



PRM8R9N06CT

PFC Device Corporation

60V Single N-Channel MOSFET

Major ratings and characteristics

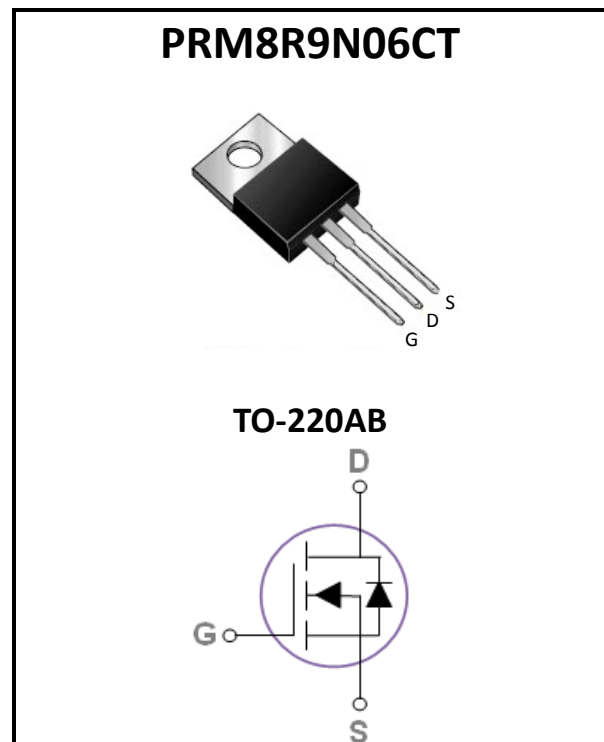
| Characteristics | Values | Units |
|--|-------------|------------------|
| V_{DS} | 60 | V |
| I_D^6 ($T_C=25^\circ\text{C}$) | 60 | A |
| Max. $R_{DS(ON)}$ @ $V_{GS}=10\text{V}$ | 8.9 | m Ω |
| Max. $R_{DS(ON)}$ @ $V_{GS}=4.5\text{V}$ | 15 | m Ω |
| T_J Operating Junction Temperature | -55 to +150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

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. $R_{DS(ON)}=8.9\text{m}\Omega@V_{GS}=10\text{V}$
- 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 | ± 20 | V |
| I_D^5 | Drain Current – Continuous ($T_C=25^\circ\text{C}$) | 78 | A |
| | Drain Current – Continuous ($T_C=100^\circ\text{C}$) | 48 | A |
| I_D^6 | Drain Current – Continuous ($T_C=25^\circ\text{C}$) | 60 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 240 | A |
| E_{AS} | Single Pulse Avalanche Energy ² | 16 | mJ |
| I_{AS} | Single Pulse Avalanche Current ² | 17 | A |
| P_D | Power Dissipation ($T_C=25^\circ\text{C}$) | 83.3 | W |
| | Power Dissipation – Derate above 25°C | 0.67 | 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 | --- | 60 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 1.5 | $^\circ\text{C}/\text{W}$ |



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 | $V_{GS}=0V, I_D=250\mu A$ | 60 | --- | --- | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$ | --- | --- | 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 | $V_{GS}=10V, I_D=20A$ | --- | 7.5 | 8.9 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | --- | 11 | 15 | m Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.0 | 1.7 | 2.5 | V |
| g_{fs} | Forward Transconductance | $V_{DS}=5V, I_D=20A$ | --- | 38 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|--------------|------------------------------------|--|-----|------|-----|----------|
| Q_g | Total Gate Charge ^{3,4} | $V_{DS}=30V, V_{GS}=10V, I_D=10A$ | --- | 21.5 | --- | nC |
| Q_{GS} | Gate-Source Charge ^{3,4} | | --- | 3.7 | --- | |
| Q_{GD} | Gate-Drain Charge ^{3,4} | | --- | 5.1 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time ^{3,4} | $V_{DD}=30V, V_{GS}=10V, R_G=3\Omega, I_D=10A$ | --- | 7 | --- | ns |
| T_r | Turn-On Rise Time ^{3,4} | | --- | 25 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time ^{3,4} | | --- | 20 | --- | |
| T_f | Turn-Off Fall Time ^{3,4} | | --- | 9 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$ | --- | 1241 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 466 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 44 | --- | |
| R_g | Gate resistance | $V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$ | --- | 0.8 | --- | 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 | $I_S=20A, di/dt=100A/\mu s$ | --- | 15 | --- | ns |
| Q_{rr} | Reverse Recovery Charge | | --- | 4 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
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
6. Package limited.



