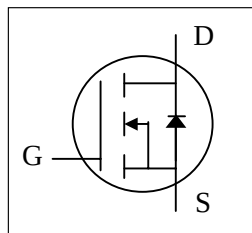
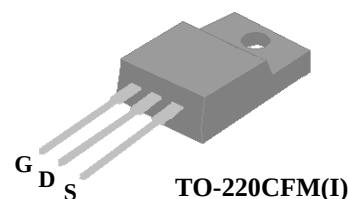


- ▼ Simple Drive Requirement
- ▼ Ultra-low On-resistance
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



BV_{DSS}	40V
$R_{DS(ON)}$	2.5m Ω
I_D	100A



Description

XP4604 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@ $T_j=25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}\text{C}$	Drain Current, V_{GS} @ 10V	100	A
$I_D@T_C=100^{\circ}\text{C}$	Drain Current, V_{GS} @ 10V	73.4	A
I_{DM}	Pulsed Drain Current ¹	320	A
$P_D@T_C=25^{\circ}\text{C}$	Total Power Dissipation	50	W
$P_D@T_A=25^{\circ}\text{C}$	Total Power Dissipation	2.3	W
E_{AS}	Single Pulse Avalanche Energy ³	80	mJ
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}\text{C}$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3	$^{\circ}\text{C}/\text{W}$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics@T_J=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	-	-	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	-	-	2.5	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2	-	4	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =40A	-	120	-	S
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V	-	-	10	uA
I _{GSS}	Gate-Source Leakage	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Q _g	Total Gate Charge	I _D =40A	-	105	168	nC
Q _{gs}	Gate-Source Charge	V _{DS} =32V	-	20	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =10V	-	44	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =20V	-	22	-	ns
t _r	Rise Time	I _D =40A	-	84	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =3.3 Ω	-	50	-	ns
t _f	Fall Time	V _{GS} =10V	-	30	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	5330	8528	pF
C _{oss}	Output Capacitance	V _{DS} =25V	-	1100	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	340	-	pF
R _g	Gate Resistance	f=1.0MHz	-	1.2	2.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ²	I _S =40A, V _{GS} =0V	-	-	1.2	V
t _{rr}	Reverse Recovery Time	I _S =40A, V _{GS} =0V	-	40	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	38	-	nC

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Starting T_J=25°C , V_{DD}=25V , L=0.1mH , R_G=25Ω

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

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

XSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

XSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN.

