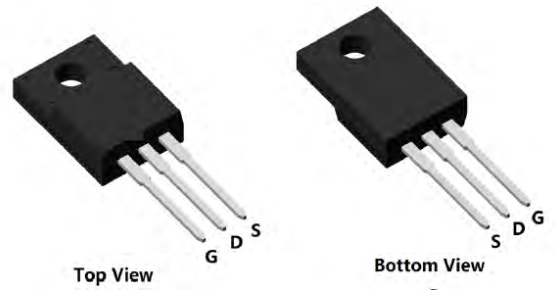
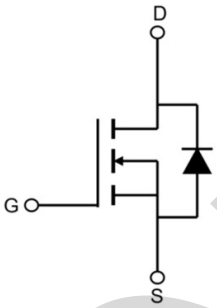
500V N-Channel Power MOSFET

MPR18N50CTF
TO-220F





V_{DS}	500	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	0.22	Ω
I_D	18	A

Features

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

Applications

- Load Switch for Portable Devices
- DC/DC Converter

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		500	V
V_{GS}	Gate-Source voltage		±30	V
I_S	Diode continuous forward current	T_C =25°C	18	A
I_D	Continuous drain current @VGS=10V	T_C =25°C	18	A
I_{DM}	Pulse drain current tested ①	T_C =25°C	72	A
EAS	Avalanche energy, single pulsed ②		480	mJ
P_D	Power Dissipation	T_C =25°C	39	W
	Derating Factor above 25℃		0.45	W/°C
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	1.27	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°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	500	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=500V,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	2.0	3.0	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=9A	--	0.22	0.28	Ω
g_{fs}	Forward Transconductance	V_{DS}=15V, ID=9A	--	12	--	S
Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	--	3170	--	pF
C_{oss}	Output Capacitance		--	210	--	pF
C_{rss}	Reverse Transfer Capacitance		--	17	--	pF
Q_g (10V)	Total Gate Charge	V_{DS}=400V, I_D=18A , V_{GS}=10V	--	40	--	nC
Q_{gs}	Gate-Source Charge		--	12	--	nC
Q_{gd}	Gate-Drain Charge		--	11.5	--	nC

Switching Characteristics

Td(on)	Turn-on Delay Time	V_{DD}=250V, I_D=18A, V_G=10V, R_G=25Ω, Tj=25°C	--	51	--	ns
Tr	Turn-on Rise Time		--	28	--	ns
Td(off)	Turn-Off Delay Time		--	157	--	ns
Tf	Turn-Off Fall Time		--	48	--	ns

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

I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		--	--	72	A
VSD	Forward on voltage	I_{SD}=18A,VGS=0V	--	--	1.4	V
Trr	Reverse Recovery Time	Is=18A , VGS=0V di/dt=100A/μs	--	450	--	ns
Qrr	Reverse Recovery Charge		--	5300	--	nC

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

② Limited by T_{Jmax}, starting T_J = 25°C, L = 10mH. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 380μs; duty cycle≤ 2%.