2. Characteristics Curves

Ratings and Characteristics Curves

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

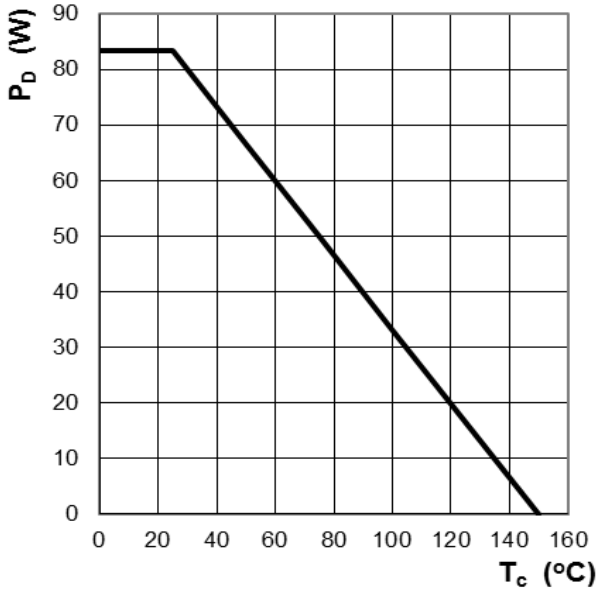


Figure 1: Power Dissipation

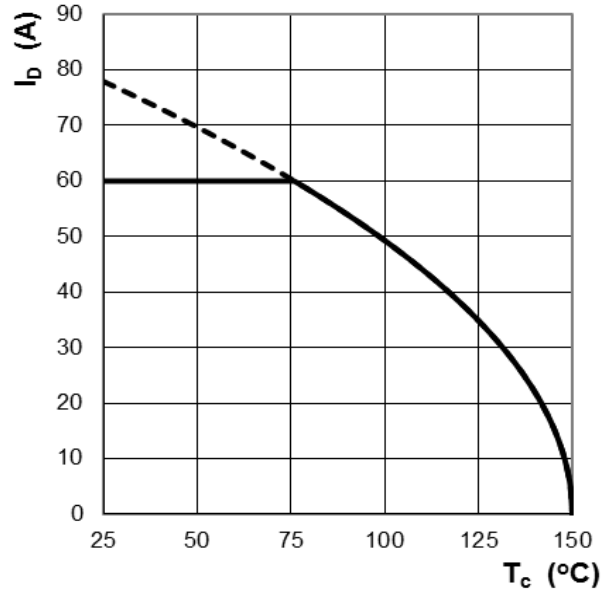


Figure 2: Continuous Drain Current vs. T_c

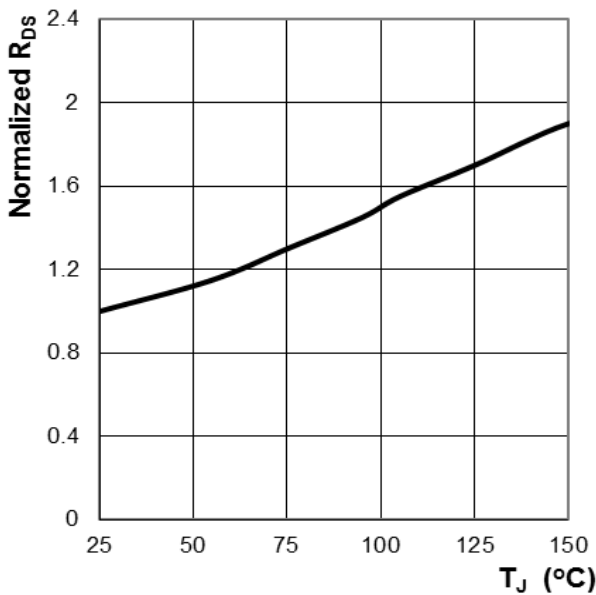


Figure 3: Normalized $R_{DS(on)}$ vs. T_j

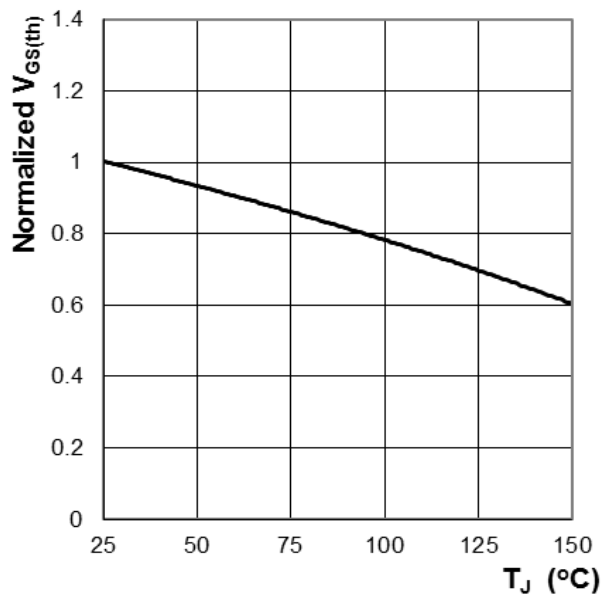


Figure 4: Normalized $V_{GS(th)}$ vs. T_j



Ratings and Characteristics Curves

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

