

60V N-Channel MOSFET

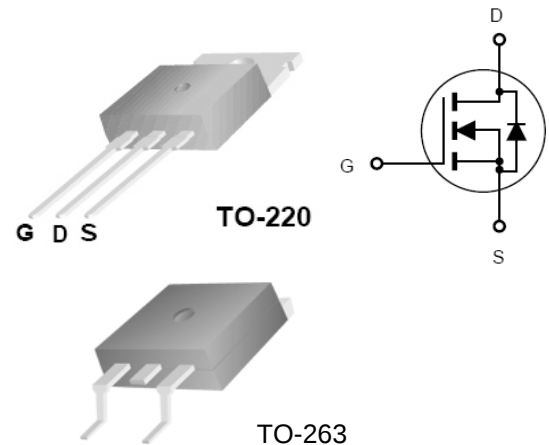
Applications:

- Power Supply
- DC-DC Converters

V_{DS}	$R_{DS(ON)}(MAX)$	I_D^a
60V	6m Ω	115A

Features:

- Lead Free
- Low $R_{DS(ON)}$ to Minimize Conductive Loss
- Low Gate Charge for Fast Switching Application
- Optimized $V_{(BR)DSS}$ Capability



Ordering Information

Park Number	Package	Brand
MXP6006DT	TO-220	MXP
MXP6006DF	TO-263	MXP

Absolute Maximum Ratings

$T_c=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	60	V
I_D^a	Continuous Drain Current	115	A
I_{DM}	Pulsed Drain Current @ $V_G=10\text{V}$	459	
P_D	Power Dissipation	158	W
	Derating Factor above 25°C	1.05	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	+/-20	V
E_{AS}	Single Pulse Avalanche Energy (L=1mH)	449	mJ
I_{AS}	Pulsed Avalanche Energy	Figure 9	A
T_j and T_{stg}	Operating Junction and Storage Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Resistance

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{\theta JC}$	Junction-to-Case	-	-	0.95	$^\circ\text{C}/\text{W}$	Water cooled heatsink, P_D adjusted for a peak junction Temperature of 175°C

Note:

a: Calculated continuous current based upon maximum allowable junction temperature $+175^\circ\text{C}$. Package limitation current is 80A.

OFF Characteristics $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	60	-	-	V	$V_{GS}=0V$, $I_D=250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	-	-	1	μA	$V_{DS}=48V$, $V_{GS}=0V$
		-	-	100		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	-	-	100	nA	$V_{GS}=+20V$
	Gate-to-Source Reverse Leakage	-	-	100		$V_{GS}=-20V$

ON Characteristics $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	-	4.6	6.0	$m\Omega$	$V_{GS}=10V$, $I_D=24A$
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	$V_{GS}=V_{DS}$, $I_D=250\mu A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
C_{iss}	Input Capacitance	-	5117	-	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MHz$
C_{oss}	Output Capacitance	-	534	-		
C_{rss}	Reverse Transfer Capacitance	-	185	-		
Q_g	Total Gate Charge	-	68	-	nC	$V_{DD}=30V$, $I_D=57A$, $V_{GS}=10V$
Q_{gs}	Gate-to-Source Charge	-	25	-		
Q_{gd}	Gate-to-Drain ("Miller") Charge	-	16	-		
$T_d(on)$	Turn-on Delay Time	-	18	-	nS	$V_{DD}=30V$, $I_D=57A$, $V_G=10V$, $R_G=2.5\Omega$
T_r	Rise Time	-	43	-		
$T_d(off)$	Turn-off Delay Time	-	46	-		
T_f	Fall Time	-	13	-		

Source-Drain Diode Characteristics $T_J=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{SD}	Diode Forward Voltage	-	-	1.2	V	$I_S=24A$, $V_{GS}=0V$
T_{rr}	Reverse Recovery Time	-	-	108.3	nS	$I_S=38A$, $di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	-	-	85.4	nC	

