

# PRM017N04S8

# PFC Device Corporation

# 40V Single N-Channel MOSFET

# Major ratings and characteristics

Characteristics	Values	Units
$V_{DS}$	40	٧
I <sub>D</sub> (T <sub>A</sub> =25°C)	9.3	Α
Max. R <sub>DS(ON)</sub> @V <sub>GS</sub> =10V	17	mΩ
Max. R <sub>DS(ON)</sub> @V <sub>GS</sub> =4.5V	22	mΩ
T <sub>J</sub> Operating Junction Temperature	-55 to +150	°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.

# PRM017N04S8 DDDDD SSP-8

# **Typical Applications**

- Charger Adapter
- Power Tools
- LED Lighting

### **Features**

- Max.  $R_{DS(ON)}=17m\Omega@V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- 100% E<sub>AS</sub> Guaranteed
- Green Device Available

# 1. Characteristics

**Maximum Ratings Characteristics** 

( $T_A = 25$  °C unless otherwise specified)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	±20	V
	Drain Current – Continuous (T <sub>A</sub> =25°C)	9.3	Α
I <sub>D</sub>	Drain Current – Continuous (T <sub>A</sub> =100°C)	5.8	Α
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	36	Α
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>2</sup>	9.8	mJ
I <sub>AS</sub>	Single Pulse Avalanche Current <sup>2</sup>	14	Α
D	Power Dissipation (T <sub>A</sub> =25°C)	2.5	W
P <sub>D</sub>	Power Dissipation – Derate above 25°C	0.02	W/°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### **Thermal Characteristics**

Symbol	Parameter	Тур.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient		50	°C/W



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### **Electrical Characteristics**

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

### **Off Characteristics**

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	40			V
-	Drain Course Leekees Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			1	uA
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =40V, 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

D	Static Drain-Source On-Resistance	$V_{GS}$ =10V, $I_D$ =5A			17	mΩ
$R_{DS(ON)}$		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A			22	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=250uA$	1.0	1	2.5	V
$g_{fs}$	Forward Transconductance	$V_{DS}$ =5V, $I_{D}$ =5A	-	16	I	S

**Dynamic and switching Characteristics** 

$Q_q$	Total Gate Charge <sup>3,4</sup>		 15.5	
$Q_{qs}$	Gate-Source Charge <sup>3, 4</sup>	V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =9.3A	 2.5	 nC
$Q_{gd}$	Gate-Drain Charge <sup>3, 4</sup>		 3	
$T_{d(on)}$	Turn-On Delay Time <sup>3, 4</sup>		 7.1	
T <sub>r</sub>	Turn-On Rise Time <sup>3,4</sup>	$V_{DD}$ =20V, $V_{GS}$ =10V, $R_{G}$ =6 $\Omega$	 29	 nc
$T_{d(off)}$	Turn-Off Delay Time <sup>3, 4</sup>	I <sub>D</sub> =9.3A	 19	 ns
$T_f$	Turn-Off Fall Time <sup>3,4</sup>		 22	
C <sub>iss</sub>	Input Capacitance		 880	
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	 80	 pF
$C_{rss}$	Reverse Transfer Capacitance		 65	
$R_{g}$	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	 2.4	 Ω

### **Drain-Source Diode Characteristics**

V <sub>SD</sub>  Source to Drain Diode Voltage   V <sub>GS</sub> =0 V, I <sub>S</sub> =9.3A       1.5   V
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### Note:

- 1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
- 2.  $V_{DD}$ =50V,  $V_{GS}$ =10V, L=0.1mH,  $I_{AS}$ =14A,  $R_G$ =25 $\Omega$ , Starting  $T_J$ =25 $^{\circ}$ C
- 3. The data tested by pulsed, pulse width  $\leq$ 300us, duty cycle  $\leq$ 2%.
- 4. Essentially independent of operating temperature.

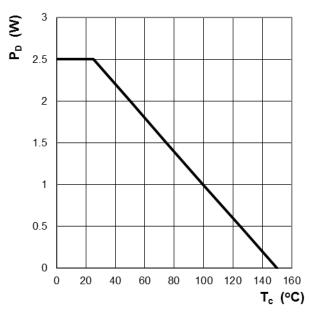


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# 2. Characteristics Curves

## **Ratings and Characteristics Curves**

# (T<sub>A</sub> = 25°C unless otherwise specified)



10 € 9 \_ 8 7 6 5 4 3 2 0 100 50 75 125 150 25 T<sub>c</sub> (°C)

