/ Descriptions

TO-220FL

Insulated-Gate Bipolar Transistor in a TO-220FL Plastic Package.

/ Features

650V/20A $V_{CE(SAT)}$= 1.45V(typ.) @I_C= 20A

Low gate charge

Trench FS Trench FS Technology

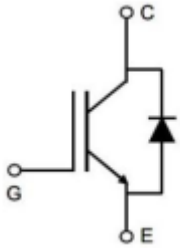
RoHS RoHS product

/ Applications

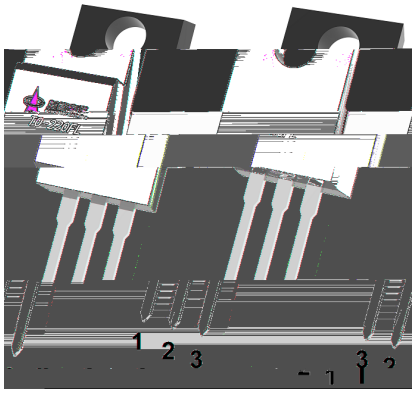
UPS

General purpose inverters,UPS.

/ Equivalent Circuit



/ Pinning



PIN1 G PIN 2 C PIN 3 E

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings(T_a=25)

Parameter		Symbol	Rating	Unit
Collector-Emitter Voltage		V_{CES}	650	V
Continuous Collector Current	T_C=+25	I_C	40	A
	T_C=+100		20	A
Pulsed Collector Current , Limited by T_{Jmax}		I_{CM}	80	A
Continuous Diode Forward Current	T_C=+25	I_F	40	A
	T_C=+100		20	A
Surge non repetitive forward current tp= 8.3 ms sinusoidal		I_{FSM}	120	A
Gate-Emitter Voltage		V_{GE}	± 30	V
Power Dissipation	T_C=+25	P_D	48	W
Operating and Storage Temperature Range		T_{STG}	-55 to +175	
Operating Temperature Range		T_J	-55 to +175	
Maximum Junction-to-Ambient		$R_{\theta JA}$	78	/W
Maximum IGBT Junction-to-Case		$R_{\theta JC}$	3.10	/W
Maximum Diode Junction-to-Case		$R_{\theta JC}$	4.12	/W

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=250uA, V_{GE}=0V	650			V
Zero Gate Voltage Collector current	I_{CES}	V_{CE}=650V, V_{GE}=0V T_J=25			35	uA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}= ±20V			±200	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE} I_C=250uA	4.5	5.2	6.5	V

Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=20A	T_J=25		1.45	1.82	V
			T_J=125		1.68		
			T_J=175		1.93		
Diode Forward Voltage	V_F	V_{GE}=0V, I_F=20A	T_J=25		1.40	1.84	V
			T_J=125		1.24		
			T_J=175		1.14		
Input Capacitance	C_{ies}	V_{GE}=0V, V_{CE}=25V, f=1MHz,T_J=25			1420		pF
Output Capacitance	C_{oes}				72		pF