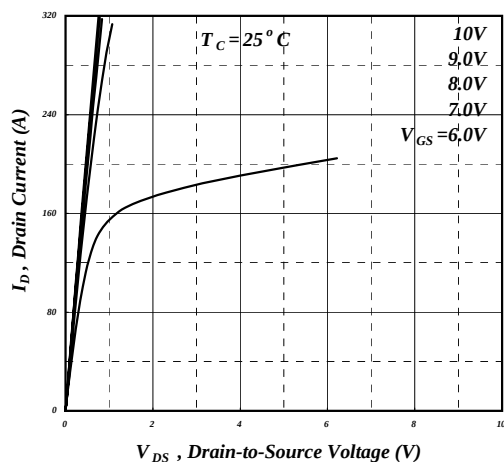


Fig 1. Typical Output Characteristics

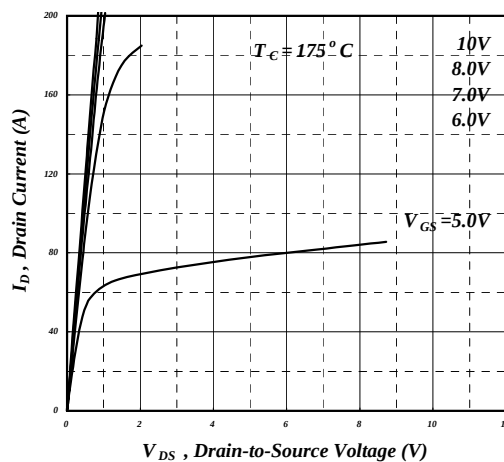


Fig 2. Typical Output Characteristics

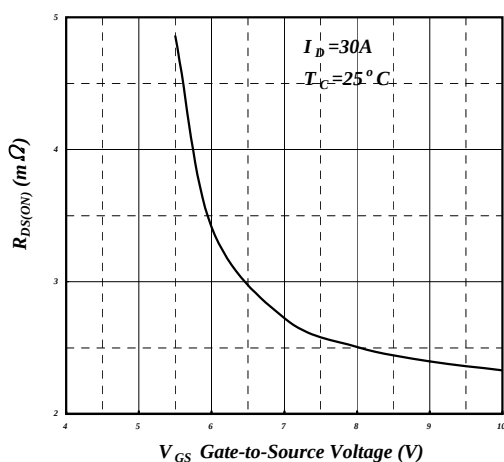
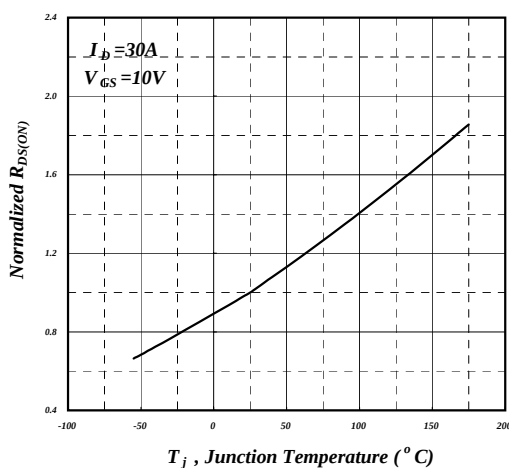
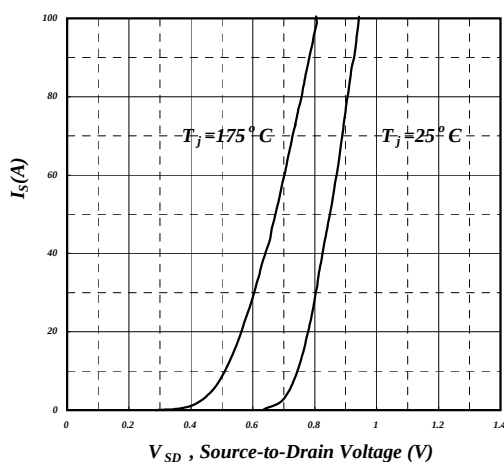


