



PRM9R7N10CTB

PFC Device Corporation

100V Single N-Channel MOSFET

Major ratings and characteristics

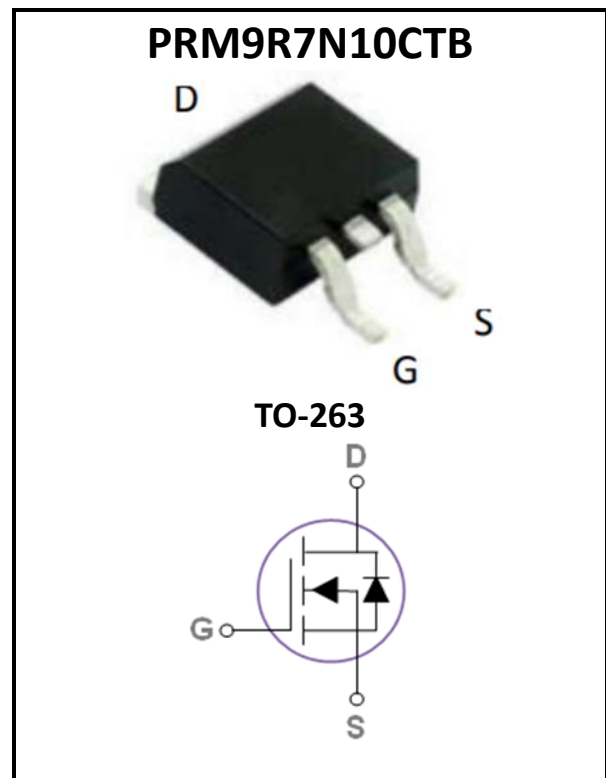
Characteristics	Values	Units
V_{DS}	100	V
$I_D(T_C=25^\circ\text{C})$	60	A
Max. $R_{DS(ON)}@V_{GS}=10\text{V}$	9.7	m Ω
Max. $R_{DS(ON)}@V_{GS}=4.5\text{V}$	15	m Ω
T_J Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

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.

Typical Applications

- Charger Adapter
- Power Tools
- LED Lighting



Features

- Max. $R_{DS(ON)}=9.7\text{m}\Omega@V_{GS}=10\text{V}$
- Improved dv/dt capability
- Fast switching
- 100% E_{AS} Guaranteed
- Green Device Available

1. Characteristics

Maximum Ratings Characteristics ($T_A = 25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	79	A
	Drain Current – Continuous ($T_C=100^\circ\text{C}$)	50	A
I_D^6	Drain Current – Continuous ($T_C=25^\circ\text{C}$)	60	A
I_{DM}	Drain Current – Pulsed ¹	240	A
E_{AS}	Single Pulse Avalanche Energy ²	32	mJ
I_{AS}	Single Pulse Avalanche Current ²	25	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	89	W
	Power Dissipation – Derate above 25°C	0.7	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	60	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.4	$^\circ\text{C}/\text{W}$



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°C	---	---	1	uA
		V _{DS} =80V, V _{GS} =0V, T _J =100°C	---	---	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 =13A	---	---	9.7	mΩ
		V _{GS} =4.5V, I _D =8A	---	---	15	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.7	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A	---	37	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3,4}	V _{DS} =50V, V _{GS} =4.5V, I _D =13A	---	17	---	nC
Q _{gs}	Gate-Source Charge ^{3,4}		---	5.2	---	
Q _{gd}	Gate-Drain Charge ^{3,4}		---	8.3	---	
T _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =50V, V _{GS} =10V, R _G =3Ω I _D =13A	---	9	---	ns
T _r	Turn-On Rise Time ^{3,4}		---	27	---	
T _{d(off)}	Turn-Off Delay Time ^{3,4}		---	26	---	
T _f	Turn-Off Fall Time ^{3,4}		---	12	---	
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1MHz	---	1667	---	pF
C _{oss}	Output Capacitance		---	286	---	
C _{rss}	Reverse Transfer Capacitance		---	31	---	
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 =1A	---	---	1	V
t _{rr}	Reverse Recovery Time	I _S =13A, di/dt=100A/us	---	52	---	ns
Q _{rr}	Reverse Recovery Charge		---	71	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=50V, V_{GS}=10V, L=0.1mH, R_G=25Ω, Starting T_J=25°C
3. The data tested by pulsed, pulse width ≤300us, duty cycle ≤2%.
4. Essentially independent of operating temperature.
5. Silicon limited



