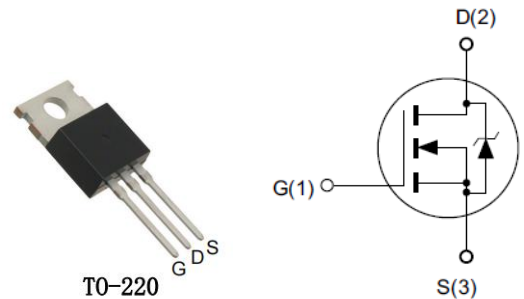


Features

- ◆ 600V, 12A, $R_{DS(on)}(Typ.) = 0.50\Omega @ V_{GS} = 10V$
- ◆ Low C_{rss}
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

Application

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



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

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage ^a	600	V
V_{GS}	Gate-Source Voltage	± 30	
I_D	Drain Current-Continuous	$T_C = 25^\circ\text{C}$	A
		$T_C = 100^\circ\text{C}$	
I_{DM}	Drain Current-Pulsed ^b	48	
P_D	Maximum Power Dissipation, $T_C = 25^\circ\text{C}$	156	W
dv/dt	Peak Diode Recovery dv/dt	-	V/ns
E_{AS}	Single Pulsed Avalanche Energy ^c	541	mJ
T_J, T_{STG}	Operating and Store Temperature Range	150, -55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.8	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	64	

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	$V_{GS} = 0V, I_D = 250\mu A$	600	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 600, V_{GS} = 0V$	-	-	1.0	μA
I_{GSS}	Forward Gate Body Leakage Current	$V_{DS} = 0V, V_{GS} = \pm 30V$	-	-	± 100	nA



MPC12N60A

N-Channel Power MOSFET

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance ^d	$V_{GS} = 10V, I_D = 6.0A$	-	0.50	0.65	Ω

■ Dynamic Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
R_G	Gate Resistance	$f = 1.0MHz$	-	-	-	Ω
C_{iss}	Input Capacitance	$V_{DS} = 25V,$ $V_{GS} = 0V,$ $f = 1.0MHz$	-	2108	-	pF
C_{oss}	Output Capacitance		-	181	-	
C_{rss}	Reverse Transfer Capacitance		-	20	-	

■ On Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 300V,$ $V_{GS} = 10V,$ $I_D = 12A,$ $R_{GEN} = 24\Omega$	-	30	-	ns
t_r	Turn-On Rise Time		-	41	-	
$t_{d(off)}$	Turn-Off Delay Time		-	136	-	
t_f	Turn-Off Fall Time		-	48	-	
Q_g	Total Gate Charge	$V_{DS} = 300V,$ $V_{GS} = 0 \text{ to } 10V,$ $I_D = 12A$	-	46	-	nC
Q_{gs}	Gate-Source Charge		-	11.6	-	
Q_{gd}	Gate-Drain Charge		-	14.7	-	

■ Drain-Source Diode Characteristics

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0V, I_S = 12A$	-	-	1.2	V
T_{rr}	Body Diode Reverse Recovery Time	$V_{GS} = 0V, I_S = 12A$ $di_F/dt = 100A/\mu s$	-	560	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	5.1	-	μC

Notes:

- $T_J = +25^\circ C$ to $+150^\circ C$.
- Repetitive rating: pulse width limited by maximum junction temperature.
- $L = 10mH, V_{DD} = 50V, I_{AS} = 10.4A, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

