PRM2R9N10CT

PFC Device Corporation

100V Single N-Channel MOSFET

Major ratings and characteristics

Characteristics	Values	Units
V_{DS}	100	**V**
I_D[6] (T_C=25°C)	233	**A**
Max. $R_{DS(ON)}$@V_{GS}=10V	2.9	**mΩ**
T_J Operating Junction Temperature	-55 to +150	**°C**

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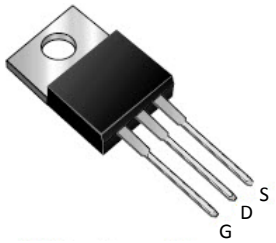
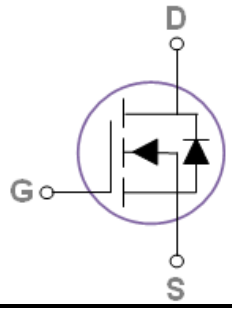


TO-220AB



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. $R_{DS(ON)}$=2.9mΩ@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	V
I_D[5]	Drain Current – Continuous (T_C=25°C)	233	A
	Drain Current – Continuous (T_C=100°C)	147	A
I_D[6]	Drain Current – Continuous (T_C=25°C)	60	A
I_{DM}	Drain Current – Pulsed[1]	240	A
E_{AS}	Single Pulse Avalanche Energy[2]	273	mJ
I_{AS}	Single Pulse Avalanche Current[2]	36	A
P_D	Power Dissipation (T_C=25°C)	284	W
	Power Dissipation – Derate above 25°C	2.3	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	---	60	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.44	°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=100℃	---	---	100	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	---	2.4	2.9	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS}, I_D=250uA	2.0	2.8	4.0	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=20A	---	80	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=50V, V_{GS}=10V, I_D=20A	---	107	---	nC
Q_{gs}	Gate-Source Charge[3,4]		---	39	---	
Q_{gd}	Gate-Drain Charge[3,4]		---	12	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=50V, V_{GS}=10V, R_G=10Ω I_D=20A	---	28	---	ns
T_r	Turn-On Rise Time[3,4]		---	45	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	54	---	
T_f	Turn-Off Fall Time[3,4]		---	23	---	
C_{iss}	Input Capacitance	V_{DS}=50V, V_{GS}=0V, f=1MHz	---	7384	---	pF
C_{oss}	Output Capacitance		---	1184	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	1.2	---	Ω

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Voltage	V_{GS}=0V, I_S=20A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_S=20A, di/dt=100A/us	---	85	---	ns
Q_{rr}	Reverse Recovery Charge		---	151	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. VDD=50V, VGS=10V, L=0.4mH, 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.

