

# XP4072CMT

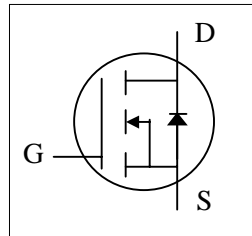
**Halogen-Free Product**

*N-CHANNEL ENHANCEMENT MODE*

*POWER MOSFET*



- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Simple Drive Requirement
- ▼ Low On-resistance
- ▼ RoHS Compliant & Halogen-Free

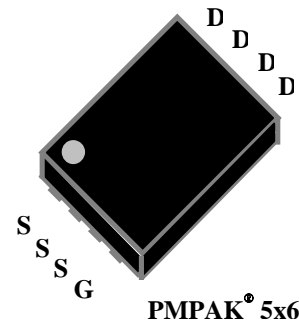


$BV_{DSS}$	30V
$R_{DS(ON)}$	5.5m $\Omega$

## Description

XP4072C series are innovative design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The PMPAK<sup>®</sup> 5x6 package is special for DC-DC converters application and the foot print is compatible with SO-8 with backside heat sink and lower profile.



PMPAK<sup>®</sup> 5x6

## Absolute Maximum Ratings @T<sub>j</sub>=25°C (unless otherwise specified)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V	52	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	33	A
I <sub>D</sub> @T <sub>A</sub> =25°C	Drain Current, V <sub>GS</sub> @ 10V <sup>3</sup>	23.4	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Drain Current, V <sub>GS</sub> @ 10V <sup>3</sup>	18.7	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	120	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	25	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	5	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>4</sup>	20	mJ
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

## Thermal Data

Symbol	Parameter	Value	Unit
R <sub>thj-c</sub>	Maximum Thermal Resistance, Junction-case	5	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient <sup>3</sup>	25	°C/W

**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	4.5	5.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	7.7	9.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1.3	1.7	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	-	45	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V	-	-	10	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±0.1	uA
Q <sub>g</sub>	Total Gate Charge <sup>5</sup>	I <sub>D</sub> =20A	-	16	25.6	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>5</sup>	V <sub>DS</sub> =15V	-	3.3	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge <sup>5</sup>	V <sub>GS</sub> =10V	-	3.5	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>5</sup>	V <sub>DS</sub> =15V	-	7.5	-	ns
t <sub>r</sub>	Rise Time <sup>5</sup>	I <sub>D</sub> =20A	-	60	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time <sup>5</sup>	R <sub>G</sub> =3.3Ω	-	17	-	ns
t <sub>f</sub>	Fall Time <sup>5</sup>	V <sub>GS</sub> =10V	-	4	-	ns
C <sub>iss</sub>	Input Capacitance <sup>5</sup>	V <sub>GS</sub> =0V	-	770	1232	pF
C <sub>oss</sub>	Output Capacitance <sup>5</sup>	V <sub>DS</sub> =25V	-	300	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance <sup>5</sup>	f=1.0MHz	-	30	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	2.5	5	Ω

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	-	-	1.2	V
t <sub>rr</sub>	Reverse Recovery Time <sup>5</sup>	I <sub>S</sub> =20A, V <sub>GS</sub> =0V,	-	20	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge <sup>5</sup>	di/dt=100A/μs	-	8	-	nC

**Notes:**

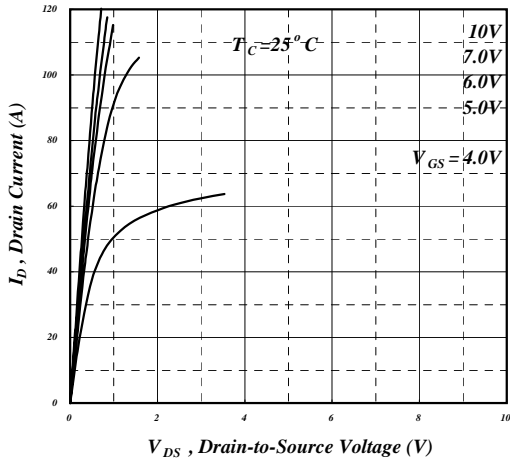
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board, t ≤10sec; 60°C/W at steady state.
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=30V , L=0.1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V
- 5.Guaranteed by design.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