■ Characteristic Curve

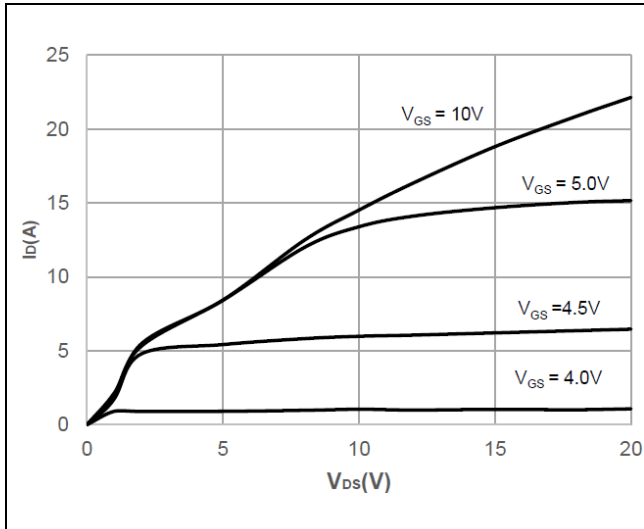


Figure 1. Typical Output Characteristics

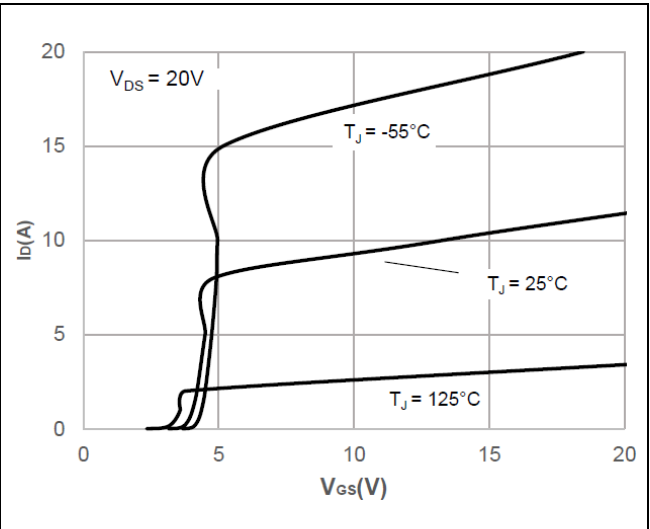


Figure 2. Typical Transfer Characteristics

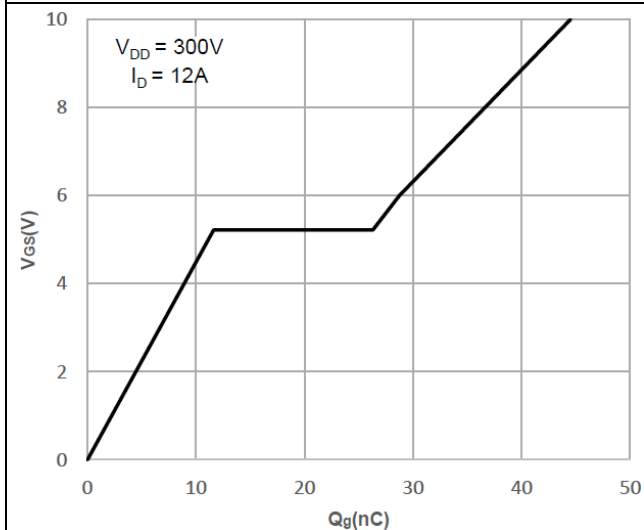


Figure 3. Typical Gate Charge

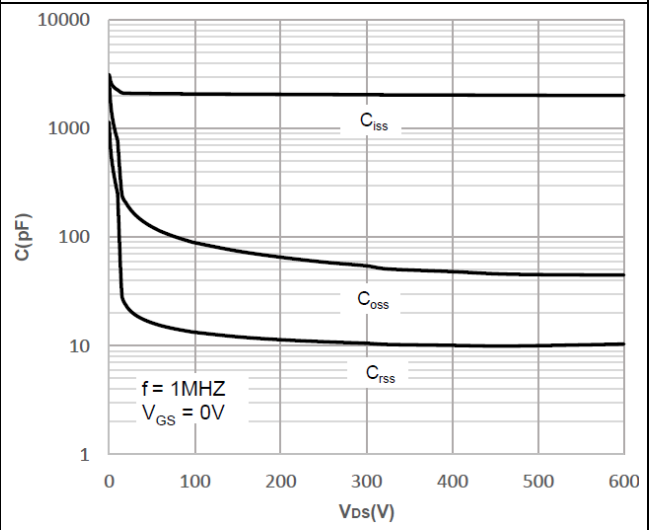


Figure 4. Typical Capacitance Characteristics

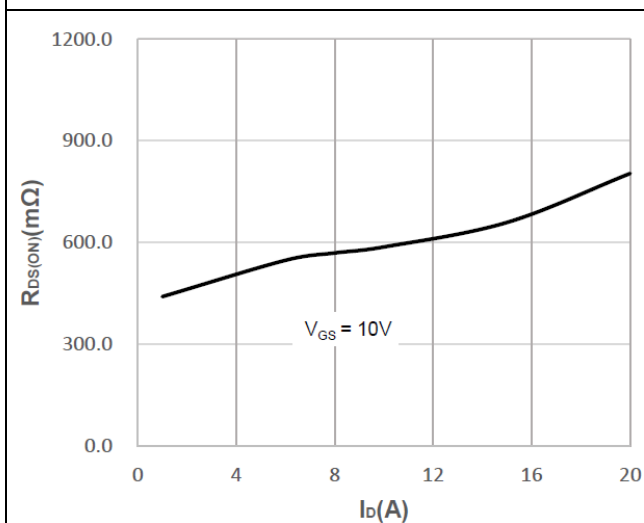


