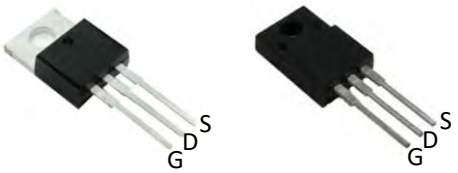
MPR9N90CTF
MPR9N90CT

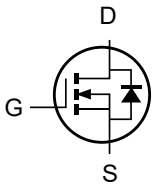
10-Jun2022

900V N-Channel Power MOSFET

MPR9N90CT **MPR9N90CTF**

TO-220AB **TO-220F**





Features

- Low gate charge
- Low Ciss
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

Application

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）
- AC to DC Converters
- Telecom, Solar

Maximum ratings, at T_A =25°C, unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	900	V
V_{GS}	Gate-Source voltage	±30	V
I_{AR}	Avalanche Current ①	2	A
I_D	Continuous drain current @VGS=10V	9	A
I_{DM}	Pulse drain current tested ①	25	A
dv/dt	Reverse Diode dV/dt③	15	V/ns
E_{AS}	Avalanche energy, single pulsed ②	120	mJ
E_{AR}	Repetitive Avalanche Energy ①	0.32	mJ
P_D	Power Dissipation	31	W
T_{STG},T_J	Storage and Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	4	°C/W

Electrical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j=25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	900	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=900V,V_{GS}=0V	--	--	1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±30V,V_{DS}=0V	--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	2.5	--	4.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	V_{GS}=10V, I_D=3.5A	--	0.92	1.2	Ω
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	--	510	--	pF
C_{oss}	Output Capacitance		--	150	--	pF
C_{rss}	Reverse Transfer Capacitance		--	11	--	pF
Q_g	Total Gate Charge	V_{DS}=450V, I_D=4.5A , V_{GS}=10V ③④	--	12	--	nC
Q_{gs}	Gate-Source Charge		--	2.5	--	nC
Q_{gd}	Gate-Drain Charge		--	5.6	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=400V, I_D=4.5A, R_G=425Ω, Tj=25°C ③④	--	25	--	ns
Tr	Turn-on Rise Time		--	18	--	ns
Td(off)	Turn-Off Delay Time		--	60	--	ns
Tf	Turn-Off Fall Time		--	20	--	ns

Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)

I_{SM}	Pulsed Diode Forward Current		--	--	25	A
V_{SD}	Forward on voltage	I_S=4.5A,V_{GS}=0V	--	--	1.5	V
Trr	Reverse Recovery Time	Is=4.5A, V_{GS}=0V di/dt=100A/μs ④	--	240	--	ns
Qrr	Reverse Recovery Charge		--	3.1	--	μC

NOTE: ① Repetitive rating; pulse width limited by max junction temperature.

② V_{DD}=50V,I_{AS}=12A ,starling T_J=25℃.

③ I_{SD}≤I_D,dI/dt=200A/us,V_{DD}≤BV_{DSS},starting T_J=25℃,Pulse width≤300us;duty cycle≤2%.