Figure 1: Power Dissipation

Figure 2: Continuous Drain Current vs. T<sub>C</sub>

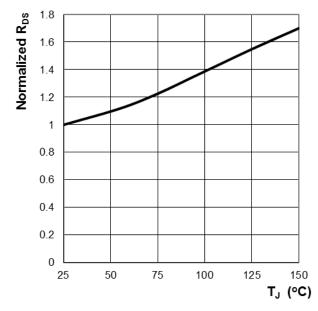


Figure 3: Normalized R<sub>DS(ON)</sub> vs. T<sub>J</sub>

Figure 4: Normalized BV<sub>DSS</sub> vs. T<sub>J</sub>



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### **Ratings and Characteristics Curves**

# ( T<sub>A</sub> = 25°C unless otherwise specified )

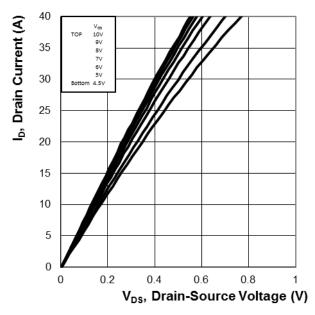


Figure 5: On-Region Characteristics

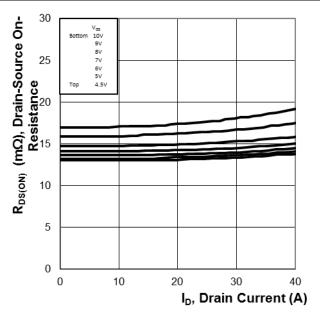


Figure 6: Typ.  $R_{DS}$  Variation vs.  $I_D$  and  $V_{GS}$ 

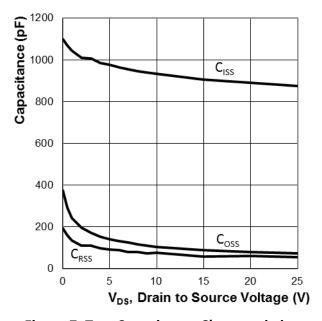


Figure 7: Typ. Capacitance Characteristics

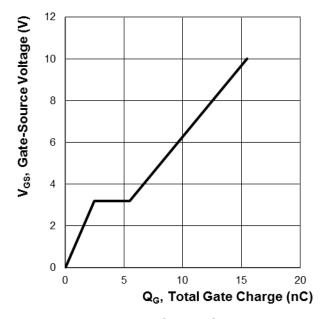


Figure 8: Typ. Gate Charge Characteristics



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### **Ratings and Characteristics Curves**

( T<sub>A</sub> = 25°C unless otherwise specified )

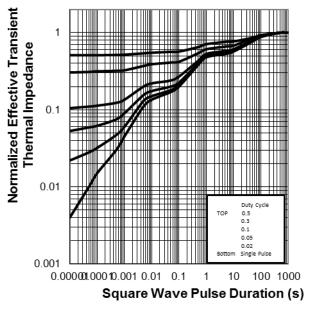


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

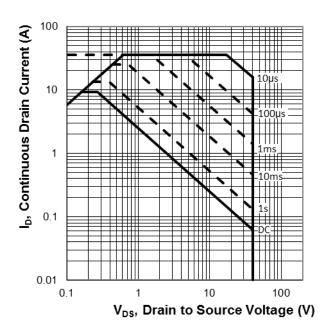


Figure 10: Maximum Safe Operation Area



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# 3. Marking information

**Top Marking Rule** 

PFC PRM 017N04S8 YYWW ABSH

PRM017N04S8 = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

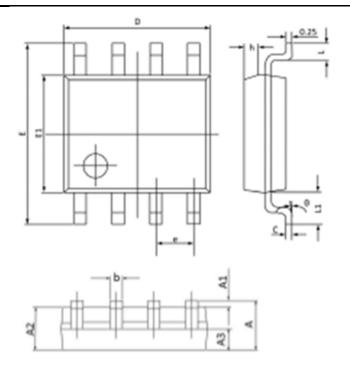
WW = Week code

ABS = Assembly code

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

# 4. Package information

# Package Outline Dimensions millimeters



Dim.	Min.	Max.		
A	1.35	1.75		
Al	0.10	0.25		
A2	1.30			
A3	0.60	0.70		
b	0.35	0.49		
С	0.18	0.26		
D	4.70	5.10		
E	5.80	6.20		
E1	3.70	4.10		
e	1.27 BSC			
h	0.25	0.50		
L	0.40	0.90		
Ll	1.05 BSC			
θ	0°	8°		
All Dimensions in mm				



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# 5. Ordering information

Part Number	Package	Delivery mode
PRM017N04S8	SOP-8	3000 pcs / 13" diameter reel

### Mechanical

Molder Plastic: UL Flammability Classification Rating 94V-0

Device Weight: 0.005 ounces (0.15grams) – SOP-8

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