2. Characteristics Curves

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

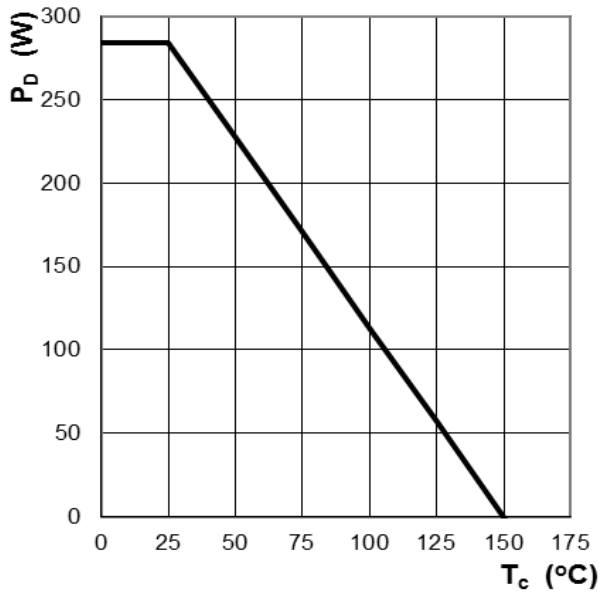


Figure 1: Power Dissipation

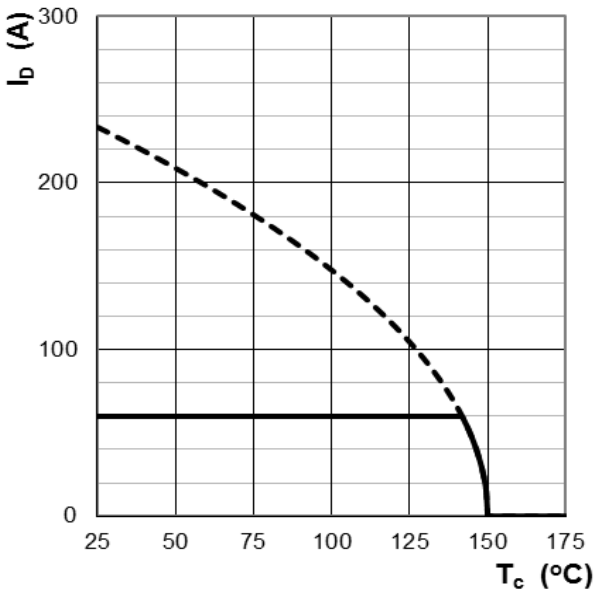


Figure 2: Continuous Drain Current vs. T_C

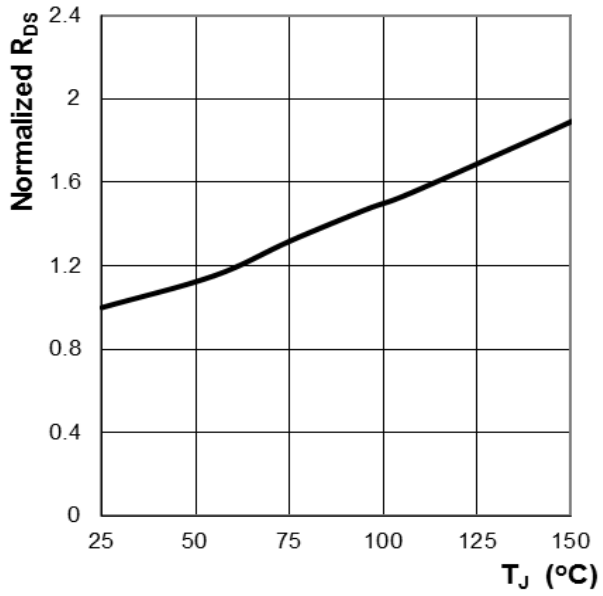


Figure 3: Normalized $R_{DS(ON)}$ vs. T_J

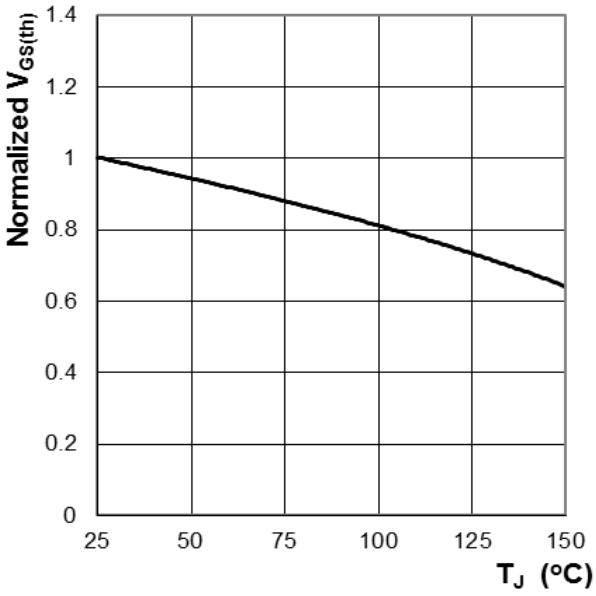


Figure 4: Normalized Vth vs. TJ

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

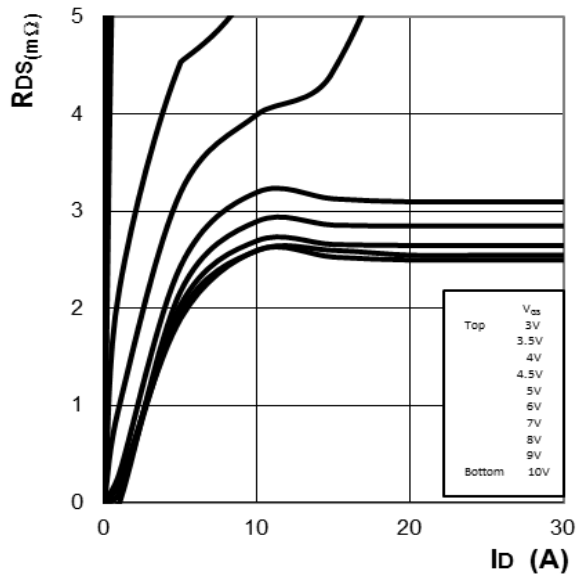


