N-Channel MOSFET

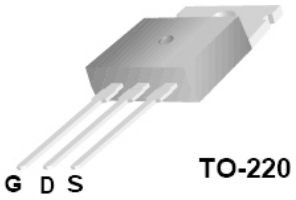
Applications:

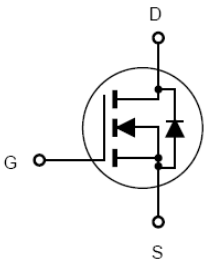
- Power Supply
- DC-DC Converters

V_{DSS}	$R_{DS(ON)}$(MAX)	I_D
40V	4mΩ	126

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℃ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Voltage	40	V
I_D	Continuous Drain Current	126	A
I_{DM}	Pulsed Drain Current @V_G=10V	504	
P_D	Power Dissipation	150	W
	Derating Factor above 25℃	1.00	W/℃
V_{GS}	Gate-to-Source Voltage	+/-20	V
E_{AS}	Single Pulse Avalanche Energy (L=11.9mH, 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	℃

*Calculated continuous current based upon maximum allowable junction temperature, +175℃

Thermal Resistance

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
$R_{\theta JC}$	Junction-to-Case			1.00	℃/W	Water cooled heatsink, P_D adjusted for a peak junction Temperature of 175℃
$R_{\theta JA}$	Junction-to-Ambient			62		1 cubic foot chanber, free air

OFF Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
B_{VDSS}	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 ℃
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℃ 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
Ciss	Input Capacitance		4193		pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
Coss	Output Capacitance		648			
Crss	Reverse Transfer Capacitance		236			
Qg	Total Gate Charge		64		nC	V_{DD}=20V, I_D=63A, V_{GS}=10V
Qgs	Gate-to-Source Charge		21			
Qgd	Gate-to-Drain ("Miller") Charge		19			
Td(on)	Turn-in Delay Time		17		nS	V_{DD}=20V, I_D=63A, V_G=10V, R_G=4.7Ω
Tr	Rise Time		37			
Td(off)	Turn-off Delay Time		85			
Tf	Fall Time		41			

Source-Drain Diode Characteristics

T_J=25℃ 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
trr	Reverse Recovery Time		59		ns	IF=38Amps, di/dt=100Amps/uS
Qrr	Reverse Recovery Change		99		nC	

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Figure 1. Maximum Power Dissipation V.S Case Temperature

