MaxPower Semiconductor

MXP4003CTS Datasheet

40V N-Channel MOSFET

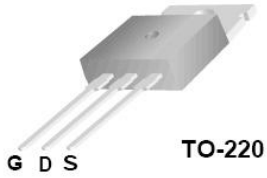
Applications:

- **Power Supply**
- **DC-DC Converters**

V_{DSS}	$R_{DS(ON)}$ (Max)	I_D[a]
40 V	3.0 mΩ	260A

Features:

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



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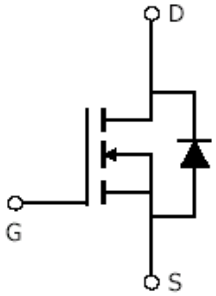

Ordering Information

Part Number	Package	Brand
MXP4003CTS	TO220	MXP

Absolute Maximum Ratings

T_c=25℃ unless otherwise specified

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	40	V
I_D[a]	Continuous Drain Current (T_C=25℃)	260	A
I_{DM}	Pulsed Drain Current @V_G=10V	1040	
P_D	Power Dissipation	300	W
	Derating Factor above 25℃	2	W/℃
E_{AS}	Single Pulse Avalanche Energy (L=1mH)	1546	mJ
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 175	℃

a. Calculated continuous current based upon maximum allowable junction temperature, +175℃. Package limitation current is 80A.

OFF Characteristics

T_J=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	40			V	V_{GS}=0V, I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current			1	μA	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	Units	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance		2.7	3	mΩ	V_{GS}= 10V, I_D=24A
$V_{GS(TH)}$	Gate Threshold Voltage	2		4	V	V_{DS}=V_{GS}, I_D=250μA

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
C_{iss}	Input Capacitance		6144		pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{oss}	Output Capacitance		2378			
C_{rss}	Reverse Transfer Capacitance		660			
Q_g	Total Gate Charge		71		nC	V_{DD}=20V, I_D=30A, V_G=10V
Q_{gs}	Gate-to-Source Charge		24			
Q_{gd}	Gate-to-Drain (“Miller”) Charge		35			
$t_{d(on)}$	Turn-on Delay Time		18		ns	V_{DD}=20V, I_D=63A, V_G=10V, R_G=4.7Ω
t_r	Rise Time		160			
$t_{d(off)}$	Turn-off Delay Time		42			
t_f	Fall Time		61			

Source-Drain Diode Characteristics

Tc=25℃ unless otherwise specified

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
V_{SD}	Diode Forward Voltage			1.2	V	I_S=24A, V_{GS}=0V
T_{rr}	Reverse Recovery Time		78		ns	I_S=30A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge		148		nC	

Thermal Resistance

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

Published by
MaxPower Semiconductor Inc.
4800 Great America Parkway, Suite# 205, Santa Clara, CA 95054

