PRM4R2N10CTB

PFC Device Corporation

100V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	100	**V**
I_D (T_C=25˚C)	185	**A**
Max. $R_{DS(ON)}$@V_{GS}=10V	4.2	**mΩ**
T_J Operating Junction Temperature	-55 to +150	**°C**

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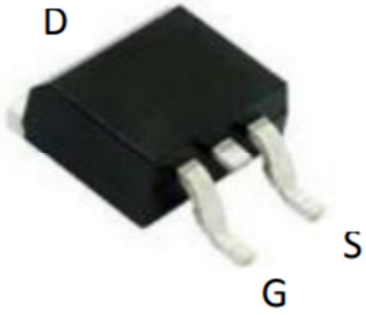
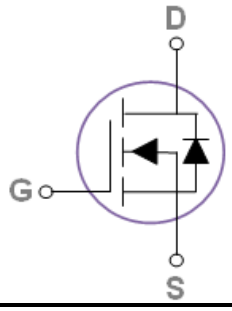


TO-263



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. $R_{DS(ON)}$=4.2mΩ@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	100	V
V_{GS}	Gate-Source Voltage	+20 / -12	V
I_D[4]	Drain Current – Continuous (T_C=25°C)	185	A
	Drain Current – Continuous (T_C=100°C)	117	A
I_D[5]	Drain Current – Continuous (T_C=25°C)	110	A
I_{DM}	Drain Current – Pulsed[1]	440	A
E_{AS}	Single Pulse Avalanche Energy[2]	125	mJ
I_{AS}	Single Pulse Avalanche Current[2]	50	A
P_D	Power Dissipation (T_C=25°C)	275	W
	Power Dissipation – Derate above 25°C	2.22	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	---	0.45	°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	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V, V_{GS}=0V, T_J=25℃	---	---	1	uA
		V_{DS}=80V, V_{GS}=0V, T_J=85℃	---	---	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	---	3.6	4.2	mΩ
		V_{GS}=4.5V, I_D=15A	---	5.0	6.0	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250uA	1.2	1.8	2.5	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=3A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=80V, V_{GS}=10V, I_D=10A	---	110	---	nC
Q_{gs}	Gate-Source Charge		---	13	---	
Q_{gd}	Gate-Drain Charge		---	32	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=50V, V_{GS}=10V, R_G=6Ω I_D=1A	---	20	---	ns
T_r	Turn-On Rise Time		---	32	---	
$T_{d(off)}$	Turn-Off Delay Time		---	157	---	
T_f	Turn-Off Fall Time		---	115	---	
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	6680	---	pF
C_{oss}	Output Capacitance		---	1690	---	
C_{rss}	Reverse Transfer Capacitance		---	200	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.2	---	Ω

Drain-Source Diode Characteristics

V_{SD} [3]	Source to Drain Diode Voltage	V_{GS}=0V, I_S=1A	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. L=0.1mH, R_G=25Ω, Starting T_J=25℃
3. The data tested by pulsed, pulse width ≦300us, duty cycle ≦2%.
4. Silicon limited.
5. Package limited.