2. Characteristics Curves

Ratings and Characteristics Curves

($T_A = 25^\circ\text{C}$ unless otherwise specified)

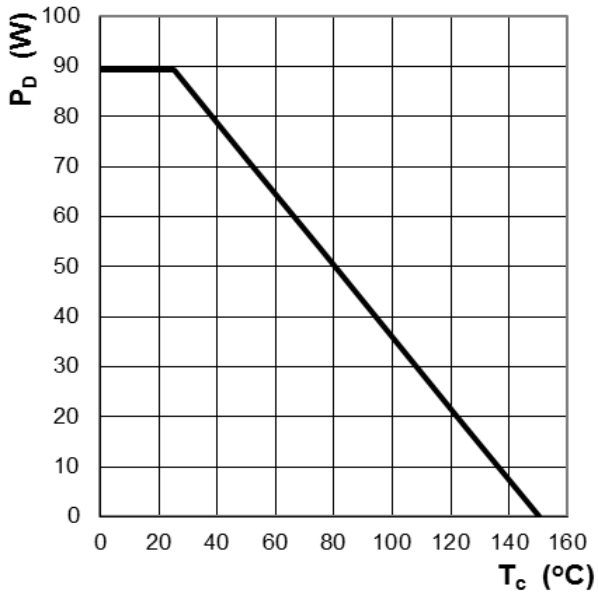


Figure 1: Power Dissipation

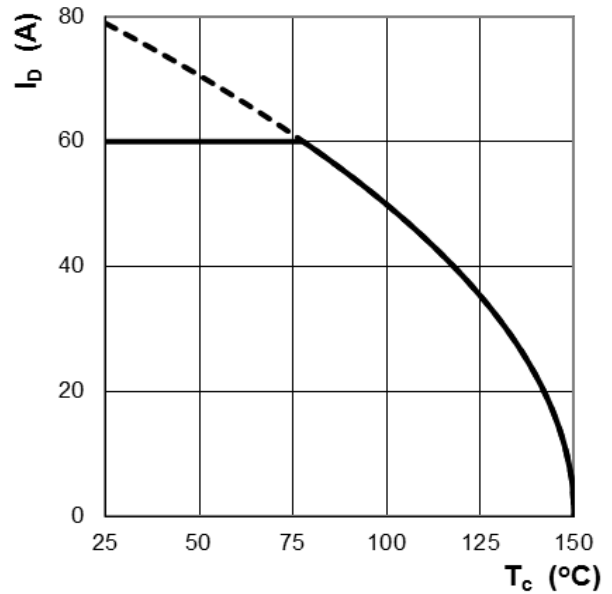


Figure 2: Continuous Drain Current vs. T_c

