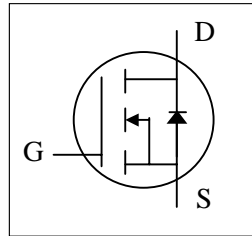


- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free

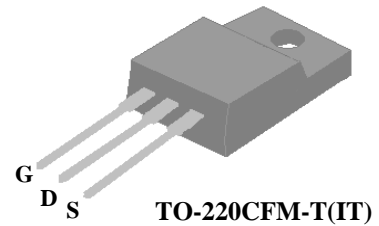


BV <sub>DSS</sub>	100V
R <sub>DS(ON)</sub>	3.88mΩ
I <sub>D</sub>	67.7A

## Description

XP10N3R8 series are innovated 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 TO-220CFM package is widely preferred for all commercial-industrial through hole applications. The mold compound provides a high isolation voltage capability and low thermal resistance between the tab and the external heat-sink.



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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	100	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	67.7	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Drain Current, V <sub>GS</sub> @ 10V	42.8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	300	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation	32.8	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation	1.92	W
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>3</sup>	211	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	Units
R <sub>thj-c</sub>	Maximum Thermal Resistance, Junction-case	3.8	°C/W
R <sub>thj-a</sub>	Maximum Thermal Resistance, Junction-ambient	65	°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	100	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =35A	-	-	3.88	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =35A	-	90	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V	-	-	25	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>4</sup>	I <sub>D</sub> =35A	-	82	131	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>4</sup>	V <sub>DS</sub> =50V	-	20	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge <sup>4</sup>	V <sub>GS</sub> =10V	-	30	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>4</sup>	V <sub>DS</sub> =50V	-	20	-	ns
t <sub>r</sub>	Rise Time <sup>4</sup>	I <sub>D</sub> =35A	-	88	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time <sup>4</sup>	R <sub>G</sub> =6Ω	-	65	-	ns
t <sub>f</sub>	Fall Time <sup>4</sup>	V <sub>GS</sub> =10V	-	106	-	ns
C <sub>iss</sub>	Input Capacitance <sup>4</sup>	V <sub>GS</sub> =0V	-	4100	6560	pF
C <sub>oss</sub>	Output Capacitance <sup>4</sup>	V <sub>DS</sub> =80V	-	620	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance <sup>4</sup>	f=1.0MHz	-	20	-	pF
R <sub>g</sub>	Gate Resistance	f=1.0MHz	-	2	4	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> =35A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time <sup>4</sup>	I <sub>S</sub> =35A, V <sub>GS</sub> =0V,	-	75	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge <sup>4</sup>	di/dt=100A/μs	-	135	-	nC

**Notes:**

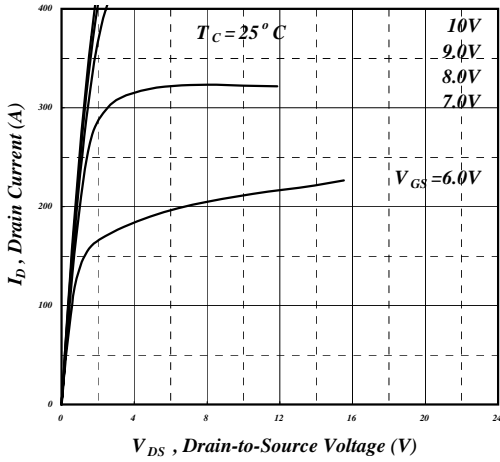
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=0.1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V
- 4.Guaranteed by design.

