PRM0R8N04HN5Q

PFC Device Corporation

40V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	40	**V**
I_D[5](T_C=25˚C)	311	**A**
Max. $R_{DS(ON)}$@V_{GS}=10V	0.8	**mΩ**
T_J Operating Junction Temperature	-55 to +175	**°C**

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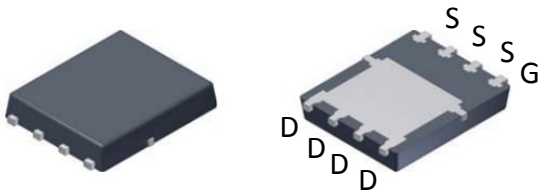
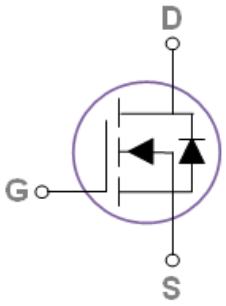


DFN 5x6



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. $R_{DS(ON)}$=0.8mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% E_{AS} Guaranteed
- Green Device Available
- AEC-Q101 Qualification

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
I_D[5]	Drain Current – Continuous (T_C=25˚C)	311	A
	Drain Current – Continuous (T_C=100˚C)	220	A
I_D[6]	Drain Current – Continuous (T_C=25˚C)	200	A
I_{DM}	Drain Current – Pulsed[1]	800	A
E_{AS}	Single Pulse Avalanche Energy[2]	131	mJ
I_{AS}	Single Pulse Avalanche Current[2]	51	A
P_D	Power Dissipation (T_C=25˚C)	107	W
	Power Dissipation – Derate above 25˚C	0.9	W/˚C
T_{STG}	Storage Temperature Range	-55 to 175	˚C
T_J	Operating Junction Temperature Range	-55 to 175	˚C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	40	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.4	˚C/W

Electrical Characteristics (T_J = 25 °C unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V, V_{GS}=0V, T_J=25°C	---	---	1	uA
		V_{DS}=32V, V_{GS}=0V, T_J=125°C	---	---	10	uA
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	---	0.7	0.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250uA	2.0	2.7	4.0	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=10A	---	55	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=20V, V_{GS}=10V, I_D=20A	---	102	---	nC
Q_{gs}	Gate-Source Charge[3,4]		---	29	---	
Q_{gd}	Gate-Drain Charge[3,4]		---	23	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=20V, V_{GS}=10V, R_G=1.5Ω I_D=20A	---	33	---	ns
T_r	Turn-On Rise Time[3,4]		---	28	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	185	---	
T_f	Turn-Off Fall Time[3,4]		---	25	---	
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	6760	---	pF
C_{oss}	Output Capacitance		---	2146	---	
C_{rss}	Reverse Transfer Capacitance		---	80	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.5	---	Ω

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	V_{GS}=0V, I_S=1A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_S=20A, di/dt=100A/us	---	57	---	ns
Q_{rr}	Reverse Recovery Charge		---	56	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. VDD=50V, VGS=10V, L=0.1mH, RG=25Ω, Starting TJ=25℃
3. The data tested by pulsed , pulse width ≦300us , duty cycle ≦2%.
4. Essentially independent of operating temperature.
5. Silicon limited.
6. Package limited.
7. Device mounted on 1in2 FR-4 board with 2oz copper. In TA=25℃ environment for test .
8. Device curve are based on junction to case thermal impedance which is measured with device mounted to a large heatsink, assuming junction temperature TJ(max) =175℃ , The SOA curve provides a single pulse rating.