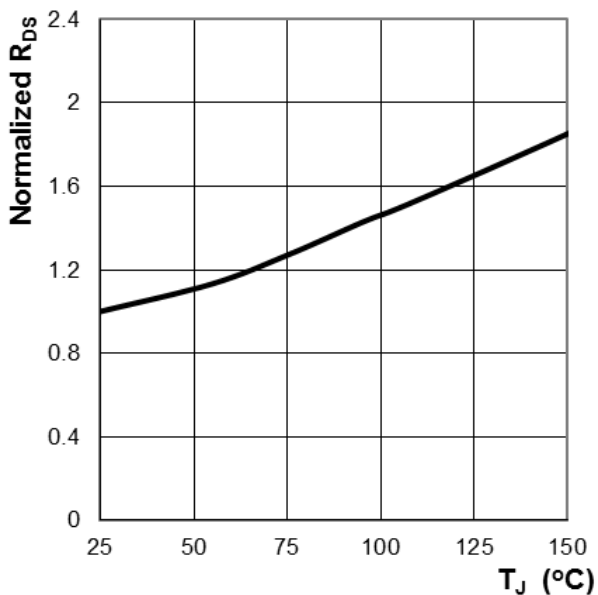


Figure 3: Normalized $R_{DS(ON)}$ vs. T_J

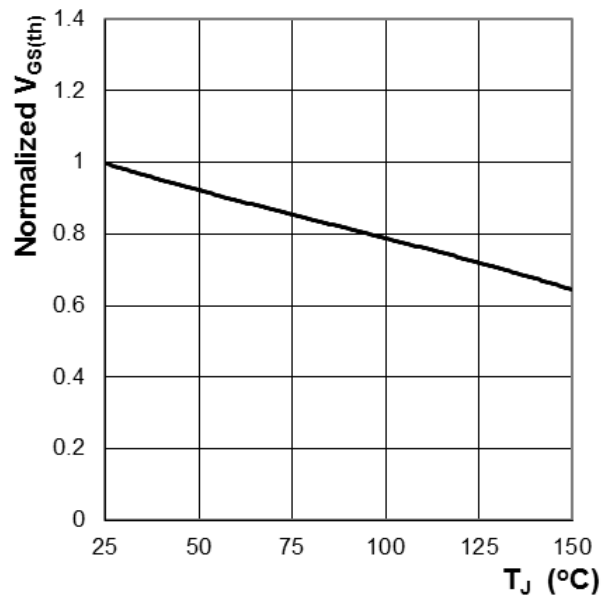


Figure 4: Normalized $V_{GS(th)}$ vs. T_J



Ratings and Characteristics Curves

($T_A = 25^\circ\text{C}$ unless otherwise specified)

