



MPF20N65A

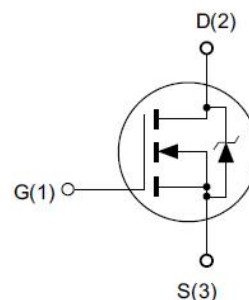
N-Channel Power MOSFET

Features

- ◆ 650V, 20A, $R_{DS(ON)}(Typ.) = 0.40 \Omega @ V_{GS} = 10V$.
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

- ◆ Adapter
- ◆ Standby Power
- ◆ Switching Mode Power Supply



Absolute Maximum Ratings $T_c = 25^\circ \text{C}$ unless otherwise noted

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_C = 25^\circ \text{C}$	20	A
	Drain Current-Continuous, $T_C = 100^\circ \text{C}$	13	A
I_{DM}	Drain Current-Pulsed ^a	80	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ \text{C}$	32	W
EAS	Single Pulsed Avalanche Energy ^b	980	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	$^\circ \text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	3.9	$^\circ \text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max	55	$^\circ \text{C/W}$

Electrical Characteristics $T_J = 25^\circ \text{C}$ unless otherwise noted

Off Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	650	-	-	
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA



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On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 10A$	-	0.4	0.47	Ω

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	3234	-	pF
C_{oss}	Output Capacitance		-	266	-	pF
C_{rss}	Reverse Transfer Capacitance		-	34	-	pF

On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 330V, I_D = 20A,$ $R_G = 24\Omega, V_{GS} = 10V$	-	45	-	ns
t_r	Turn-On Rise Time		-	64	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	218	-	ns
t_f	Turn-Off Fall Time		-	84	-	ns
Q_g	Total Gate Charge	$V_{DS} = 520V, I_D = 20A,$ $V_{GS} = 10V$	-	73	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	nC
Q_{gd}	Gate-Drain Charge		-	29	-	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	$V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F = 20A, di/dt = 100A/\mu s$	-	494	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	7.9	-	μC

Notes:

- Repetitive rating; pulse width limited by maximum junction temperature.
- $L=10mH, V_{DD}=50V, I_{as}=14.0A, R_G=25ohm$ Starting $T_J=25^\circ C$
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$

