

**/ Descriptions**

TO-220FL

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

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

Low gate charge

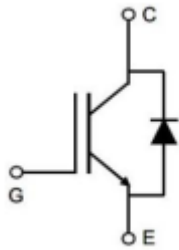
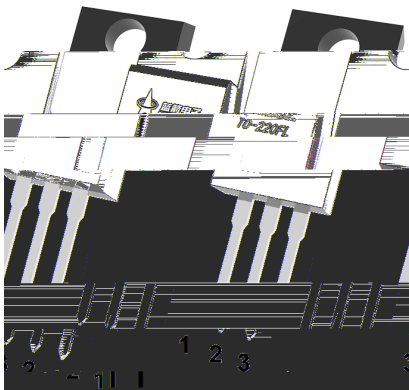
Trench FS Trench FS Technology

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 $t_p=8.3$ ms sinusoidal |            | $I_{FSM}$       | 120         | A    |
| Gate-Emitter Voltage                                         |            | $V_{GE}$        | $\pm 30$    | 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( $T_a=25$  )

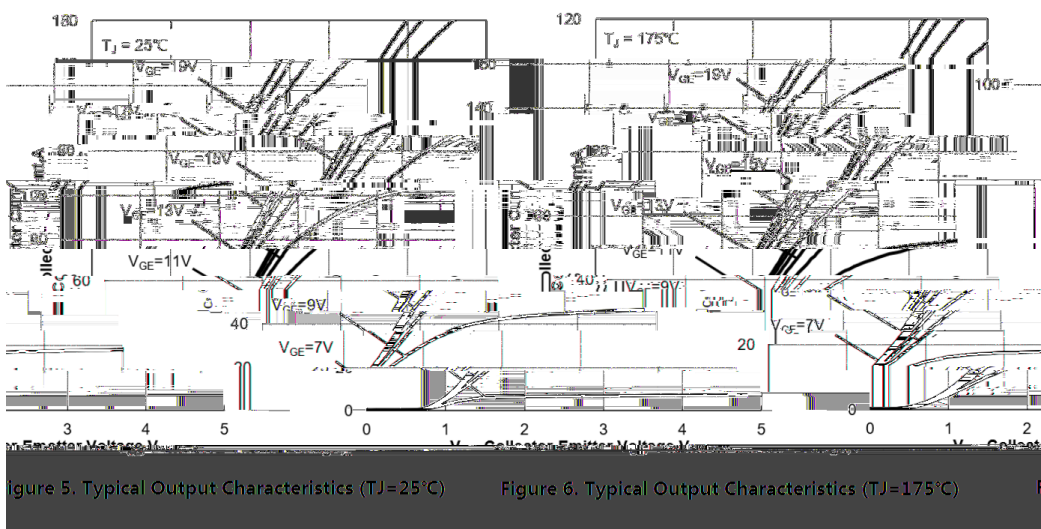
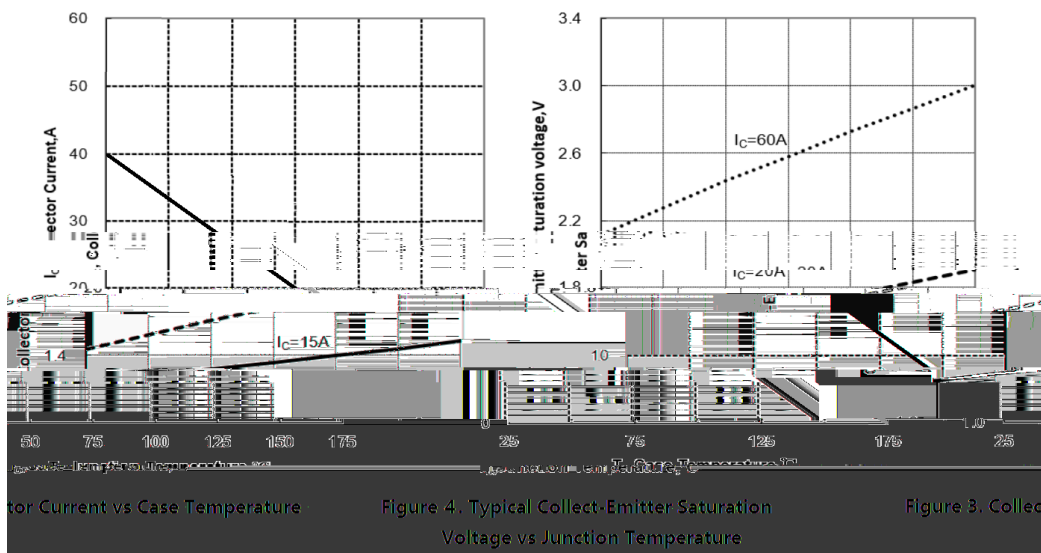
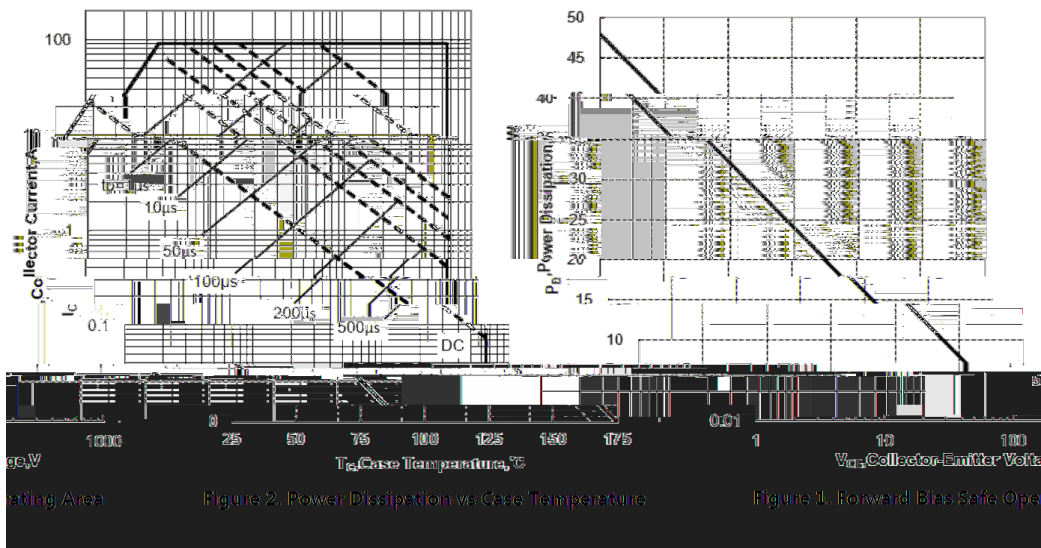
| Parameter                           | Symbol       | Test Conditions                            | Min | Typ | Max       | Unit    |
|-------------------------------------|--------------|--------------------------------------------|-----|-----|-----------|---------|
| Collector-Emitter Breakdown Voltage | $BV_{CES}$   | $I_C=250\mu A$ , $V_{GE}=0V$               | 650 |     |           | V       |
| Zero Gate Voltage Collector current | $I_{CES}$    | $V_{CE}=650V$ ,<br>$V_{GE}=0V$<br>$T_J=25$ |     |     | 35        | $\mu A$ |
| Gate-Emitter Leakage Current        | $I_{GES}$    | $V_{CE}=0V$ ,<br>$V_{GE}=\pm 20V$          |     |     | $\pm 200$ | 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