Figure 5. Static Drain-Source On-Resistance vs. Drain Current

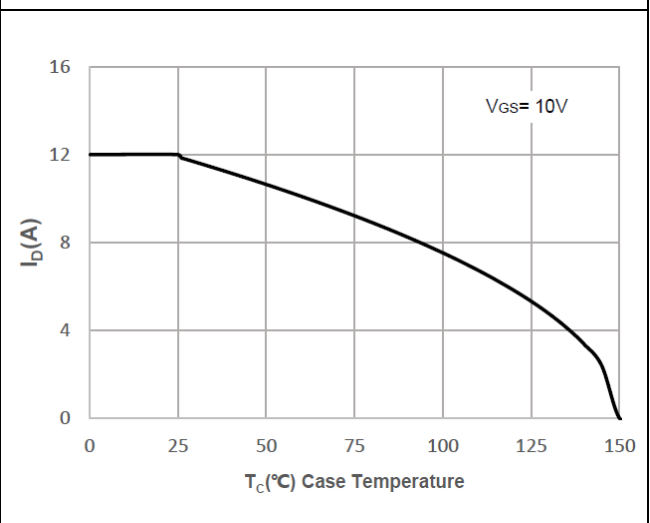


Figure 6. Continuous Drain Current vs. Case Temperature

Characteristic Curve

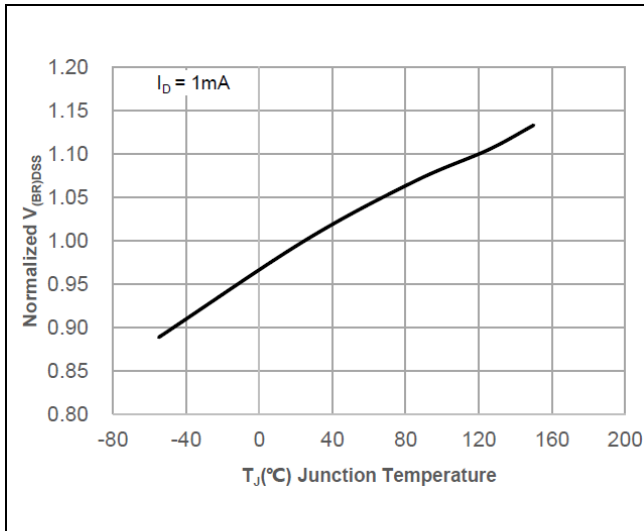


Figure 7. Normalized Drain-Source Breakdown Voltage vs. Junction Temperature

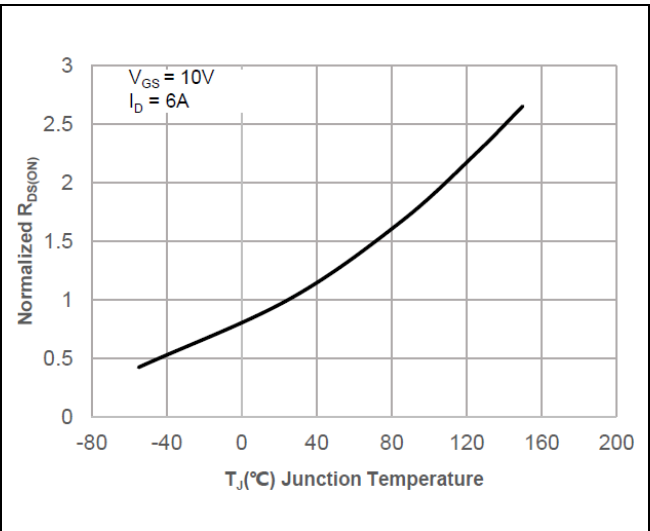


Figure 8. Normalized Static Drain-Source On-Resistance vs. Junction Temperature