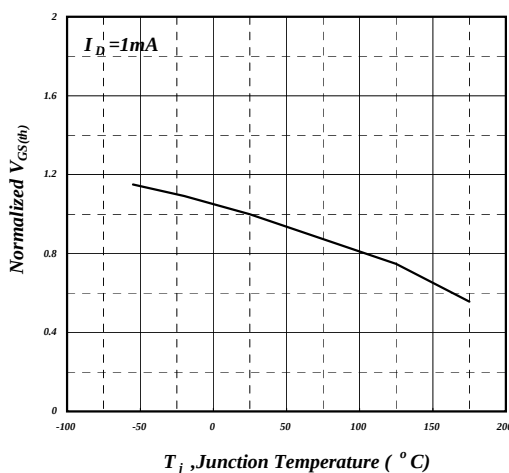
Fig 3. On-Resistance v.s. Gate Voltage



**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**

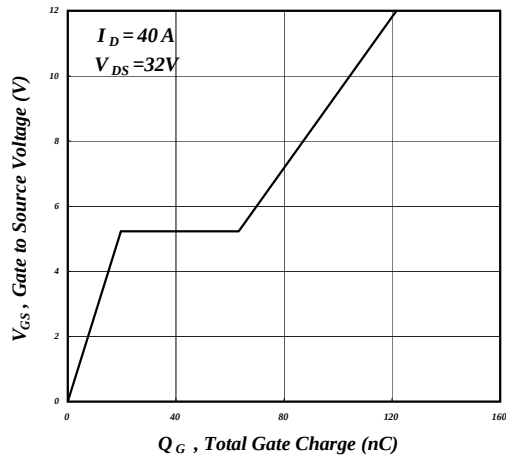


Fig 7. Gate Charge Characteristics

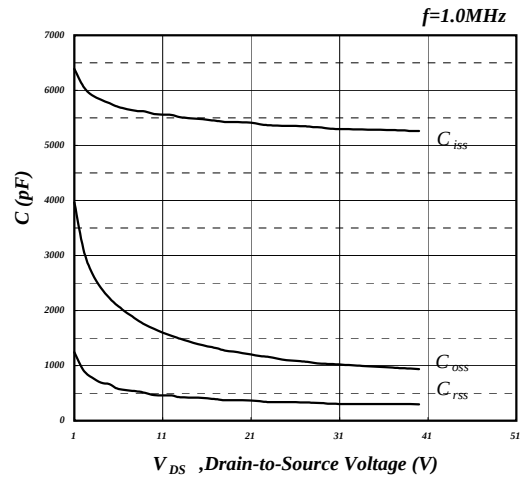


Fig 8. Typical Capacitance Characteristics

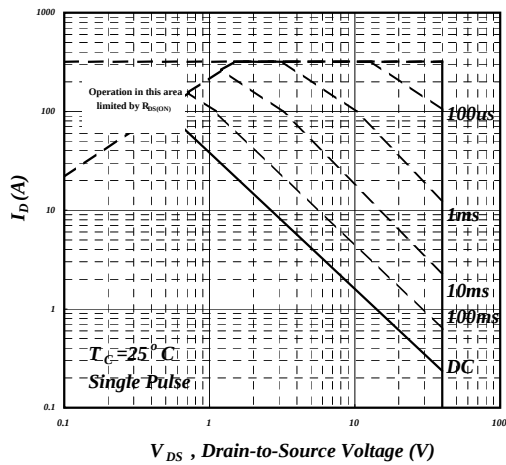


Fig 9. Maximum Safe Operating Area

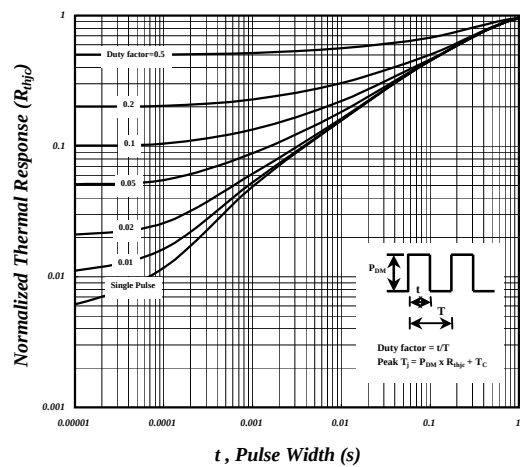


Fig 10. Effective Transient Thermal Impedance