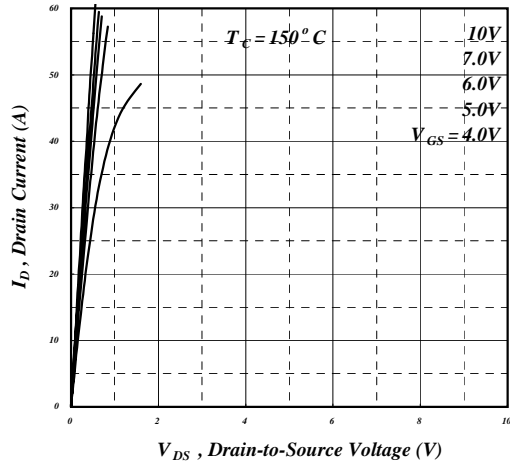
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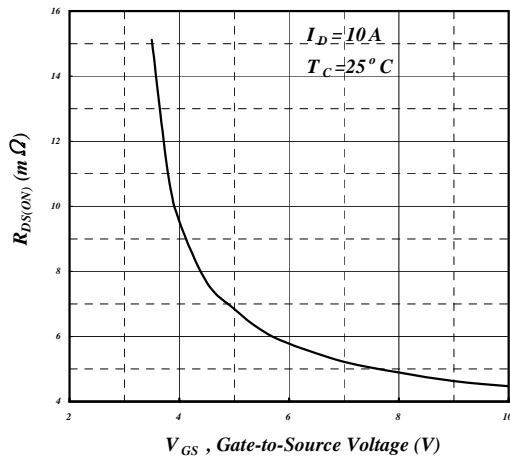
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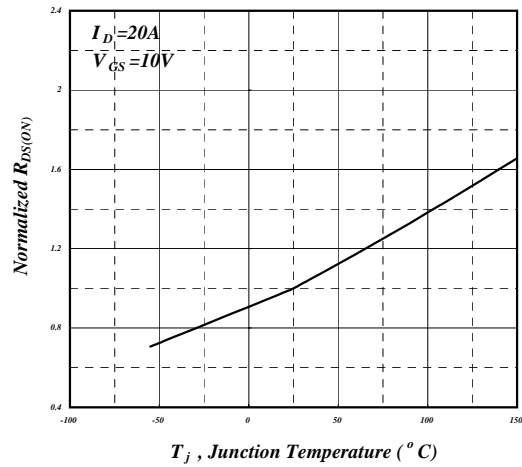
**Fig 1. Typical Output Characteristics**



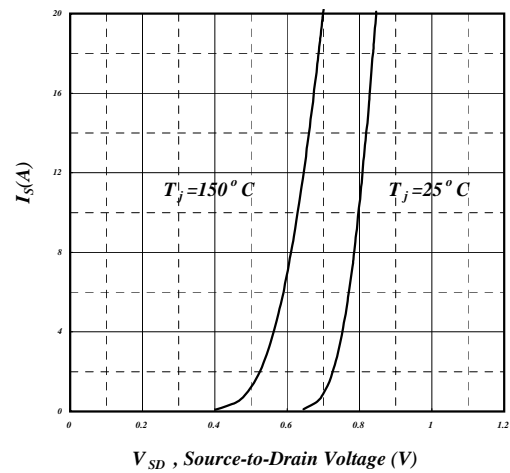
**Fig 2. Typical Output Characteristics**



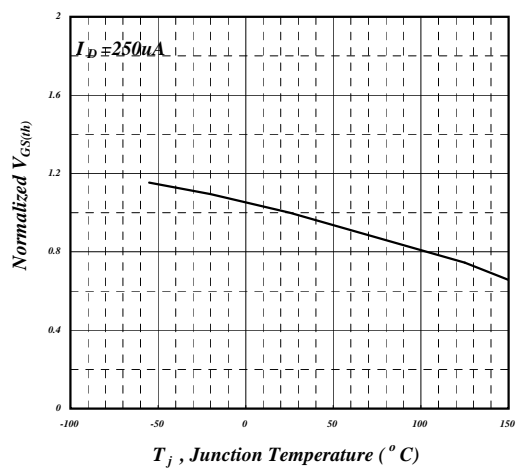
**Fig 3. On-Resistance v.s. Gate Voltage**