④ Repetitive rating; pulse width limited by maximum junction temperature

Typical Characteristics

Fig.1 On Region Characteristics

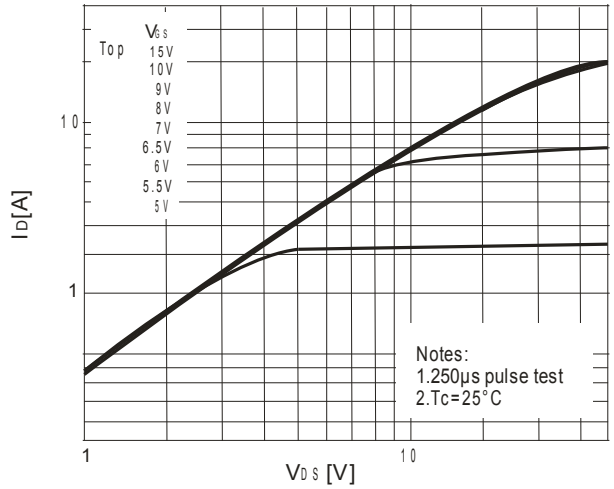


Fig.2 Transfer Characteristics

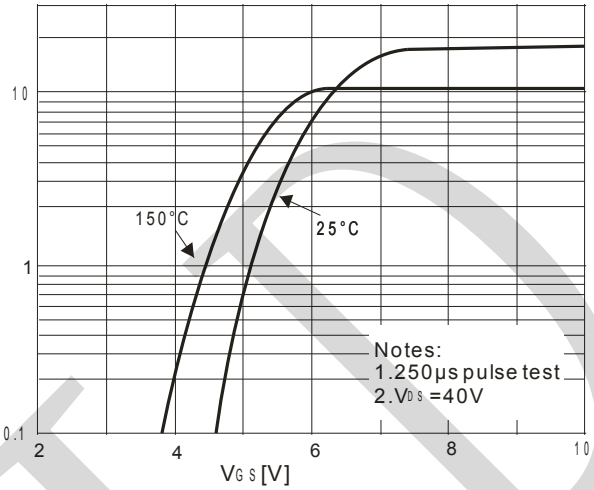


Fig.3 On-Resistance Variation vs Drain Current and Gate Voltage