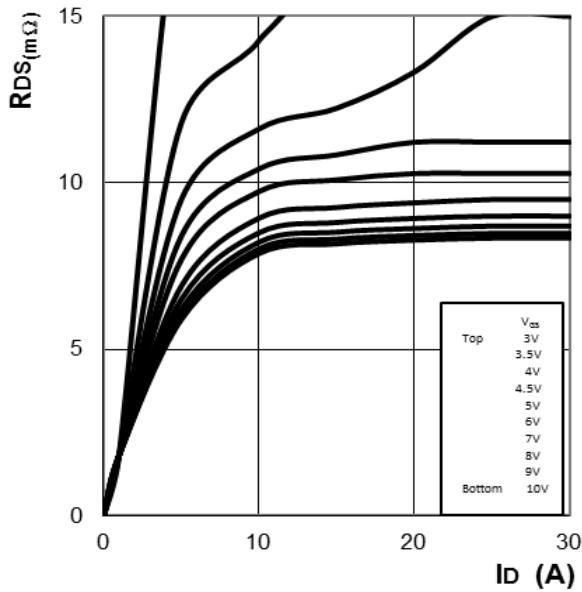


Figure 5: RDS(ON) vs. Drain Current and Gate Voltage

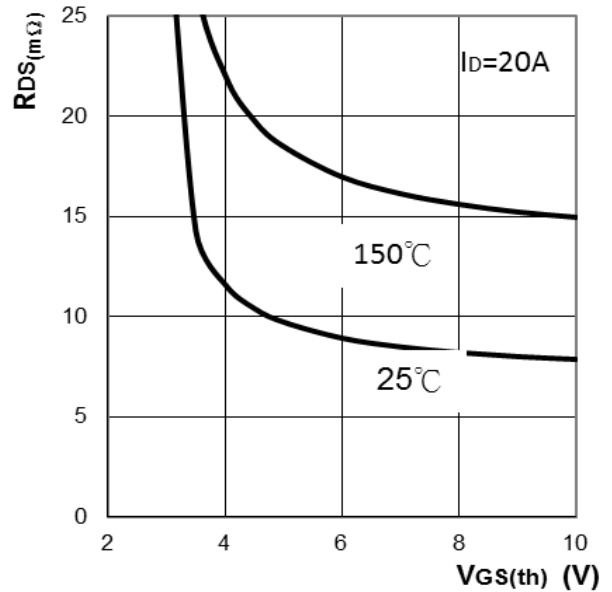


Figure 6: RDS(ON) vs. Gate Voltage

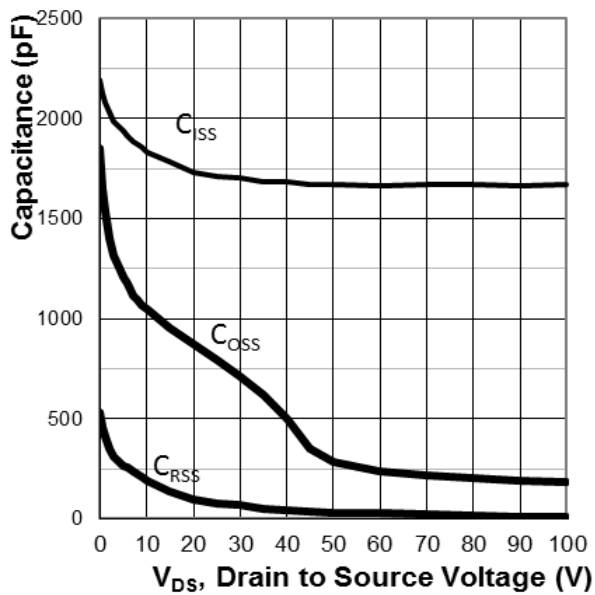


Figure 7: Typ. Capacitance Characteristics

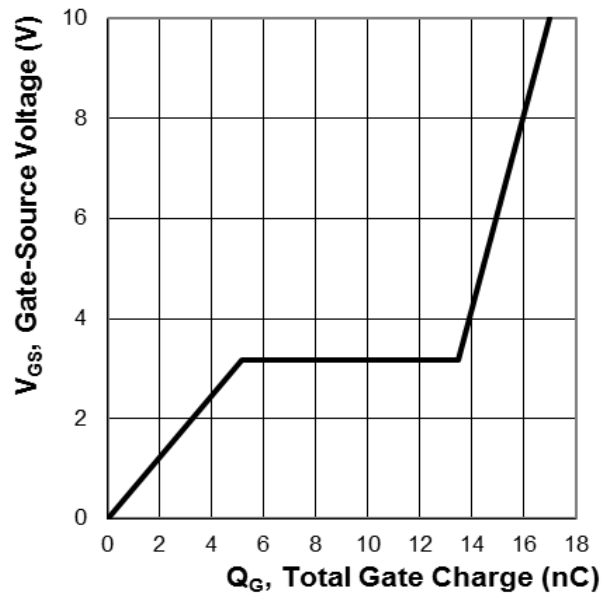


Figure 8: Typ. Gate Charge Characteristics



Ratings and Characteristics Curves

($T_A = 25^\circ\text{C}$ unless otherwise specified)