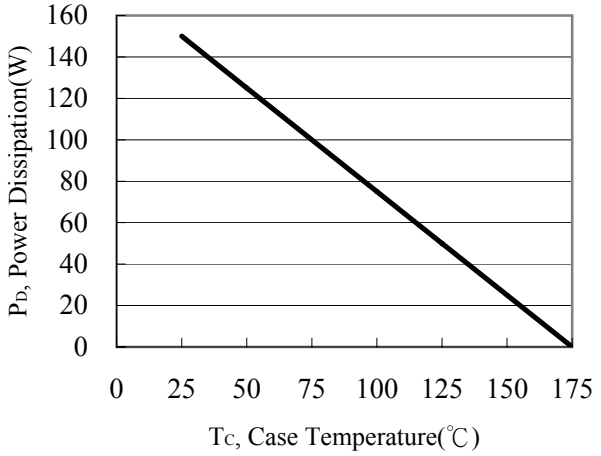


Figure 2. Maximum Continuous Drain Current V.S Case Temperature

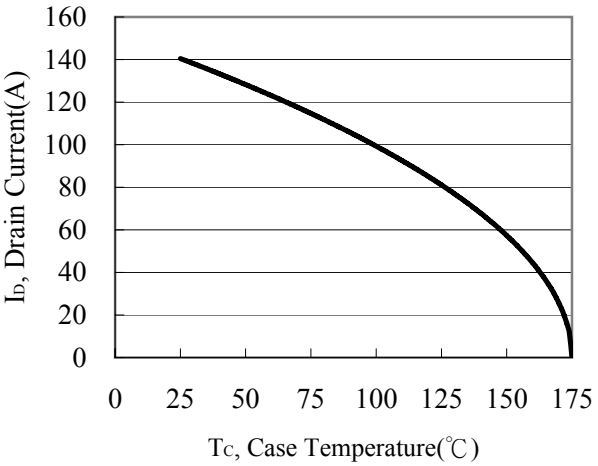


Figure 3. Typical Output Characteristics

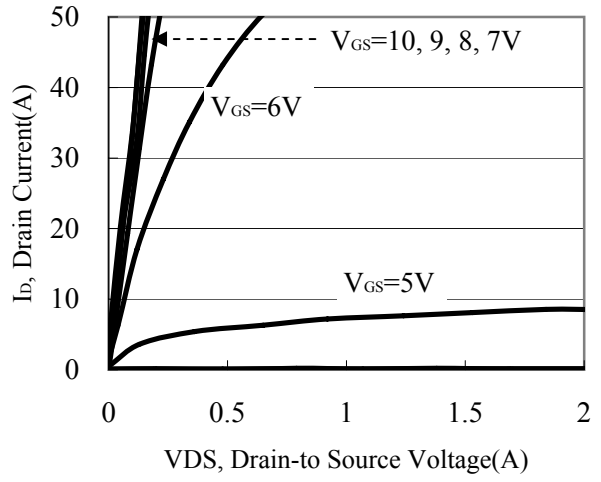


Figure 4. Breakdown Voltage V.S Junction Temperature

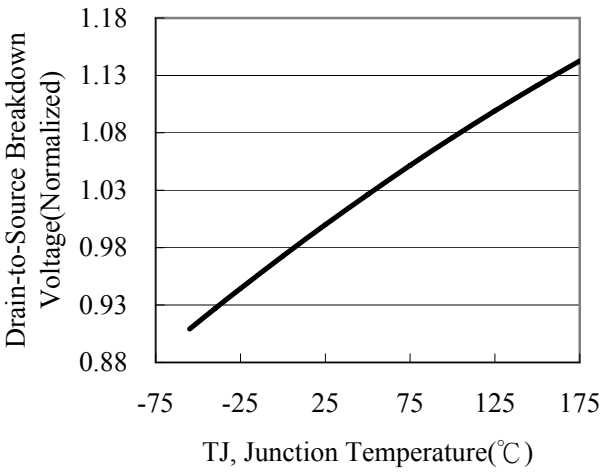


Figure 5. Threshold Voltage V.S Junction Temperature

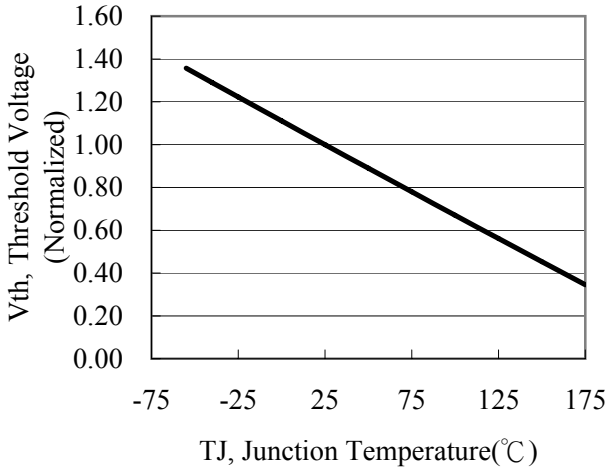


Figure 6. Drain-to-Source Resistance V.S Junction Temperature