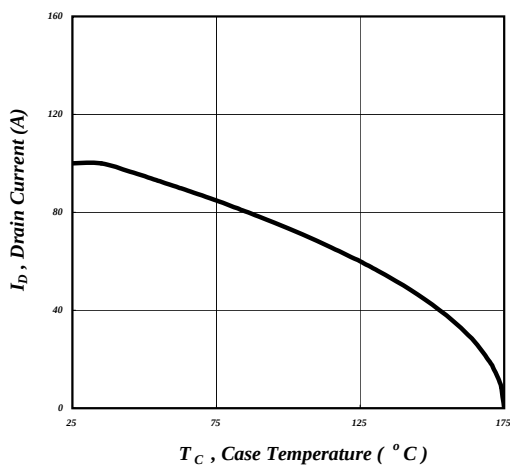


Fig 11. Drain Current v.s. Case Temperature

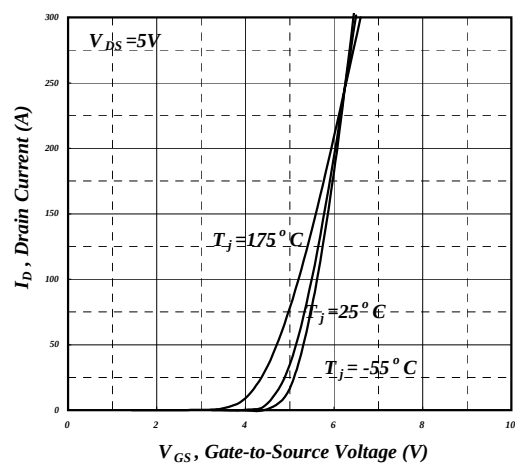


Fig 12. Transfer Characteristics

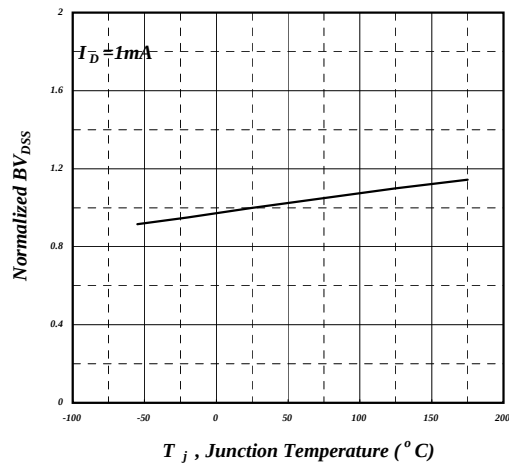


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

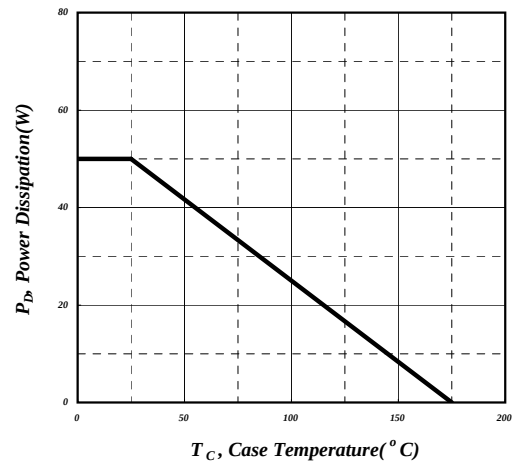


Fig 14. Total Power Dissipation

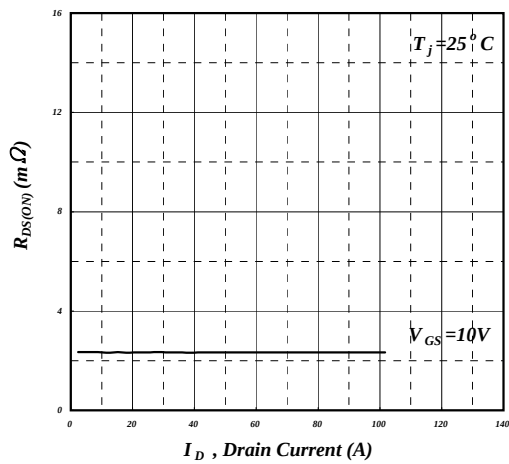
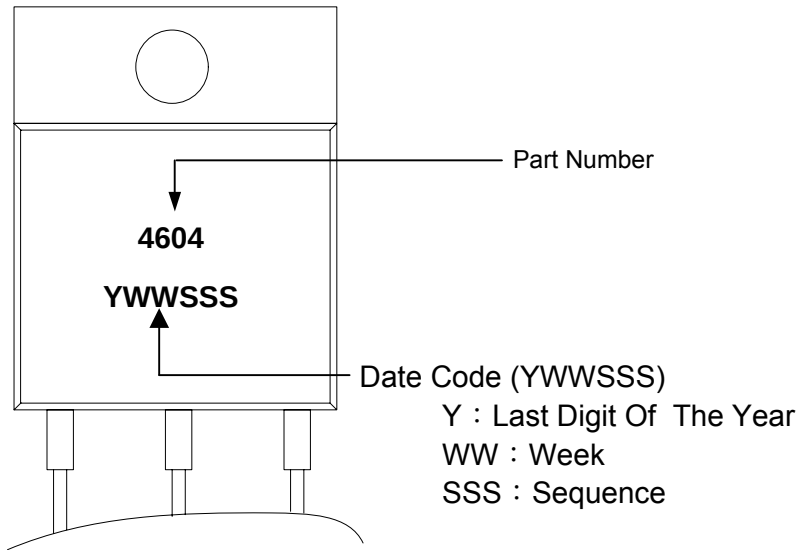
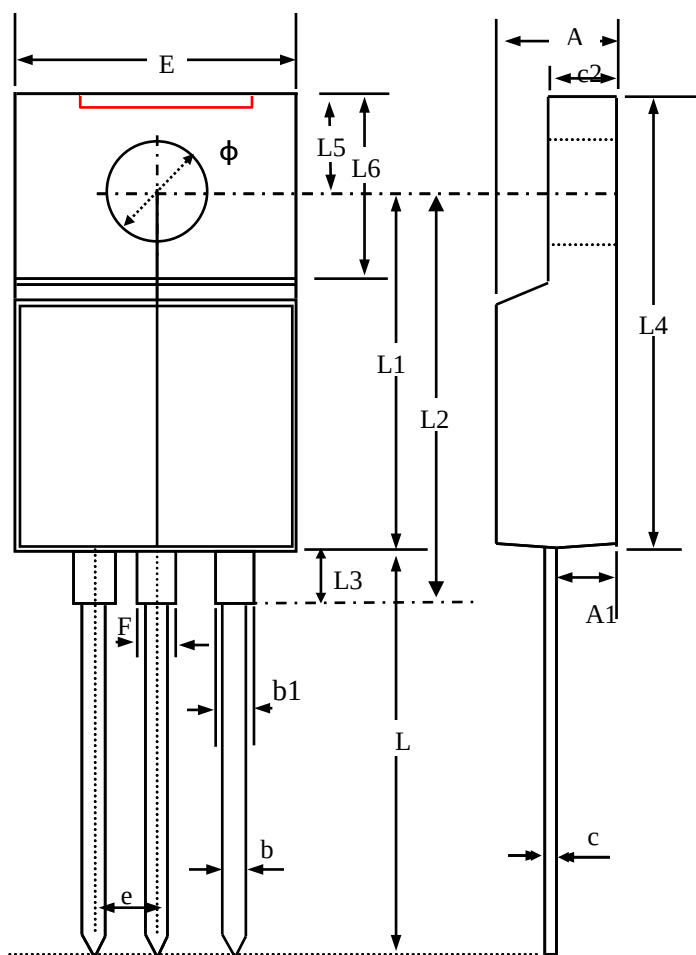