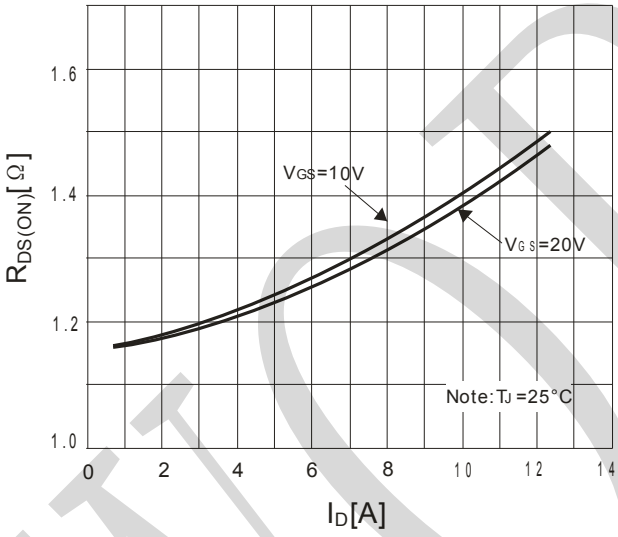


Fig.4 Body Diode Forward Voltage Variation vs. Source Current and Temperature

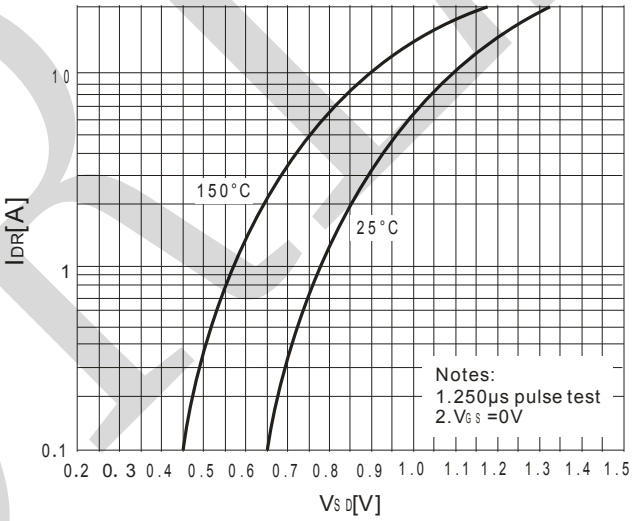


Fig.5 Capacitance Characteristics

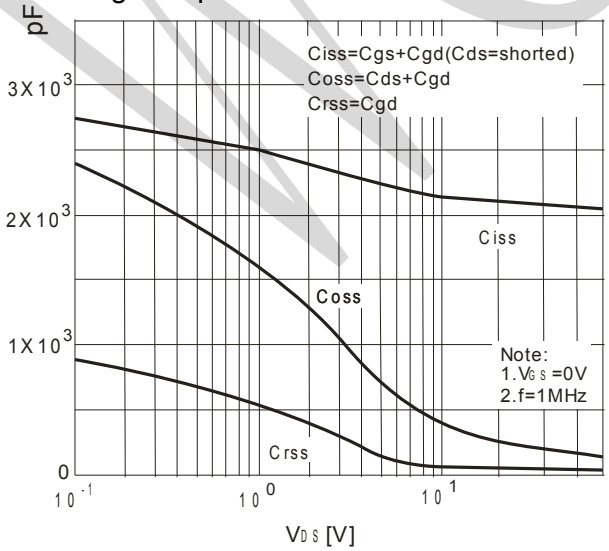
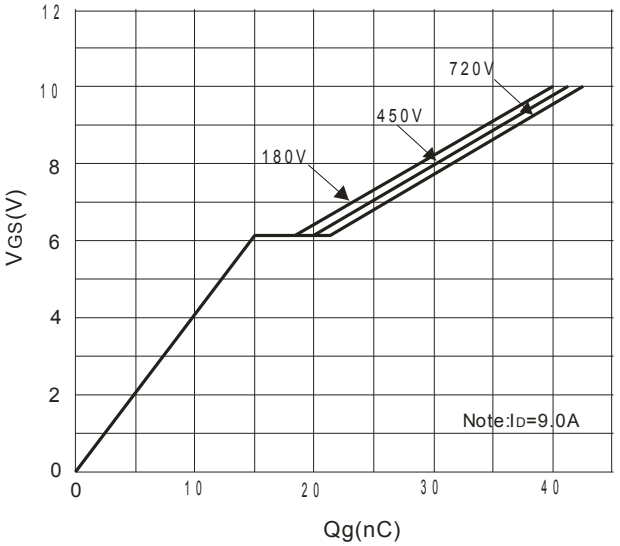