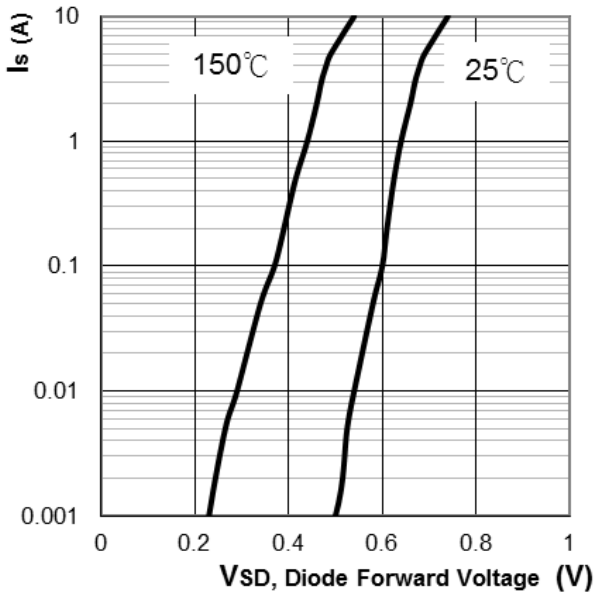


Figure 9: Body Diode Characters

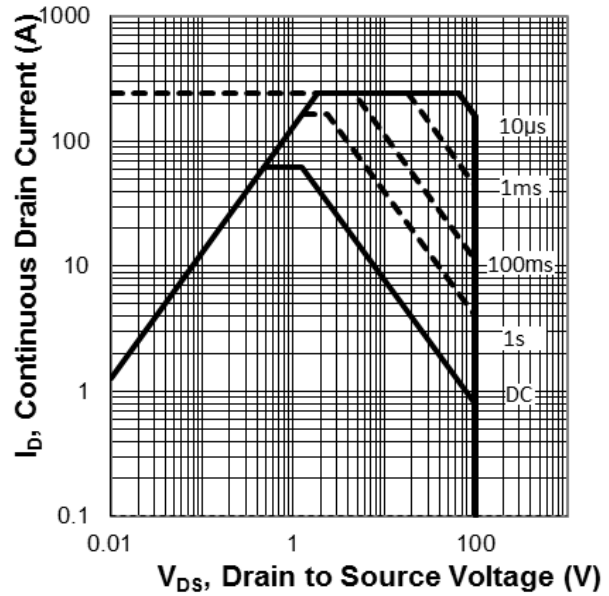


Figure 10: Maximum Safe Operation Area

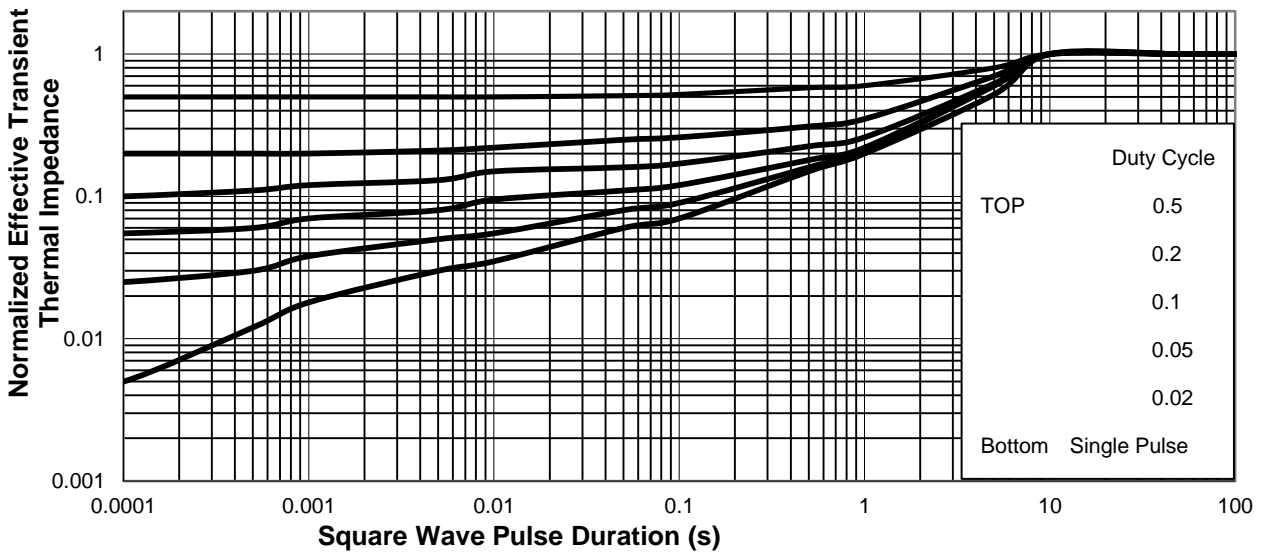
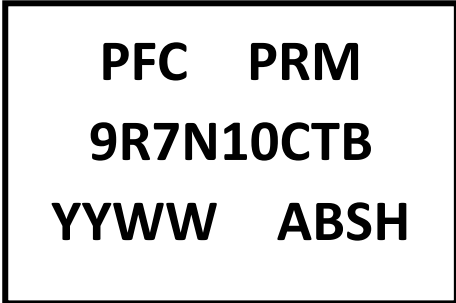


