PRM4R0N03D

PFC Device Corporation

30V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	30	**V**
I_D[6] (T_C=25°C)	50	**A**
Max. $R_{DS(ON)}$@V_{GS}=10V	4	**mΩ**
Max. $R_{DS(ON)}$@V_{GS}=4.5V	6	**mΩ**
T_J Operating Junction Temperature	-55 to +150	**°C**

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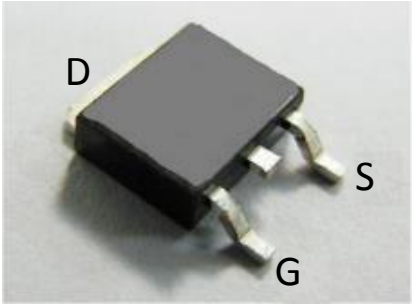
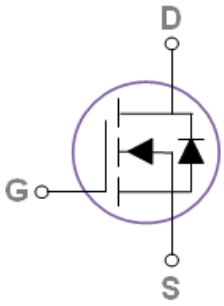


TO-252 (D-PAK)



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. $R_{DS(ON)}$=4mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- 100% E_{AS} 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	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D[5]	Drain Current – Continuous (T_C=25˚C)	88	A
	Drain Current – Continuous (T_C=100˚C)	55	A
I_D[6]	Drain Current – Continuous (T_C=25˚C)	50	A
I_{DM}	Drain Current – Pulsed[1]	200	A
E_{AS}	Single Pulse Avalanche Energy[2]	80	mJ
I_{AS}	Single Pulse Avalanche Current[2]	40	A
P_D	Power Dissipation (T_C=25˚C)	50	W
	Power Dissipation – Derate above 25˚C	0.4	W/˚C
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.5	˚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	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V, V_{GS}=0V, T_J=25°C	---	---	1	uA
		V_{DS}=30V,V_{GS}=0V, T_J=125°C	---	---	250	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	---	---	4	mΩ
		V_{GS}=4.5V , I_D=10A	---	---	6	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	---	3.0	V
g_{fs}	Forward Transconductance	V_{DS}=5V , I_D=20A	---	70	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3, 4]	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	47	---	nC
Q_{gs}	Gate-Source Charge[3, 4]		---	5.6	---	
Q_{gd}	Gate-Drain Charge[3, 4]		---	13	---	
$T_{d(on)}$	Turn-On Delay Time[3, 4]	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=20A	---	19	---	ns
T_r	Turn-On Rise Time[3, 4]		---	127	---	
$T_{d(off)}$	Turn-Off Delay Time[3, 4]		---	54	---	
T_f	Turn-Off Fall Time[3, 4]		---	116	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	2600	---	pF
C_{oss}	Output Capacitance		---	370	---	
C_{rss}	Reverse Transfer Capacitance		---	250	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.7	---	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/us	---	18	---	ns
Q_{rr}	Reverse Recovery Charge		---	5	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. L=0.1mH, R_G=25Ω,Starting TJ=25°C
3. The data tested by pulsed , pulse width ≦300us , duty cycle ≦2%.
4. Essentially independent of operating temperature.
5. Silicon limited.
6. Package limited.