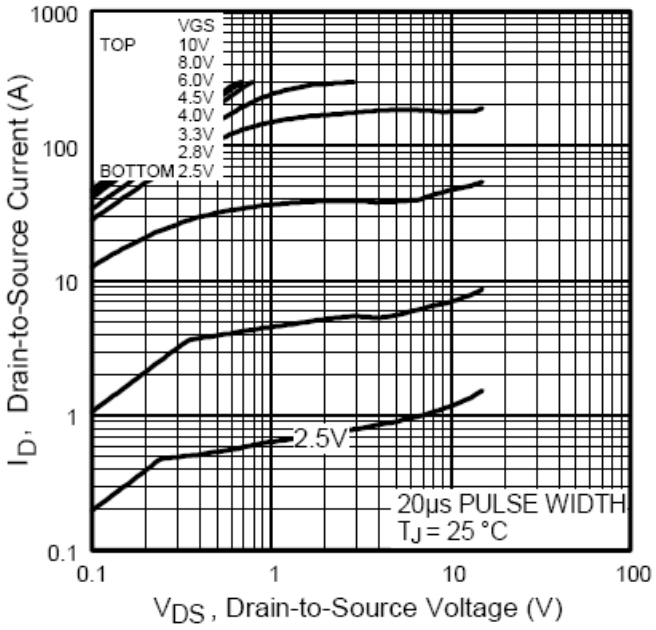

Fig 1. Typical Output Characteristics

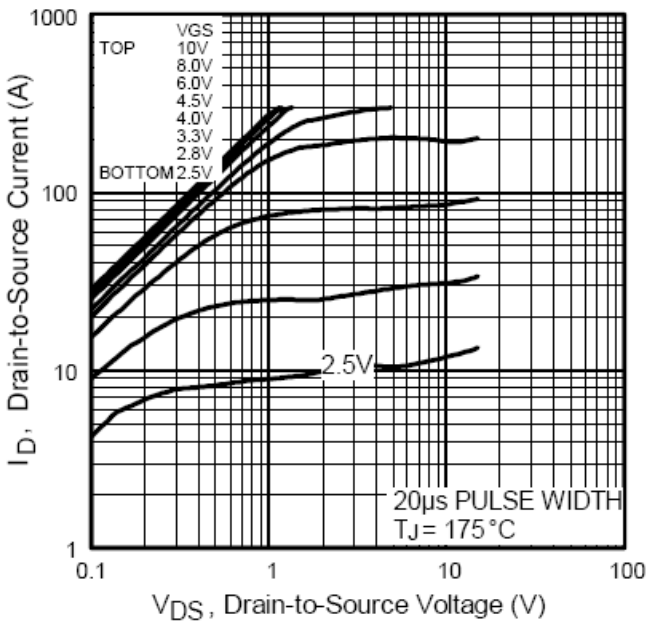

Fig 2. Typical Output Characteristics

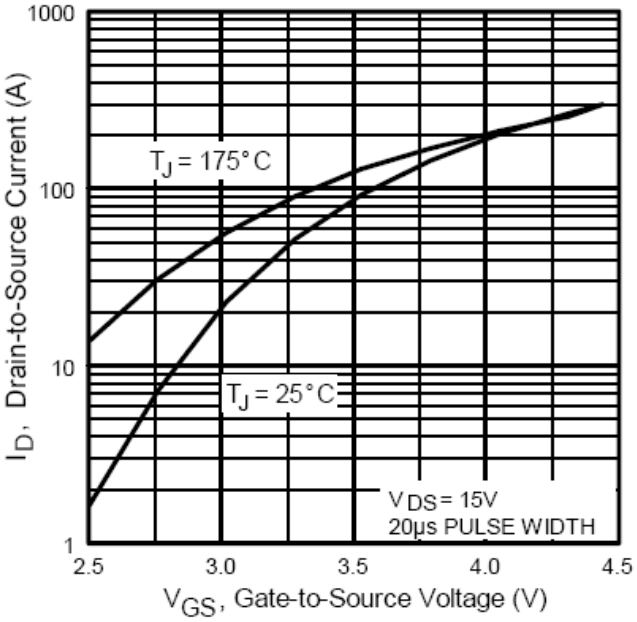

Fig 3. Typical Transfer Characteristics

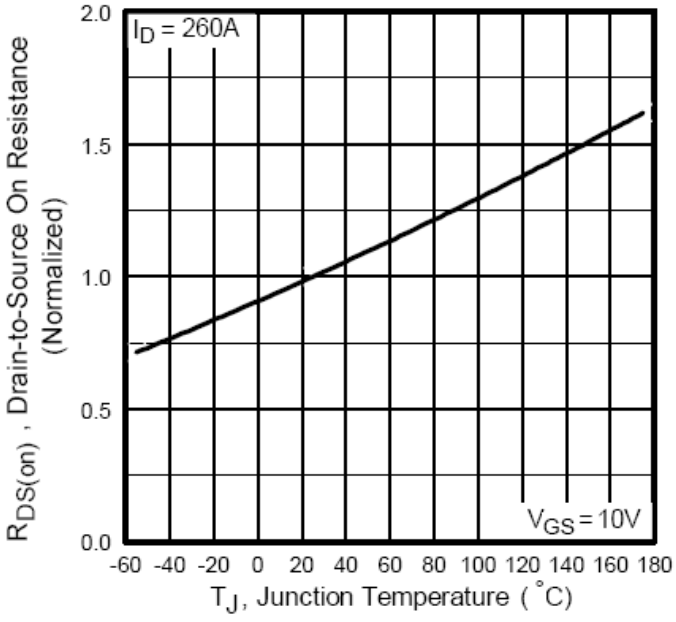

Fig 4. Normalized On-Resistance Vs. Temperature

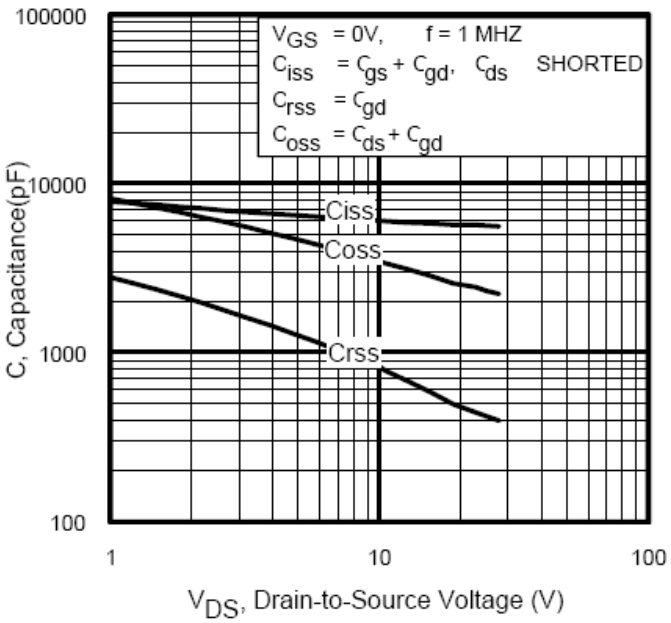

