

/ Descriptions

TO-220FL

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

/ Features650V/20A $V_{CE(SAT)} = 1.45V(\text{typ.}) @ I_C = 20A$

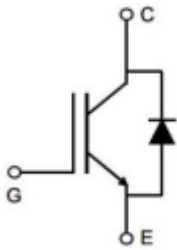
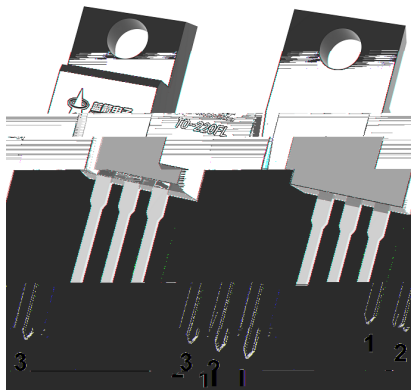
Low gate charge

Trench FS Trench FS Technology

RoHS RoHS product

/ Applications

General purpose inverters

/ 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 $t_p=8.3$ 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($T_a=25$)

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

BRGB20N65FL

Rev.A Mar.-2026



DATA SHEET

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

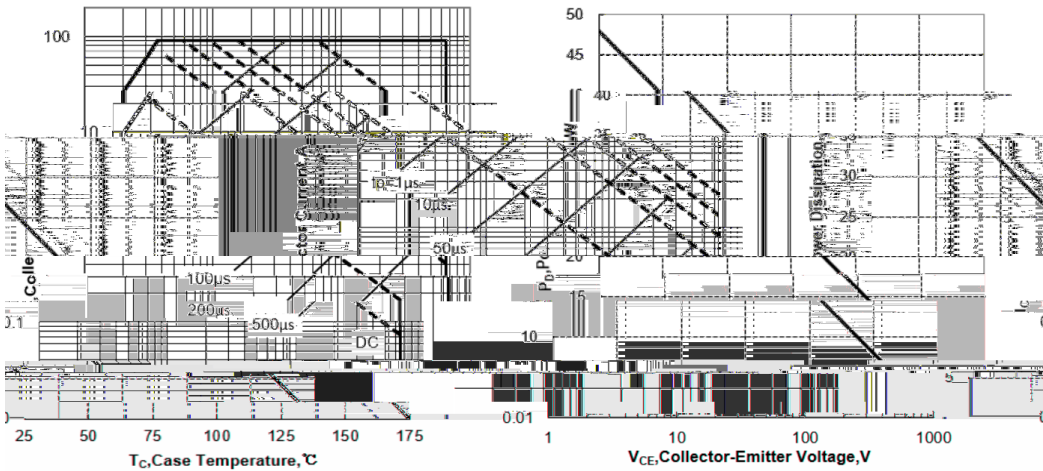


Figure 1. Forward Bias Safe Operating Area