2. Characteristics Curves

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

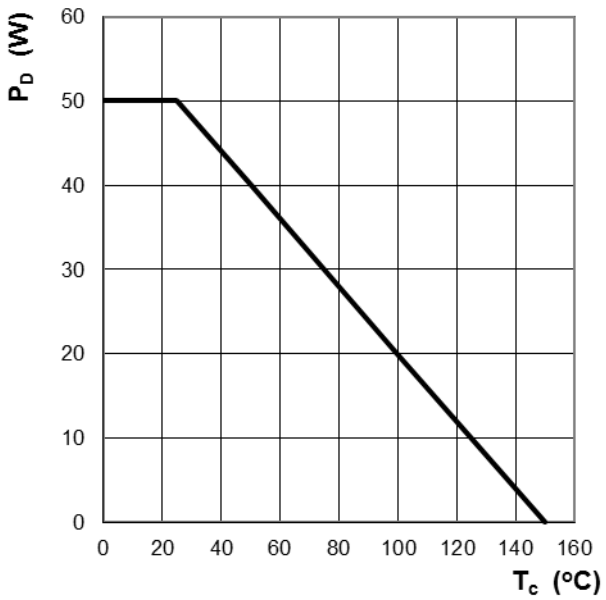


Figure 1: Power Dissipation

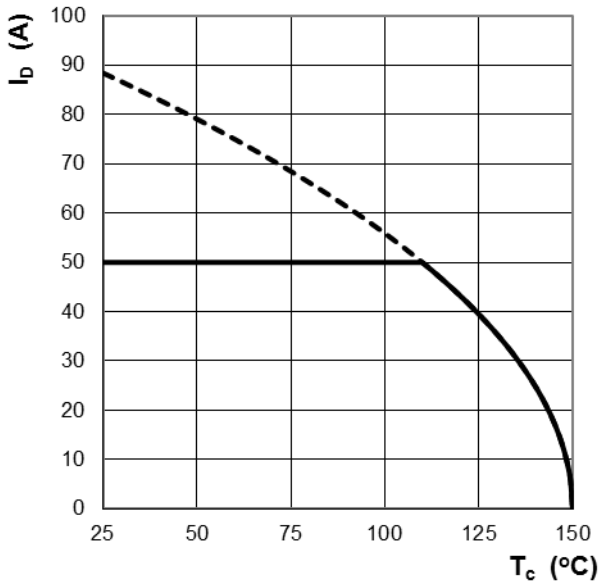


Figure 2: Continuous Drain Current vs. T_C

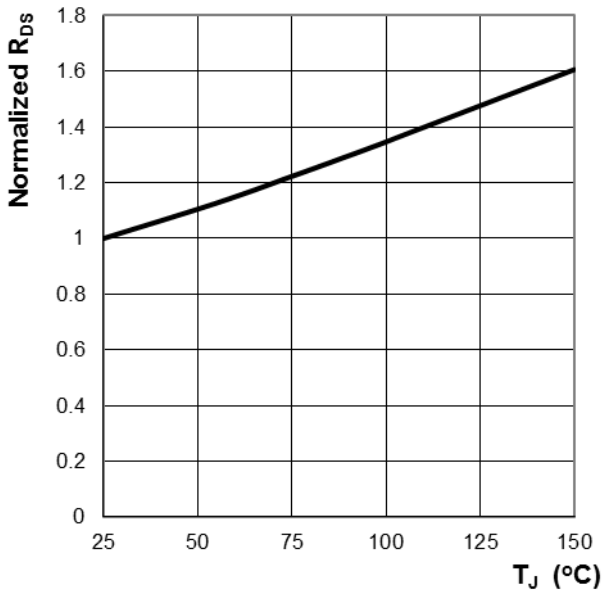


Figure 3: Normalized $R_{DS(ON)}$ vs. T_J

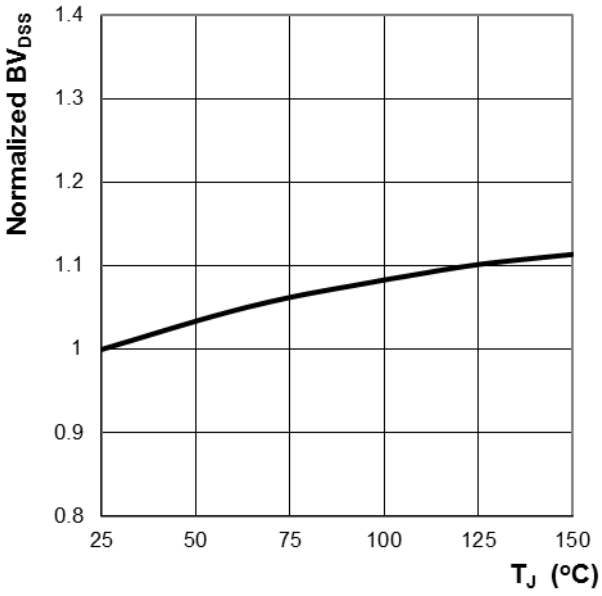


Figure 4: Normalized BV_{DSS} vs. T_J

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

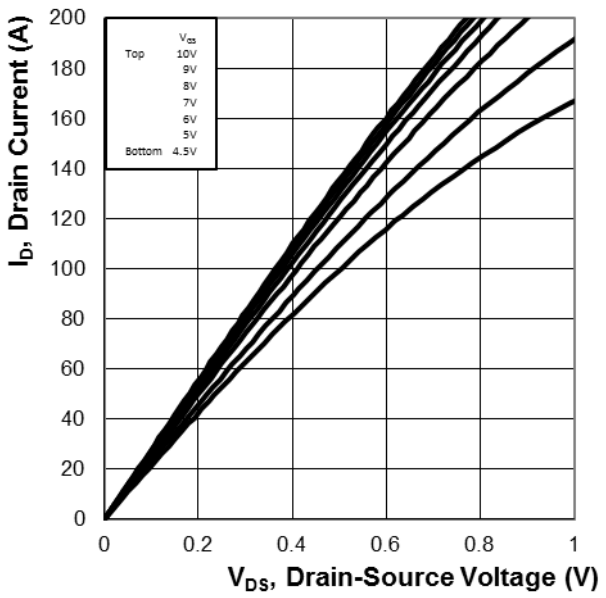


Figure 5: On-Region Characteristics

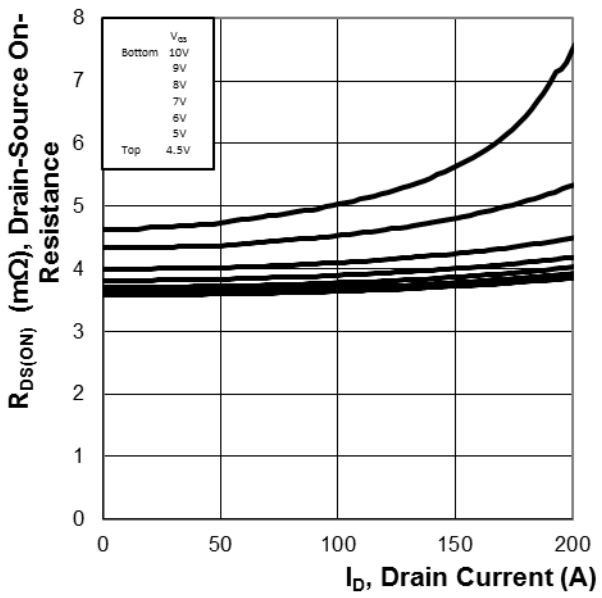


