

N-Channel MOSFET

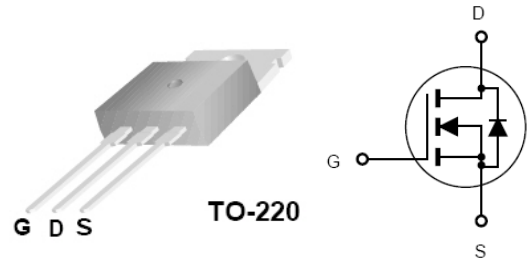
Applications:

- Power Supply
- DC-DC Converters

V_{DSS}	$R_{DS(ON)}(MAX)$	I_D^a
40V	4m Ω	137A

Features:

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



Ordering Information

Park Number	Package	Brand
MXP4004CT	TO-220	MXP

Absolute Maximum Ratings

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

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	40	V
I_D^a	Continuous Drain Current	137	A
I_{DM}	Pulsed Drain Current @ $V_G=10V$	548	
P_D	Power Dissipation	150	W
	Derating Factor above 25°C	1.00	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	+/-20	V
E_{AS}	Single Pulse Avalanche Energy ($L=11.9\text{mH}$, $I_{AS}=9A$)	773	mJ
I_{AS}	Pulsed Avalanche Energy	Figure 7	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			1.00	$^\circ\text{C}/\text{W}$	Water cooled heatsink, P_D adjusted for a peak junction Temperature of 175°C
$R_{\theta JA}$	Junction-to-Ambient			62		1 cubic foot chamber, free air

Note:

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

OFF CharacteristicsT_J=25°C unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
B _{VDS}	Drain-to-Source Breakdown Voltage	40			V	V _{GS} =0V, I _D =250uA
I _{DSS}	Drain-to-Source Leakage Current			1	uA	V _{DS} =32V, V _{GS} =0V
				100		V _{DS} =32V, V _{GS} =0V, T _J =125 °C
I _{GSS}	Gate-to-Source Forward Leakage			100	nA	V _{GS} =+20V
	Gate-to-Source Reverse Leakage			100		V _{GS} = -20V

ON CharacteristicsT_J=25°C unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
R _{DS(ON)}	Static Drain-to-Source On-Resistance			4	mΩ	V _{GS} =10V, I _D =24A
V _{GS(TH)}	Gate Threshold Voltage.	2		4	V	V _{GS} =V _{DS} , I _D =250uA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
C _{iss}	Input Capacitance		4193		pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
C _{oss}	Output Capacitance		648			
C _{rss}	Reverse Transfer Capacitance		236			
Q _g	Total Gate Charge		64		nC	V _{DD} =20V, I _D =63A, V _{GS} =10V
Q _{gs}	Gate-to-Source Charge		21			
Q _{gd}	Gate-to-Drain ("Miller") Charge		19			
T _{d(on)}	Turn-in Delay Time		17		nS	V _{DD} =20V, I _D =63A, V _G =10V, R _G =4.7Ω
T _r	Rise Time		37			
T _{d(off)}	Turn-off Delay Time		85			
T _f	Fall Time		41			

Source-Drain Diode CharacteristicsT_J=25°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		59		ns	I _F =38Amps, di/dt=100Amps/uS
Q _{rr}	Reverse Recovery Charge		99		nC	