Figure 2. Power Dissipation vs Case Temperature

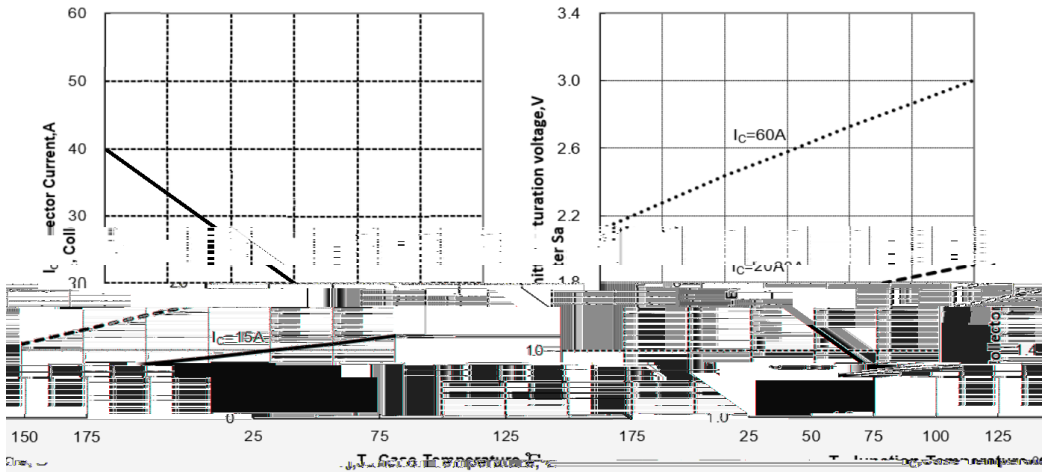


Figure 3. Collector Current vs Case Temperature

Figure 4. Typical Collect-Emitt Saturation Voltage vs Junction Temperature

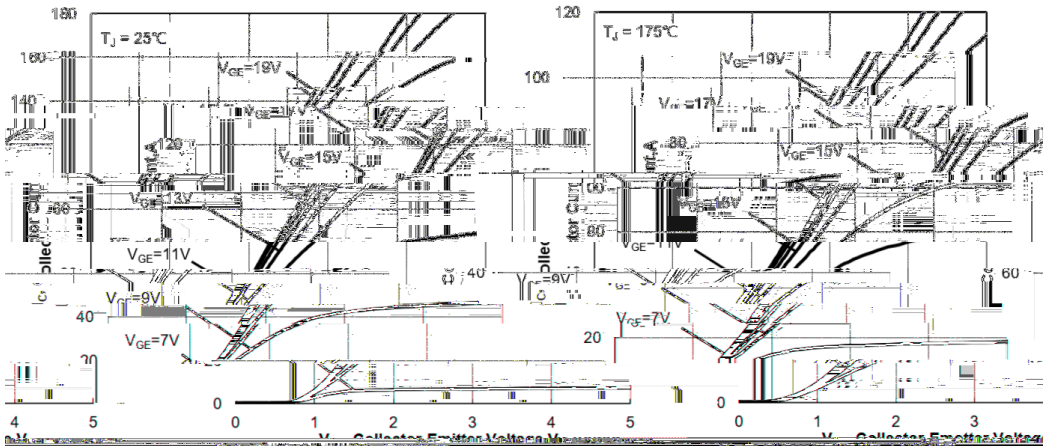
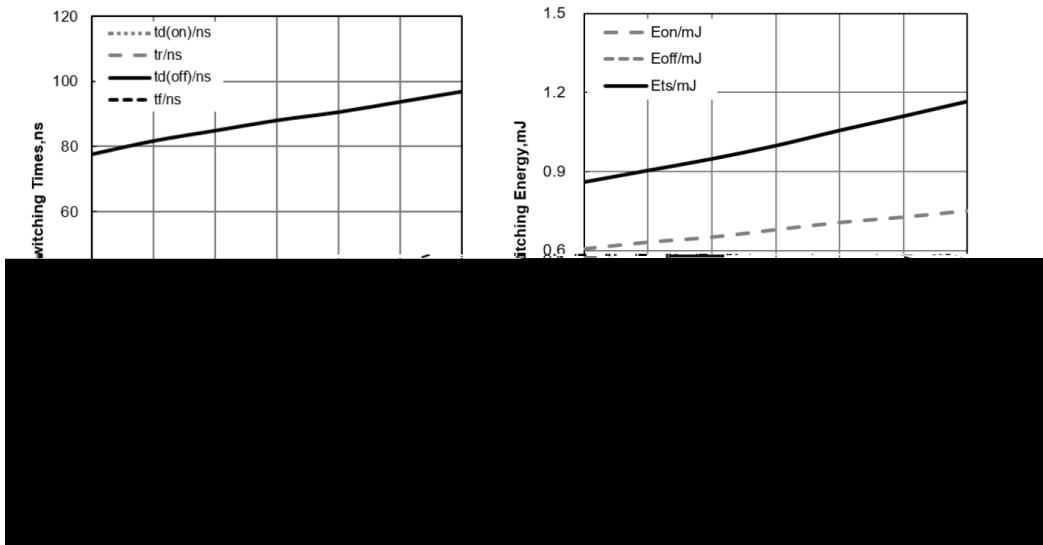
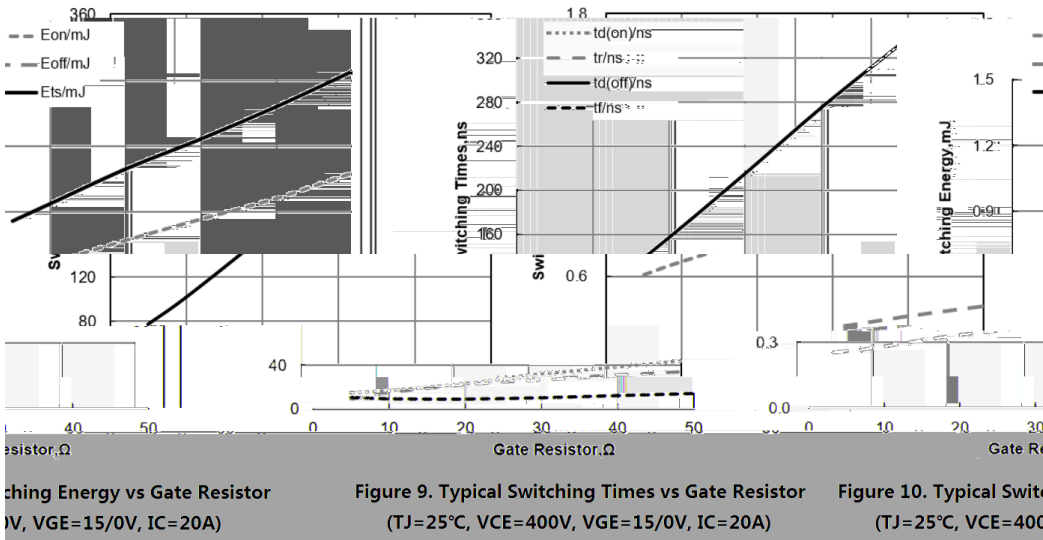
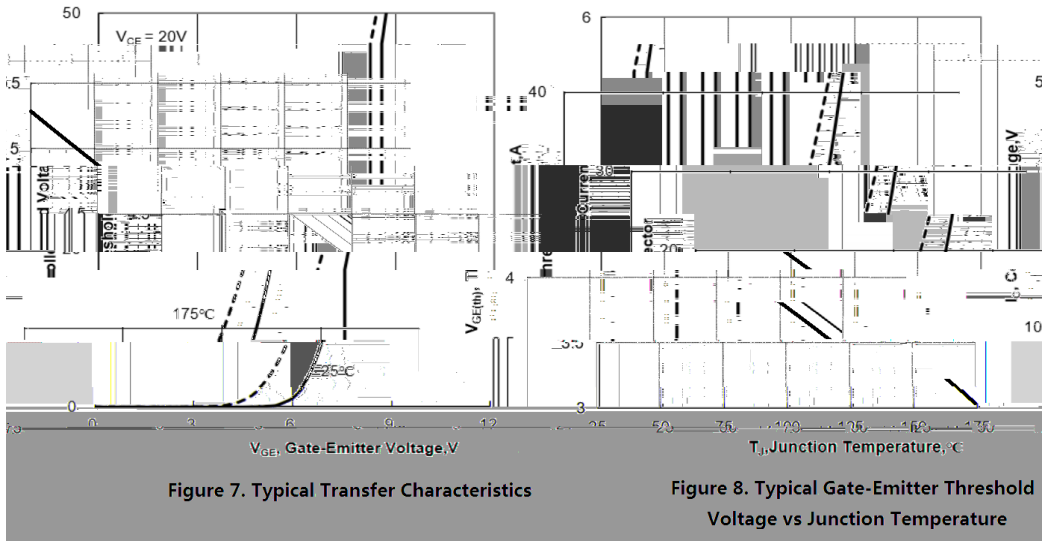


