



# PRM2R8N06N5

PFC Device Corporation

## 65V Single N-Channel MOSFET

### Major ratings and characteristics

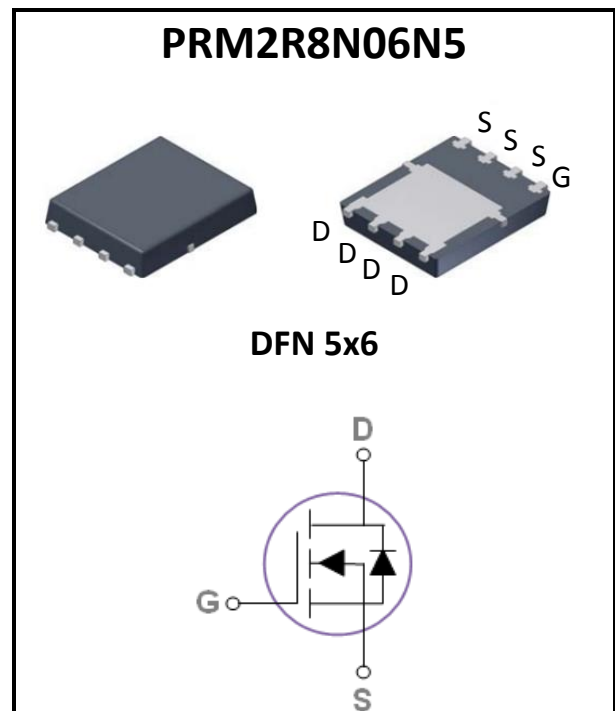
| Characteristics                          | Values      | Units            |
|--|-------------|------------------|
| $V_{DS}$                                 | 65          | V                |
| $I_D^5$ ( $T_C=25^\circ\text{C}$ )       | 45          | A                |
| Max. $R_{DS(ON)}$ @ $V_{GS}=10\text{V}$  | 2.8         | $\text{m}\Omega$ |
| Max. $R_{DS(ON)}$ @ $V_{GS}=4.5\text{V}$ | 5.4         | $\text{m}\Omega$ |
| $T_J$ 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.  $R_{DS(ON)}=2.8\text{m}\Omega$ @ $V_{GS}=10\text{V}$
- 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                                   | 65         | V                   |
| $V_{GS}$  | Gate-Source Voltage                                    | +20/-12    | V                   |
| $I_D^4$   | Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )  | 150        | A                   |
|           | Drain Current – Continuous ( $T_C=100^\circ\text{C}$ ) | 94         | A                   |
| $I_D^5$   | Drain Current – Continuous ( $T_C=25^\circ\text{C}$ )  | 45         | A                   |
| $I_{DM}$  | Drain Current – Pulsed <sup>1</sup>                    | 180        | A                   |
| $E_{AS}$  | Single Pulse Avalanche Energy <sup>2</sup>             | 20         | mJ                  |
| $I_{AS}$  | Single Pulse Avalanche Current <sup>2</sup>            | 20         | A                   |
| $P_D$     | Power Dissipation ( $T_C=25^\circ\text{C}$ )           | 104        | W                   |
|           | Power Dissipation – Derate above $25^\circ\text{C}$    | 0.83       | 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   | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case    | ---  | 1.2  | $^\circ\text{C/W}$ |



## 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 | $V_{GS}=0V, I_D=250\mu A$                     | 65   | ---  | ---  | V       |
| $I_{DSS}$  | Drain-Source Leakage Current   | $V_{DS}=65V, V_{GS}=0V, T_J=25^\circ\text{C}$ | ---  | ---  | 1    | $\mu A$ |
| $I_{GSS}$  | Gate-Source Leakage Current    | $V_{GS}=20V, V_{DS}=0V$                       | ---  | ---  | 100  | nA      |

### On Characteristics

|              |                                   |                               |     |     |     |           |
|--------------|-----------------------------------|-------------------------------|-----|-----|-----|-----------|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10V, I_D=20A$         | --- | --- | 2.8 | $m\Omega$ |
|              |                                   | $V_{GS}=4.5V, I_D=10A$        | --- | --- | 5.4 | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.0 | --- | 2.5 | V         |
| gfs          | Forward Transconductance          | $V_{DS}=5V, I_D=20A$          | --- | 50  | --- | S         |

