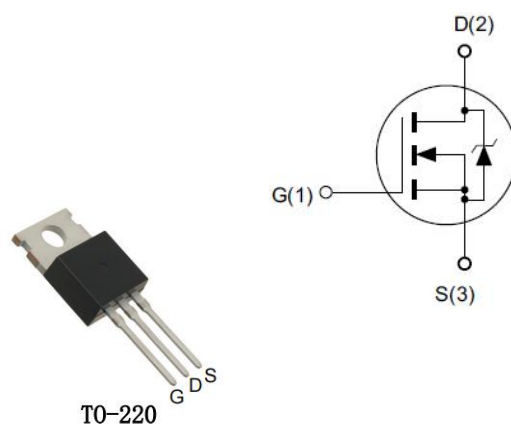


Features

- ◆ 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 $T_c = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage ^a	650	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current-Continuous, $T_C = 25^\circ C$	20	A
	Drain Current-Continuous, $T_C = 100^\circ C$	12.5	A
I_{DM}	Drain Current-Pulsed ^b	804	A
P_D	Maximum Power Dissipation @ $T_J = 25^\circ C$	250	W
EAS	Single Pulsed Avalanche Energy ^d	980	mJ
T_J, T_{STG}	Operating and Store Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-Case Max.	0.5	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient Max	62.5	$^\circ C/W$

Electrical Characteristics $T_J = 25^\circ C$ 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	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA



MPC20N65

N-Channel Power MOSFET

■ 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	-	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^c	$V_{GS} = 10V, I_D = 10A$	-	0.40	0.50	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
g_{fs}	Forward Transconductance	$V_{DS} = 15V, I_D = 10A$		16		S
C_{iss}	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	3059	-	pF
C_{oss}	Output Capacitance		-	291	-	pF
C_{rss}	Reverse Transfer Capacitance		-	16	-	pF

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 325V, I_D = 20A,$ $R_G = 25\Omega, V_{GS} = 10V$	-	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
Q_g	Total Gate Charge	$V_{DS} = 325V, I_D = 20A,$ $V_{GS} = 10V$	-	53		nC
Q_{gs}	Gate-Source Charge		-	11	-	nC
Q_{gd}	Gate-Drain Charge		-	19	-	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	$V_{GS} = 0V, I_S = 20A$	-	0.9	1.4	V

Notes:

- $T_J = -55^\circ C$ to $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$
- $L = 10mH, V_{DD} = 50V, I_{as} = 14A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$