Figure 6: Typ. R_{DS} Variation vs. I_D and V_{GS}

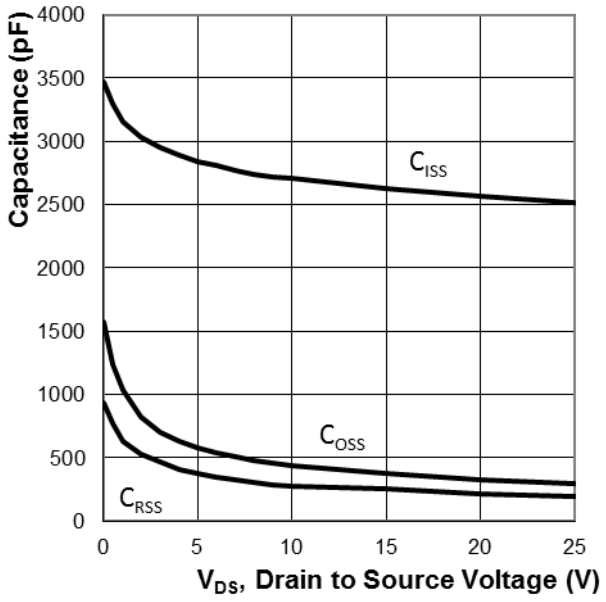


Figure 7: Typ. Capacitance Characteristics

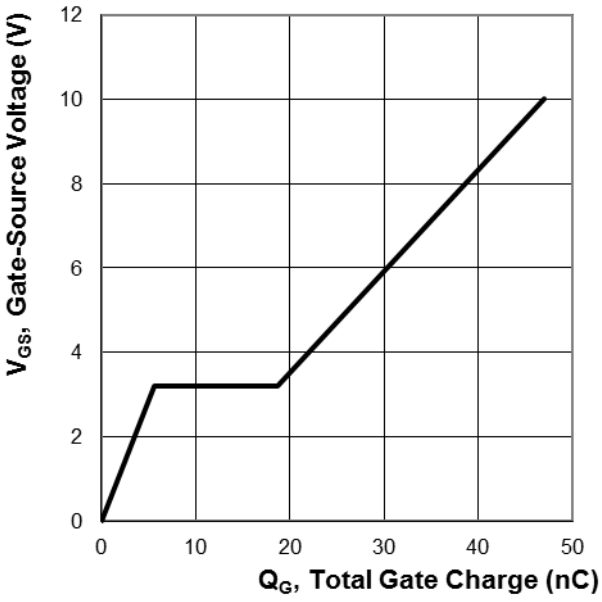


Figure 8: Typ. Gate Charge Characteristics

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

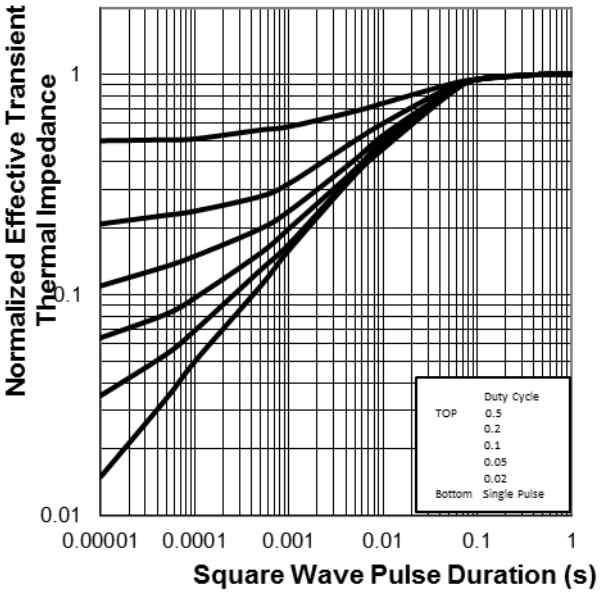


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

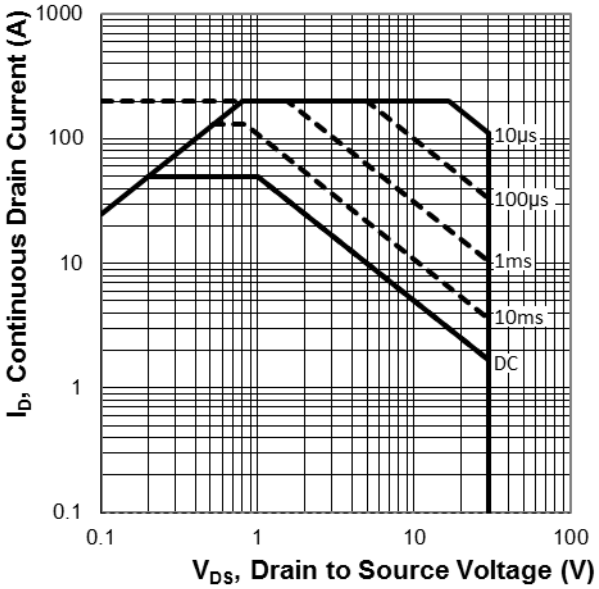


Figure 10: Maximum Safe Operation Area

3. Marking information

Top Marking Rule

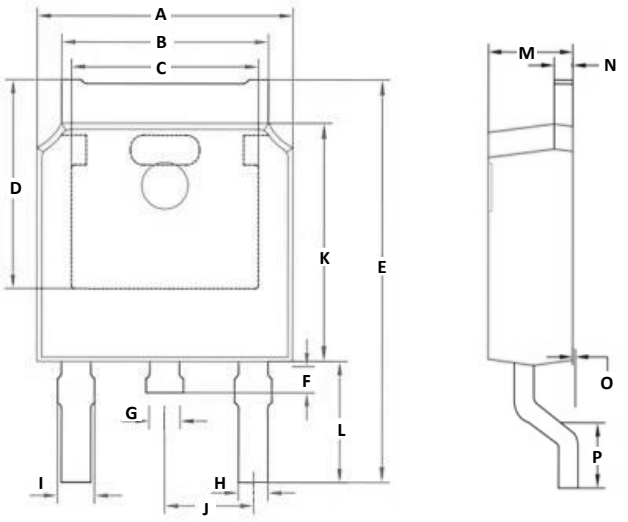
PFC PRM **4R0N03D** **YYWW ABSH**

PRM4R0N03D = 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-252 (DPAK)



Dim.	Min.	Max.
A	6.30	6.90
B	5.10	5.60
C	3.50	-----
D	4.60	-----
E	9.40	10.60
F	0.50	1.20
G	0.70	0.90
H	0.50	0.90
I	0.50	0.90
J	2.30 Ref.	
K	5.40	6.30
L	2.40	3.40
M	2.10	2.50
N	0.35	0.65
O	-----	0.20
P	1.40	1.90
All Dimensions in millimeter		

5. Ordering information

Part Number	Package	Delivery mode
PRM4R0N03D	TO-252 (D-PAK)	2500 pcs / 13" diameter reel

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.01 ounces (0.3grams) - TO-252 (D-PAK)