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

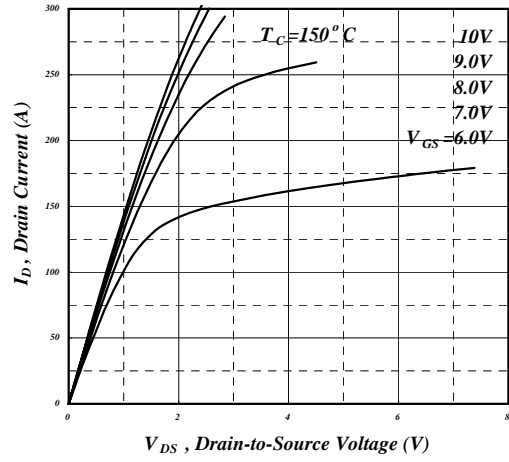
USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT, AUTOMOTIVE OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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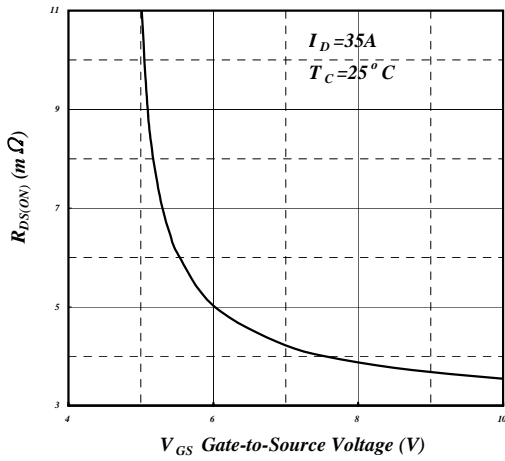
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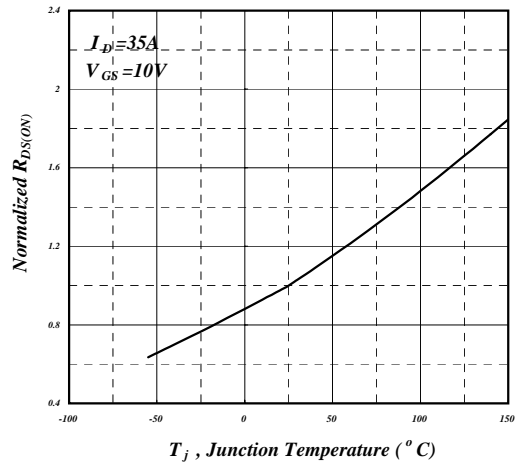
**Fig 1. Typical Output Characteristics**



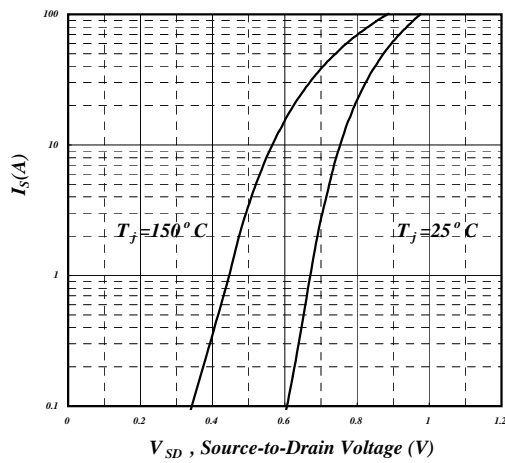
**Fig 2. Typical Output Characteristics**



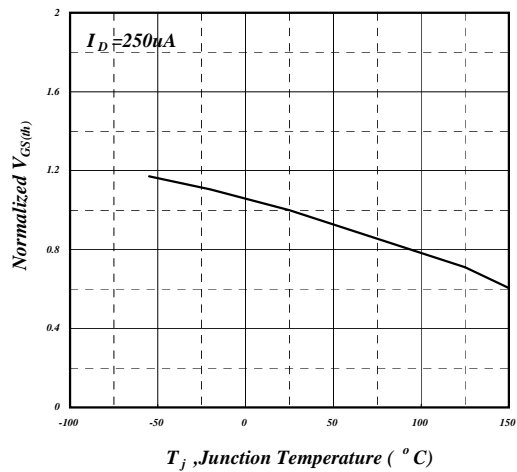
**Fig 3. On-Resistance v.s. Gate Voltage**