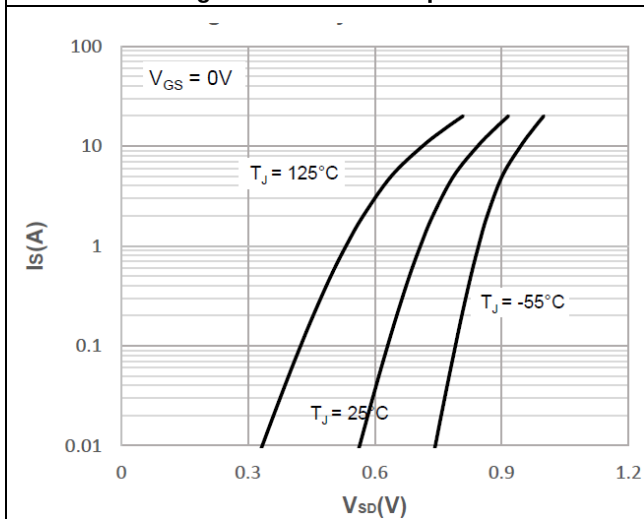


Figure 9. Body Diode Characteristics

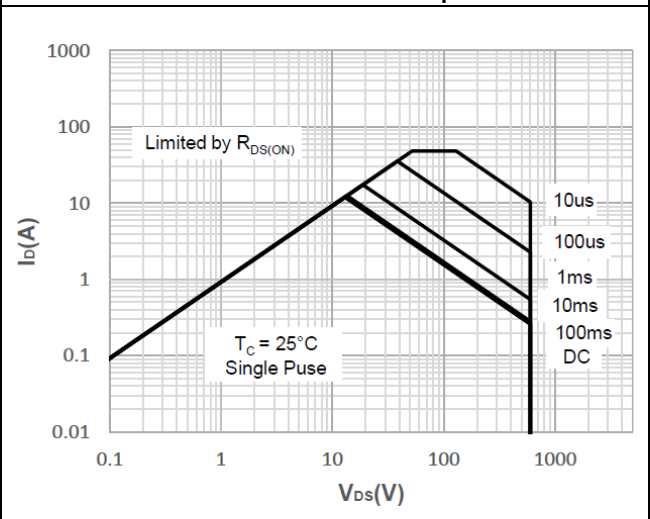


Figure 10. Safe Operating Area

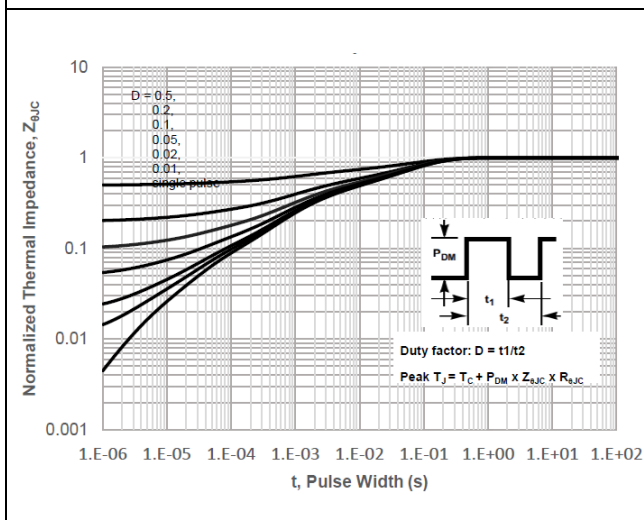


Figure 11. Normalized Maximum Transient Thermal Impedance

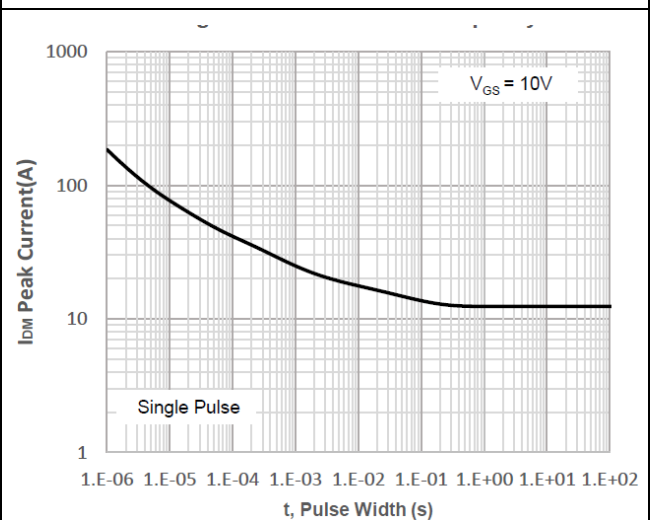


Figure 12. Peak Current Capacity

■ Package Information

TO-220