Typical Characteristics

Figure 1. **Output Characteristics**

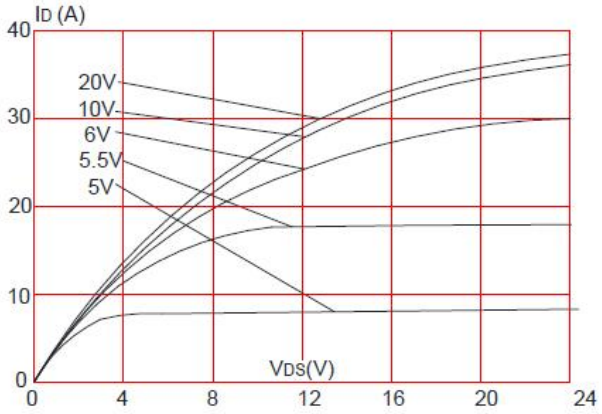


Figure 2. **Typical Transfer Characteristics**

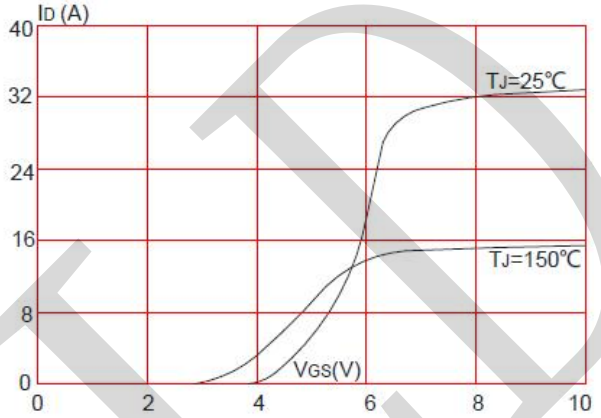


Figure 3. **On-resistance vs. Drain Current**

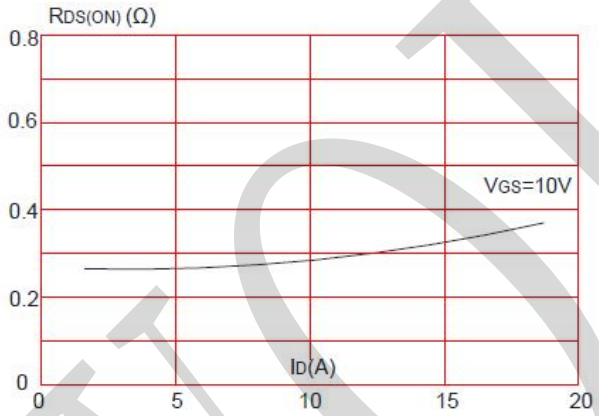


Figure 4. **Body Diode Characteristics**

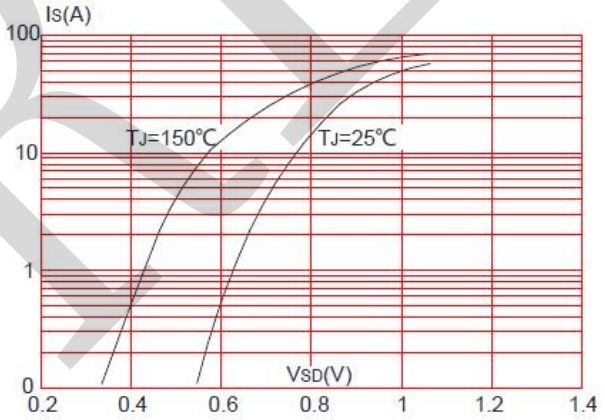


Figure 5. **Gate Charge Characteristics**

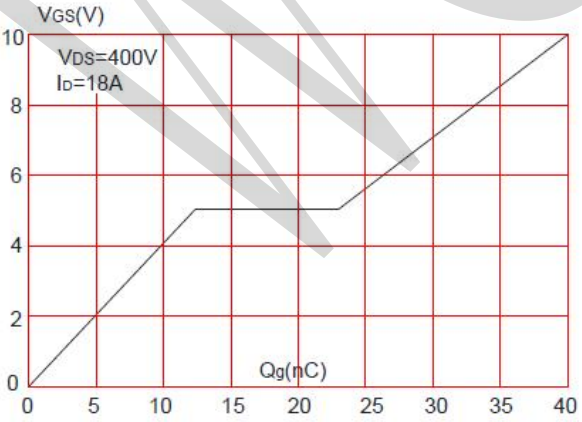
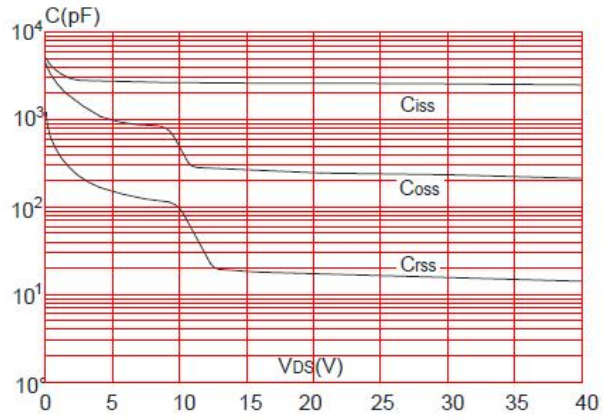