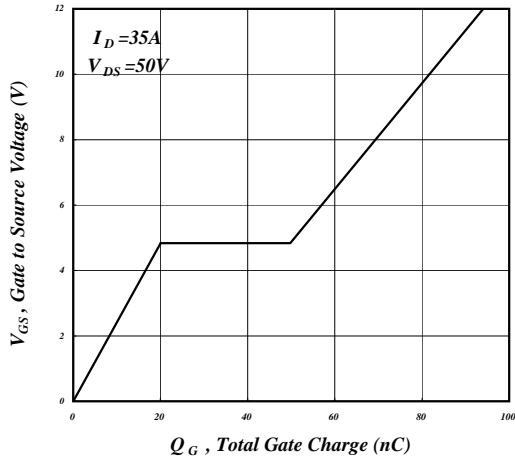
**Fig 4. Normalized On-Resistance v.s. Junction Temperature**



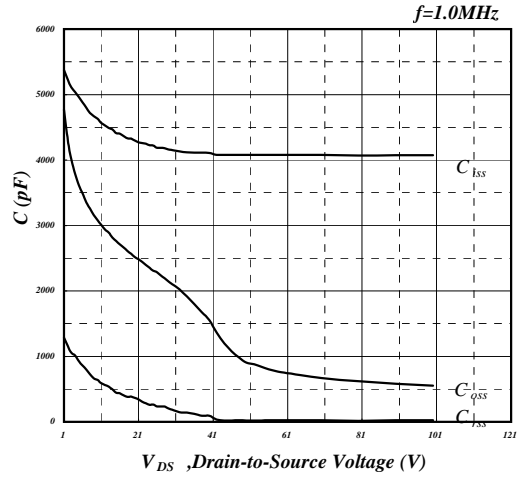
**Fig 5. Forward Characteristic of Reverse Diode**



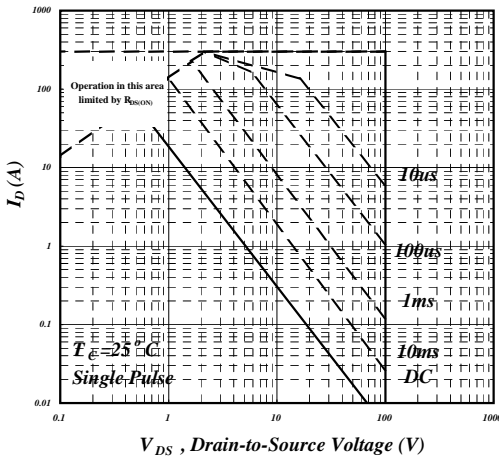
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



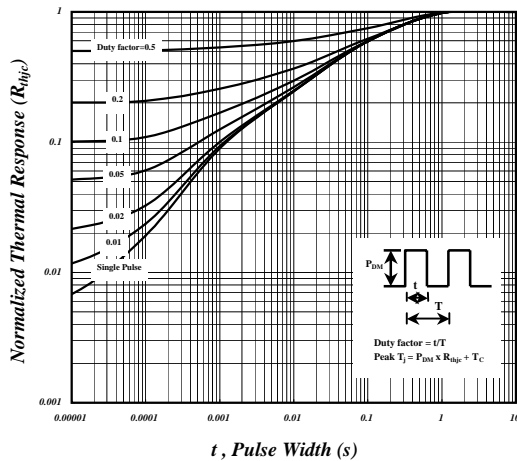
**Fig 7. Gate Charge Characteristics**



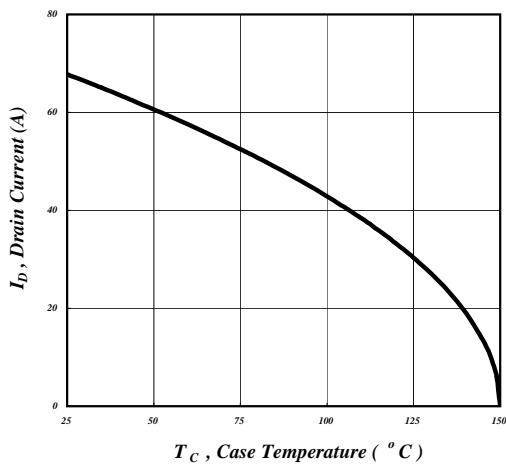
**Fig 8. Typical Capacitance Characteristics**