### Dynamic and switching Characteristics

|              |                              |  |     |      |     |          |
|--------------|------------------------------|--|-----|------|-----|----------|
| $Q_g$        | Total Gate Charge            | $V_{DS}=30V, V_{GS}=10V, I_D=20A$              | --- | 97   | --- | nC       |
| $Q_{gs}$     | Gate-Source Charge           |  | --- | 15   | --- |          |
| $Q_{gd}$     | Gate-Drain Charge            |  | --- | 29   | --- |          |
| $T_{d(on)}$  | Turn-On Delay Time           | $V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=20A$ | --- | 25   | --- | ns       |
| $T_r$        | Turn-On Rise Time            |  | --- | 98   | --- |          |
| $T_{d(off)}$ | Turn-Off Delay Time          |  | --- | 95   | --- |          |
| $T_f$        | Turn-Off Fall Time           |  | --- | 155  | --- |          |
| $C_{iss}$    | Input Capacitance            | $V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$         | --- | 5200 | --- | pF       |
| $C_{oss}$    | Output Capacitance           |  | --- | 2200 | --- |          |
| $C_{rss}$    | Reverse Transfer Capacitance |  | --- | 140  | --- |          |
| $R_g$        | Gate resistance              | $V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$          | --- | 1.7  | --- | $\Omega$ |

### Drain-Source Diode Characteristics

|            |                               |                             |     |     |     |    |
|------------|-------------------------------|-----------------------------|-----|-----|-----|----|
| $V_{SD}^3$ | Source to Drain Diode Voltage | $V_{GS}=0V, I_S=20A$        | --- | --- | 1.5 | V  |
| $t_{rr}$   | Reverse Recovery Time         | $I_S=20A, di/dt=100A/\mu s$ | --- | 65  | --- | ns |
| $Q_{rr}$   | Reverse Recovery Charge       |                             | --- | 84  | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $L=0.1\text{mH}, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
3. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Silicon limited.
5. Package limited.



