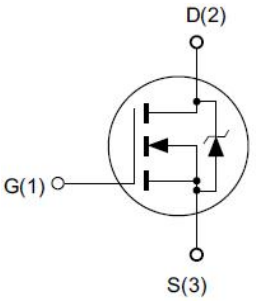
MPF20N50

N-Channel Power MOSFET

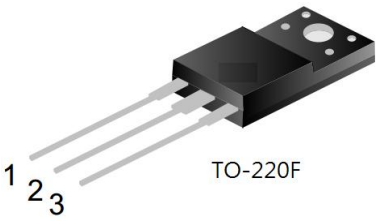
Features

- ◆ 500V, 20A, $R_{DS(ON)}$(Typ.) = 0.24Ω@VGS = 10V.
- ◆ Fast Switching
- ◆ 100% Avalanche Tested



Application

- ◆ Adaptor
- ◆ Standby Power
- ◆ Switching power supply
- ◆ PFC



Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Limit	Unit
		TO-220F	
V_{DS}	Drain-Source Voltage [a]	500	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, T_C =25°C	20	A
	Drain Current-Continuous, T_C =100°C	12.5	A
I_{DM}	Drain Current-Pulsed [b]	80	A
P_D	Maximum Power Dissipation @ T_J =25°C	88	W
EAS	Single Pulsed Avalanche Energy [d]	980	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	1.42	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max.	62.5	°C/W

Electrical Characteristics T_J = 25°C unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{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}	Forward Gate Body Leakage Current	V_{DS} = 0V, V_{GS} = ±30V	-	-	±100	nA

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS}(th)$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D =250μA	2	-	4	V
$R_{DS}(on)$	Static Drain-Source On-Resistance c	V_{GS} = 10V, I_D =10A	-	0.24	0.30	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Ciss	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	3059	-	pF
Coss	Output Capacitance		-	291	-	pF
Crss	Reverse Transfer Capacitance		-	16	-	pF

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 250V, I_D =20A, V_{GS}=10V	-	35	-	ns
t_r	Turn-On Rise Time		-	64	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	83	-	ns
t_f	Turn-Off Fall Time		-	44	-	ns
Qg	Total Gate Charge	V_{DS} = 400V, I_D =20A, V_{GS} = 10V	-	54		nC
Qgs	Gate-Source Charge		-	13.3	-	nC
Qgd	Gate-Drain Charge		-	18.7	-	nC

Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
I_S	Drain-Source Diode Forward Continuous Current	V_{GS} = 0V	-	-	20	A
I_{SM}	Maximum Pulsed Current	V_{GS} = 0V	-	-	80	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	-		1.4	V
Trr	Body Diode Reverse Recovery Time	di/dt=100A/us Is=20A,V_{GS}=0V	-	535	-	ns
Qrr	Reverse Recovery Charge		-	6.4	-	uC

Notes:

a. T_J=+25 ℃ to +150 ℃.

b. Repetitive rating; pulse width limited by maximum junction temperature.

c. Pulse width≦300us; duty cycle≦2%.

d. L=10mH, I_{AS} =14A,V_{DD}=50V,R_G=25Ω Starting T_J=25 ℃.

