



# PRM8R9N06CTF

PFC Device Corporation

## 60V Single N-Channel MOSFET

### Major ratings and characteristics

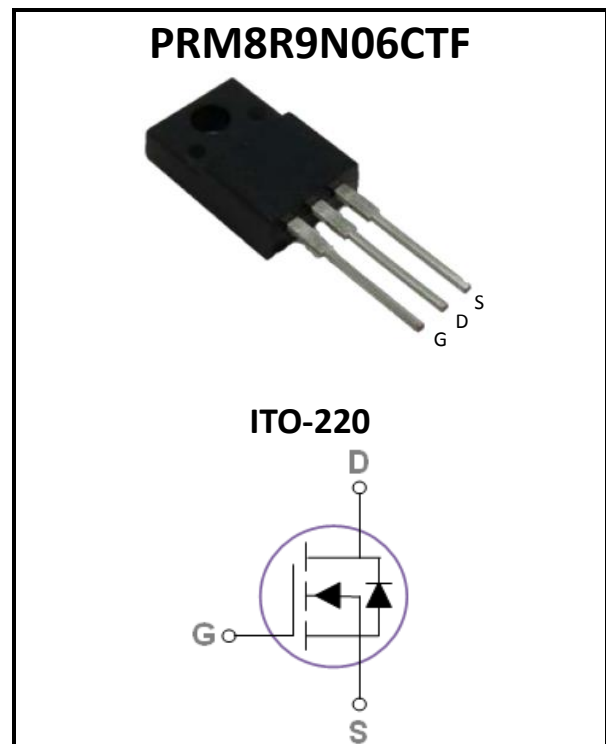
Characteristics	Values	Units
$V_{DS}$	60	V
$I_D^6$ ( $T_C=25^\circ\text{C}$ )	51	A
Max. $R_{DS(ON)}$ @ $V_{GS}=10\text{V}$	8.9	m $\Omega$
Max. $R_{DS(ON)}$ @ $V_{GS}=4.5\text{V}$	15	m $\Omega$
$T_J$ Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

### 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.  $R_{DS(ON)}=8.9\text{m}\Omega@V_{GS}=10\text{V}$
- 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 ( $T_C=25^\circ\text{C}$ )	51	A
	Drain Current – Continuous ( $T_C=100^\circ\text{C}$ )	31.4	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	204	A
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	16	mJ
$I_{AS}$	Single Pulse Avalanche Current <sup>2</sup>	17	A
$P_D$	Power Dissipation ( $T_C=25^\circ\text{C}$ )	35.8	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.28	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	---	3.5	$^\circ\text{C}/\text{W}$



## 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> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	100	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	---	7.5	8.9	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	11	15	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.7	2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	---	38	---	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> =10A	---	21.5	---	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3,4</sup>		---	3.7	---	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3,4</sup>		---	5.1	---	
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> =3Ω I <sub>D</sub> =10A	---	7	---	ns
T <sub>r</sub>	Turn-On Rise Time <sup>3,4</sup>		---	25	---	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3,4</sup>		---	20	---	
T <sub>f</sub>	Turn-Off Fall Time <sup>3,4</sup>		---	9	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	1241	---	pF
C <sub>oss</sub>	Output Capacitance		---	466	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	44	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	---	0.8	---	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	---	15	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge		---	4	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=50V, V<sub>GS</sub>=10V, 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



