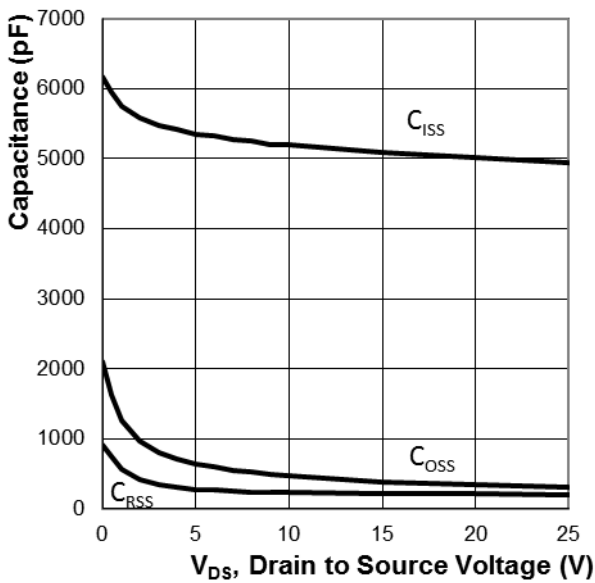


Figure 7: Typ. Capacitance Characteristics

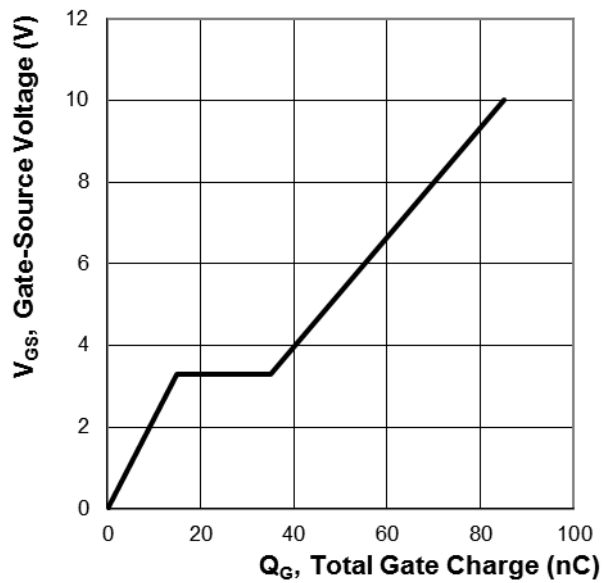


Figure 8: Typ. Gate Charge Characteristics



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

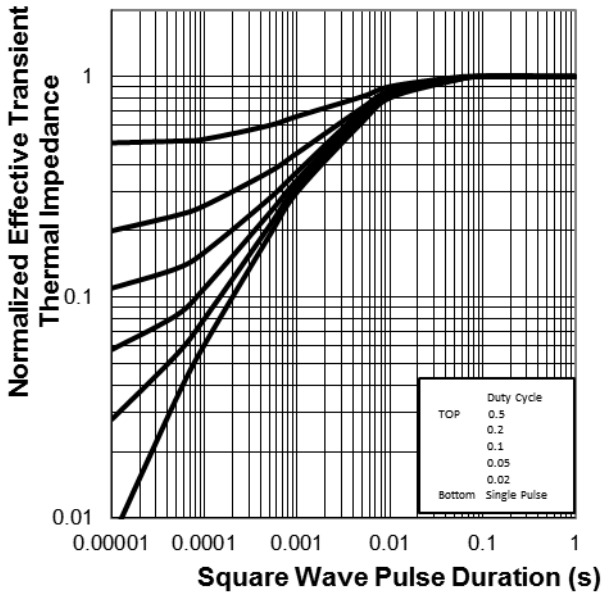


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

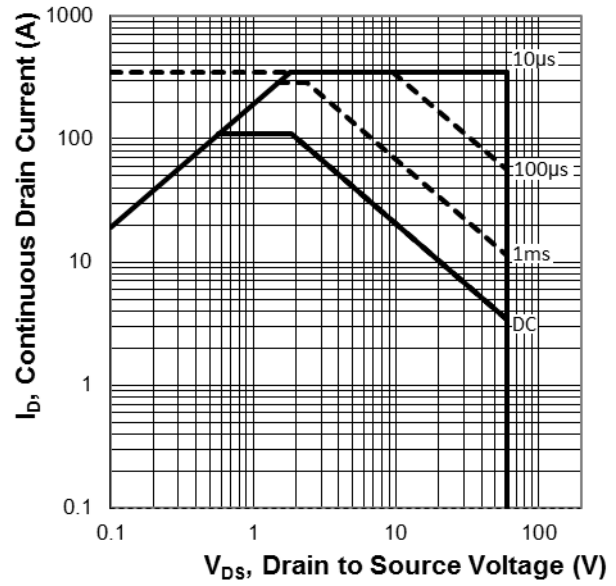
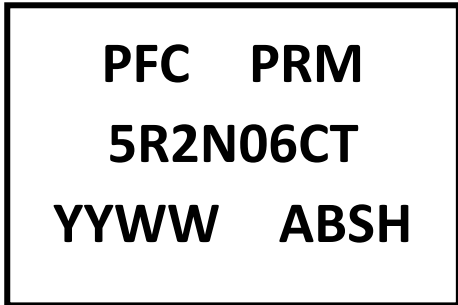


Figure 10: Maximum Safe Operation Area



### 3. Marking information

Top Marking Rule



PRM5R2N06CT = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

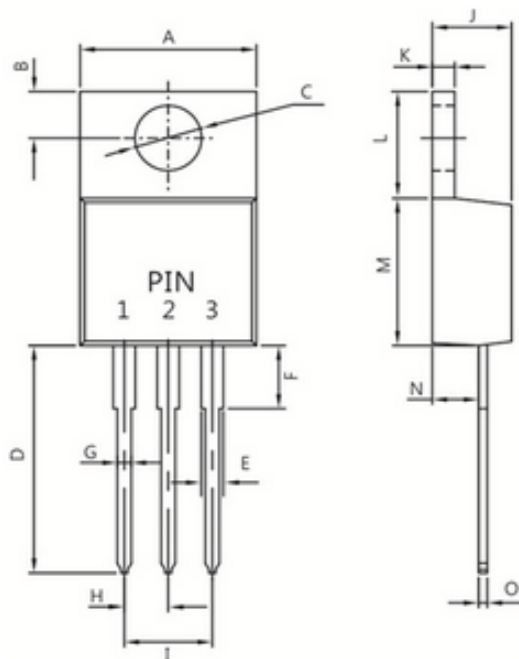
WW = Week code

ABS = Assembly code

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

### 4. Package information

Package Outline Dimensions millimeters



Dim.	Min.	Max.
A	----	10.50
B	2.50	3.50
C	3.50	4.10
D	13.10	13.90
E	1.15	1.45
F	----	6.35
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
PRM5R2N06CT	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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