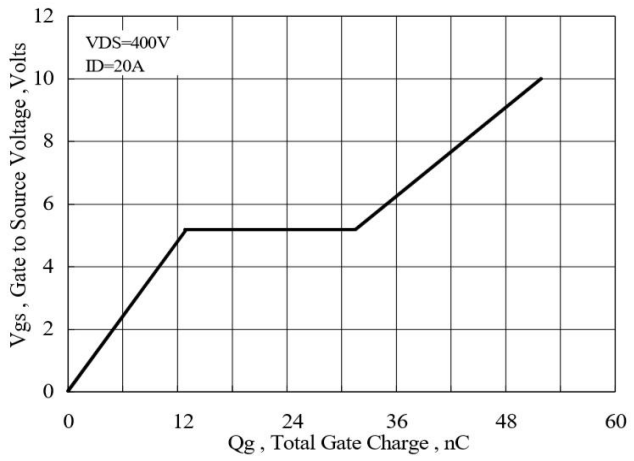


Figure 1. Gate Charge Characteristics

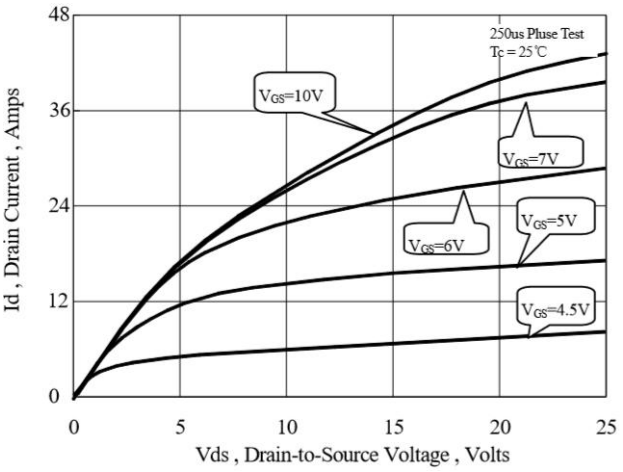


Figure 2. On-State Characteristics

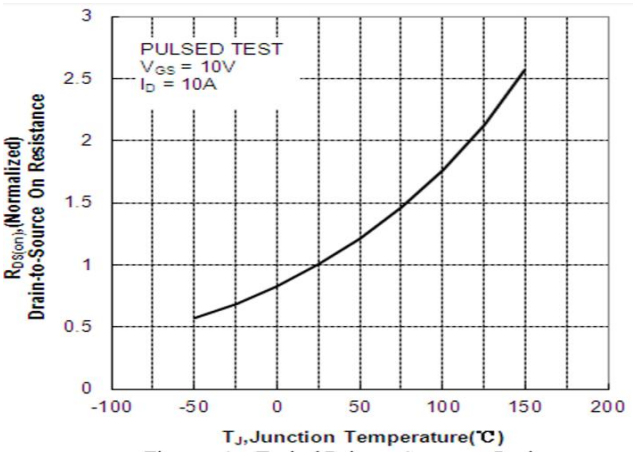


Figure 3. Normalized On-Resistance Variation with Temperature

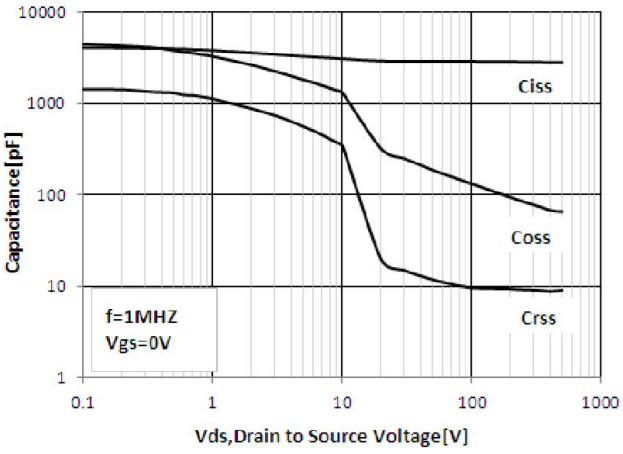


Figure 4. Typical Capacitance vs Drain to Source Voltage

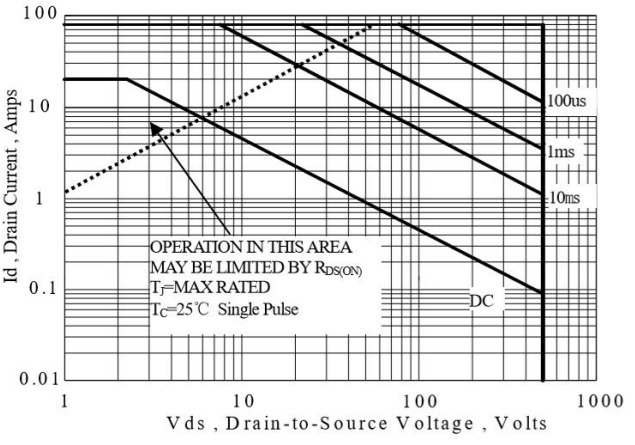


Figure 5. Maximum Forward Bias Safe Operating Area TO-220F

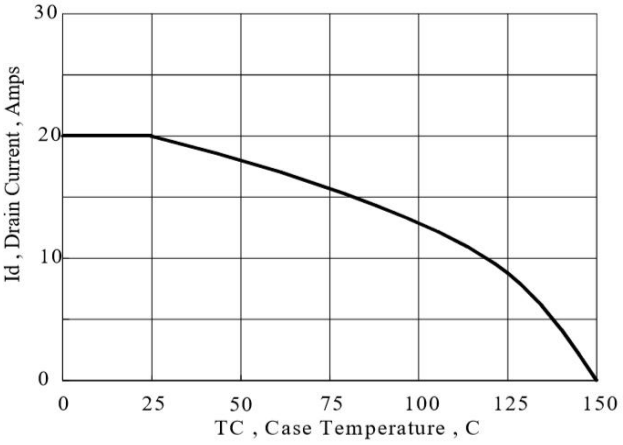


Figure 6. Maximum Continuous Drain Current vs Case Temperature

■ Package Information