2. Characteristics Curves

Ratings and Characteristics Curves

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

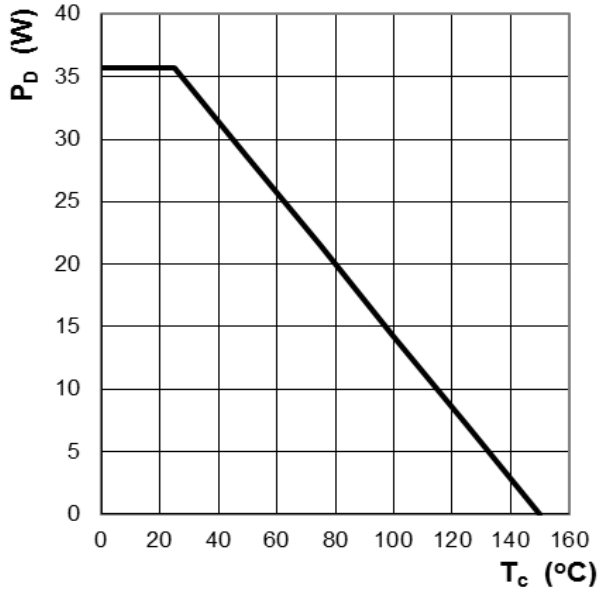


Figure 1: Power Dissipation

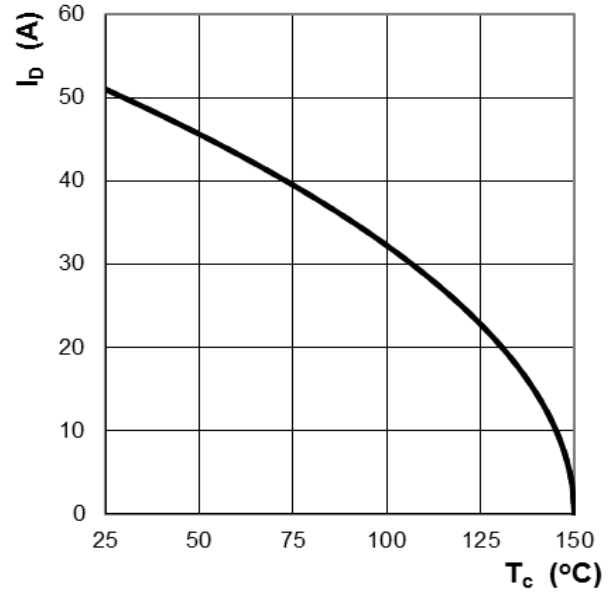


Figure 2: Continuous Drain Current vs.  $T_c$

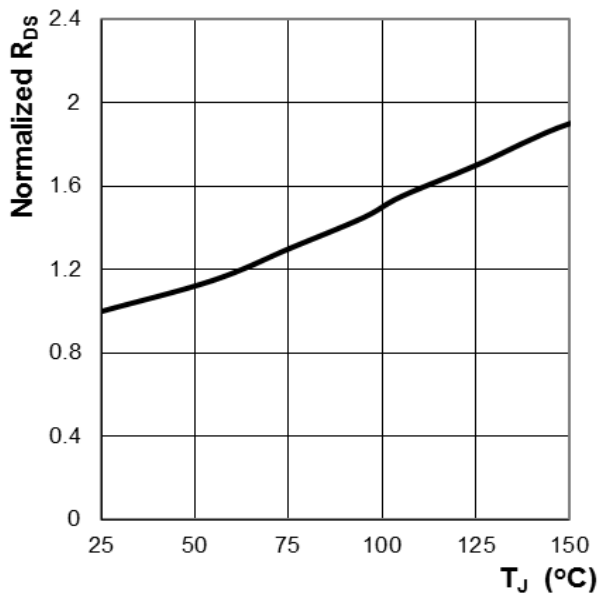


Figure 3: Normalized  $R_{DS(on)}$  vs.  $T_j$

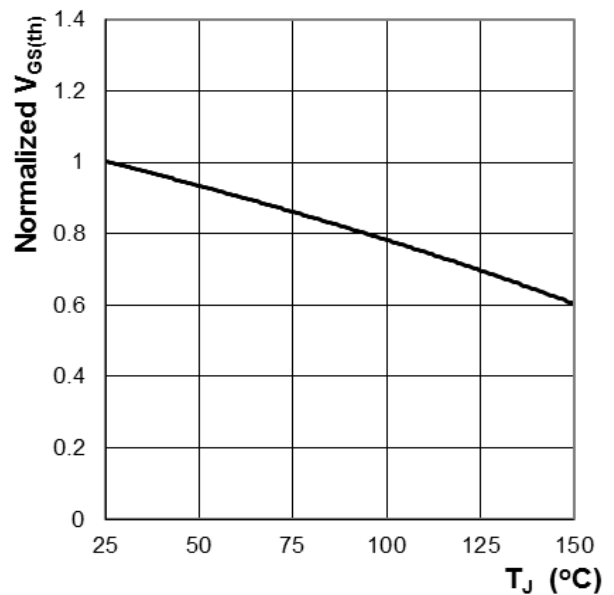


Figure 4: Normalized  $V_{GS(th)}$  vs.  $T_j$