2. Characteristics Curves

Ratings and Characteristics Curves **(T_A = 25℃ unless otherwise specified)**

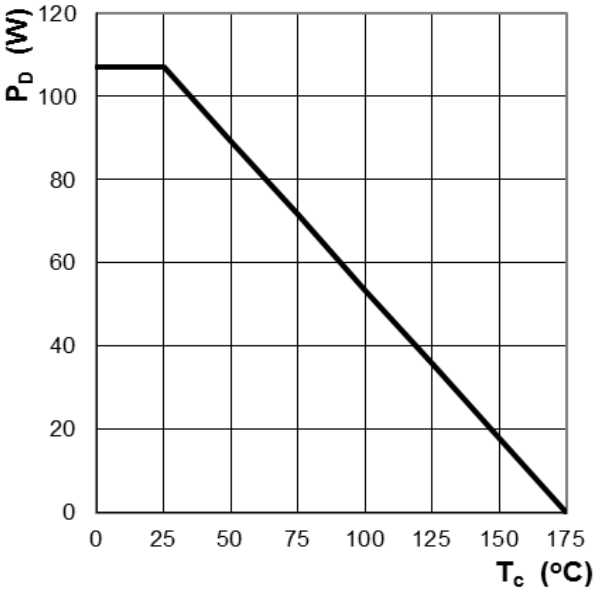


Figure 1: Power Dissipation

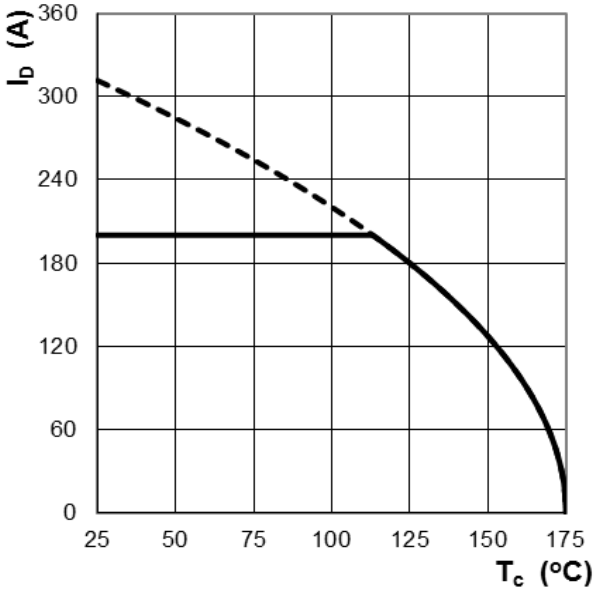


Figure 2: Continuous Drain Current vs. T_C

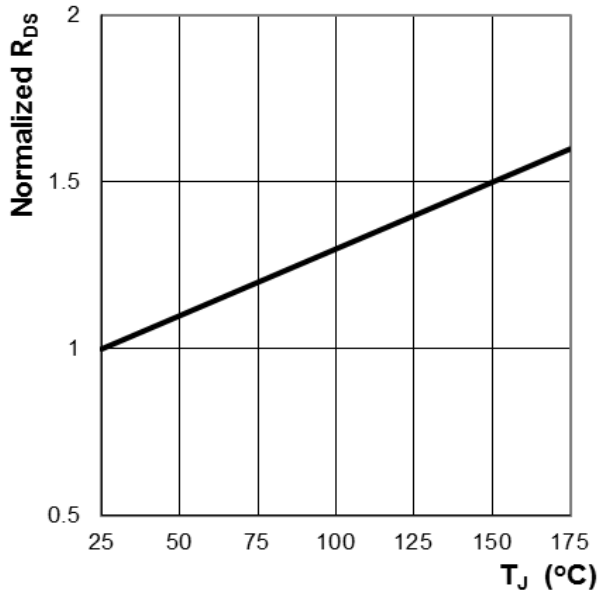


Figure 3: Normalized $R_{DS(ON)}$ vs. T_J

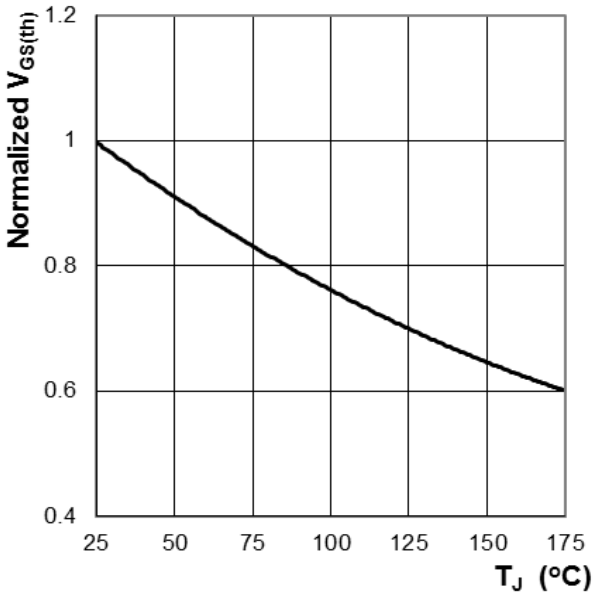


Figure 4: Normalized Vth vs. T_J