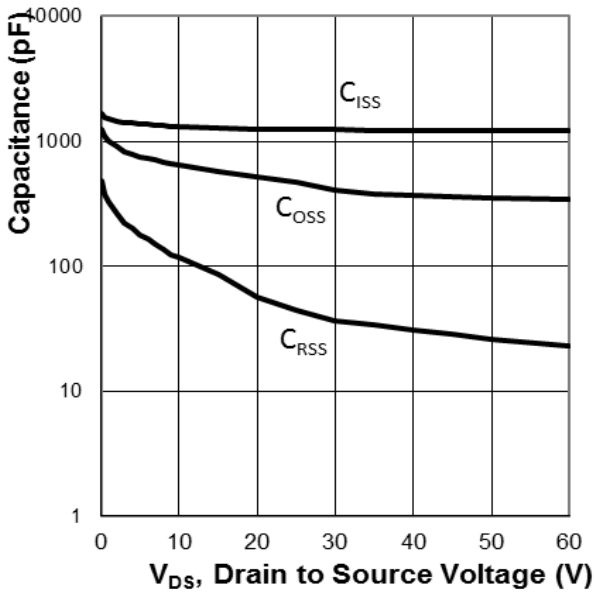


Figure 7: Typ. Capacitance Characteristics

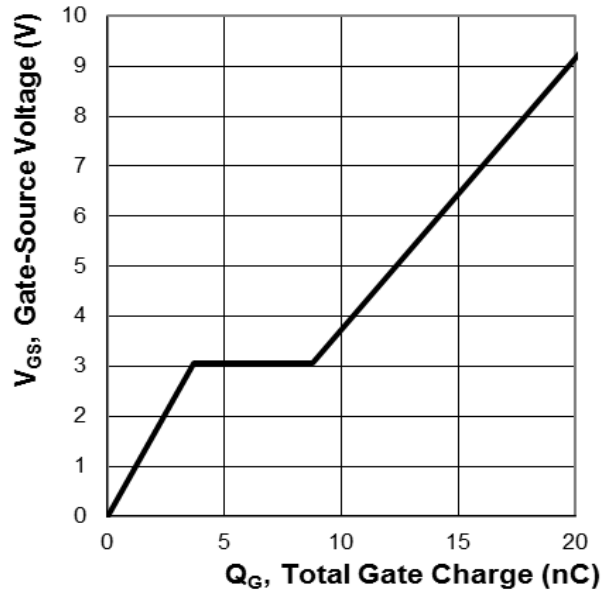


Figure 8: Typ. Gate Charge Characteristics

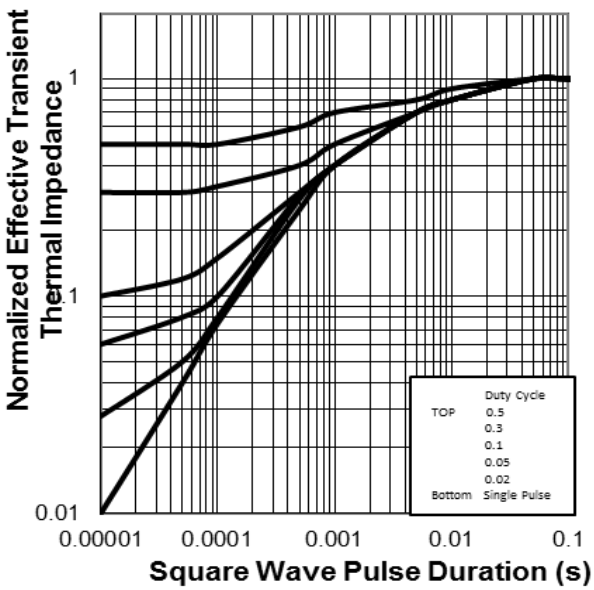


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

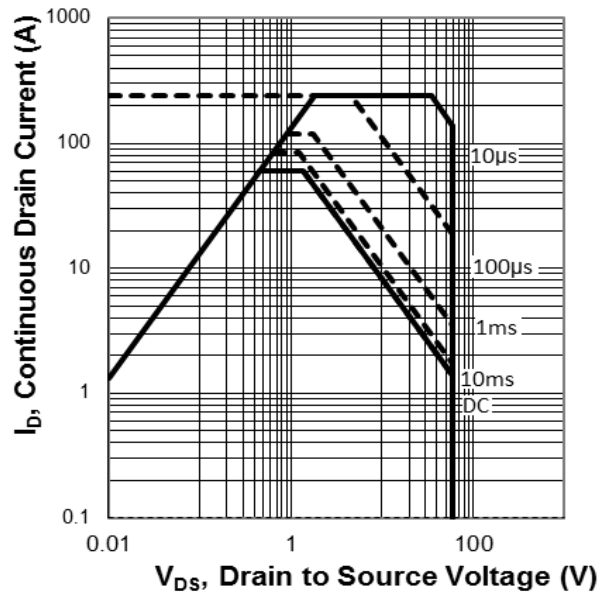
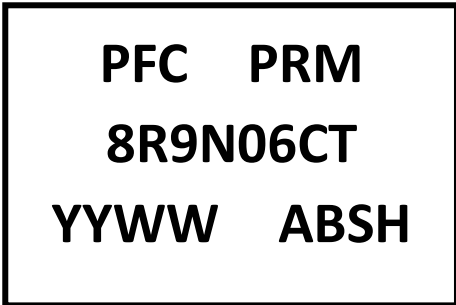


Figure 10: Maximum Safe Operation Area



3. Marking information

Top Marking Rule



PRM8R9N06CT = 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 | 14.60 | 15.40 |
| B | ----- | 10.50 |
| C | 2.50 | 3.50 |
| D | 5.84 | 6.86 |
| E | 8.50 | 9.50 |
| F | ----- | 4.50 |
| G | 13.10 | 14.20 |
| H | 2.29 | 2.79 |
| I | 0.60 | 1.00 |
| J | 0.30 | 0.64 |
| K | 3.50 | 4.10 |
| L | 4.20 | 4.80 |
| M | 1.10 | 1.40 |
| N | 2.40 | 2.79 |
| O | 1.15 | 1.49 |

All Dimensions in millimeter



5. Ordering information

| Part Number | Package | Delivery mode |
|-------------|----------|---------------|
| PRM8R9N06CT | 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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