/ Electrical Characteristic Curve

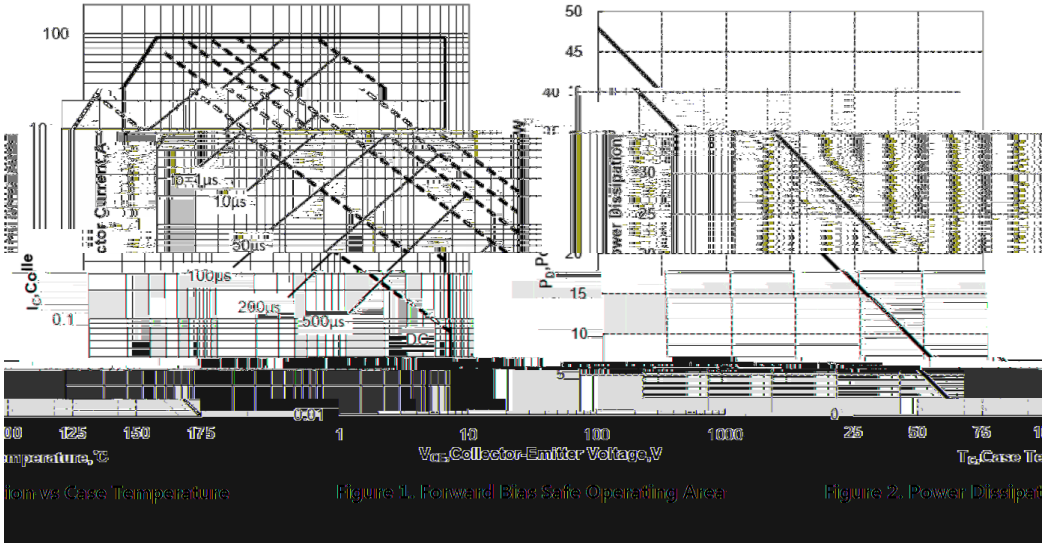


Figure 1. Forward Bias Safe Operating Area

Figure 2. Power Dissipat

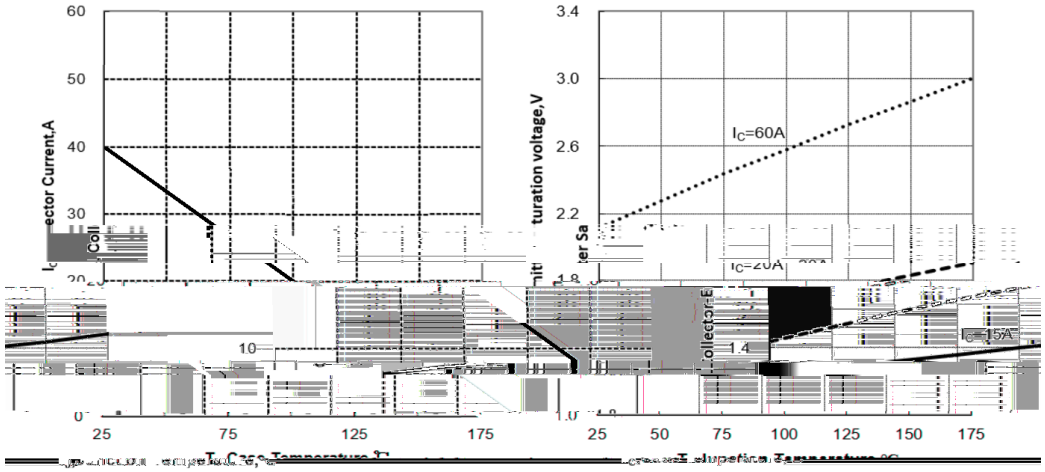


Figure 3. Collector Current vs Case Temperature

Figur

e 4. Typical Collect-Emitter Saturation Voltage vs Junction Temperature

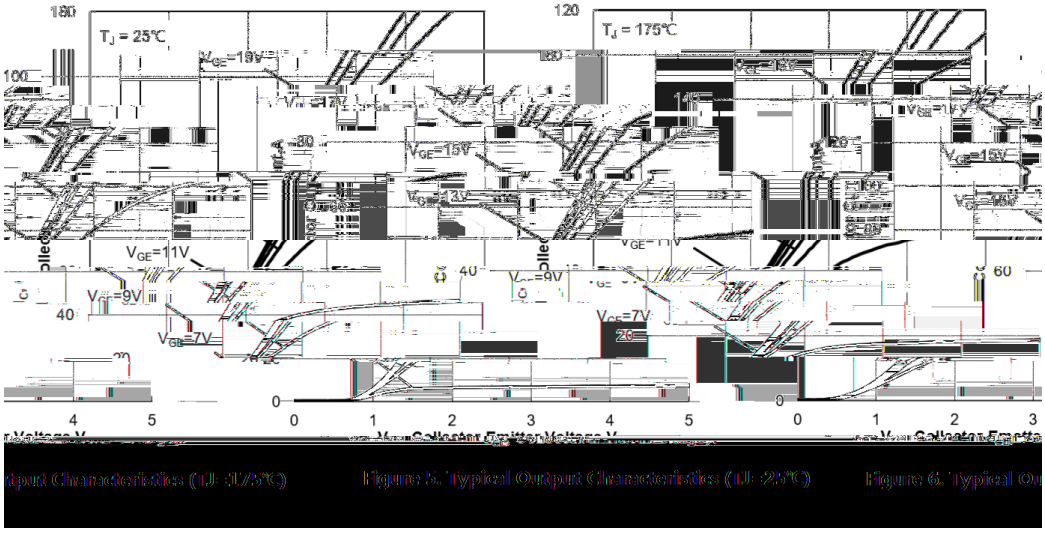


Figure 5. Typical Output Characteristics (TJ= 175°C)

