

## 60V N-Channel MOSFET

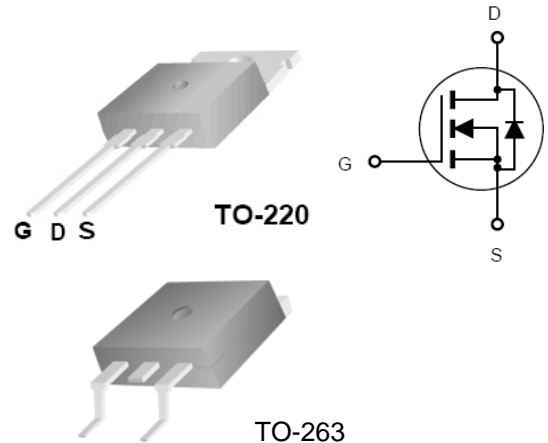
### Applications:

- Power Supply
- DC-DC Converters

$V_{DS}$	$R_{DS(ON)}(MAX)$	$I_D^a$
60V	6m $\Omega$	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 @ $V_G=10V$	459	
$P_D$	Power Dissipation	158	W
	Derating Factor above $25^\circ\text{C}$	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 $175^\circ\text{C}$

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	uA	$V_{DS}=48V, V_{GS}=0V$
		-	-	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**

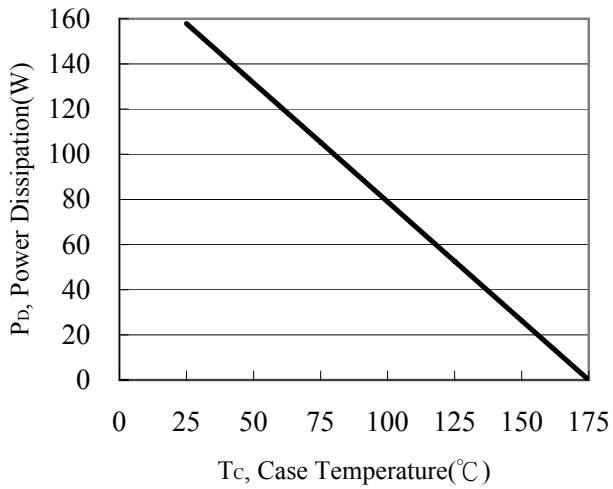
Essentially independent of operating temperature

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$C_{iss}$	Input Capacitance	-	5117	-	pF	$V_{GS}=0V, V_{DS}=25V,$ $f=1.0\text{MHz}$
$C_{oss}$	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	-		

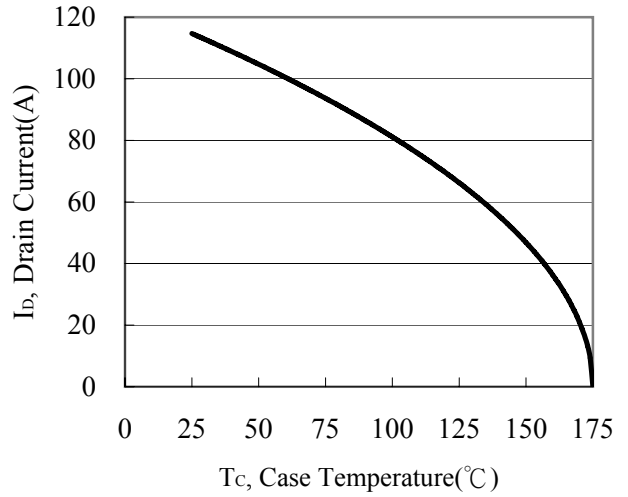
**Source-Drain Diode Characteristics**  $T_J=25^{\circ}\text{C}$  unless otherwise specified

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	

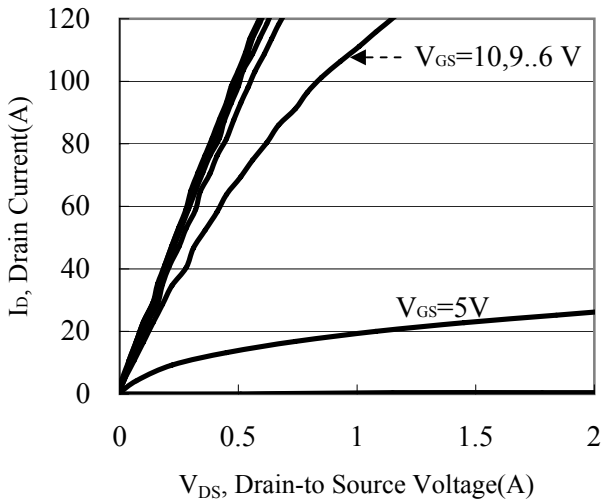
**Figure 1. Maximum Power Dissipation V.S Case Temperature**