Figure 5: RDS(ON) vs. Drain Current and Gate Voltage

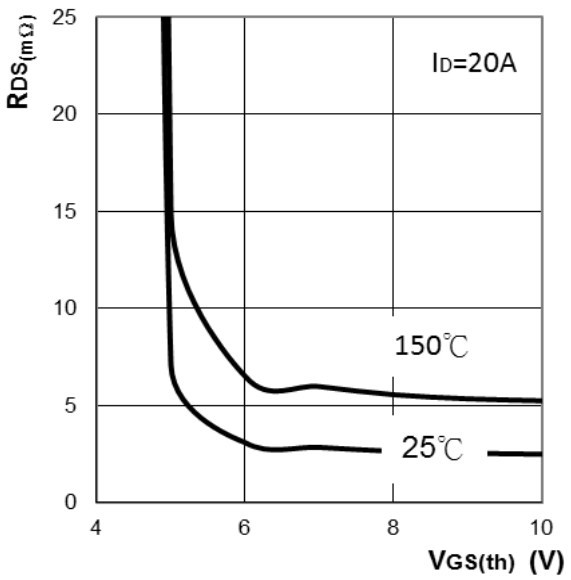


Figure 6: RDS(ON) vs. Gate Voltage

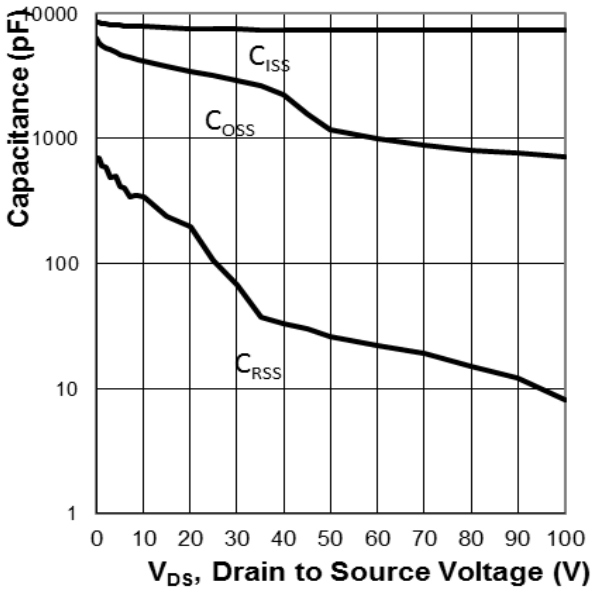


Figure 7: Typ. Capacitance Characteristics

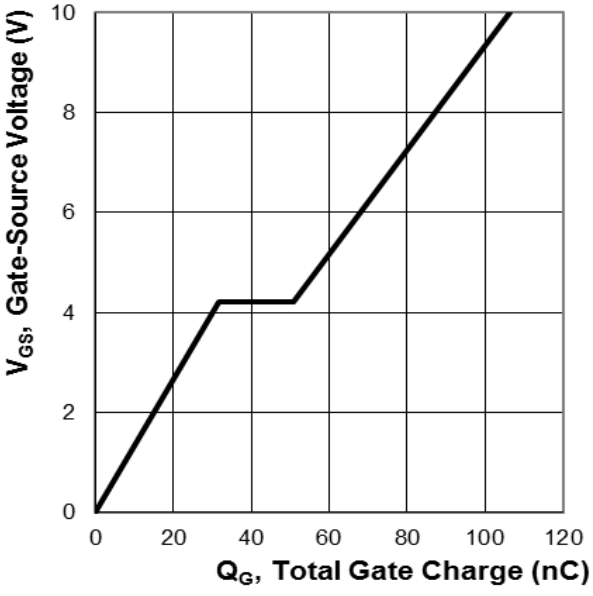


Figure 8: Typ. Gate Charge Characteristics

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

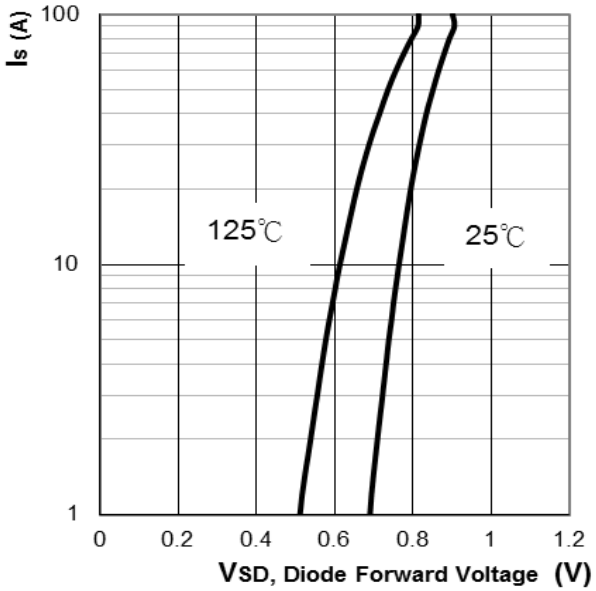


Figure 9: Body Diode Characters

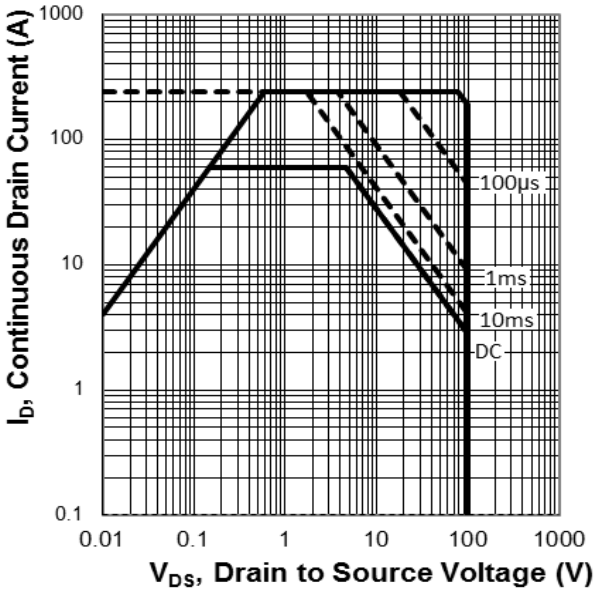