Figure 6. Typical Output Characteristics (TJ= 25°C)

/ Electrical Characteristic Curve

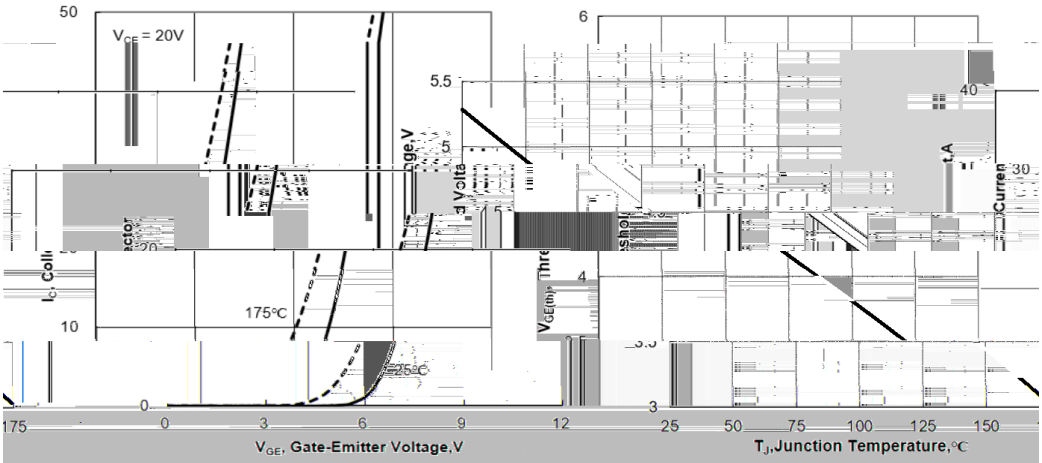


Figure 7. Typical Transfer Characteristics

Figure 8. Typical Gate-Emitter Threshold Voltage vs Junction Temperature

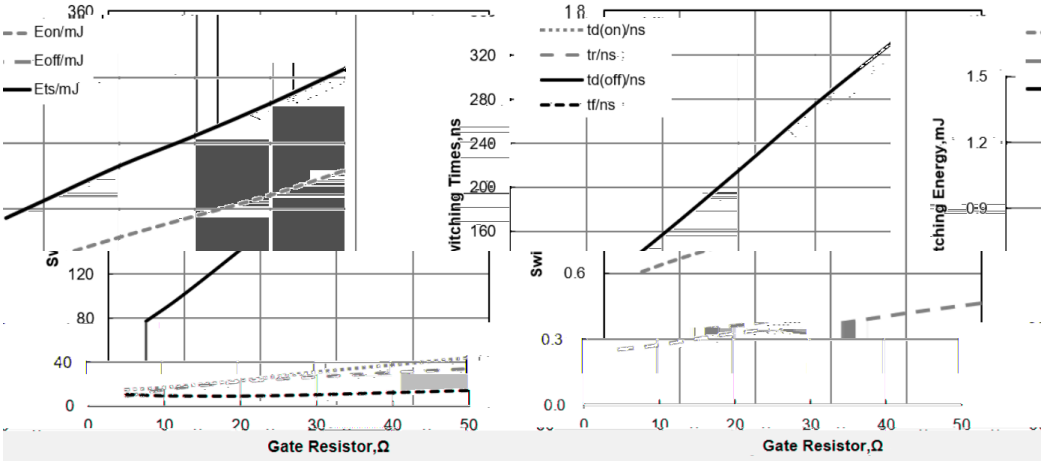
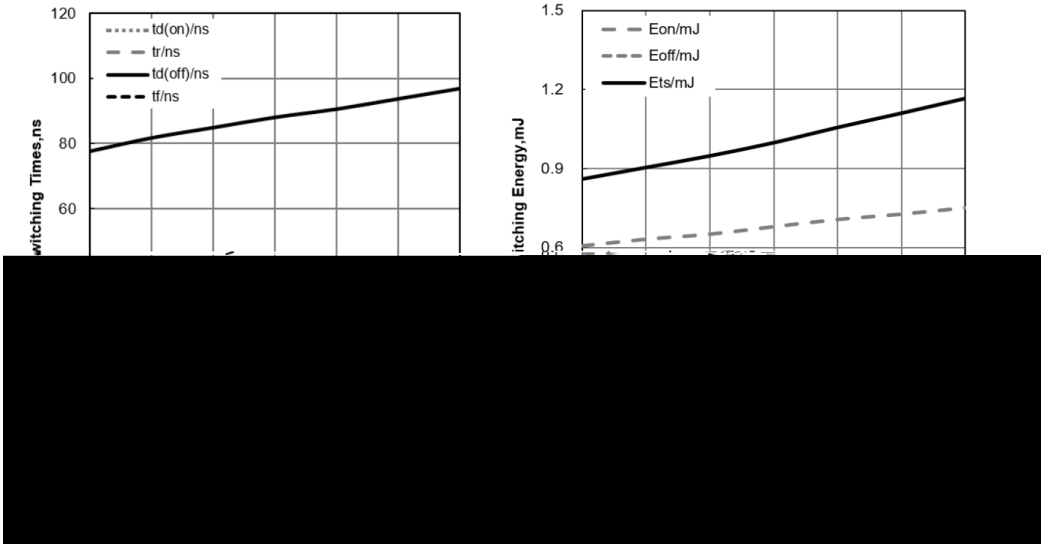
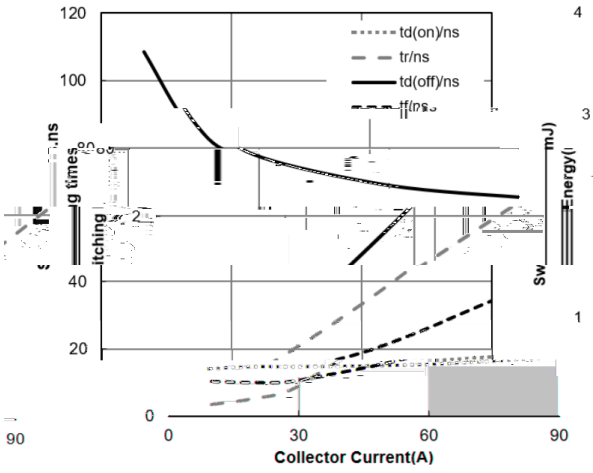