Ratings and Characteristics Curves **(T_A = 25℃ unless otherwise specified)**

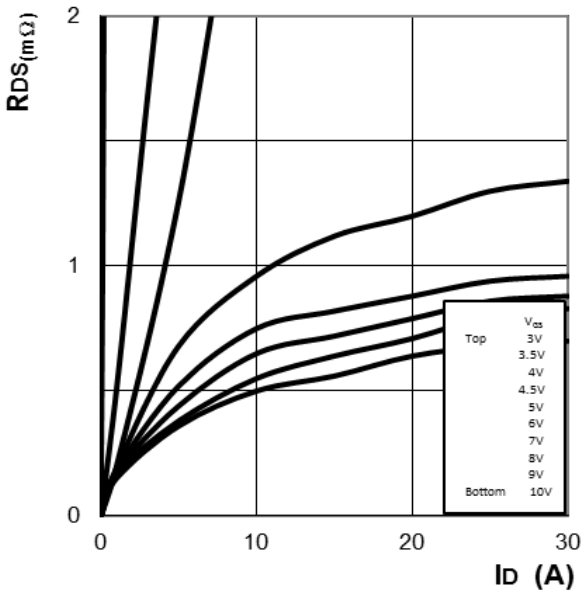


Figure 5: RDS(ON) vs. Drain Current and Gate Voltage

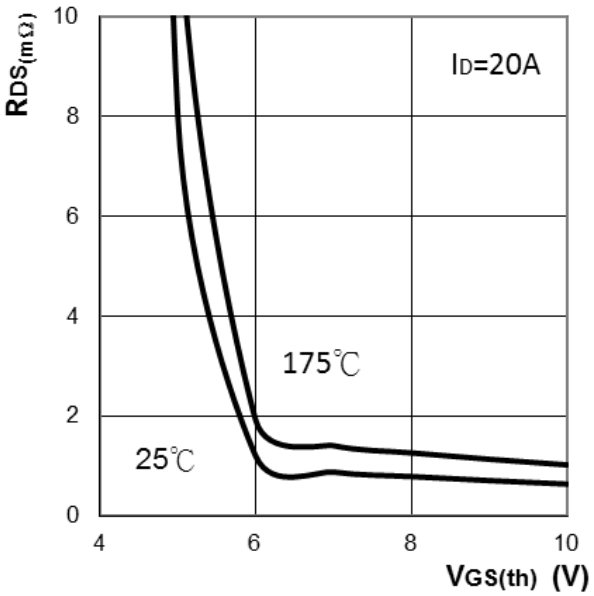


Figure 6: RDS(ON) vs. Gate Voltage

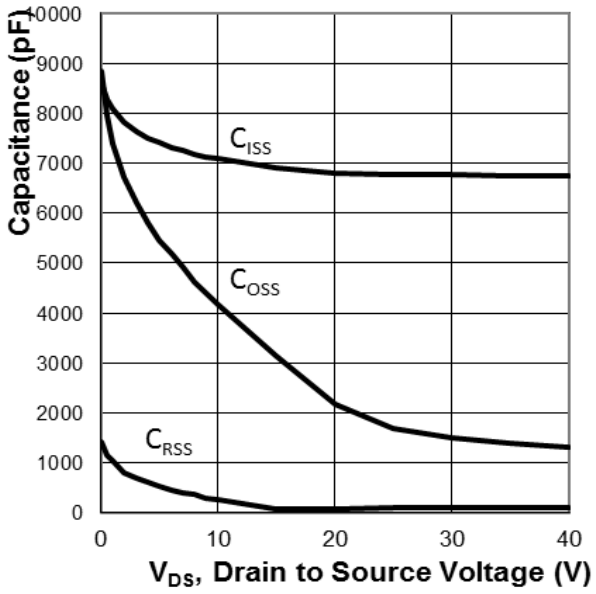


Figure 7: Typ. Capacitance Characteristics

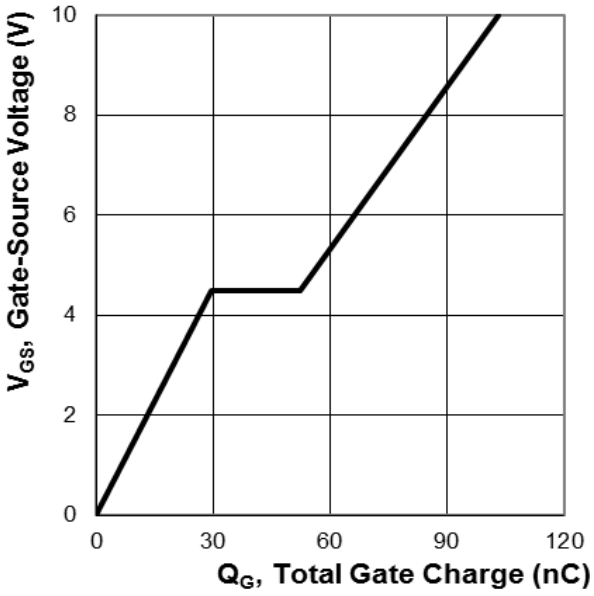


Figure 8: Typ. Gate Charge Characteristics

Ratings and Characteristics Curves **(T_A = 25℃ unless otherwise specified)**