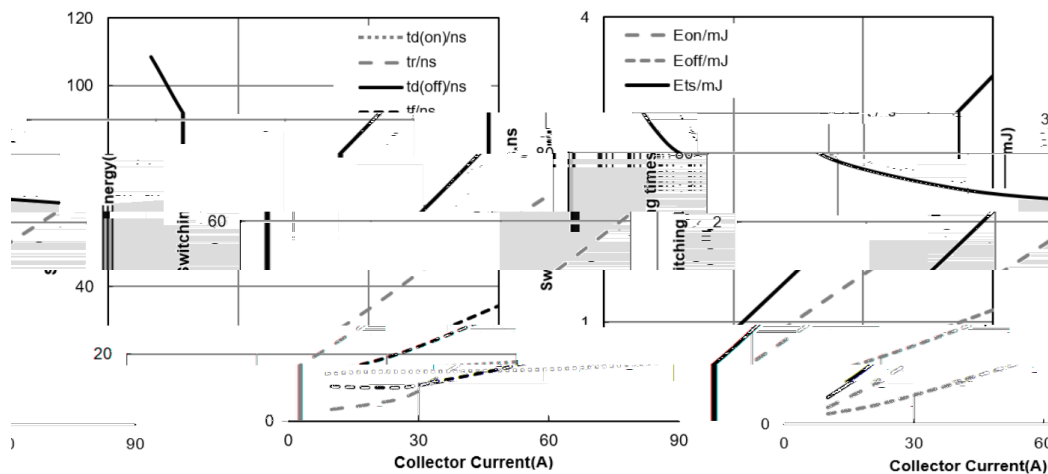
Figure 5. Typical Output Characteristics (ID=25°C)

Figure 6. Typical Output Characteristics (ID=100°C)

/ Electrical Characteristic Curve



/ Electrical Characteristic Curve



Energy vs Collector
VGE=15V

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

Figure 14. Typical Switching Energy
vs Collector Current (TJ=25°C, VCE=400V,

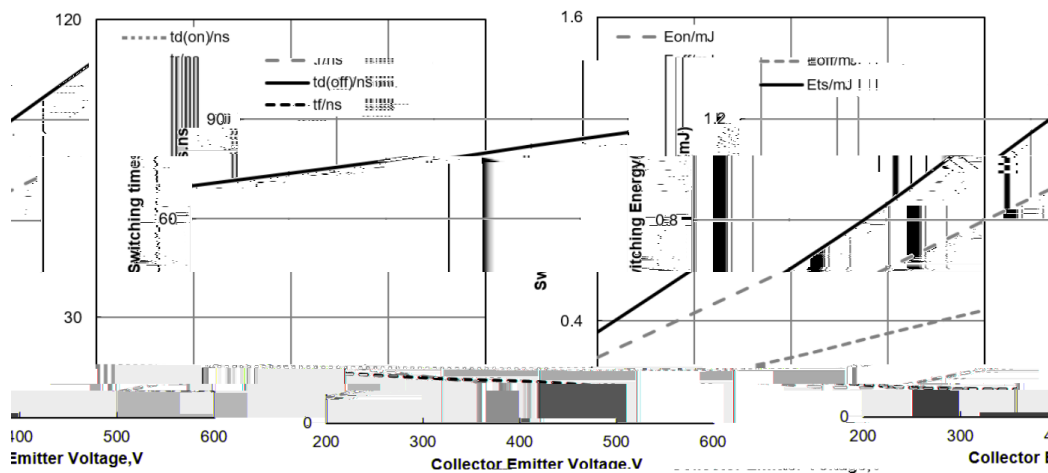


Figure 15. Typical Switching Times vs VCE
(TJ=25°C, VGE=15V, IC=20A)

Figure 16. Typical Switching Energy vs VCE
(TJ=25°C, VGE=15V, IC=20A)