Figure 11: Normalized Thermal Transient Impedance, Junction-to-Case



3. Marking information

Top Marking Rule



PRM9R7N10CTB = Product Type Marking Code

YYWW = Date Code

YY = Last two digits of year

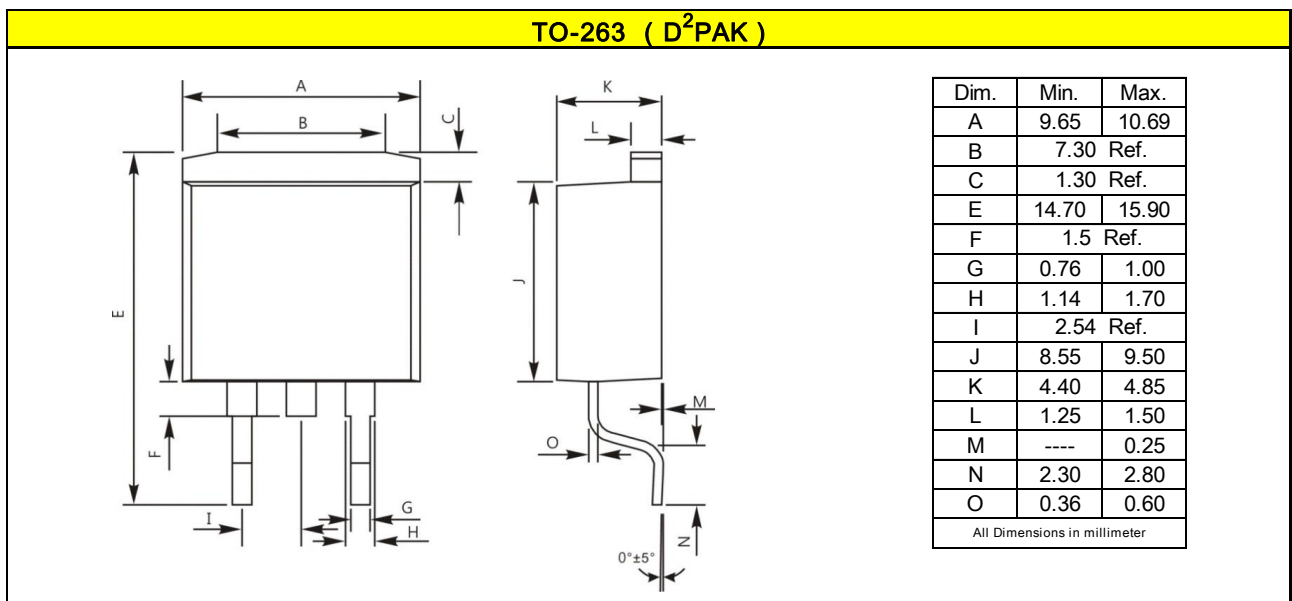
WW = Week code

ABS = Assembly code

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

4. Package information

Package Outline Dimensions millimeters



5. Ordering information

Part Number	Package	Delivery mode
PRM9R7N10CTB	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

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