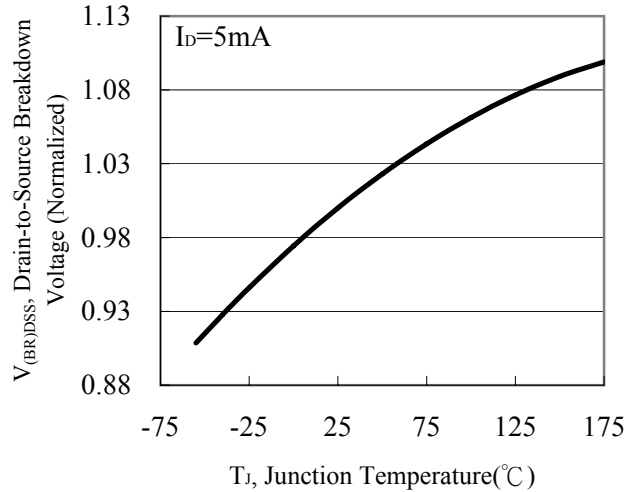
**Figure 2. Maximum Continuous Drain Current V.S Case Temperature**



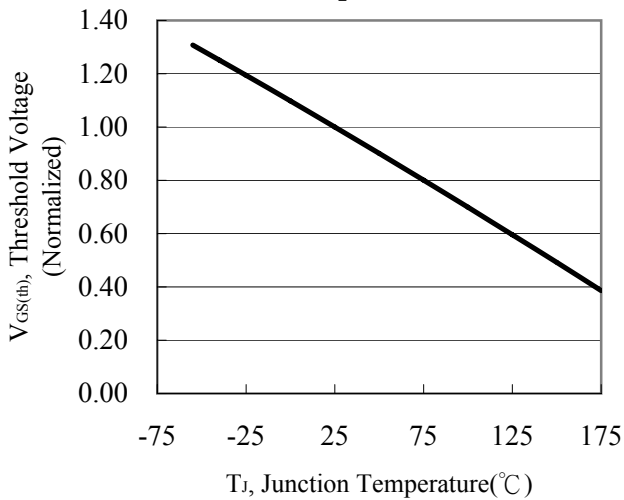
**Figure 3. Typical Output Characteristics**



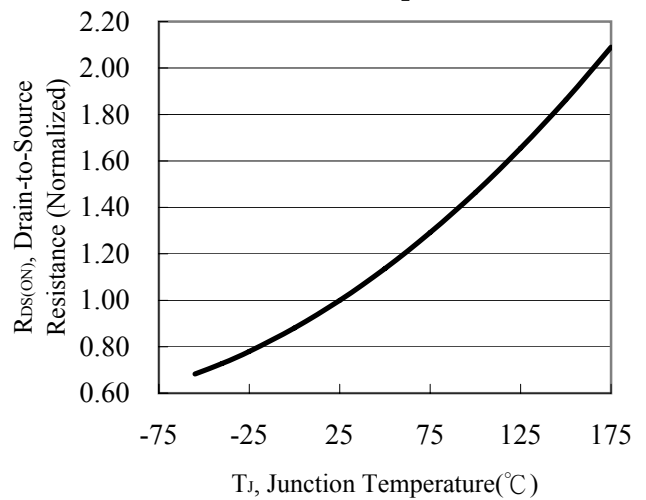
**Figure 4. Breakdown Voltage V.S Junction Temperature**