2. Characteristics Curves

Ratings and Characteristics Curves

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

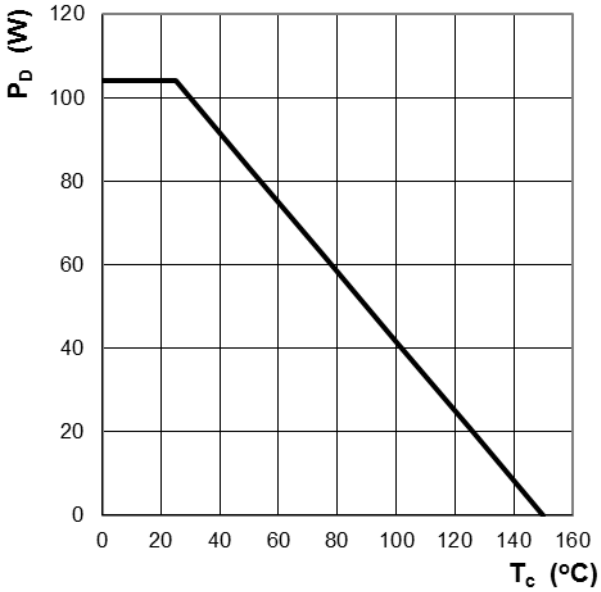


Figure 1: Power Dissipation

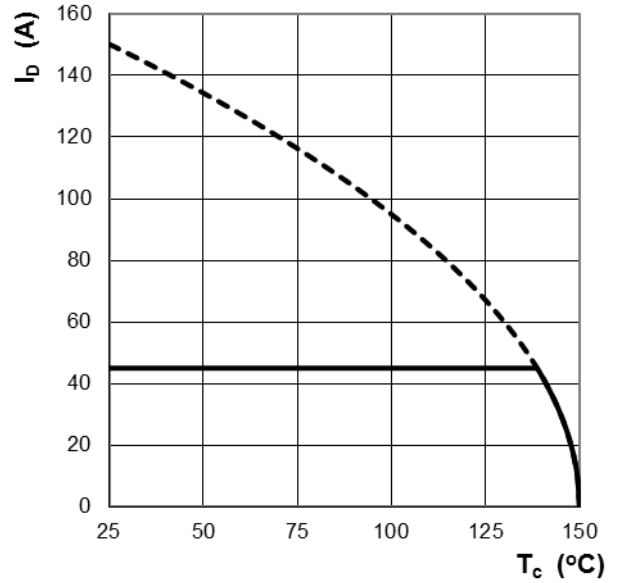


Figure 2: Continuous Drain Current vs.  $T_c$

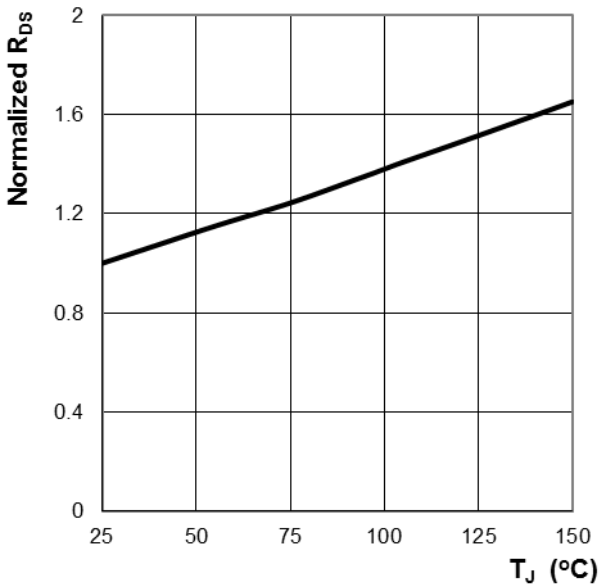


Figure 3: Normalized  $R_{DS(on)}$  vs.  $T_j$

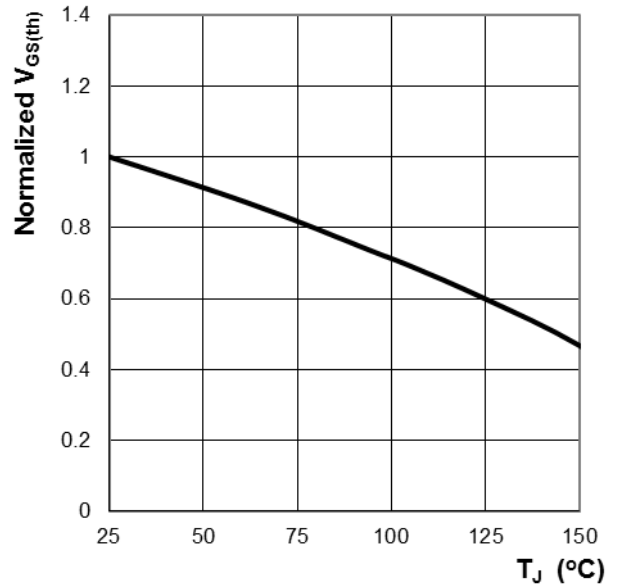


Figure 4: Normalized  $V_{GS(th)}$  vs.  $T_j$



Ratings and Characteristics Curves

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