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



**Fig 5. Forward Characteristic of Reverse Diode**



**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

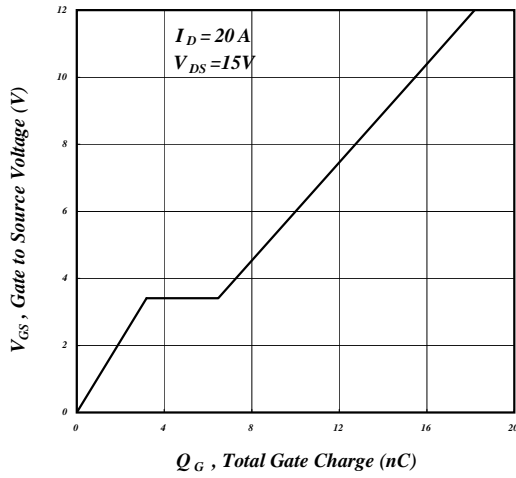


Fig 7. Gate Charge Characteristics

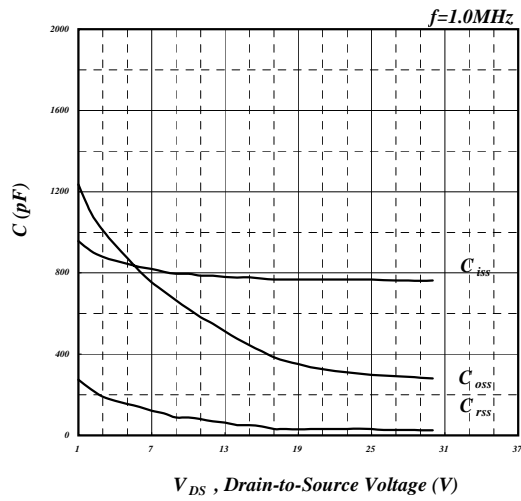


Fig 8. Typical Capacitance Characteristics

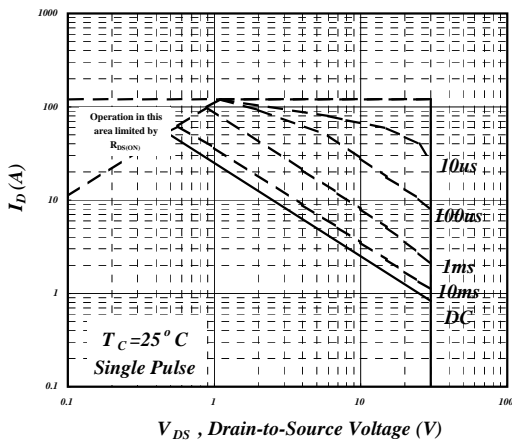


Fig 9. Maximum Safe Operating Area

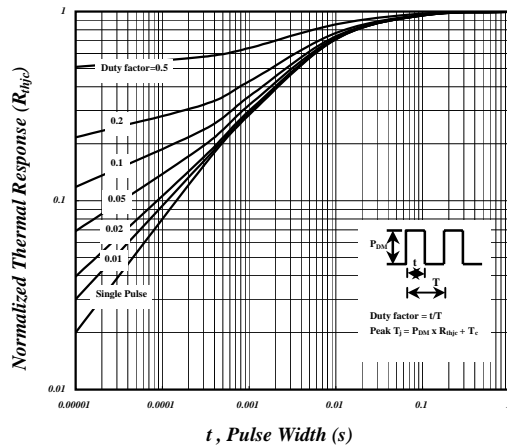