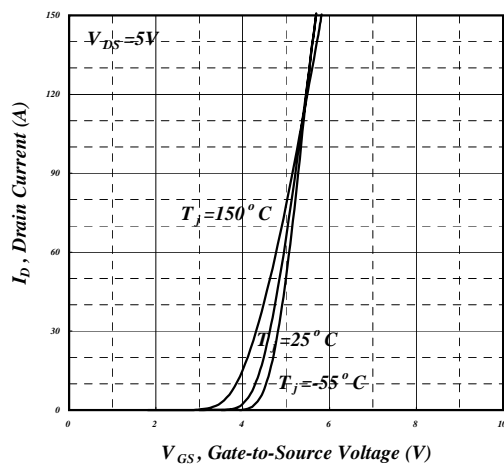
**Fig 9. Maximum Safe Operating Area**



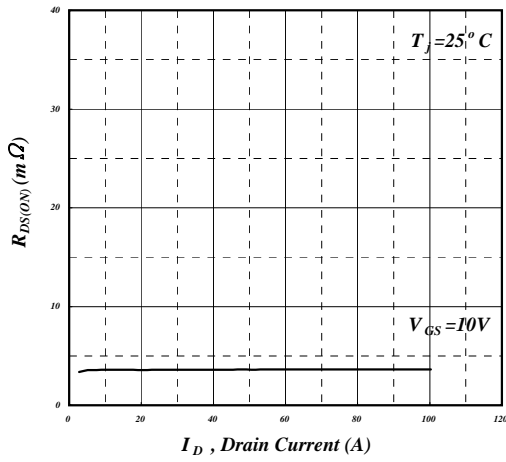
**Fig 10. Effective Transient Thermal Impedance**



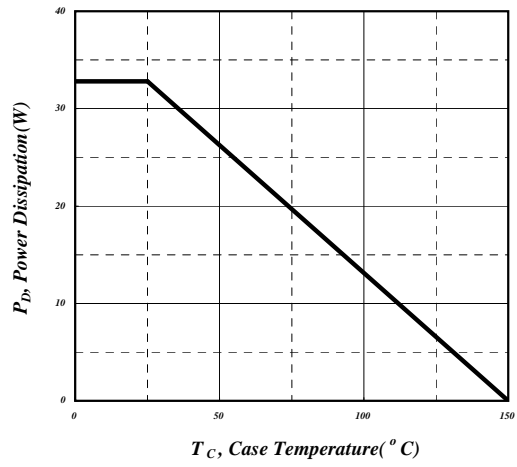
**Fig 11. Drain Current v.s. Case Temperature**



**Fig 12. Transfer Characteristics**



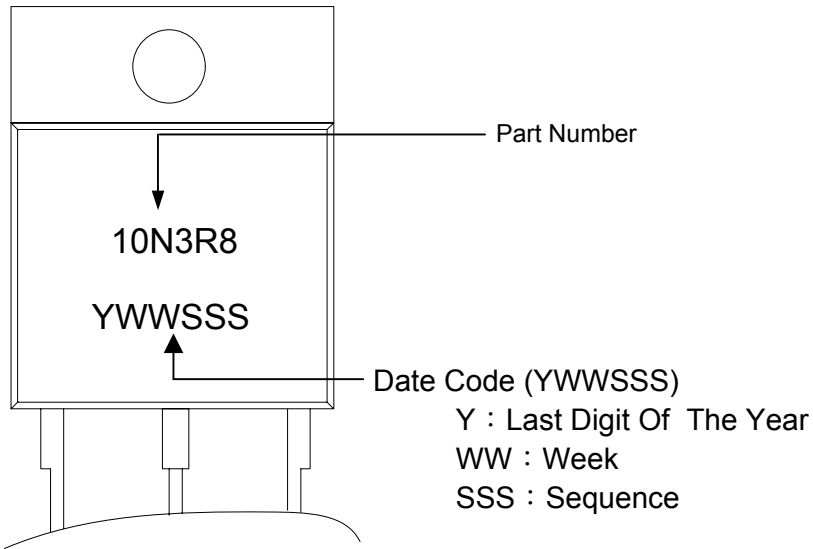
**Fig 13. Typ. Drain-Source on State Resistance**