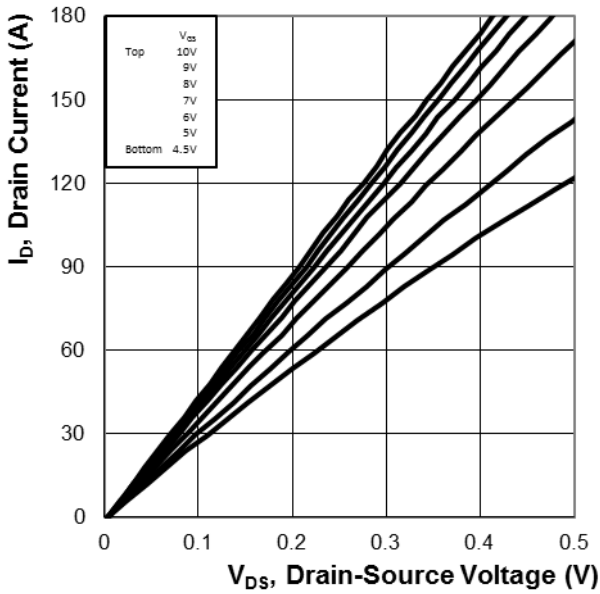


Figure 5: On-Region Characteristics

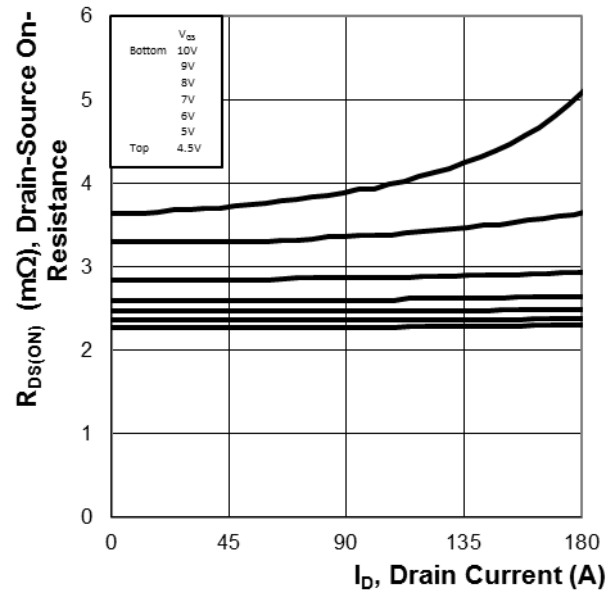


Figure 6: Typ.  $R_{DS}$  Variation vs.  $I_D$  and  $V_{GS}$

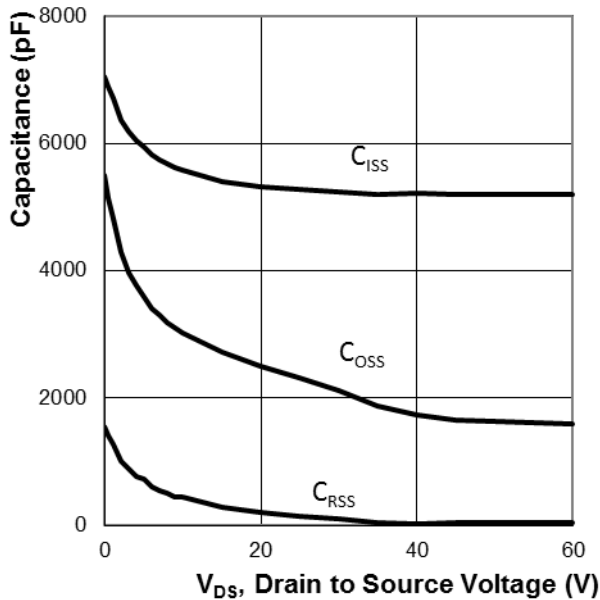


Figure 7: Typ. Capacitance Characteristics

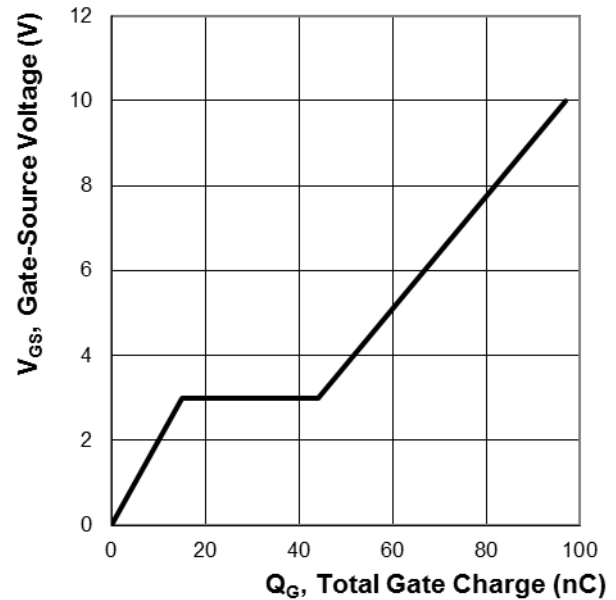


Figure 8: Typ. Gate Charge Characteristics



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

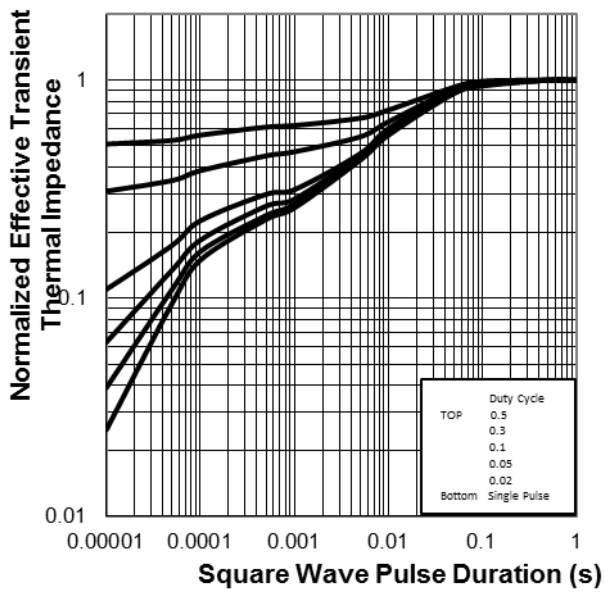


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

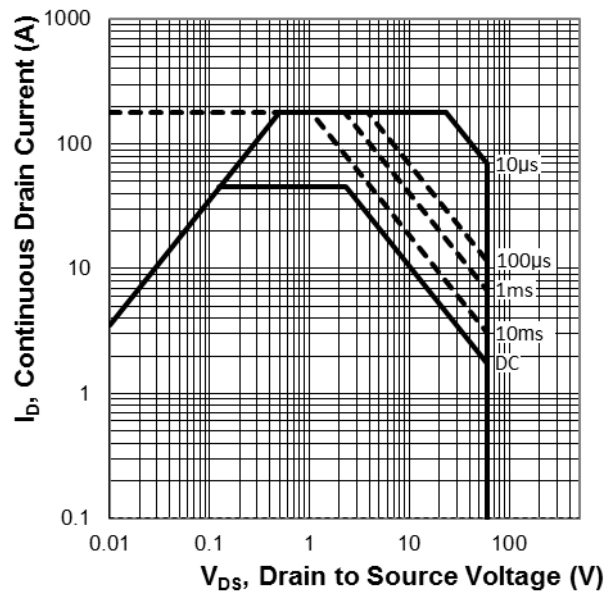
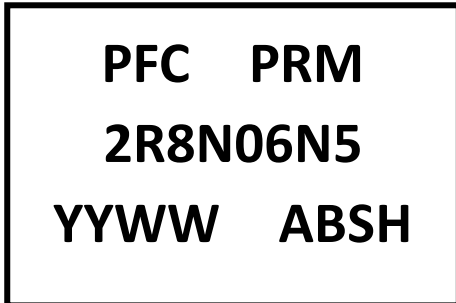