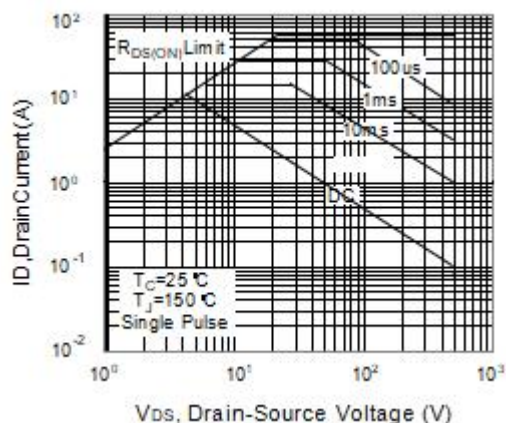


Figure 1 Maximum Safe Operating Area

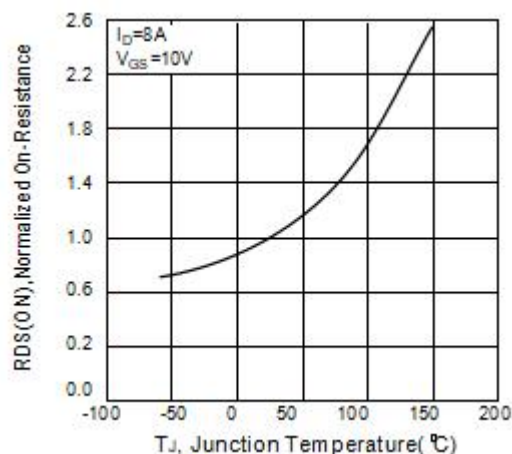


Figure 2 Normalized On-Resistance Variation with Temperature

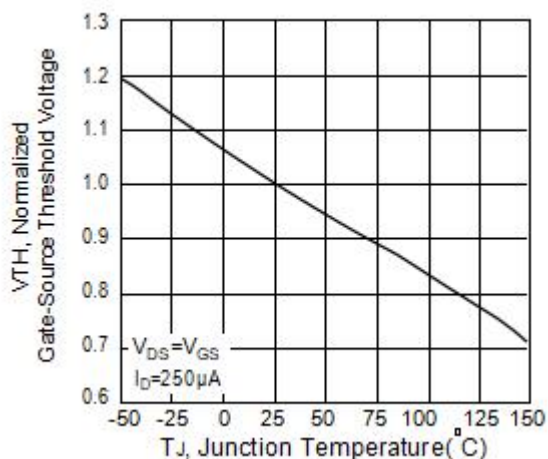


Figure 3. Typical Theshold Voltage vs Junction Temperature

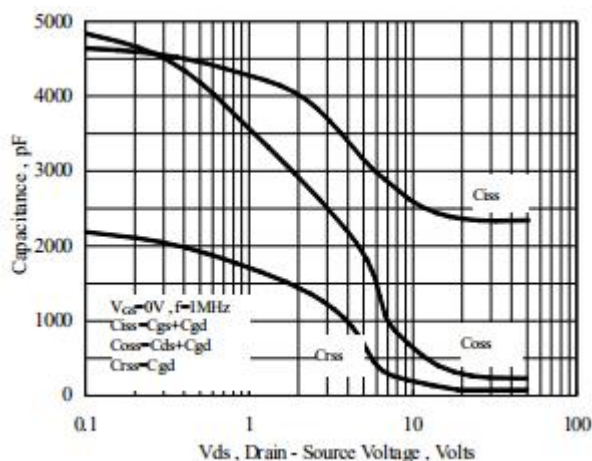


Figure 4. Capacitance Characteristics

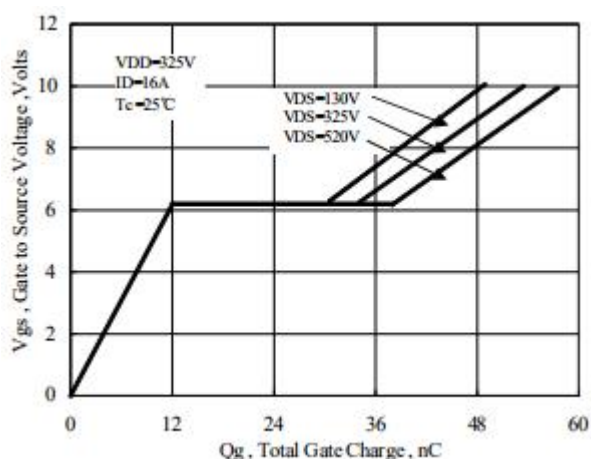


Figure 5. Gate Charge Characteristics

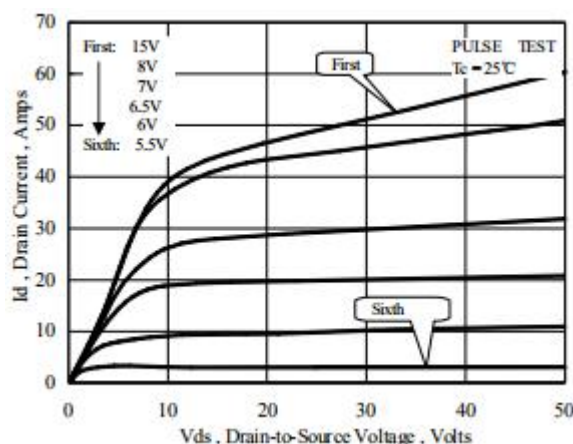


Figure 6. On-State Characteristics

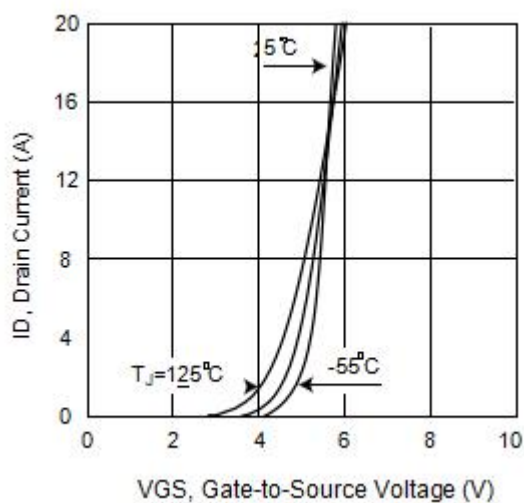


Figure 7. Typical Body Diode Transfer Characteristics

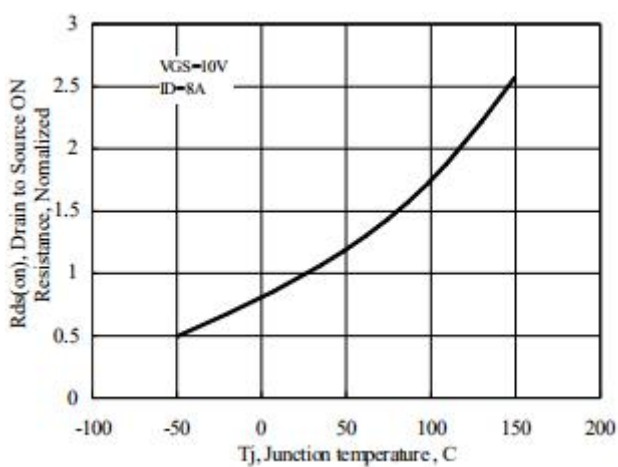


Figure 8. Typical Breakdown Voltage vs Junction Temperature

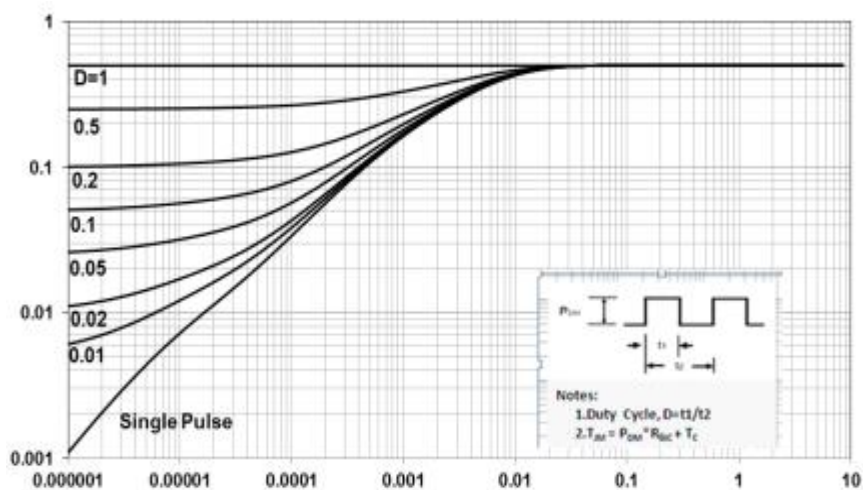


Figure 9. Normalized Effective Transient Thermal Impedance With Pulse Duration

■ Package Information