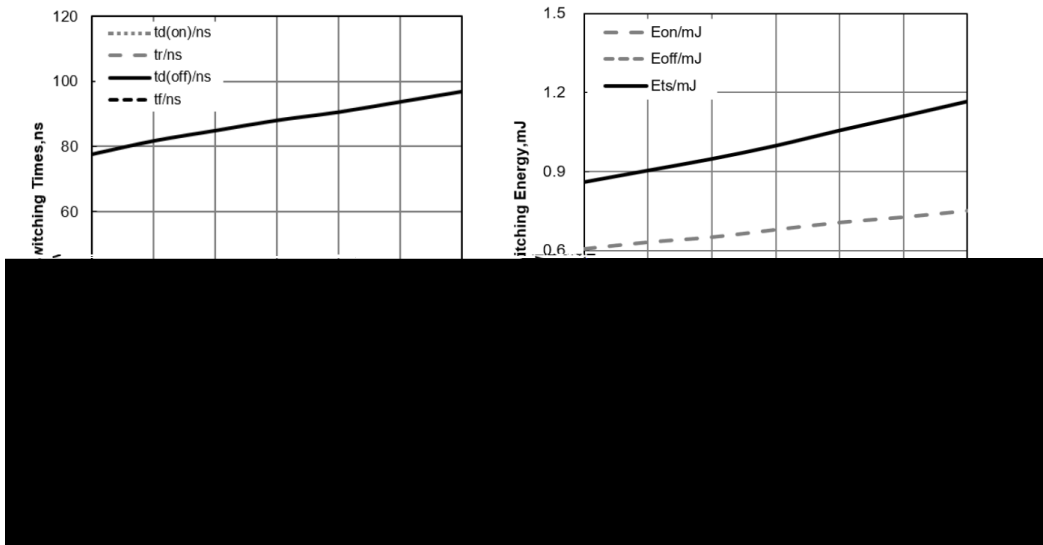
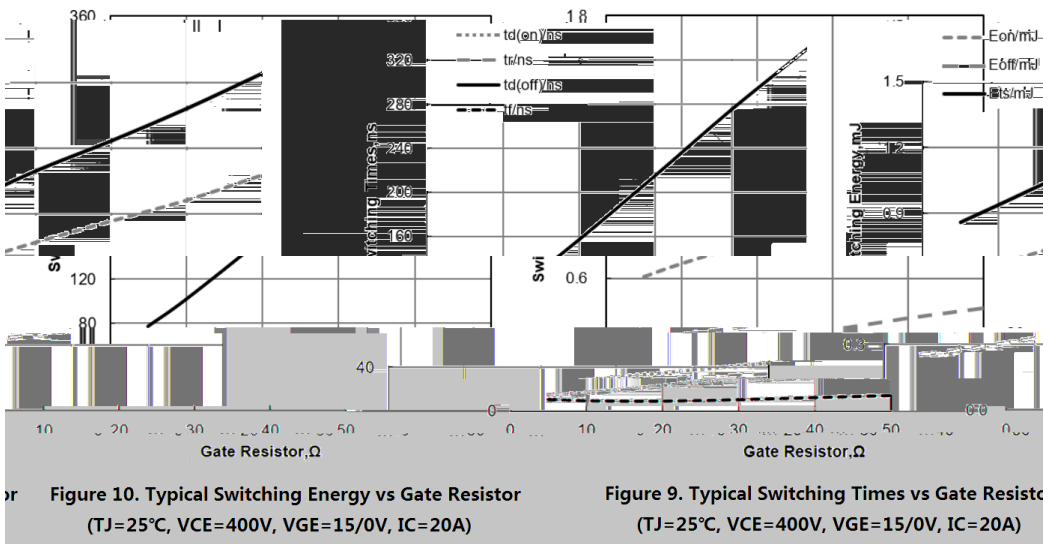
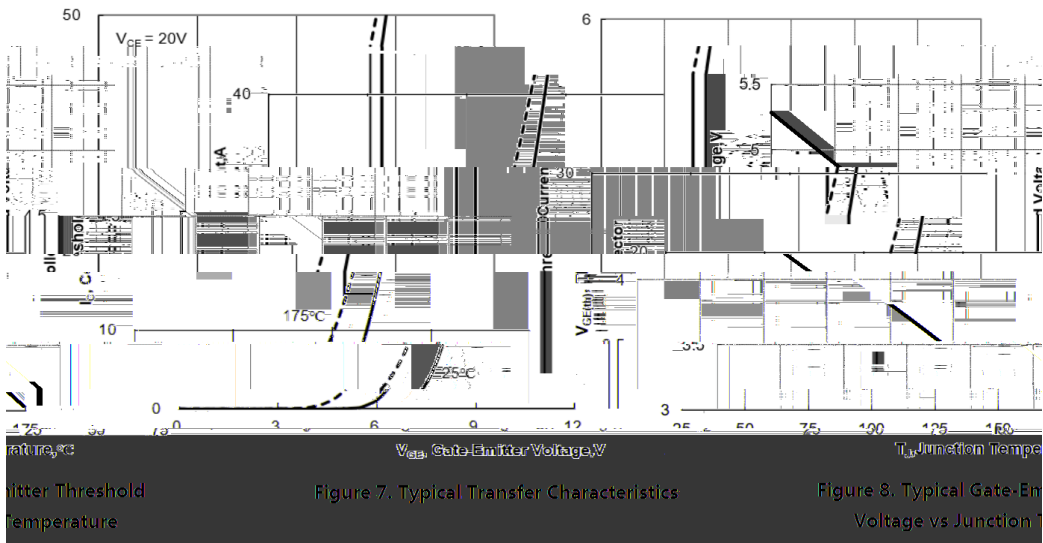
Rev.A Mar.-2026