Figure 9. Typical Switching Times vs Gate Resistor (TJ=25℃, VCE=400V, VGE=15/0V, IC=20A)

Figure 10. Typical Switching Energy vs Gate Res (TJ=25℃, VCE=400V, VGE=15/0V, IC=20A)



/ Electrical Characteristic Curve



:tor

Figure 13. Typical Switching Times vs Collector Current (TJ=25℃, VCE=400V, VGE=15/0V)

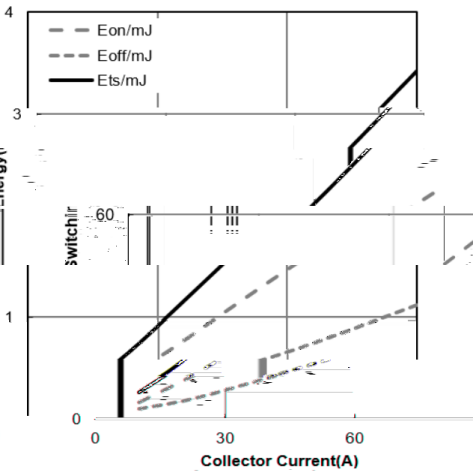
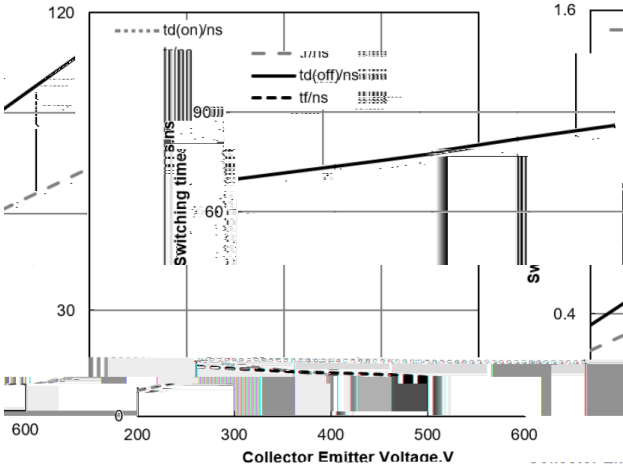