Figure 1. Maximum Power Dissipation V.S Case Temperature

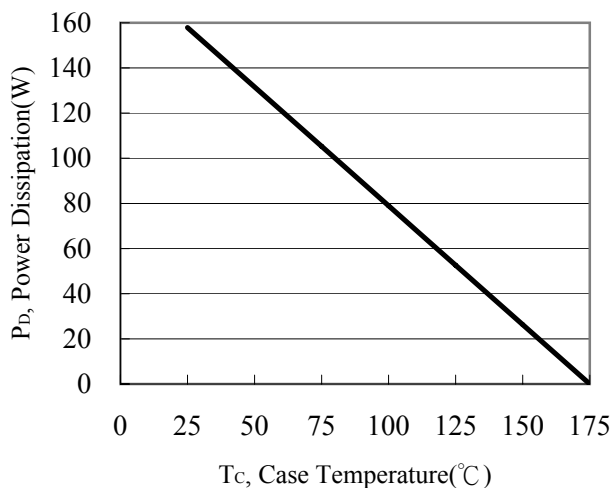


Figure 2. Maximum Continuous Drain Current V.S Case Temperature

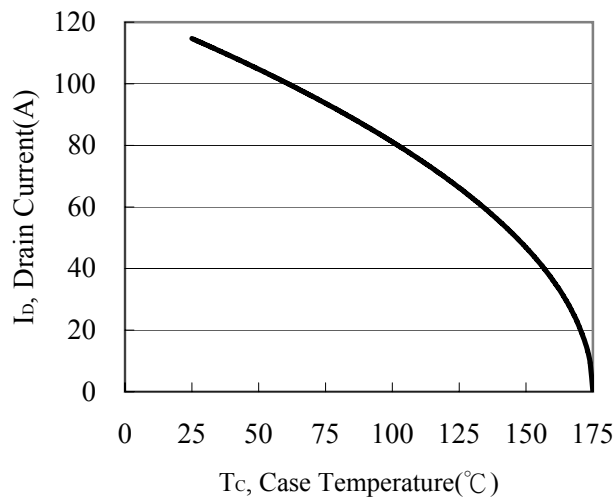


Figure 3. Typical Output Characteristics

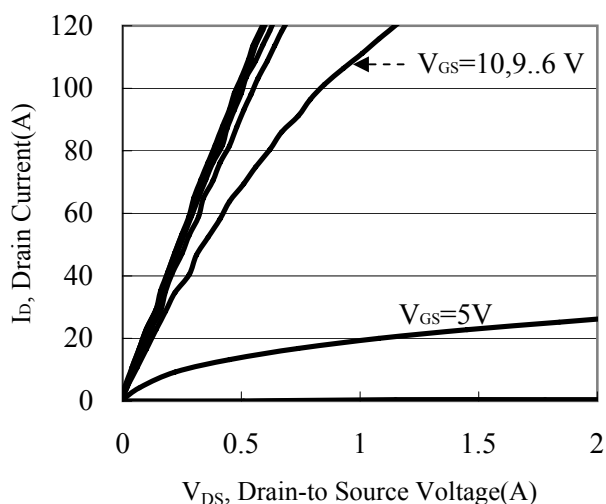


Figure 4. Breakdown Voltage V.S Junction Temperature

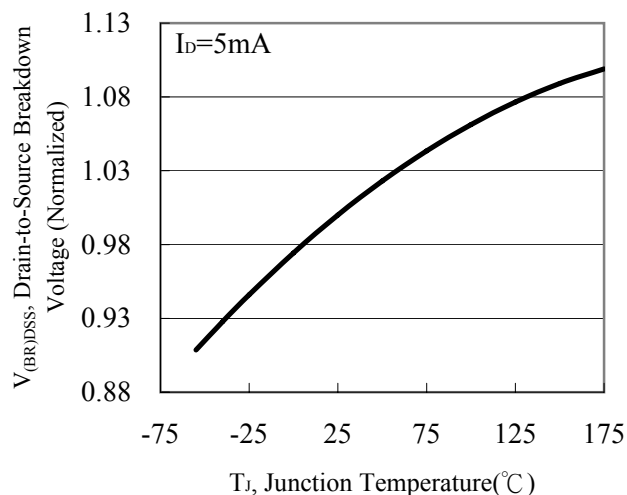


Figure 5. Threshold Voltage V.S Junction Temperature

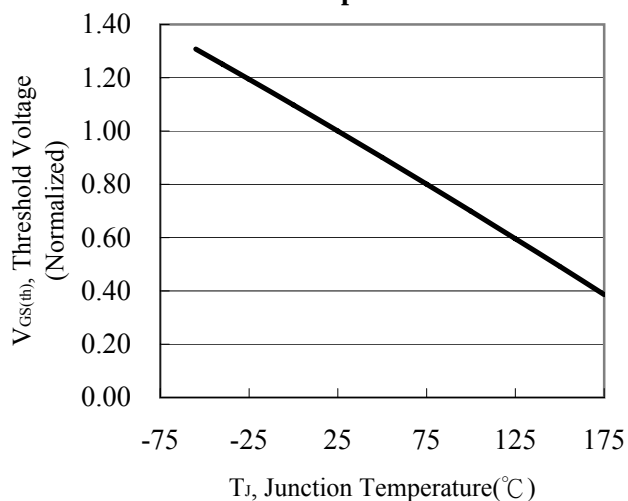