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

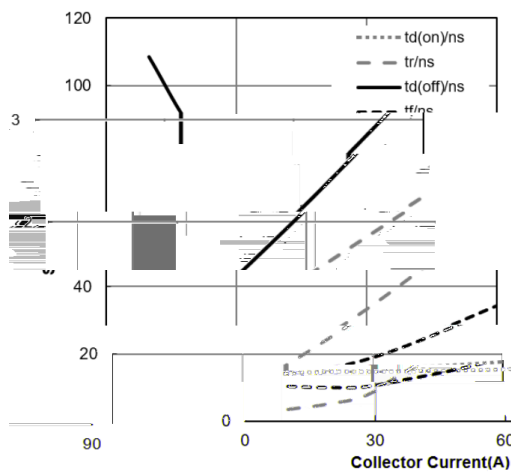
/ Electrical Characteristic Curve



/ Electrical Characteristic Curve



## / Electrical Characteristic Curve



vs Collector  
=15/0V)

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

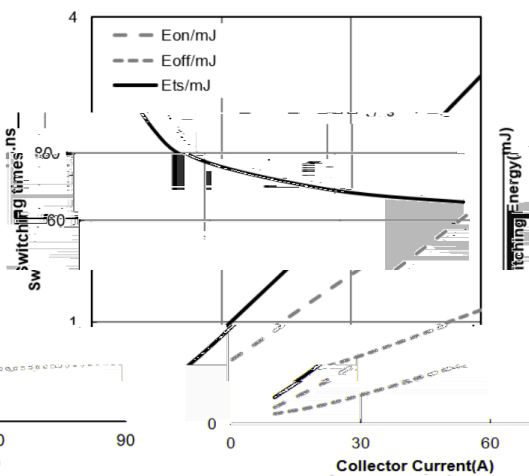


Figure 14. Typical Switching Energy vs Collector Current (TJ=25°C, VCE=400V, VGE=15/0V)

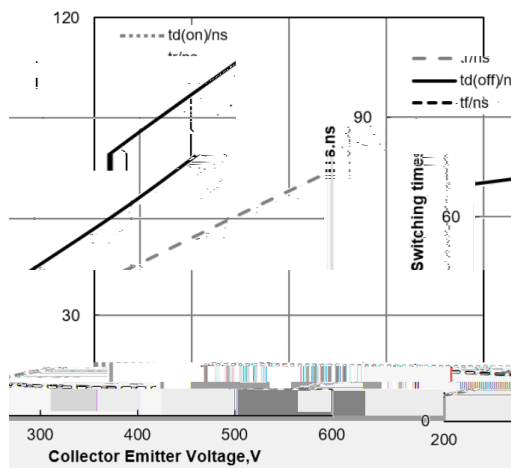


Figure 15. Typical Switching Times vs VCE (TJ=25°C, VGE=15/0V, IC=20A)