Fig 10. Effective Transient Thermal Impedance

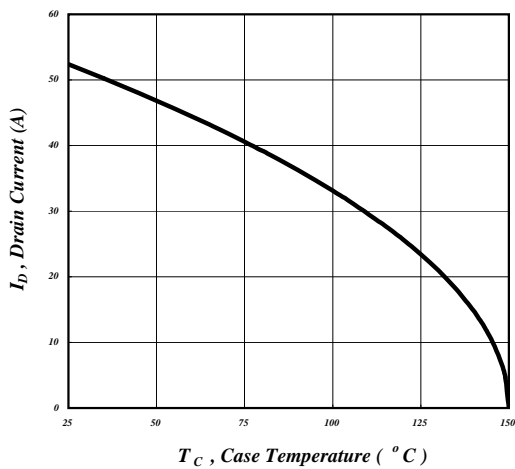


Fig 11. Drain Current v.s. Case Temperature

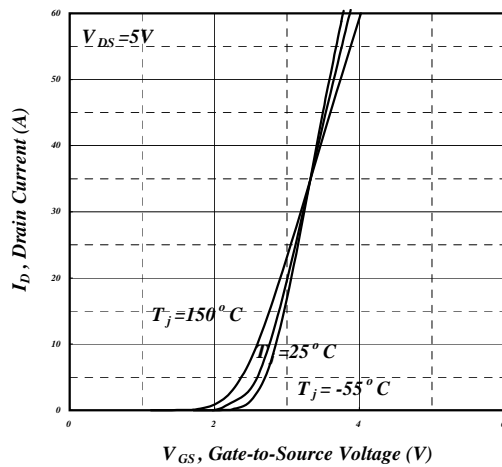
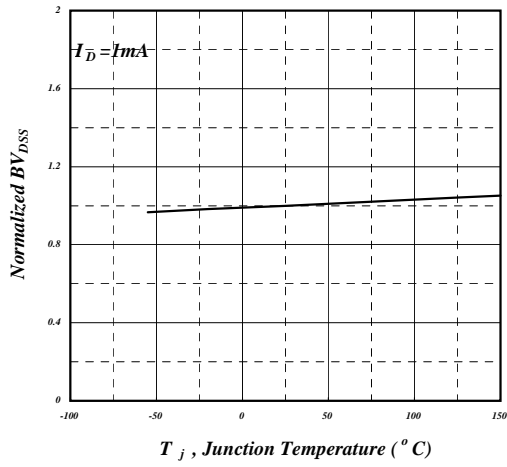
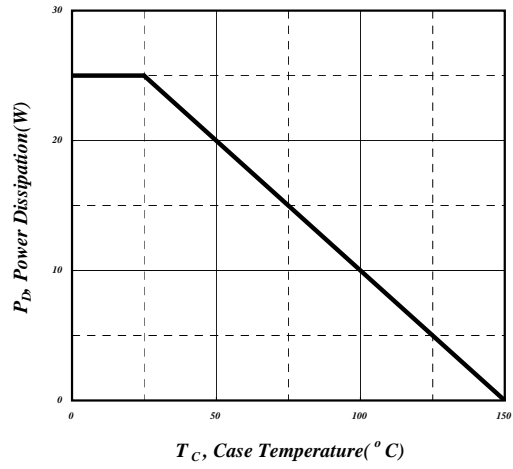


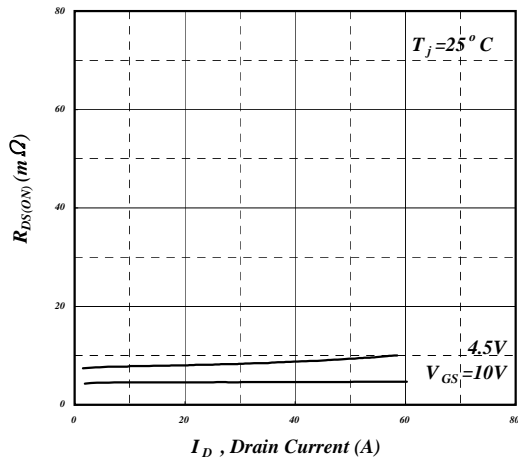
Fig 12. Transfer Characteristics



**Fig 13. Normalized  $BV_{DSS}$  v.s. Junction Temperature**



**Fig 14. Total Power Dissipation**



**Fig 15. Typ. Drain-Source on State Resistance**