Fig.6 Gate Charge Characteristics



Typical Characteristics

Fig.7 Breakdown Voltage Variation vs. Temperature

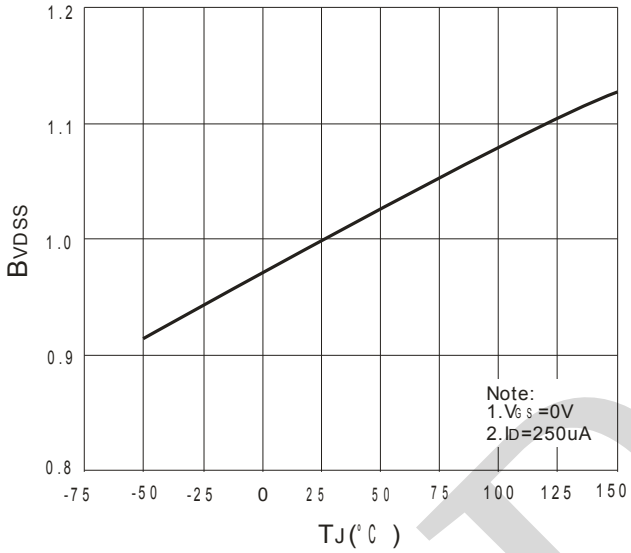


Fig.8On-Resistance Variation vs. Temperature

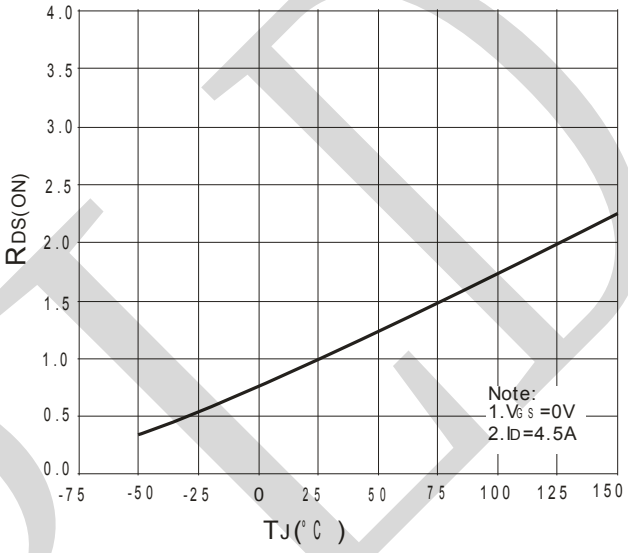


Fig.9 Maximum Safe Operation Area

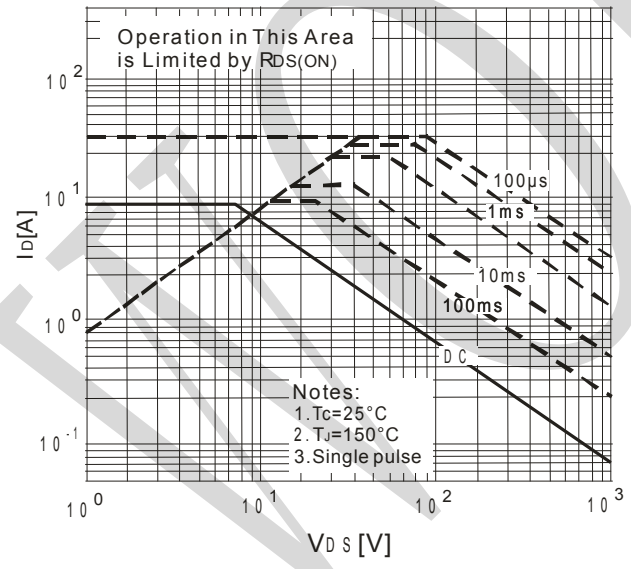
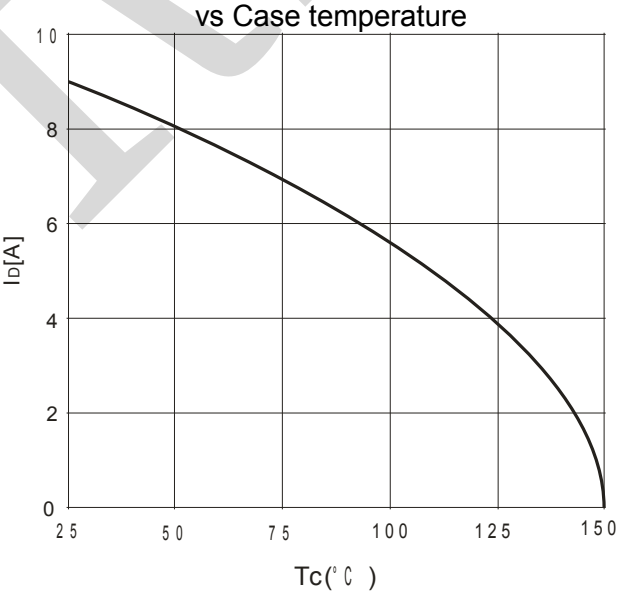
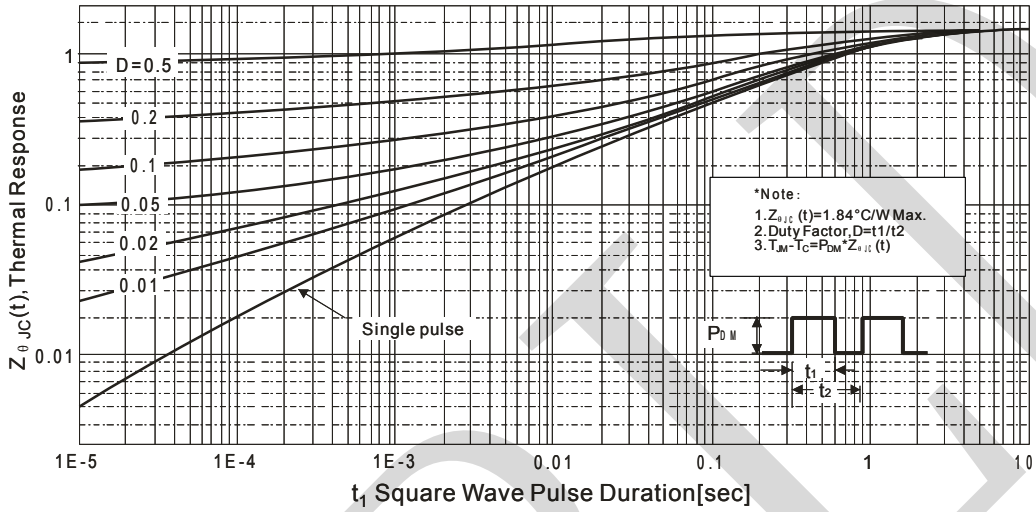