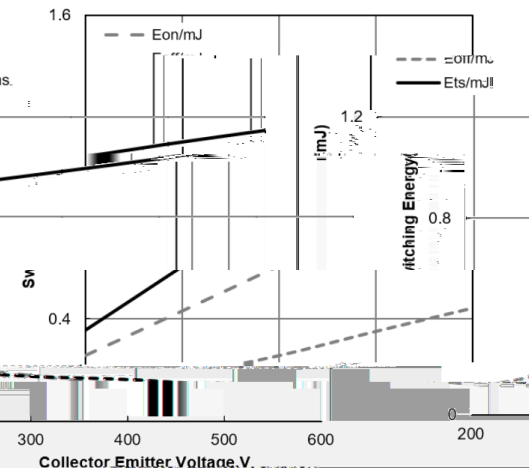
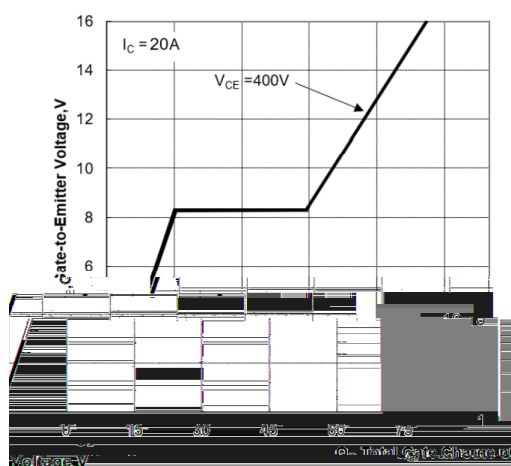


Figure 16. Typical Switching Energy vs VCE (TJ=25°C, VGE=15/0V, IC=20A)