Figure 1. Maximum Power Dissipation V.S Case Temperature

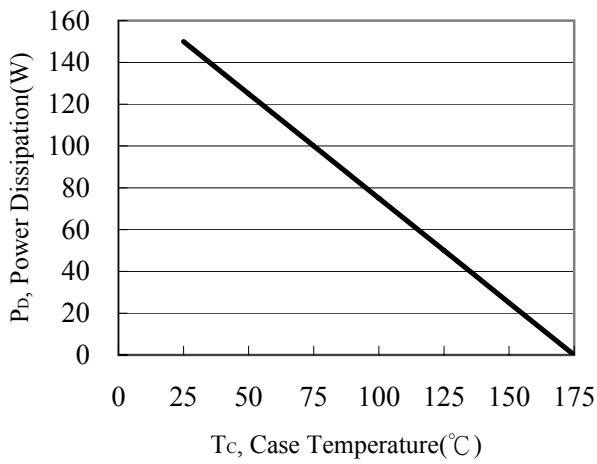


Figure 2. Maximum Continuous Drain Current V.S Case Temperature

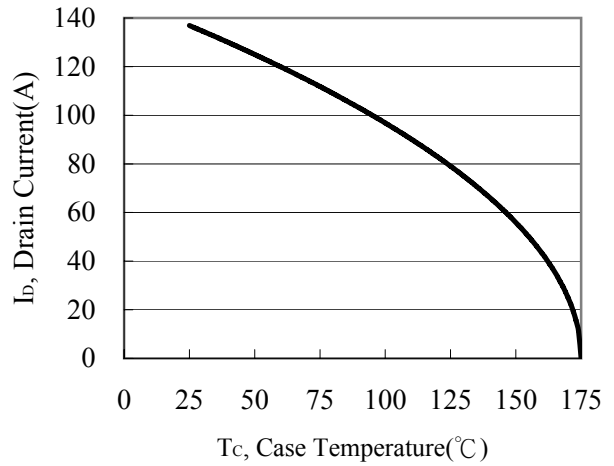


Figure 3. Typical Output Characteristics

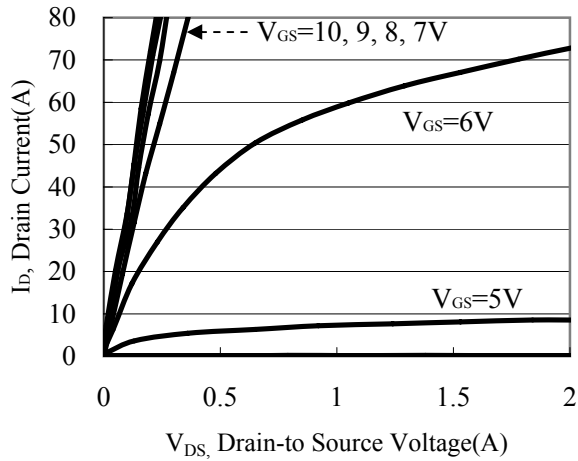


Figure 4. Breakdown Voltage V.S Junction Temperature

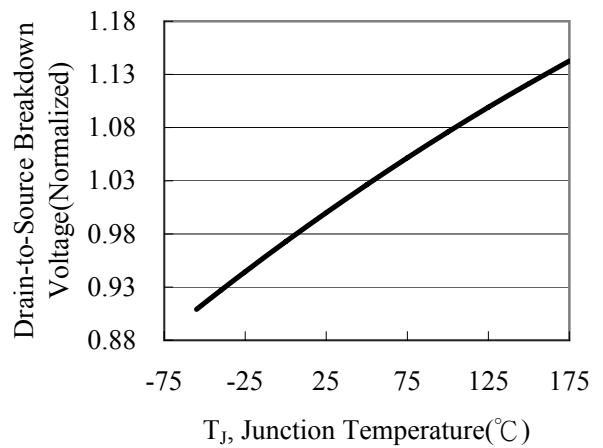


Figure 5. Threshold Voltage V.S Junction Temperature

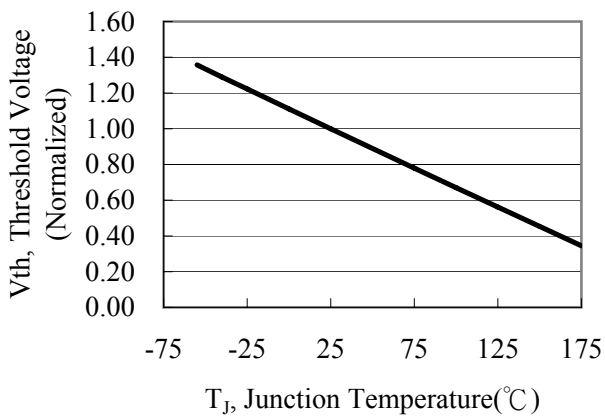