Figure 6. Drain-to-Source Resistance V.S Junction Temperature

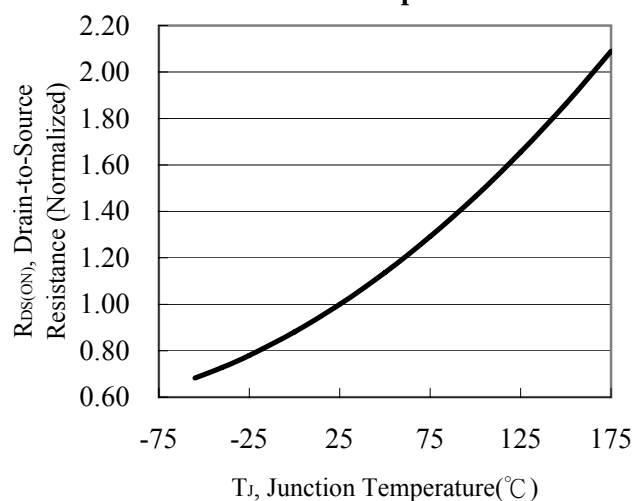


Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

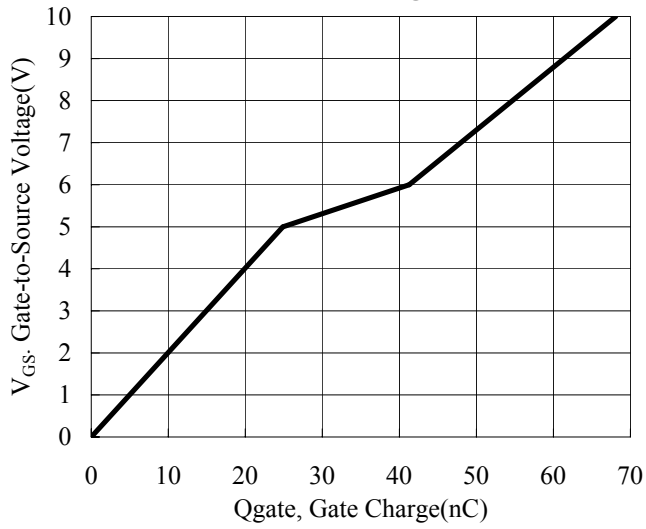


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

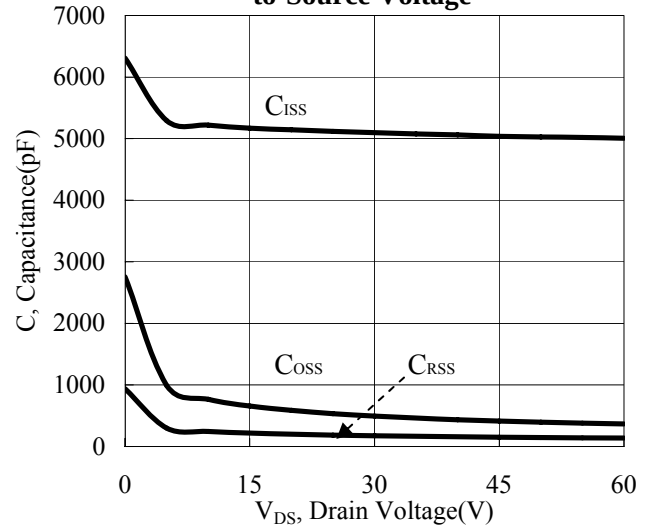


Figure 9. Unclamped Inductive Switching Capability

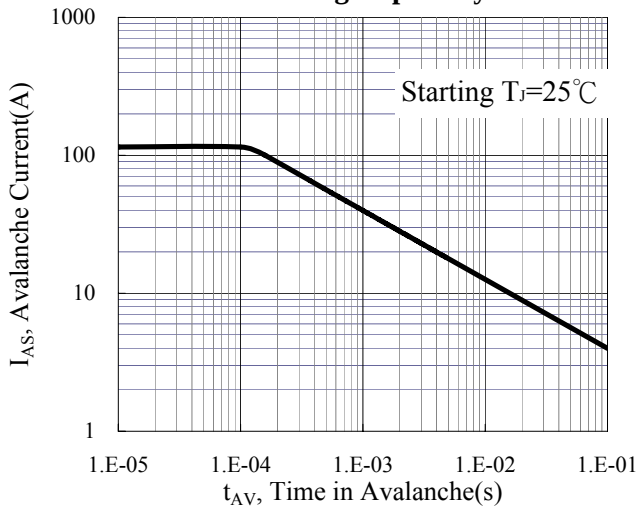
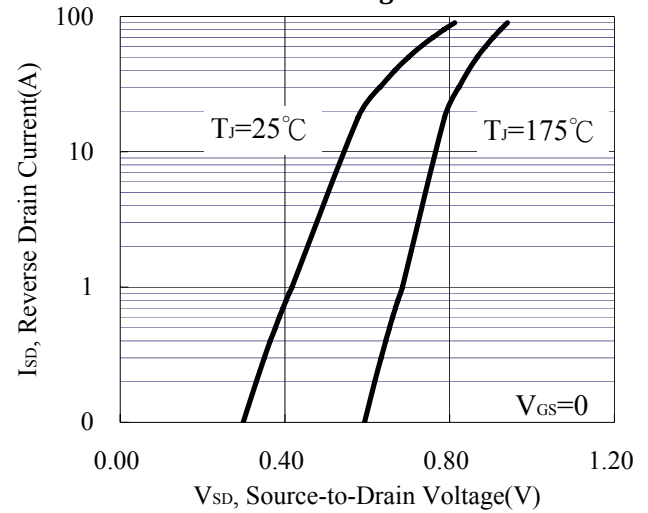


Figure 10. Source-Drain Diode Forward Voltage



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