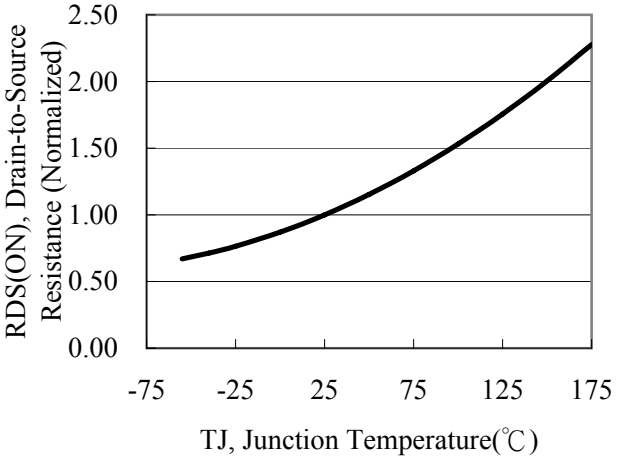


Figure 7. Typical Gate Charge vs. Gate-to-Source Voltage

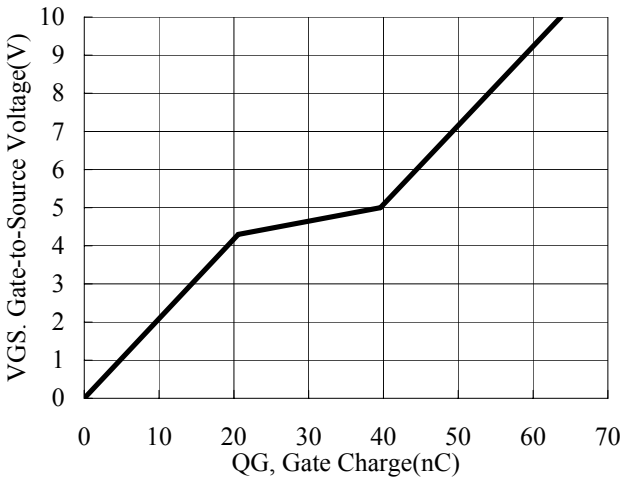


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

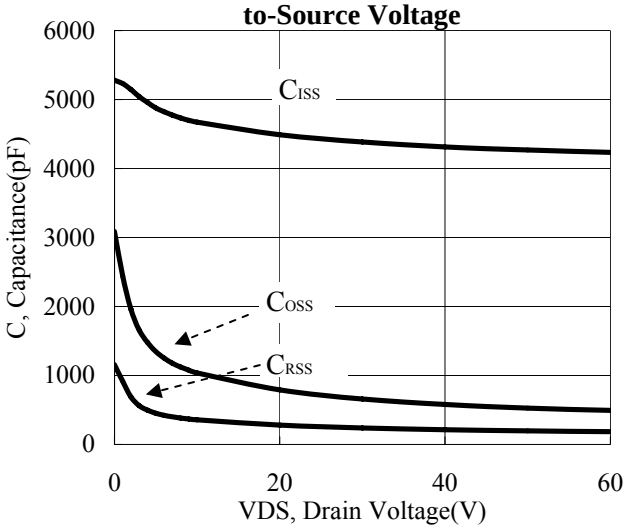


Figure 9. Unclamped Inductive Switching Capability

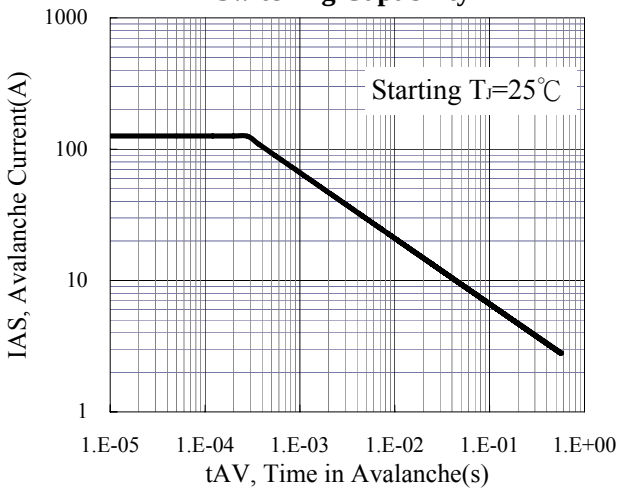
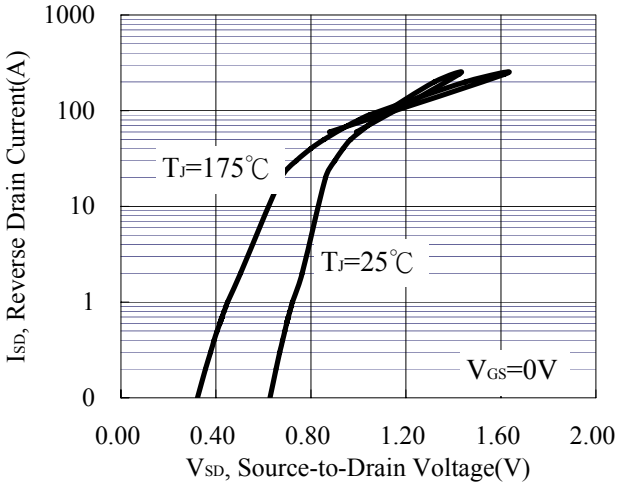


Figure 10. Source-Drain Diode Forward Voltage



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