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

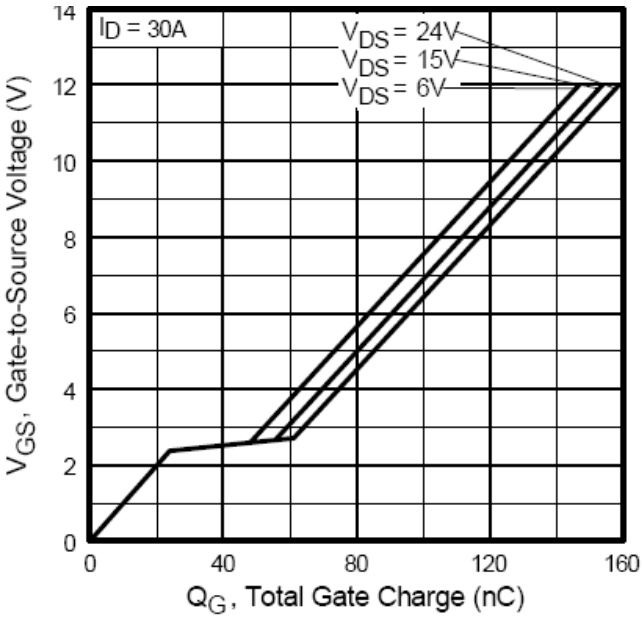

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

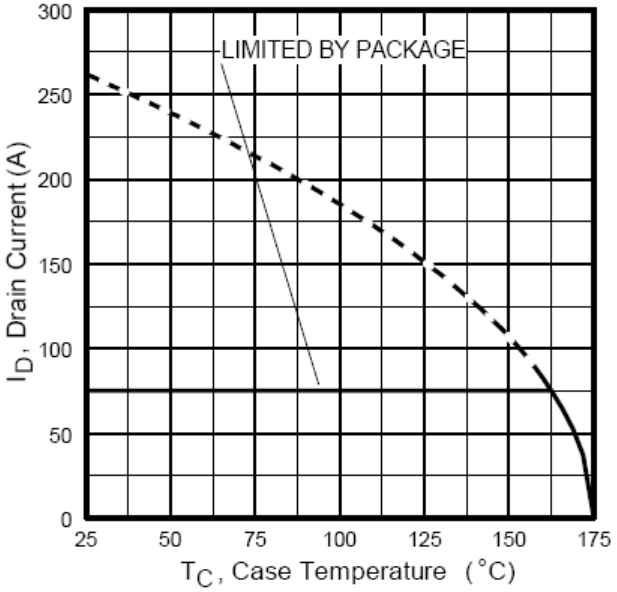

Fig 7. Maximum Drain Current Vs. Case Temperature

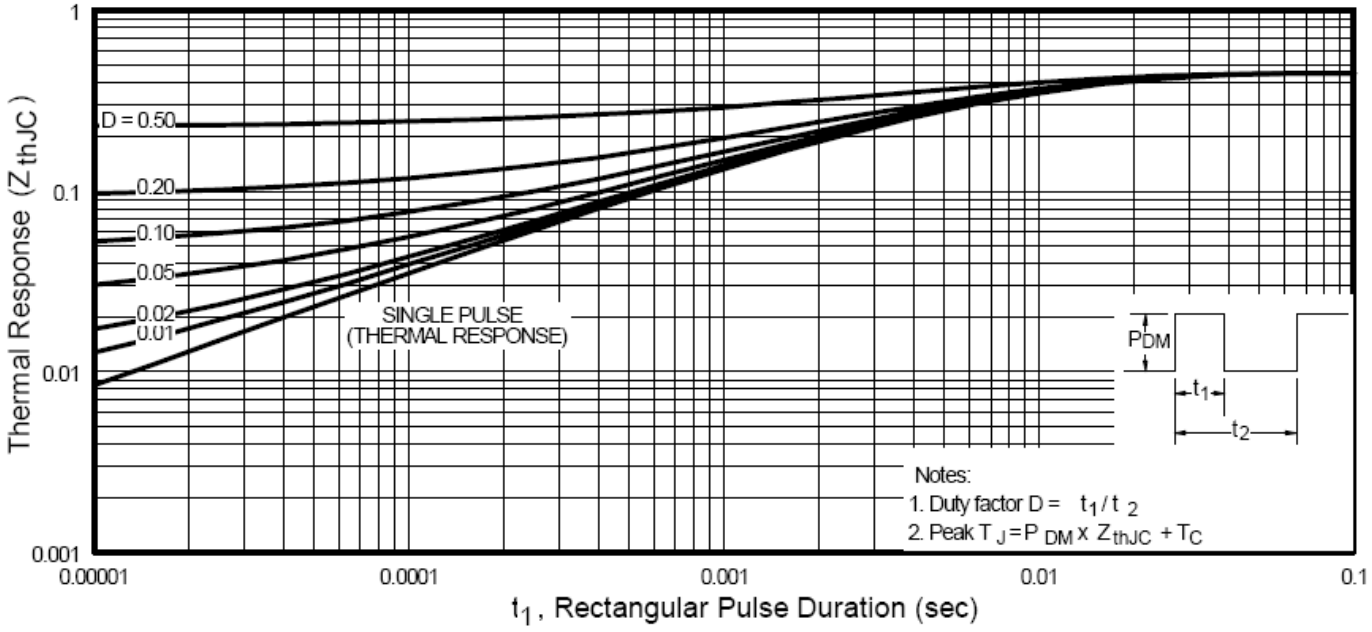

Fig 8. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Outline
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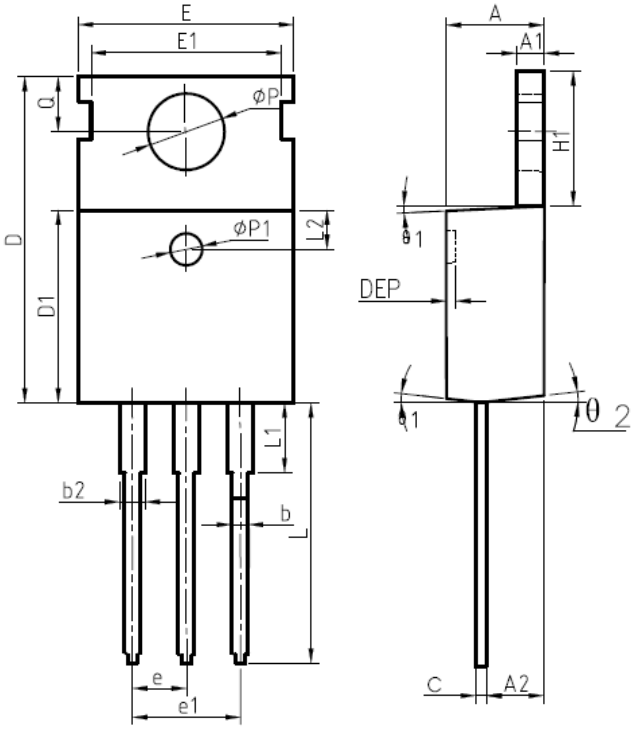