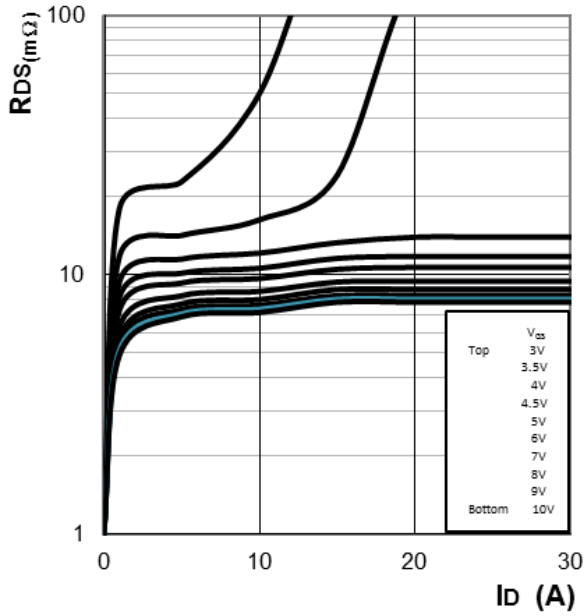


Figure 5: RDS(ON) vs. Drain Current and Gate Voltage

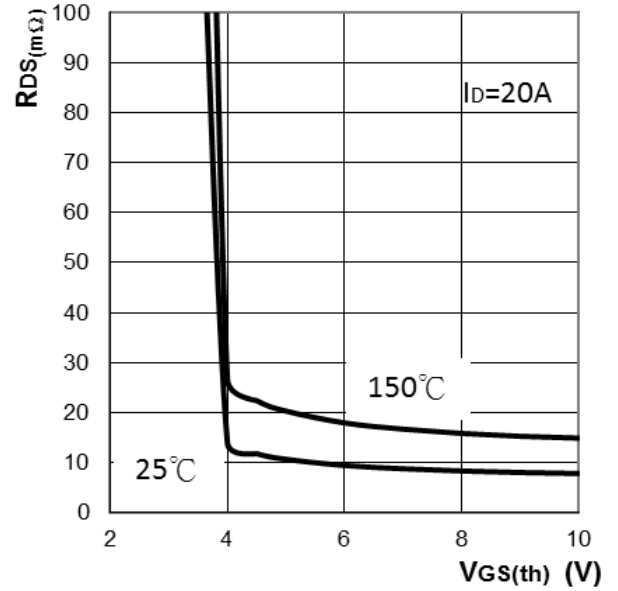


Figure 6: RDS(ON) vs. Gate Voltage

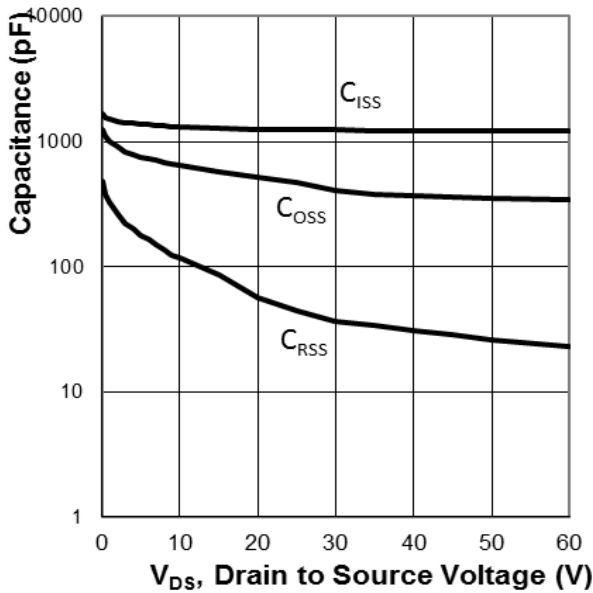


Figure 7: Typ. Capacitance Characteristics

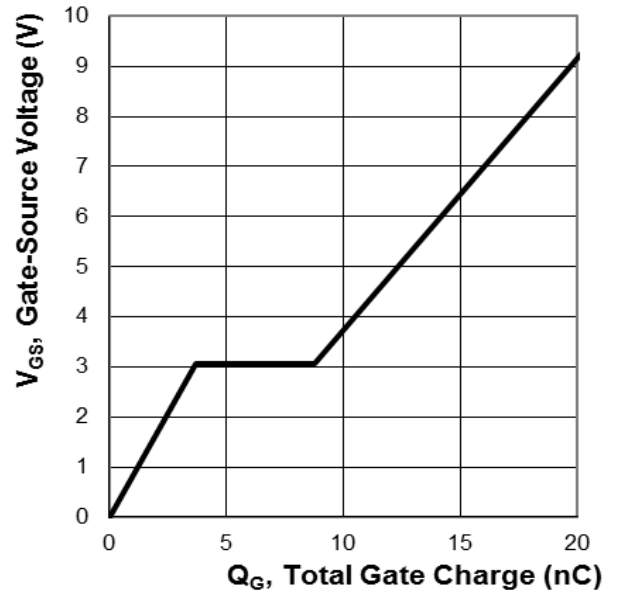


Figure 8: Typ. Gate Charge Characteristics



Ratings and Characteristics Curves

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

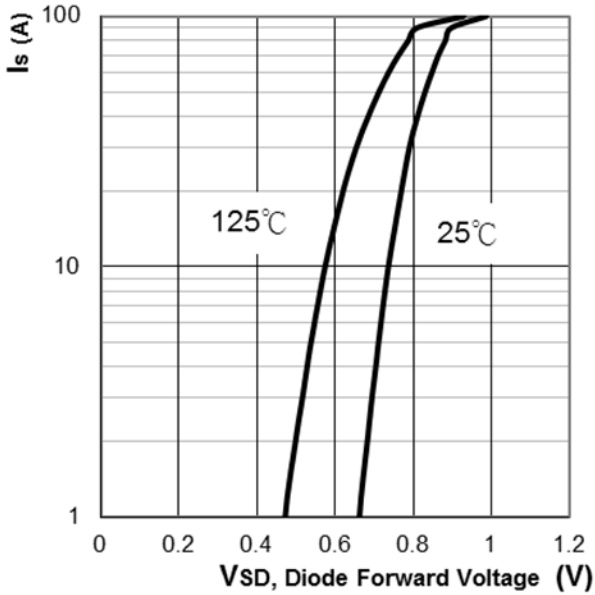