2. Characteristics Curves

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

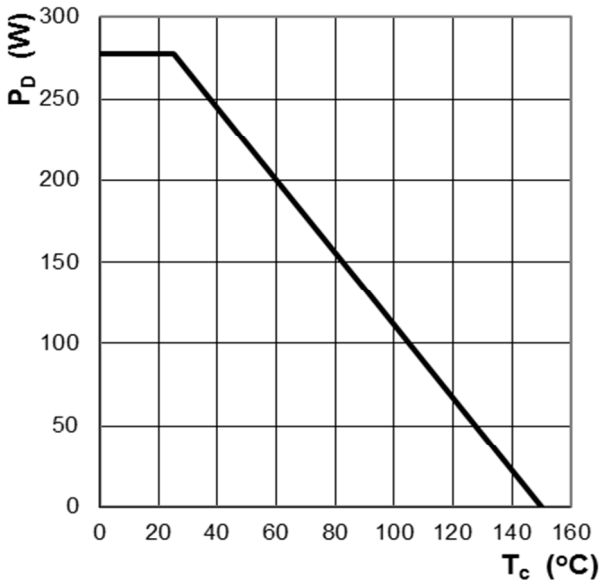


Figure 1: Power Dissipation

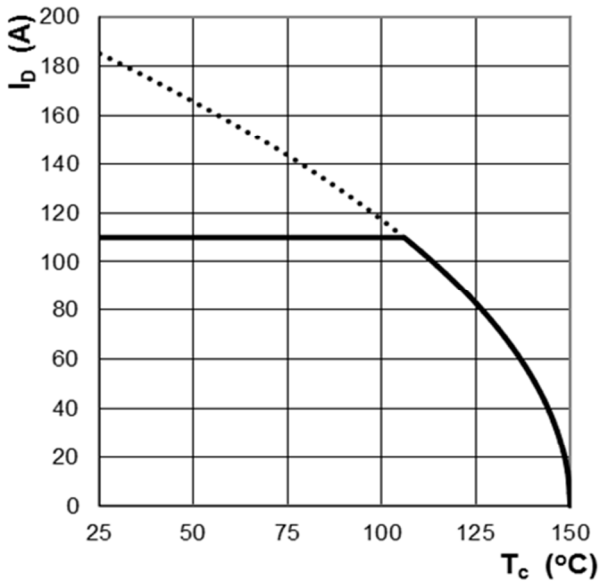


Figure 2: Continuous Drain Current vs. T_C

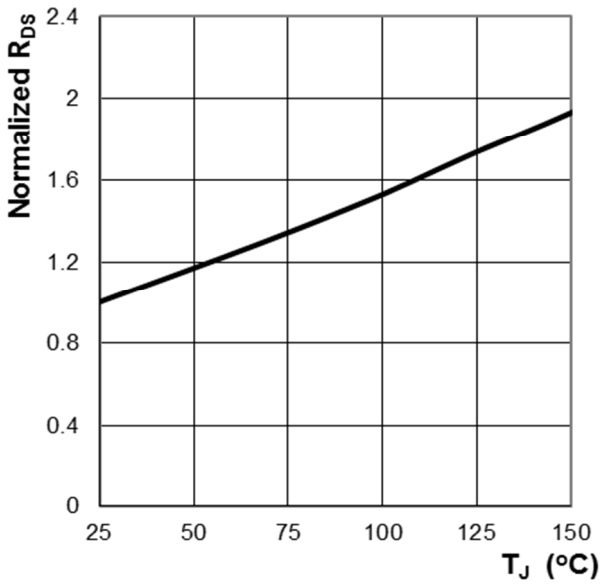


Figure 3: Normalized $R_{DS(ON)}$ vs. T_J

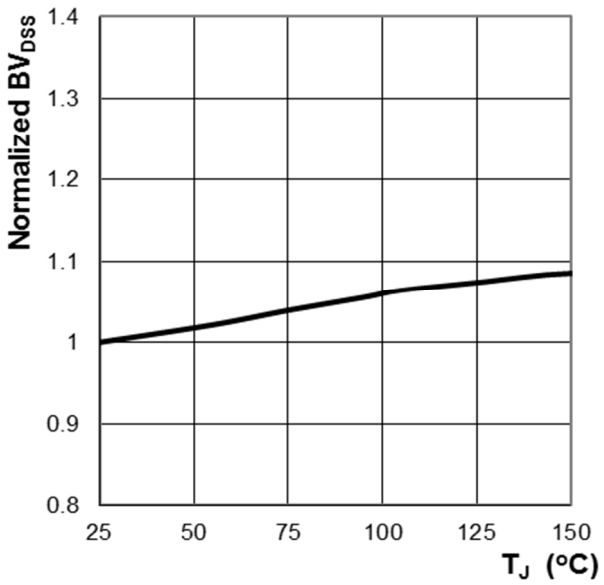


Figure 4: Normalized BV_{DSS} vs. T_J

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

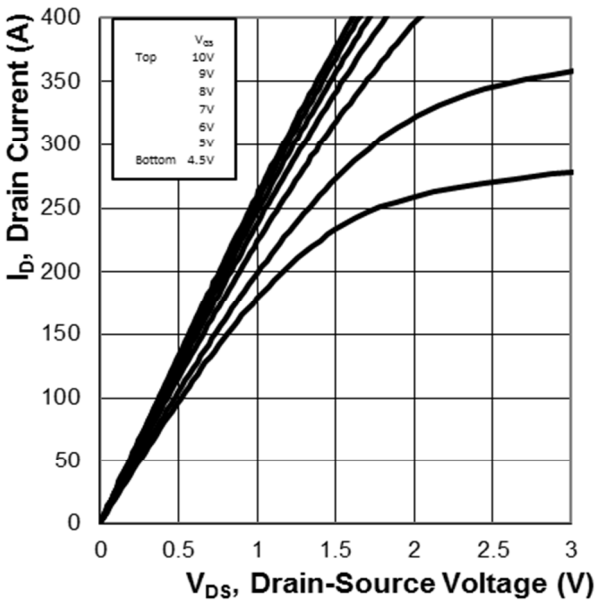


Figure 5: On-Region Characteristics

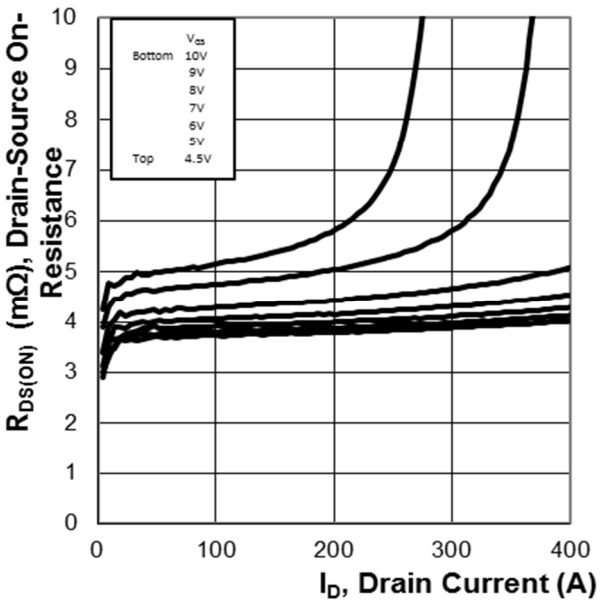