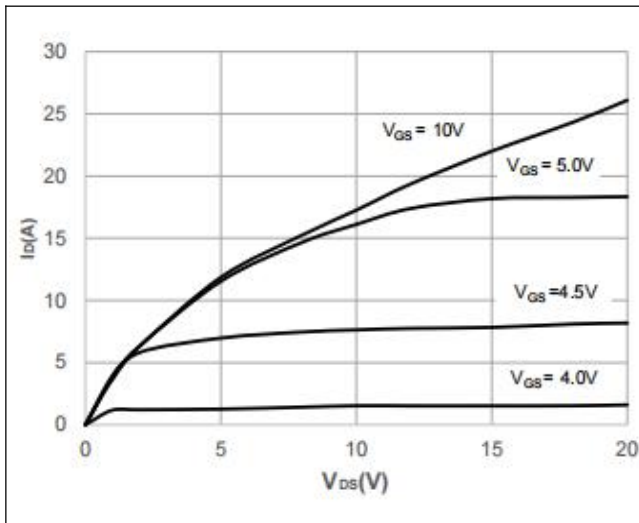


Figure 1. Typical Output Characteristics

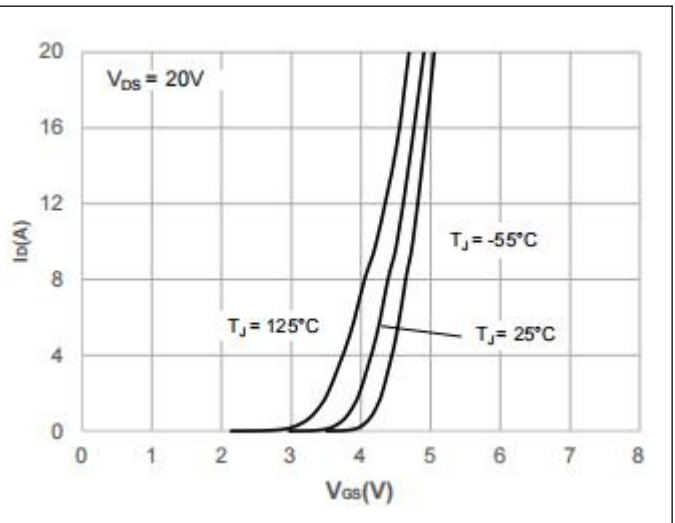


Figure 2. Typical Transfer Characteristics

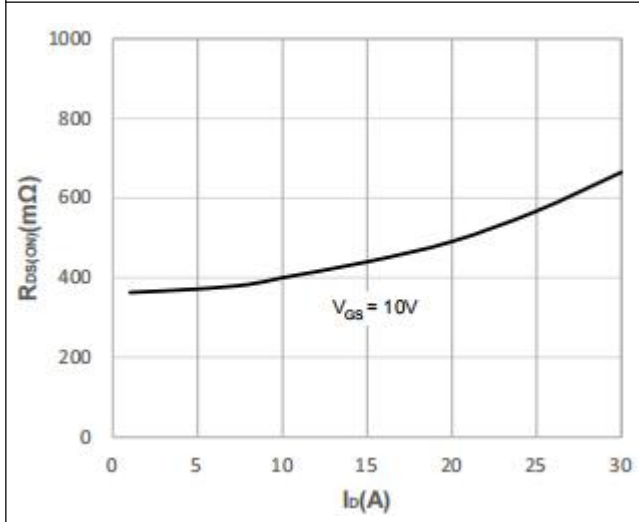


Figure 3. On- Resistance vs. Drain Current

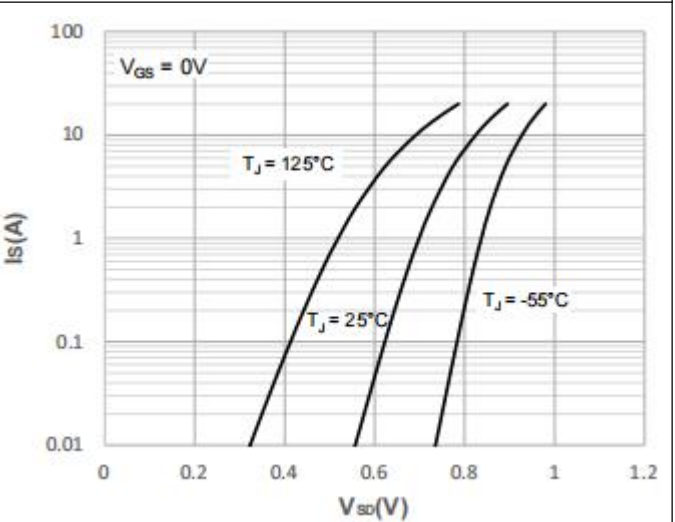


Figure 4. Body-Diode Characteristics

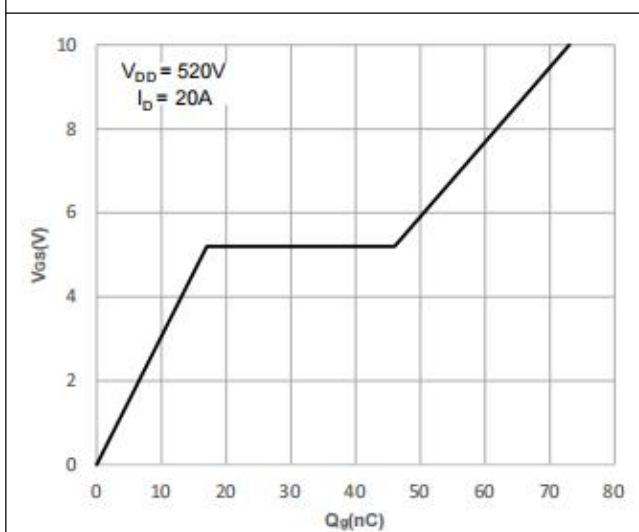


Figure 5. Gate-Charge Characteristics

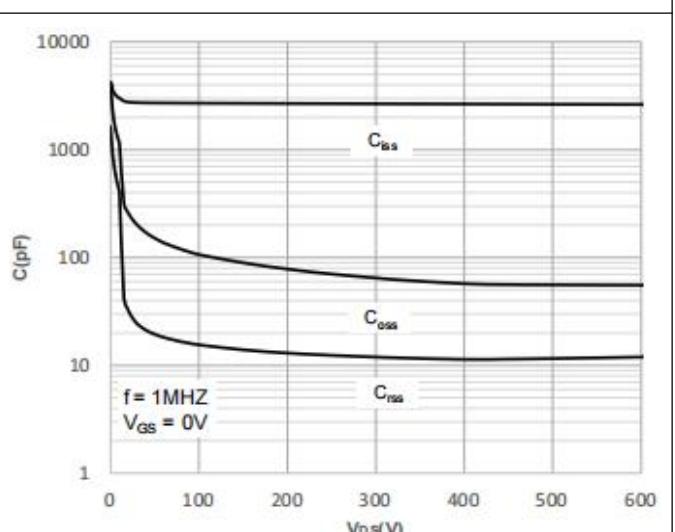


Figure 6. Capacitance Characteristics