Figure 6. **Capacitance Characteristics**



Typical Characteristics

Figure 7: **Normalized Breakdown Voltage vs. Junction Temperature**

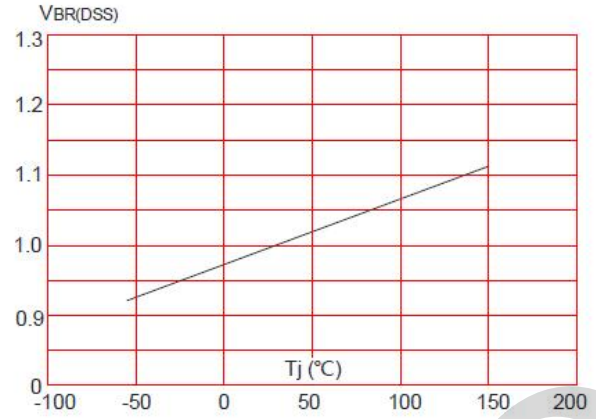


Figure 8: **Normalized on Resistance vs. Junction Temperature**

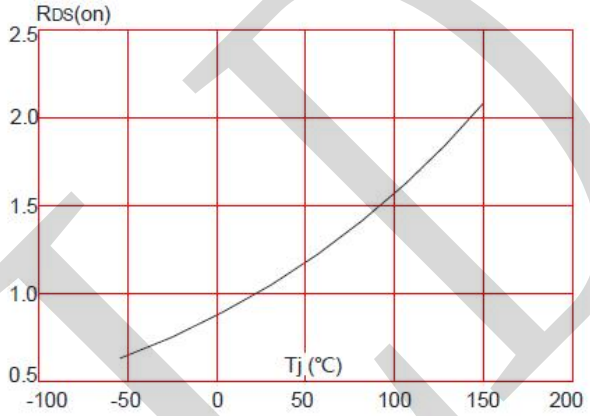


Figure 9: **Maximum Safe Operating Area**

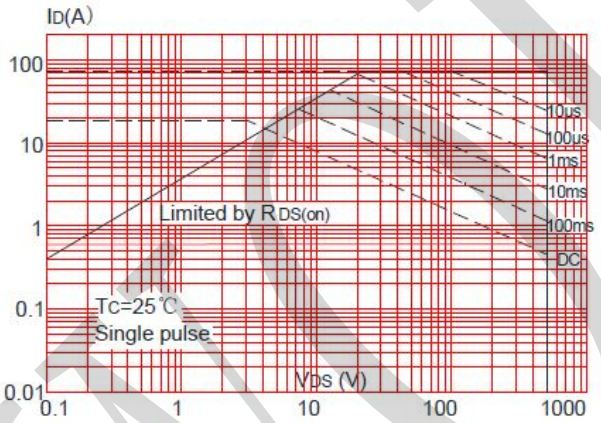


Figure 10: **Maximum Continuous Drain Current vs. Case Temperature**

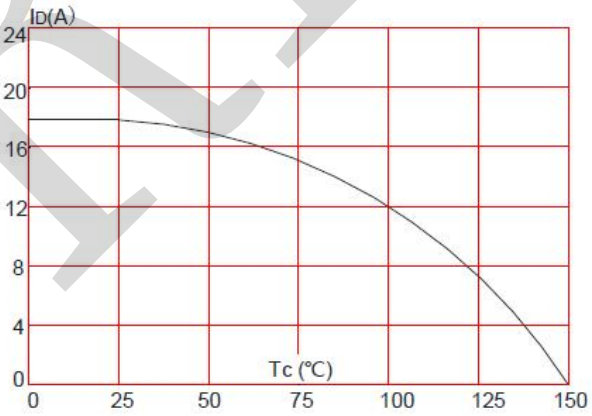
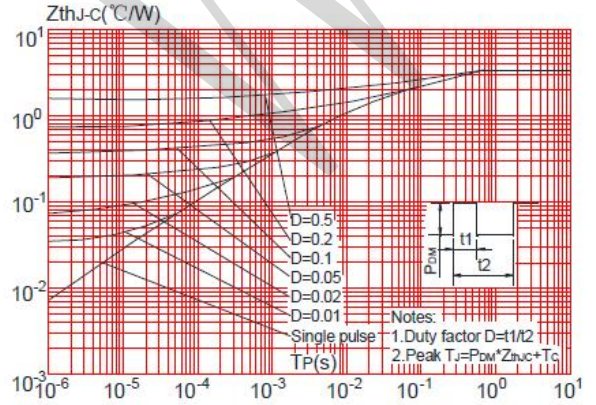
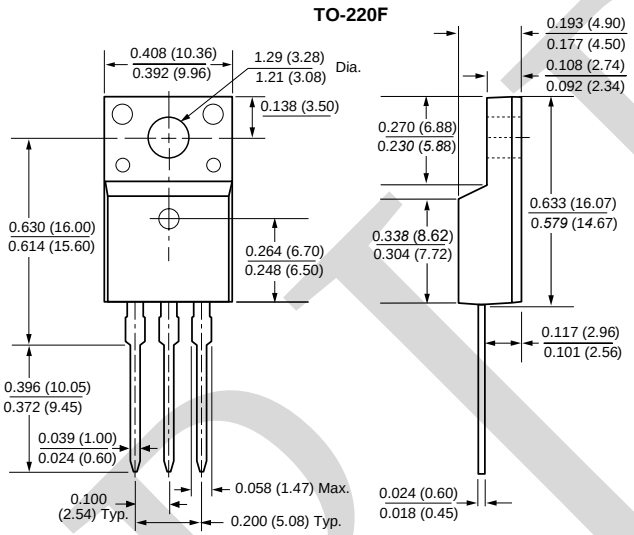


Figure.11: **Maximum Effective Transient Thermal Impedance, Junction-to-Case**

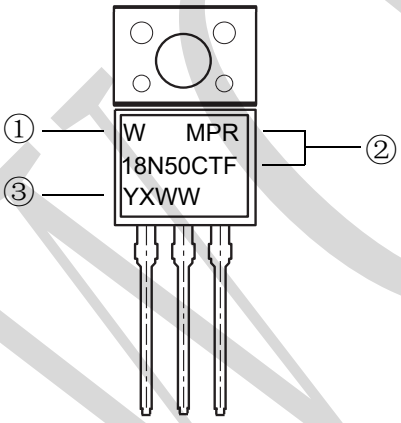


PACKAGE OUTLINE DIMENSIONS

TO-220F Package Information



Marking Information



①W : Company's trademark

②Product model : MPR18N50CTF

③PDC information：

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)