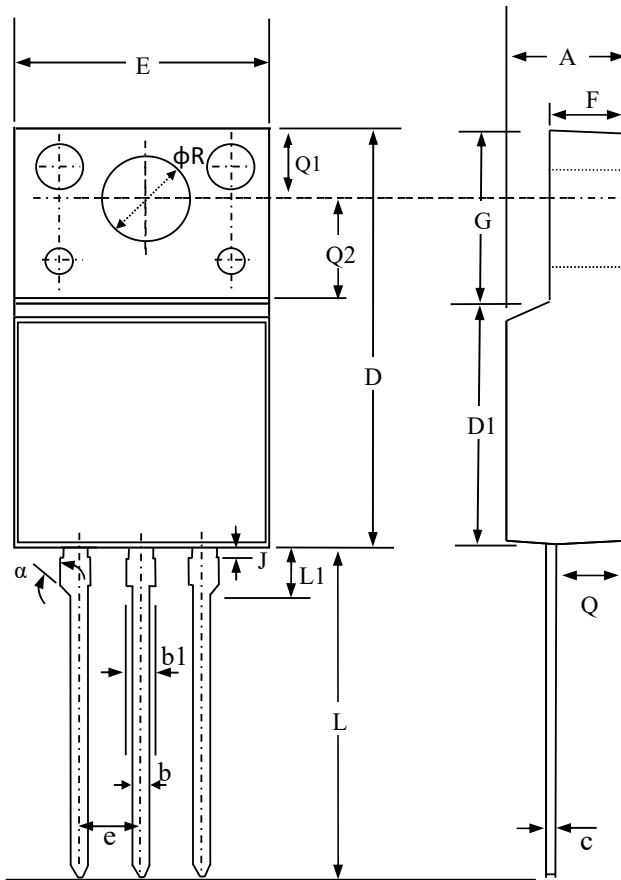
**Fig 14. Total Power Dissipation**

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**MARKING INFORMATION**



**Package Outline : TO-220CFM-T**



SYMBOLS	Millimeters		
	MIN	NOM	MAX
<b>A</b>	4.30	4.50	4.70
<b>b</b>	0.54	0.69	0.84
<b>b1</b>	0.99	1.14	1.29
<b>c</b>	0.45	0.62	0.79
<b>D</b>	14.70	15.00	15.30
<b>D1</b>	8.5 Ref.		
<b>e</b>	2.54 Ref.		
<b>E</b>	9.70	10.00	10.30
<b>F</b>	2.50	2.70	2.90
<b>G</b>	6.30	6.70	7.10
<b>L</b>	12.50	13.00	13.50
<b>L1</b>	1.80	2.30	2.80
<b>J</b>	0.10	0.20	--
<b>Q</b>	2.50	2.60	2.90
<b>Q1</b>	2.90	3.10	3.30
<b>Q2</b>	3.5 Ref.		
<b><math>\phi R</math></b>	3.00	3.20	3.40
<b><math>\alpha</math></b>	45° Ref.		

- 1.All dimension are in millimeters.
- 2.Dimension does not include burrs and mold flash/protrusions.
- 3.The outline schematic is not to scale and slightly different from the actual product appearance.

**TO-220CFM-T FOOTPRINT :**