Figure 10: Maximum Safe Operation Area



### 3. Marking information

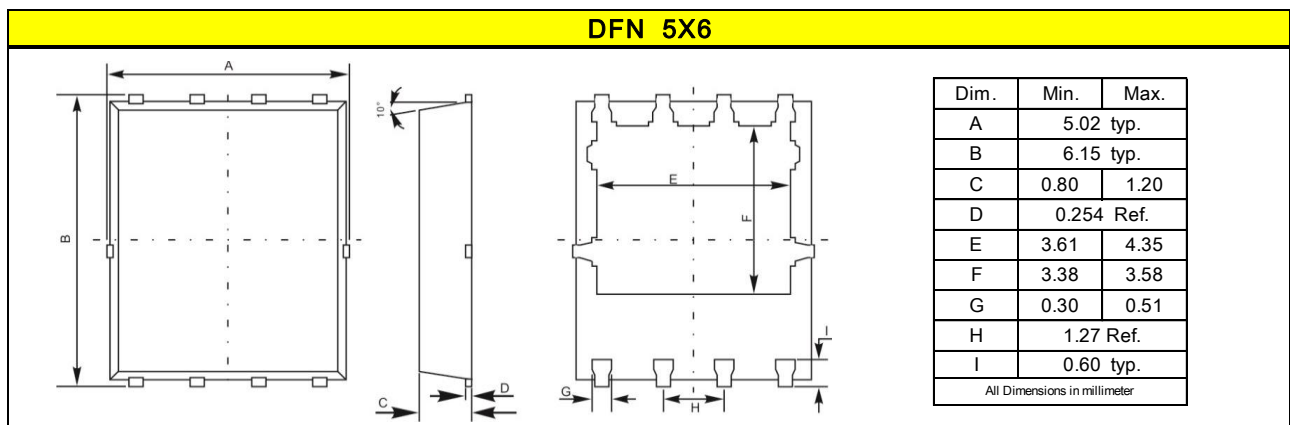
#### Top Marking Rule



PRM2R8N06N5 = 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



**5. Ordering information**

| Part Number | Package | Delivery mode                |
|-------------|---------|------------------------------|
| PRM2R8N06N5 | DFN 5X6 | 3000 pcs / 13" diameter reel |

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.003 ounces (0.093grams) – DFN 5x6

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