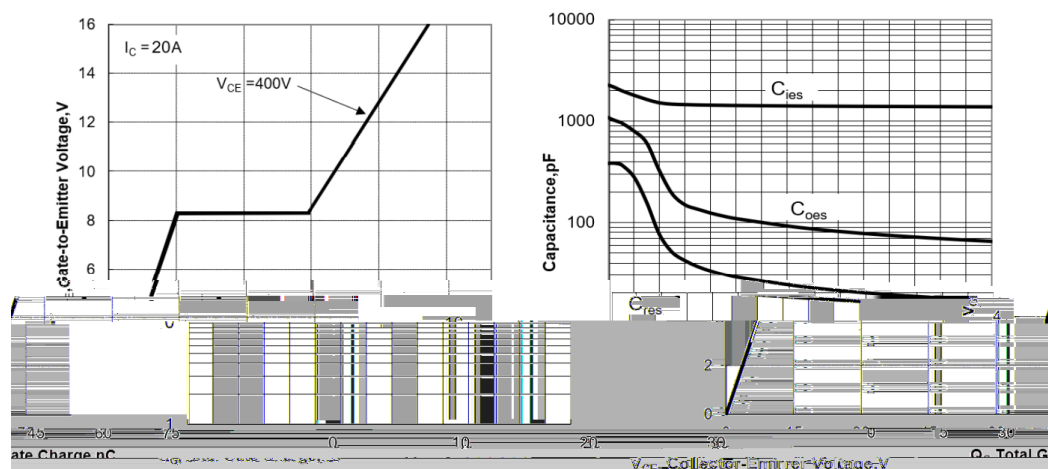


Figure 17. Typical Gate Charge

Figure 18. Typical Capacitance vs
Collector-Emmitter Voltage

/ Electrical Characteristic Curve

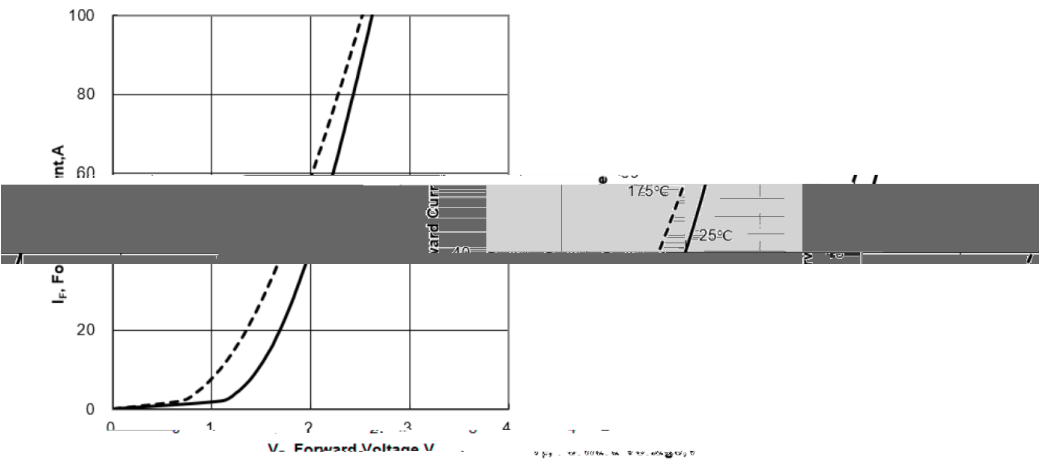
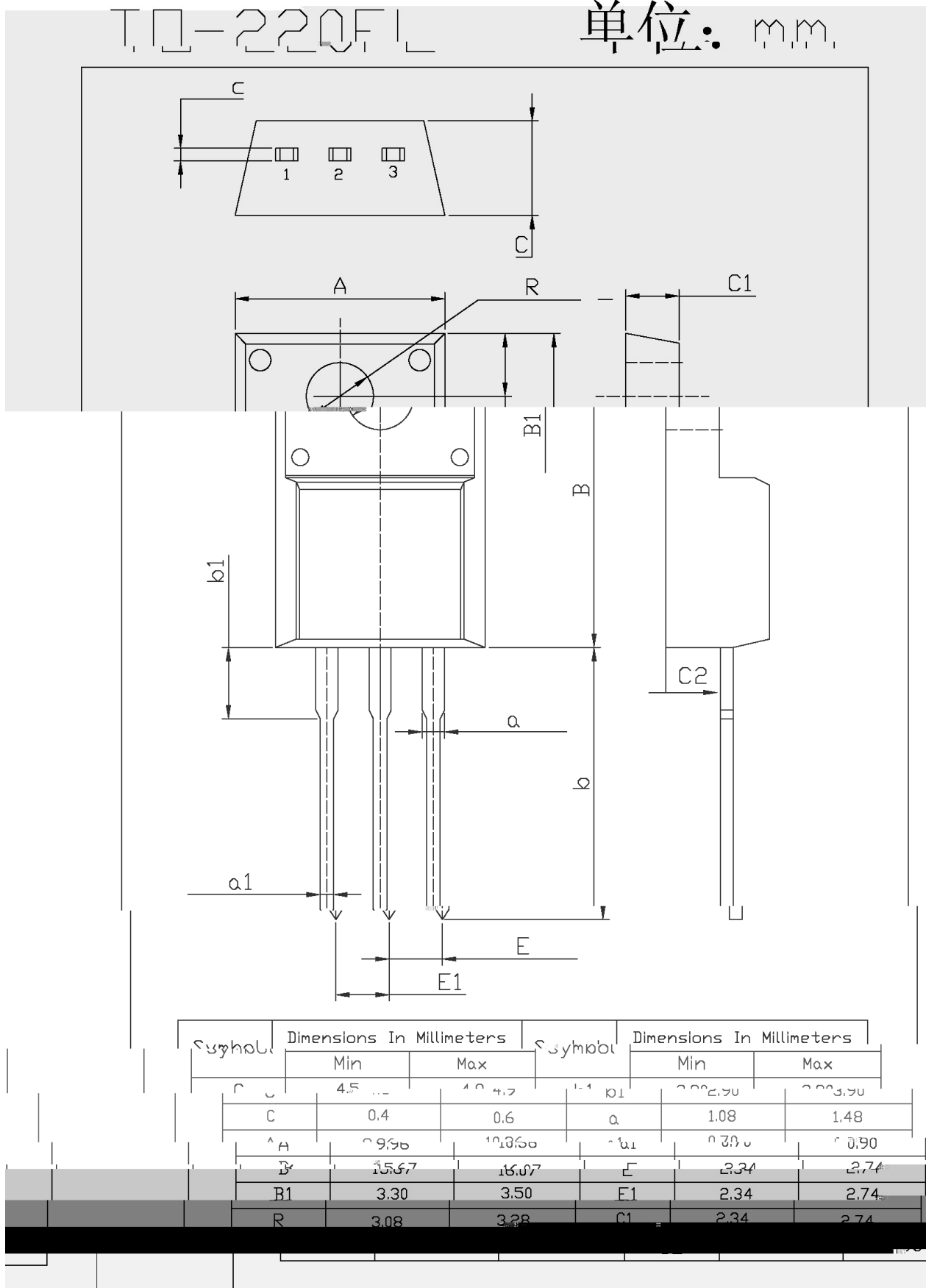