Fig 15. Typ. Drain-Source on State Resistance

MARKING INFORMATION

Package Outline : TO-220CFM

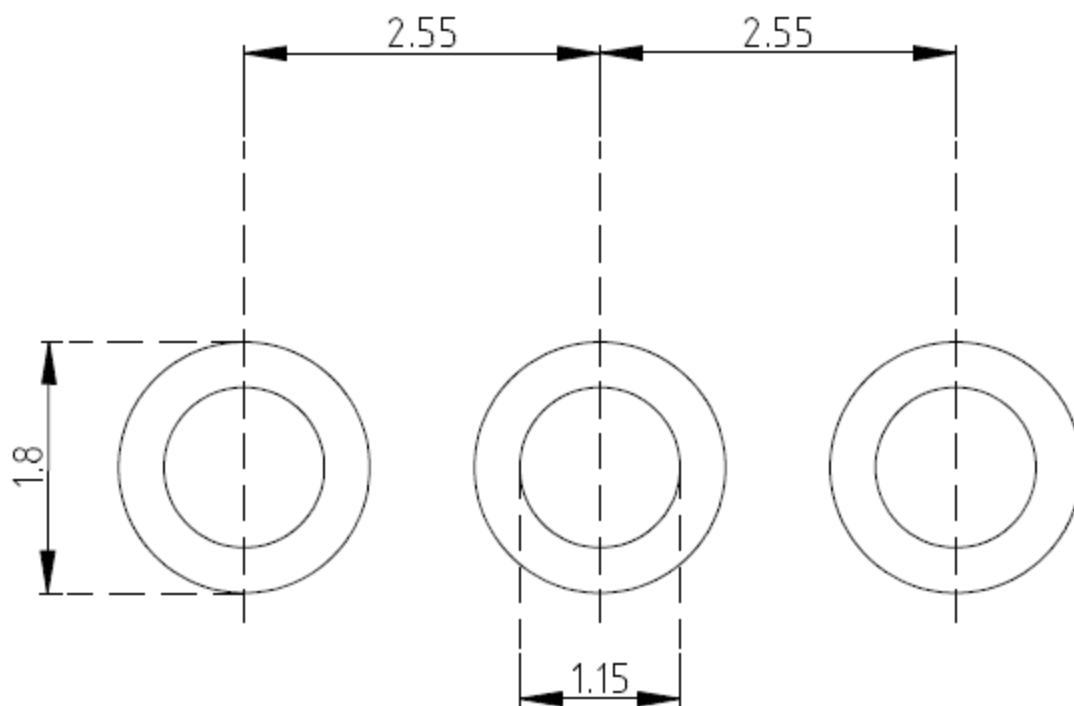


SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	4.40	4.65	4.90
A1	2.50	2.68	2.86
b	0.70	0.84	0.98
b1	1.10	1.30	1.50
c	0.45	0.54	0.63
c2	2.34	2.54	2.74
E	10.00	10.20	10.40
L	12.78	13.22	13.65
L1	12.45	12.70	12.95
L2	15.10	15.80	16.50
L3	2.83	3.22	3.60
L4	15.67	16.04	16.40
L5	3.20	3.30	3.40
L6	6.50	6.73	6.95
ϕ	3.00	3.14	3.28
e	2.40	2.55	2.70
F	1.15	1.33	1.50

1.All Dimensions Are in Millimeters.

2.Dimension Does Not Include Mold Protrusions.

TO-220CFM FOOTPRINT :



UNIT: mm