Figure 10: Maximum Safe Operation Area

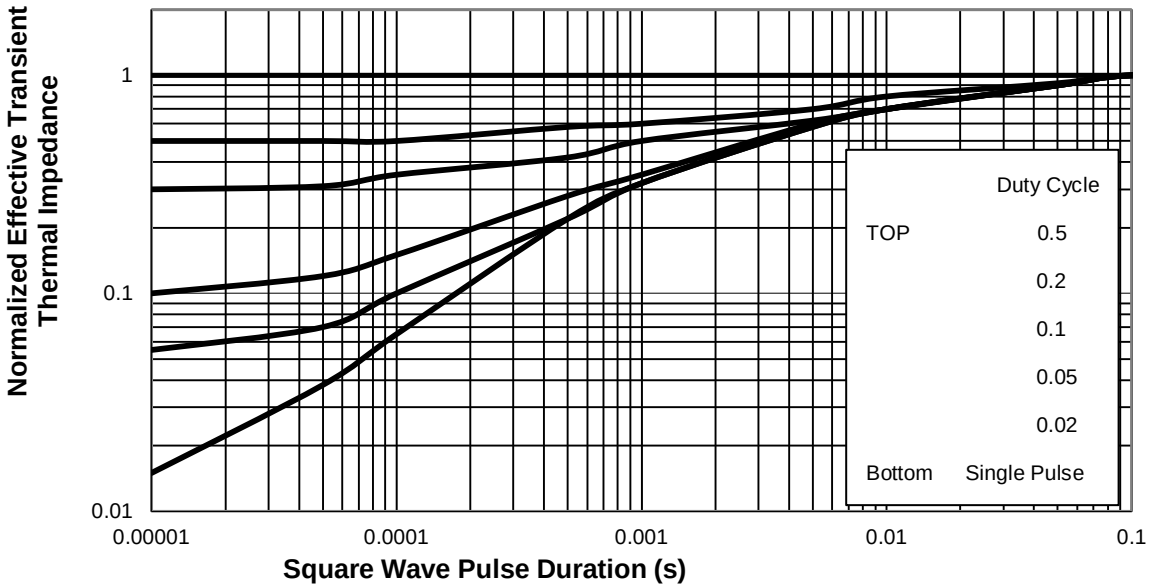


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case

3. Marking information

Top Marking Rule

PFC PRM
2R9N10CT
YYWW ABSH

PRM2R9N10CT = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

WW = Week code

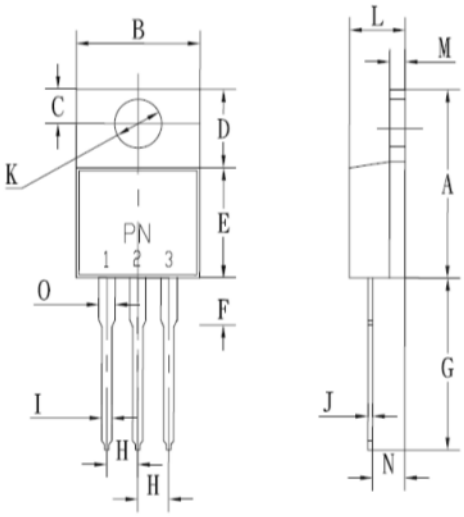
ABS = Assembly code

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

4. Package information

Package Outline Dimensions millimeters

TO-220AB



Dim.	Min.	Max.
A	14.60	15.40
B	-----	10.50
C	2.50	3.50
D	5.84	6.86
E	8.50	9.50
F	-----	4.50
G	13.10	14.20
H	2.29	2.79
I	0.60	1.00
J	0.30	0.64
K	3.50	4.10
L	4.20	4.80
M	1.10	1.40
N	2.40	2.79
O	1.15	1.49
All Dimensions in millimeter		

5. Ordering information

Part Number	Package	Delivery mode
PRM2R9N10CT	TO-220AB	50 pcs / Tube

Mechanical

- Molder Plastic: UL Flammability Classification Rating 94V-0
- Device Weight : 0.07 ounces (1.96grams) - TO-220AB
- Mounting Torque : Recommended 4~5 kg-cm