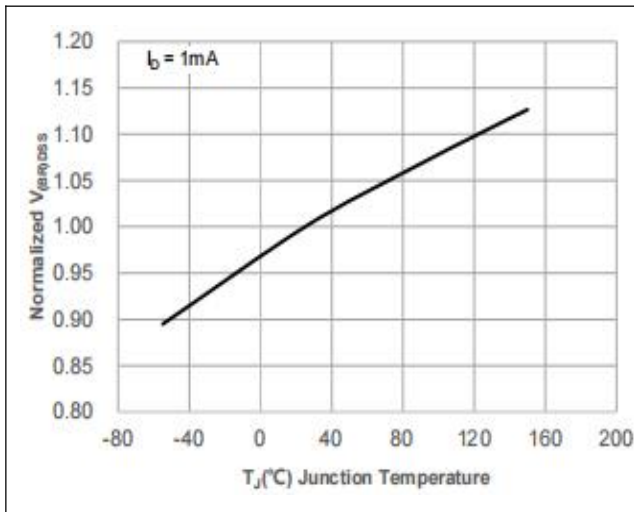


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

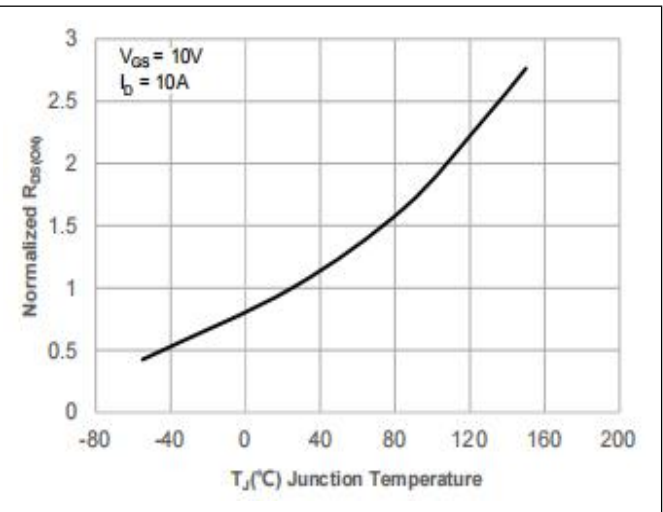


Figure 8. Normalized on Resistance vs. Junction Temperature

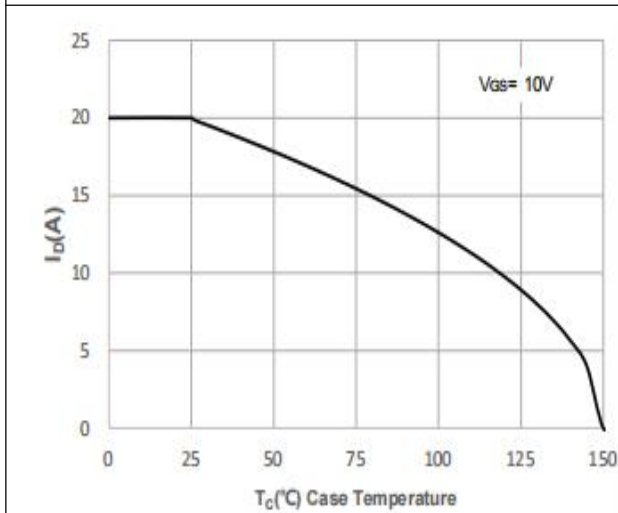


Figure 9: Maximum Continuous Drain Current vs. Case Temperature

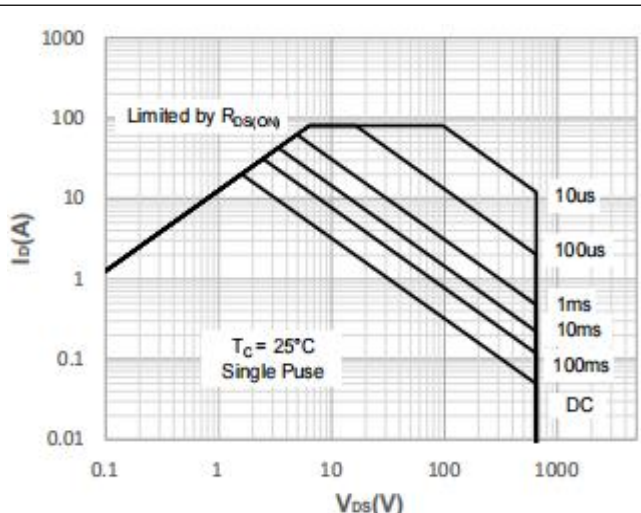


Figure 10. Maximum Safe Operating Area

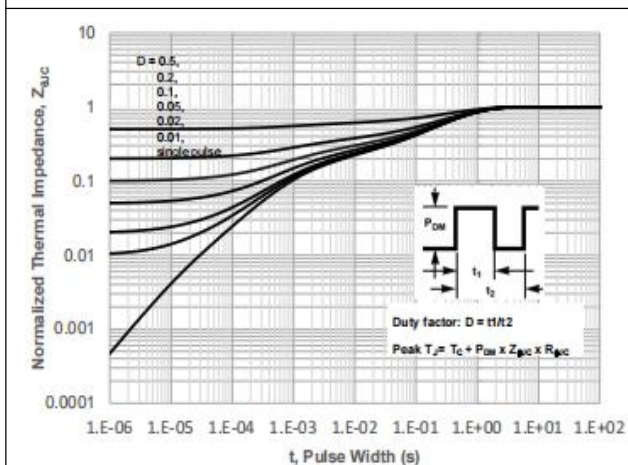


Figure 11: Normalized Maximum Transient Thermal Impedance

■ Package Information