Fig.10 Maximum Drain Current vs Case temperature



Typical Characteristics

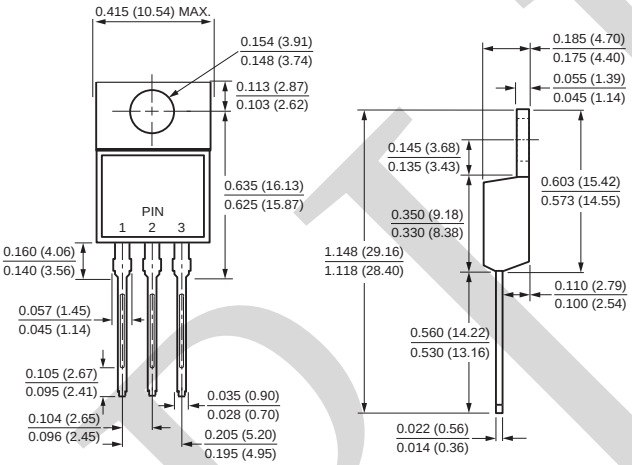
Fig.11 Transient thermal Response Curve



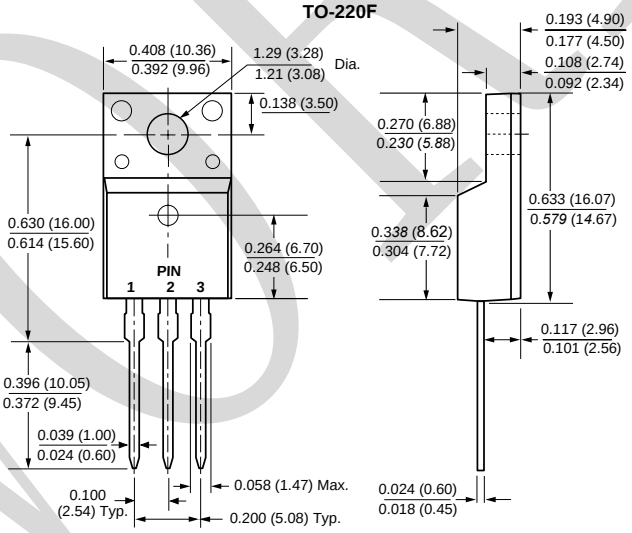
PACKAGE OUTLINE DIMENSIONS

Note:unit mm

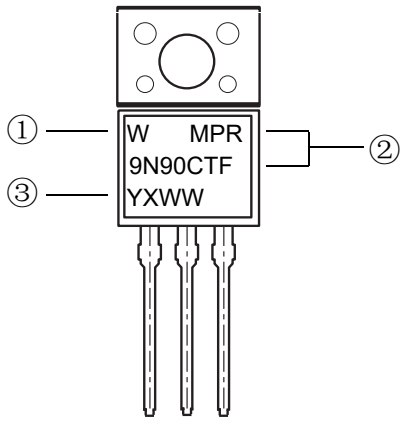
TO-220AB



TO-220F



Marking Information



①W : Company's trademark
②Product model : MPR9N90CTF/MPR9N90CT
③PDC information：

Y X WW

WW:Week code(01 to 53)
X:Internal identification code
Y:Year code(ex:0=2020)