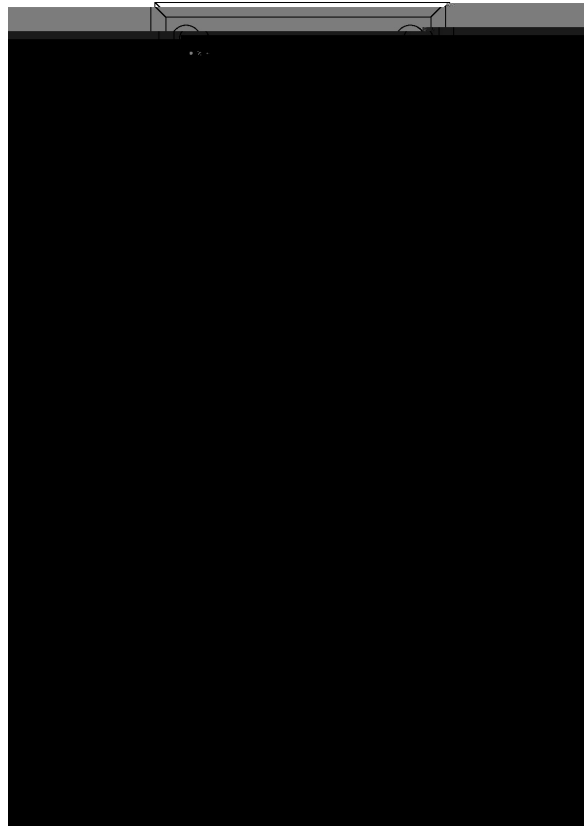
Figure 19. Typical Diode Forward Current
vs Forward Voltage

/ Package Dimensions





/ Marking Instructions



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