Figure 6. Drain-to-Source Resistance V.S Junction Temperature

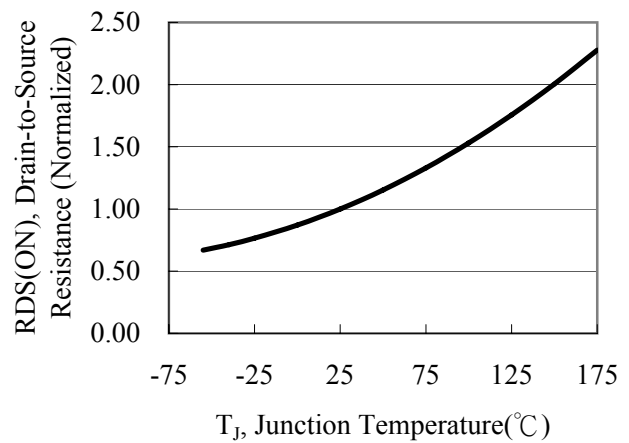


Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

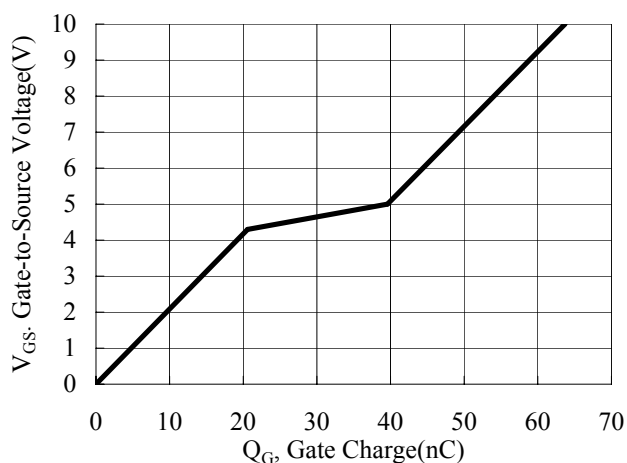


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

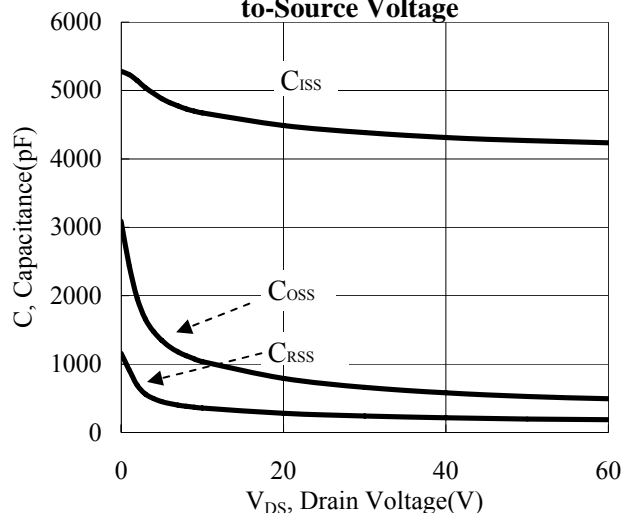


Figure 9. Unclamped Inductive Switching Capability

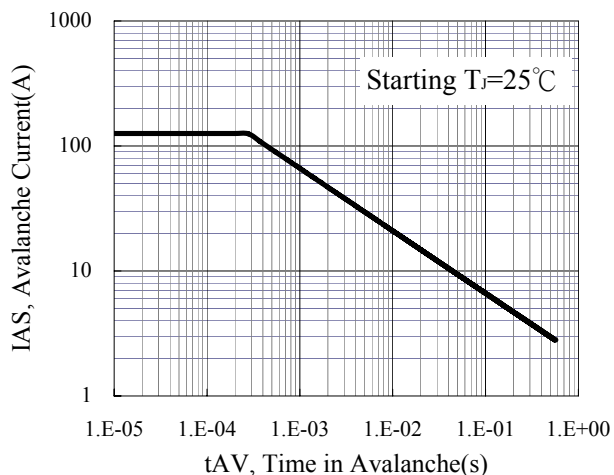
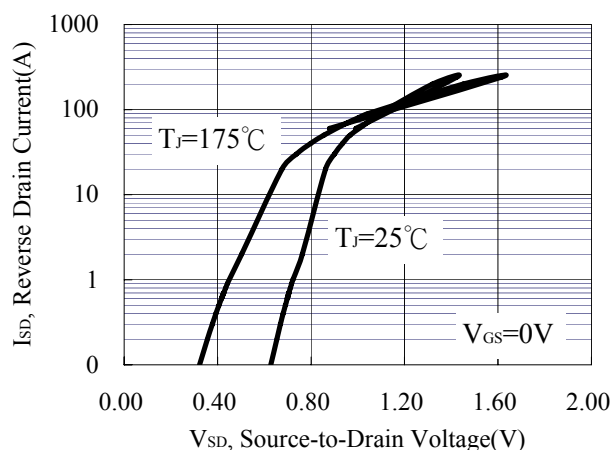


Figure 10. Source-Drain Diode Forward Voltage



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