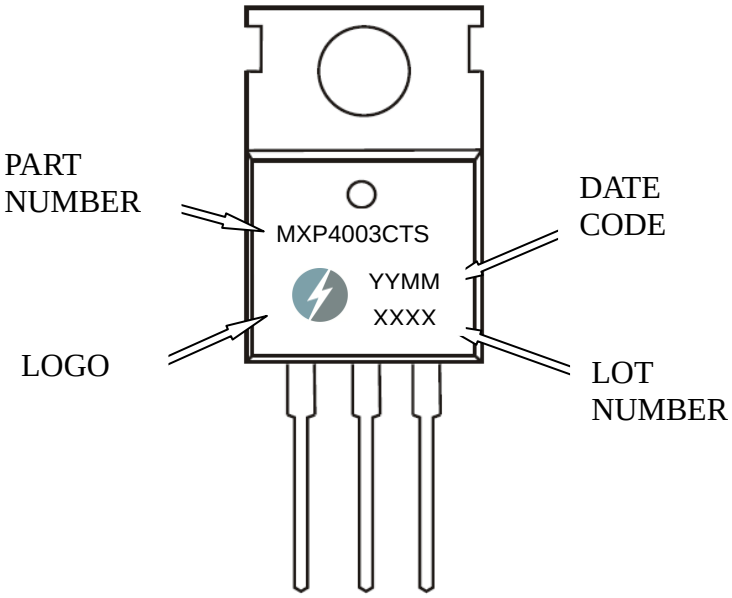


COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	–	1.37	0.050	–	0.054
A2	2.35	2.40	2.50	0.091	0.094	0.098
b	0.77	–	0.90	0.030	–	0.035
b2	1.23	–	1.36	0.048	–	0.054
c	0.48	–	0.56	0.019	–	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.70	9.90	10.20	0.382	0.389	0.402
E1	–	8.70	–	–	0.343	–
E2	9.80	10.00	10.20	0.386	0.394	0.401
ØP1	1.40	1.50	1.60	0.055	0.059	0.063
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	–	13.17	0.502	–	0.519
L1	–	–	3.95	–	–	0.156
L2	2.50REF			0.098REF		
ØP	3.50Ⓓ	3.60	3.63	0.137	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.116
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°

Part Marking Information
TO-220



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