Figure 6: Typ. R_{DS} Variation vs. I_D and V_{GS}

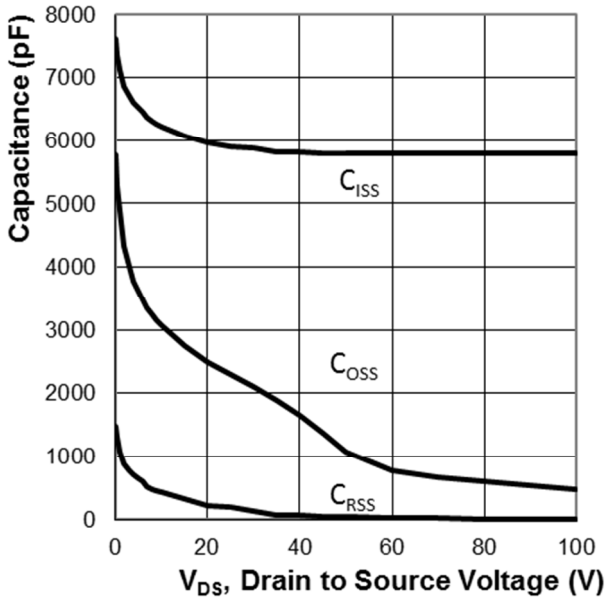


Figure 7: Typ. Capacitance Characteristics

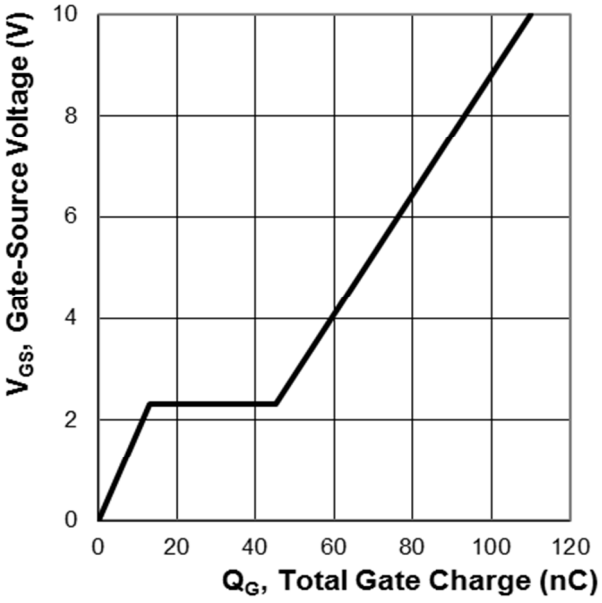


Figure 8: Typ. Gate Charge Characteristics

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

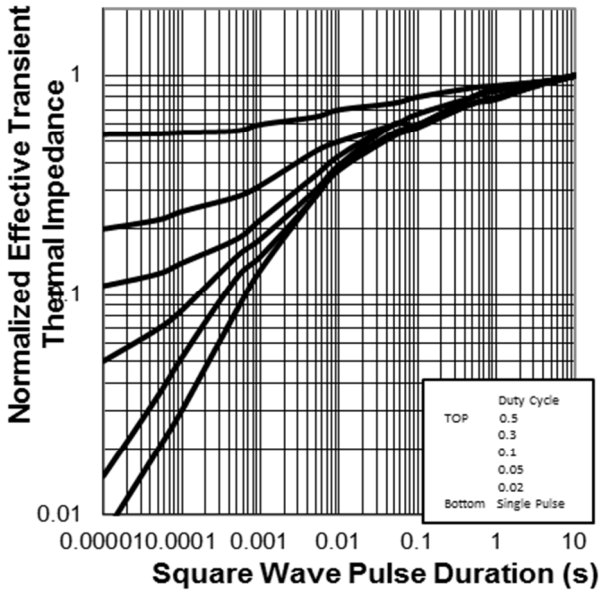


Figure 9: Normalized Thermal Transient Impedance, Junction-to-Case

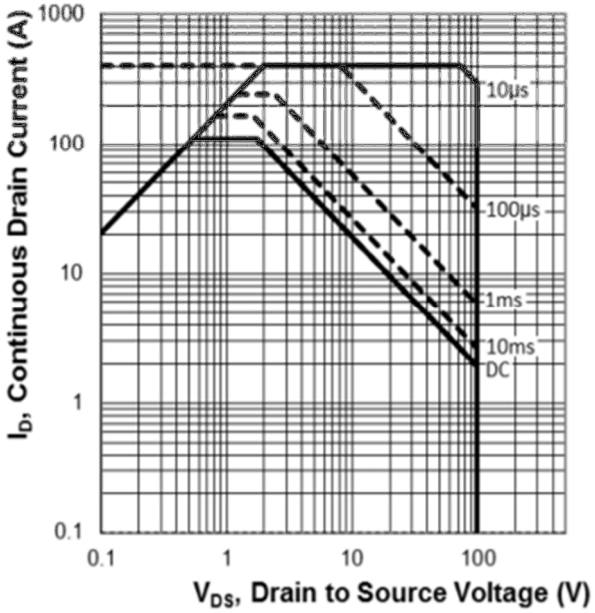


Figure 10: Maximum Safe Operation Area

3. Marking information

Top Marking Rule

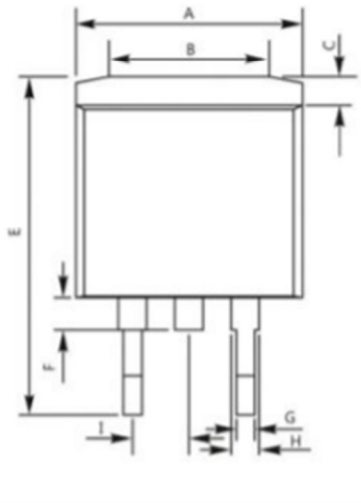
PFC PRM
4R2N10CTB
YYWW ABSH

PRM4R2N10CTB = 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-263 (D^2PAK)



Dim.	Min.	Max.
A	9.65	10.69
B	7.30 Ref.	
C	1.30 Ref.	
E	14.70	15.90
F	1.5 Ref.	
G	0.76	1.00
H	1.14	1.70
I	2.54 Ref.	
J	8.55	9.50
K	4.40	4.85
L	1.25	1.50
M	----	0.25
N	2.30	2.80
O	0.36	0.60

All Dimensions in millimeter

5. Ordering information

Part Number	Package	Delivery mode
PRM4R2N10CTB	TO-263	800 pcs / 13" diameter reel

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.04 ounces (1.16grams) - TO-263
- Mounting Torque : Recommended 4~5 kg-cm