Figure 14. Typical Switching Energy vs Collec Current (TJ=25℃, VCE=400V, VGE=15/0V)



5. Typical Switching Times vs VCE

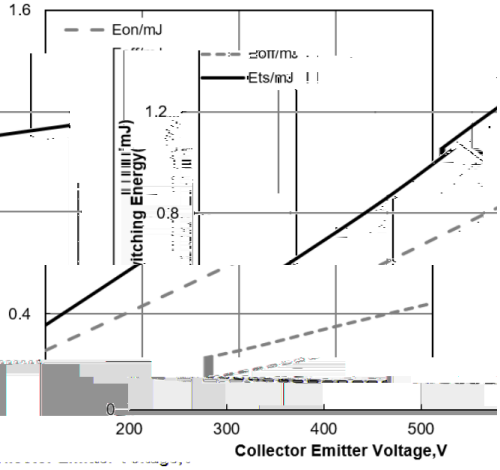
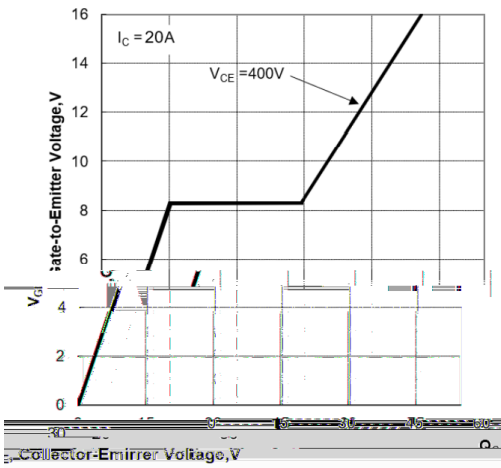


