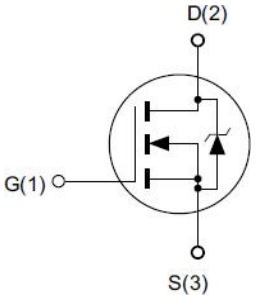
SPF20N65M

N-Channel Power MOSFET

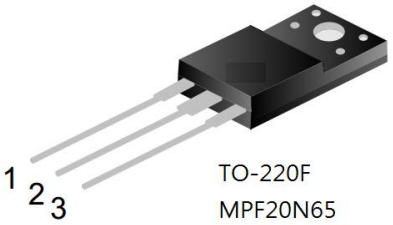
Features

- ◆ 650V, 20A, $R_{DS(ON)}$(Max.) = 0.5Ω@VGS = 10V.
- ◆ Low Crss
- ◆ Fast Switching
- ◆ 100% Avalanche Tested



Application

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



TO-220F
MPF20N65

Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Limit	Unit
		TO-220F	
V_{DS}	Drain-Source Voltage [a]	650	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	45	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.	1.47	°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	650	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650V, 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	-	0.37	0.5	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} = 325V, I_D =20A, V_{GS}=10V	-	37	-	ns
t_r	Turn-On Rise Time		-	70	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	89	-	ns
t_f	Turn-Off Fall Time		-	49	-	ns
Qg	Total Gate Charge	V_{DS} = 325V, I_D =20A, V_{GS} = 10V	-	54.5		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

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

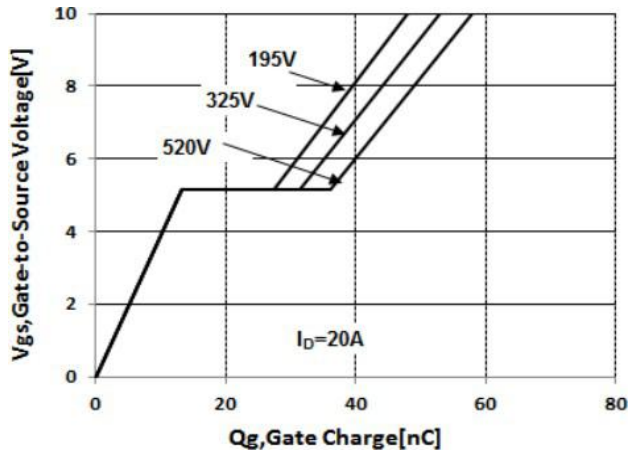


Figure 1. Gate Charge Characteristics

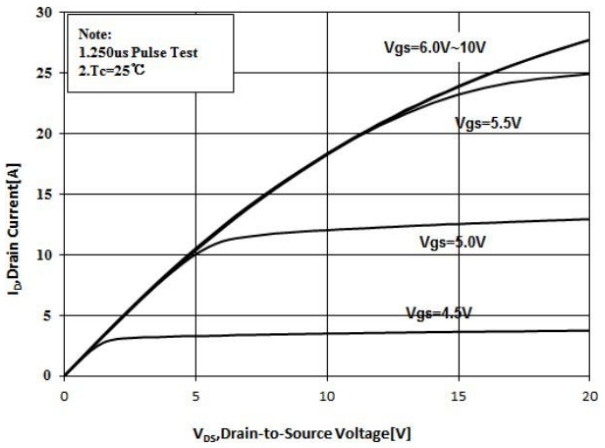


Figure 2. On-State Characteristics

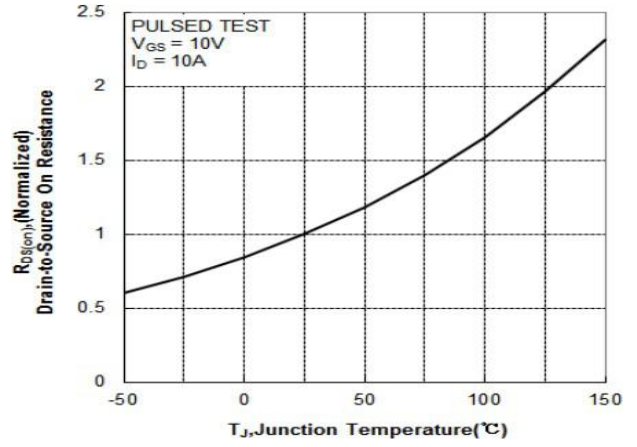


Figure 3. Normalized On-Resistance Variation with Temperature

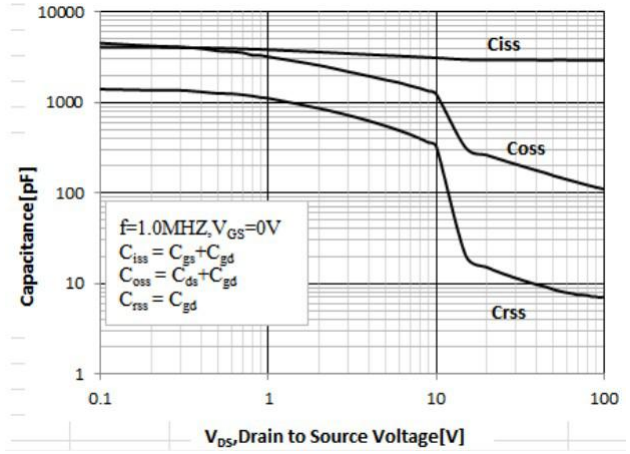


Figure 4. Typical Capacitance vs Drain to Source Voltage

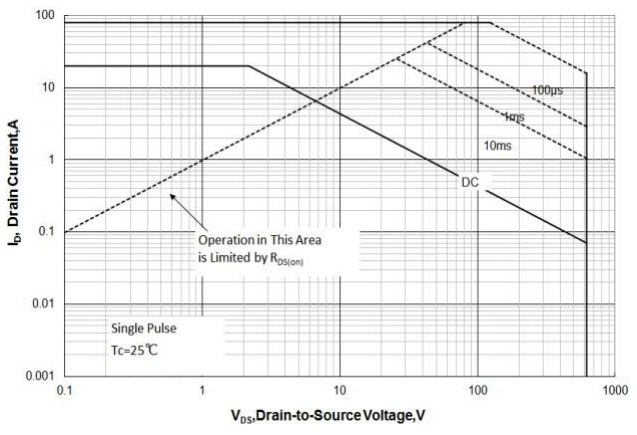


Figure 5 Maximum Forward Bias Safe OperatingArea

TO-220F

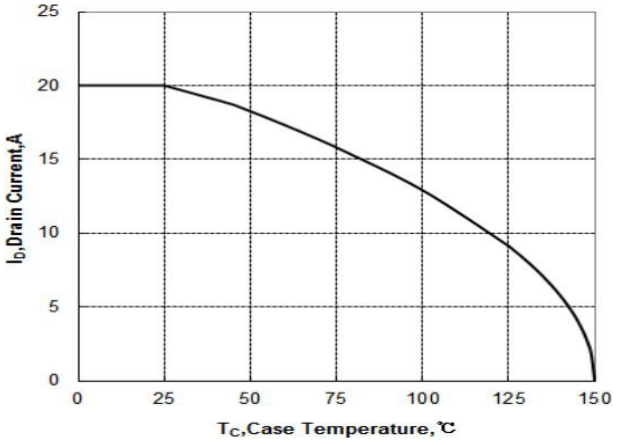


Figure 6. Maximum Continuous Drain Current vs Case Temperature