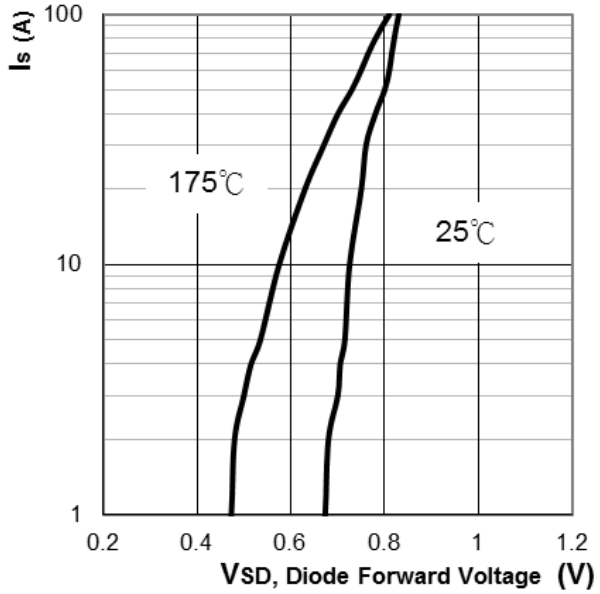


Figure 9: Body Diode Characters

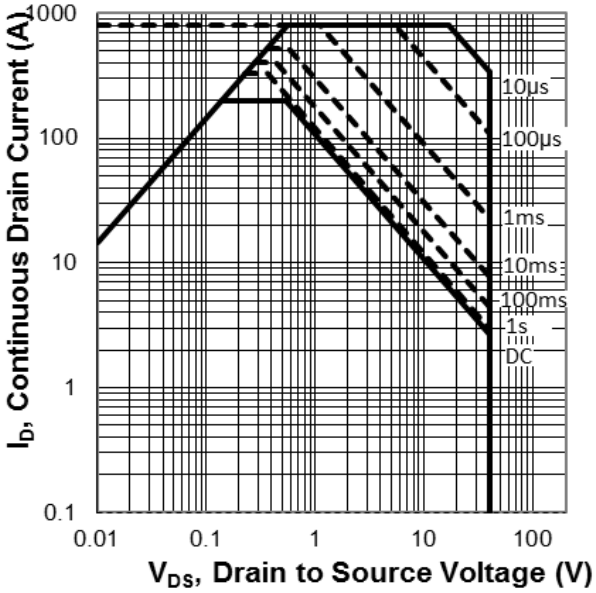


Figure 10: Maximum Safe Operation Area

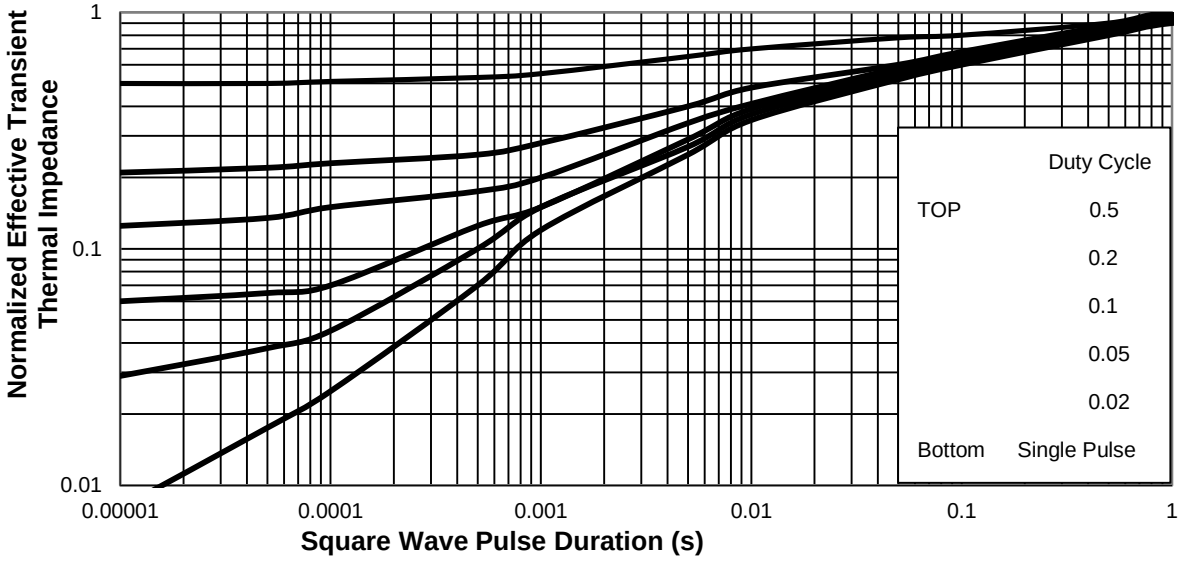


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case

3. Marking information

Top Marking Rule

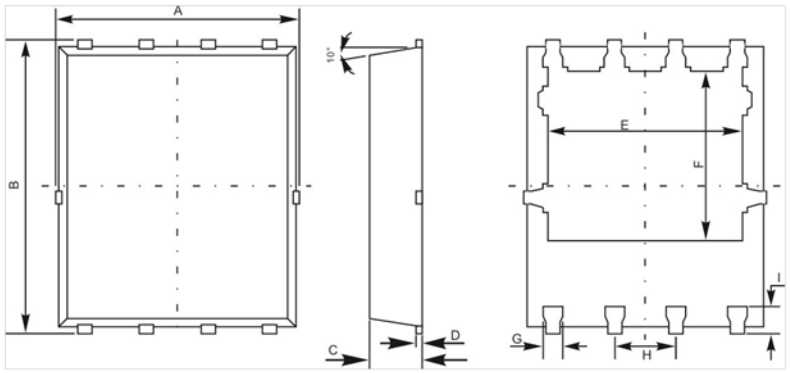
PFC PRM
0R8N04HN5
YYWW ABSQ

PRM0R8N04HN5 = Product Type Marking Code
YYWW = Date Code
YY = Last two digits of year
WW = Week code
ABS = Assembly code
Q = AEC-Q101 Qualification

4. Package information

Package Outline Dimensions millimeters

DFN 5X6



Dim.	Min.	Max.
A	5.02 typ.	
B	6.15 typ.	
C	0.80	1.20
D	0.254 Ref.	
E	3.91	4.11
F	3.38	3.58
G	0.30	0.50
H	1.27 Ref.	
I	0.45	0.65
All Dimensions in millimeter		

5. Ordering information

Part Number	Package	Delivery mode
PRM0R8N04HN5Q	DFN 5X6	5000 pcs / 13" diameter reel

Mechanical

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