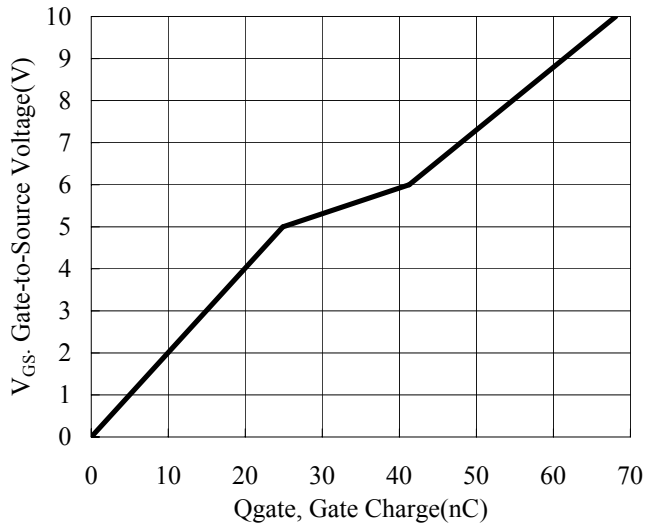
**Figure 5. Threshold Voltage V.S Junction Temperature**



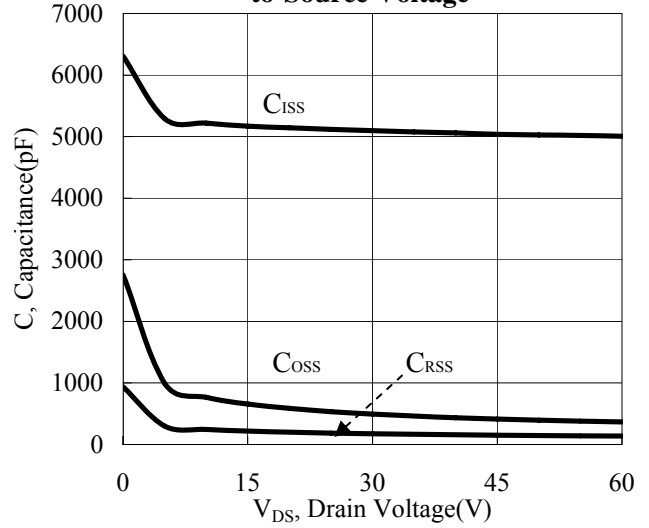
**Figure 6. Drain-to-Source Resistance V.S Junction Temperature**



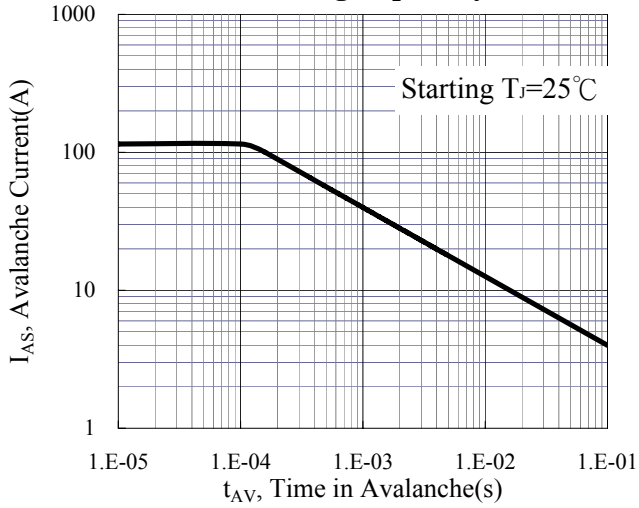
**Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage**



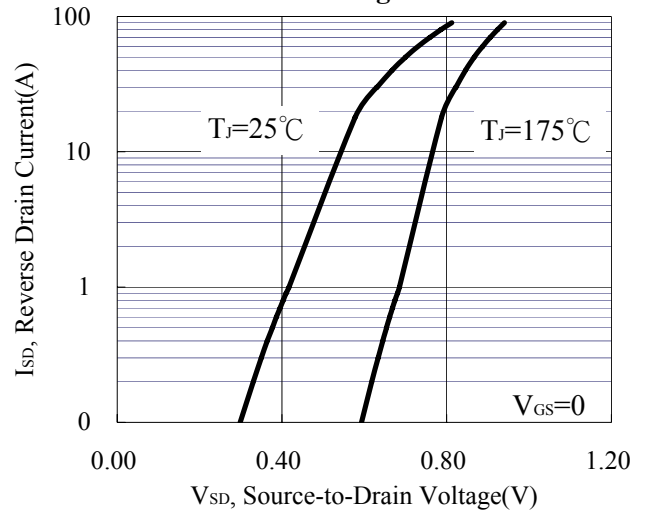
**Figure 8. Typical Capacitance vs. Drain-to-Source Voltage**



**Figure 9. Unclamped Inductive Switching Capability**



**Figure 10. Source-Drain Diode Forward Voltage**



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