Figure 16. Typical Switching Energy vs VCE

Figure 1



e 18. Typical Capacitance vs CollectorEmitter Voltage

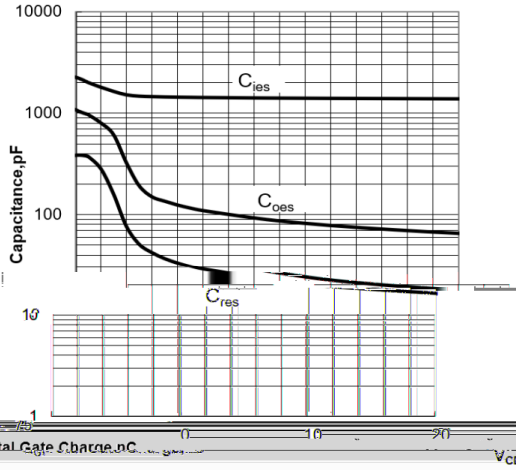


Figure 17. Typical Gate Charge

Figu

/ Electrical Characteristic Curve

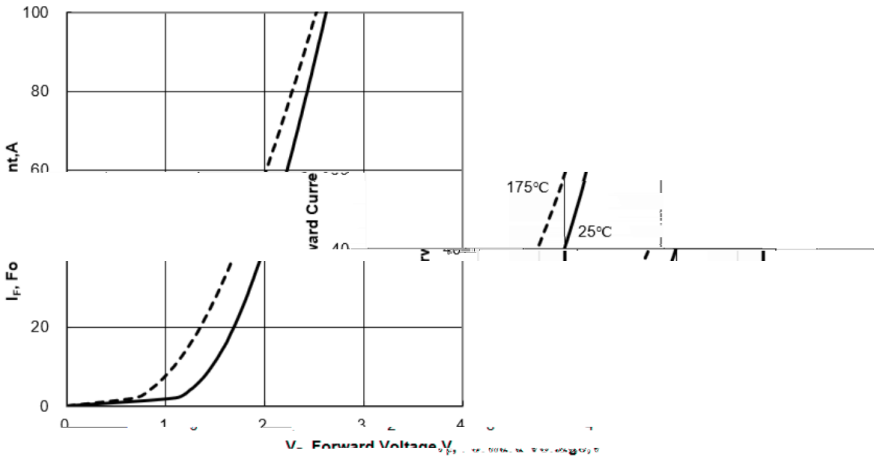
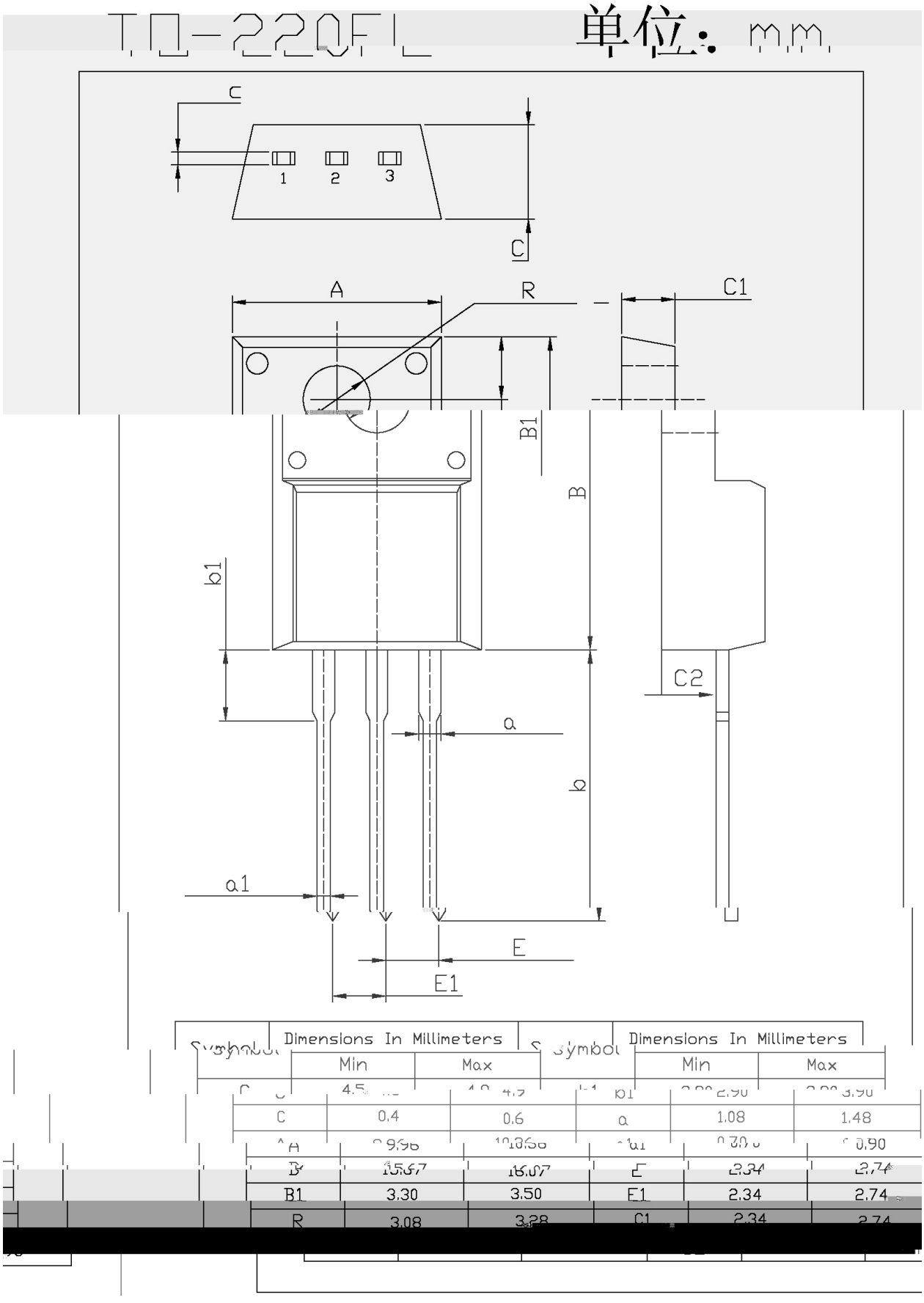


Figure 19. Typical Diode Forward Current vs Forward Voltage

/ Package Dimensions



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	0.4	0.6	a	1.08	1.48
A	9.96	10.36	a1	0.70	0.90
B	15.67	16.07	E	2.34	2.74
B1	3.30	3.50	E1	2.34	2.74
R	3.08	3.28	C1	2.34	2.74

/ Marking Instructions