Figure 9: Body Diode Characters Area

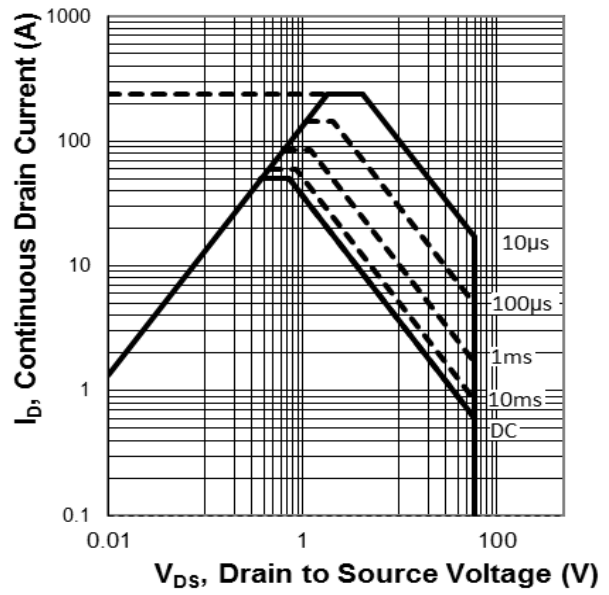


Figure 10: Maximum Safe Operation

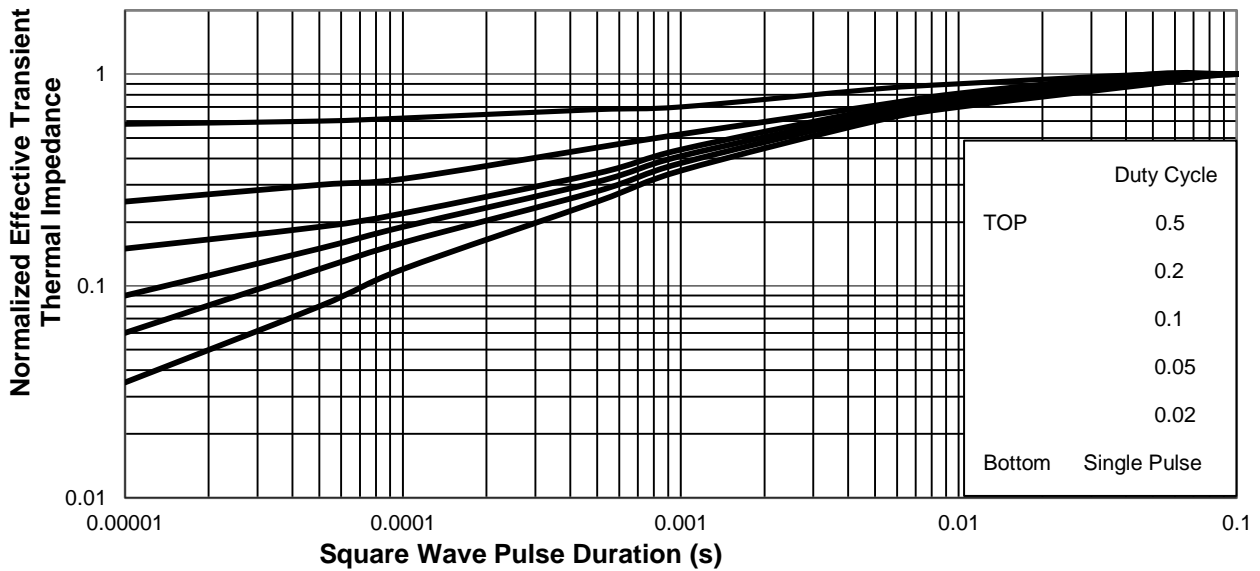
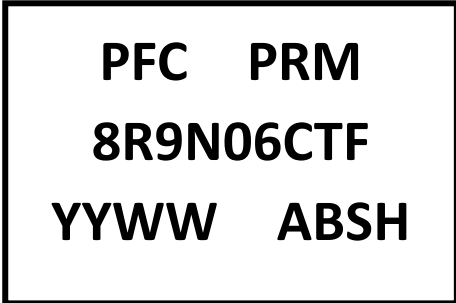


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case



### 3. Marking information

Top Marking Rule



PRM8R9N06CTF = 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

**ITO-220AB**

Dim.	Min.	Max.
A	-----	10.50
B	2.60	3.00
C	6.50	7.10
D	2.90	3.50
E	13.10	13.90
F	2.80	4.00
G	1.11	1.45
H	0.40	0.80
I	2.40	2.80
J	5.00	5.40
K	4.30	4.70
L	2.90	3.30
M	8.20	9.00
N	2.50	2.90
O	0.40	0.80

All Dimensions in millimeter



**5. Ordering information**

Part Number	Package	Delivery mode
PRM8R9N06CTF	ITO-220AB	50 pcs / Tube

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.06 ounces (1.74grams) - ITO-220AB
- Mounting Torque : Recommended 4~5 kg-cm

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