Capacitance vs  
Voltage

Figure 17. Typical Gate Charge

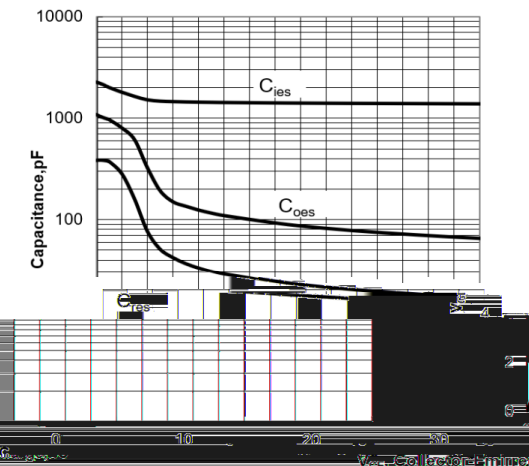


Figure 18. Typical Capacitance vs Collector-Emitter Voltage

/ Electrical Characteristic Curve

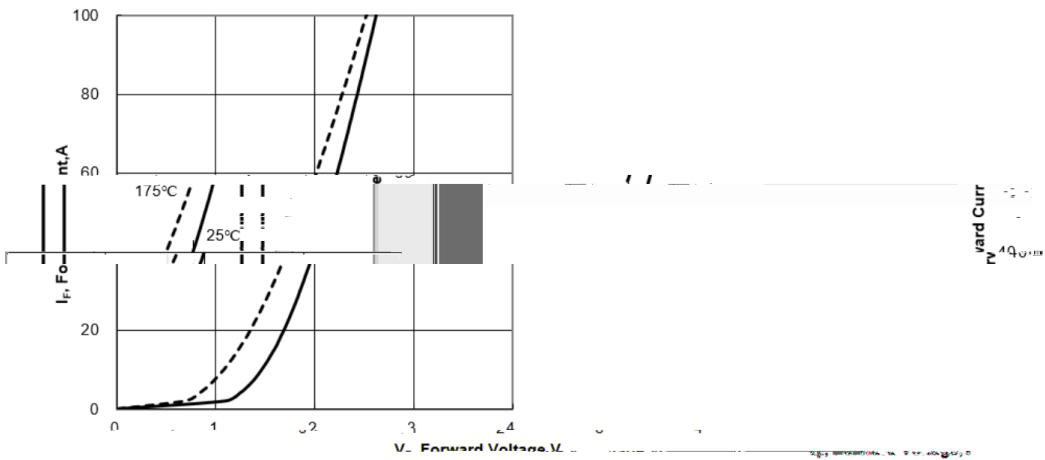
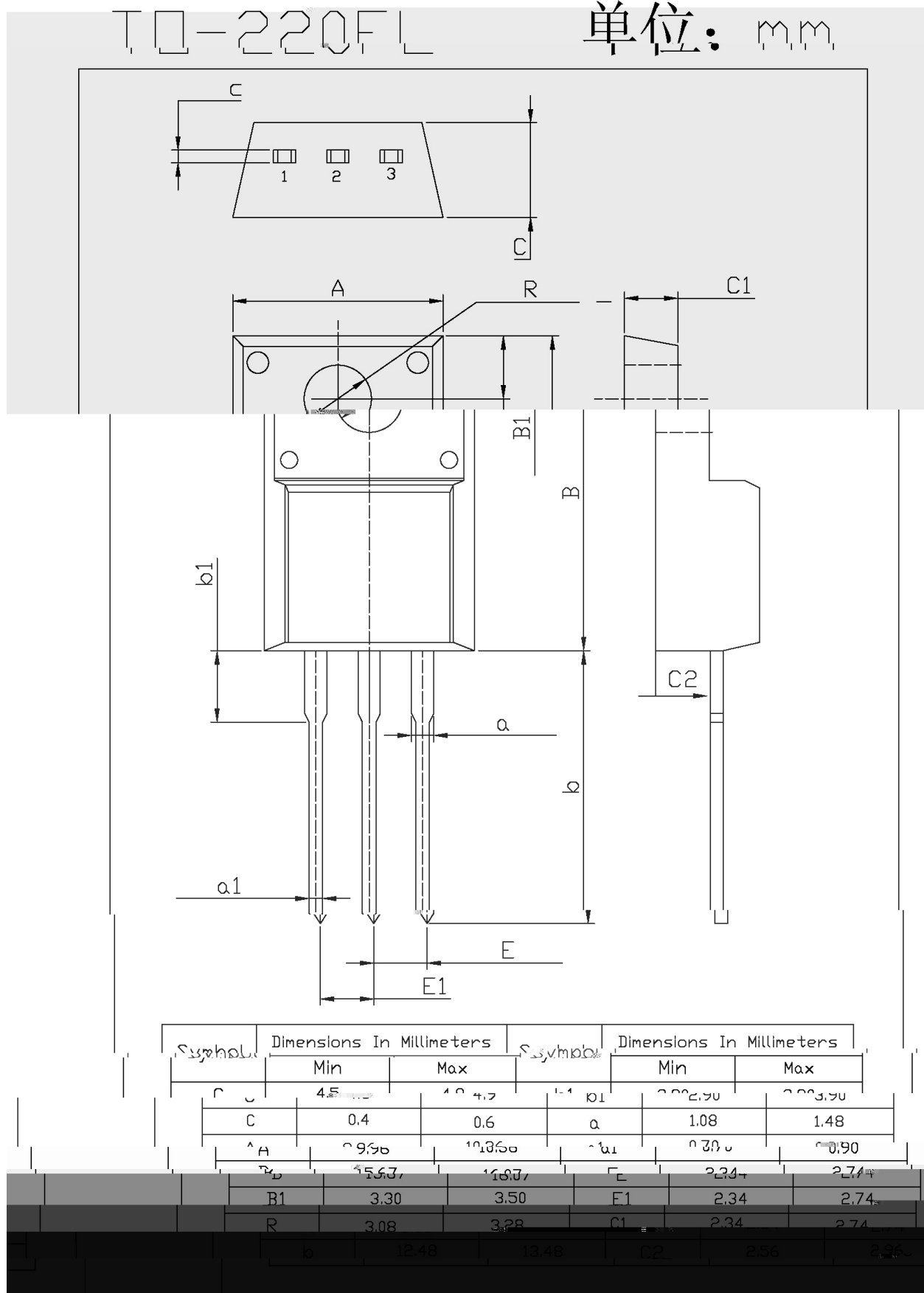
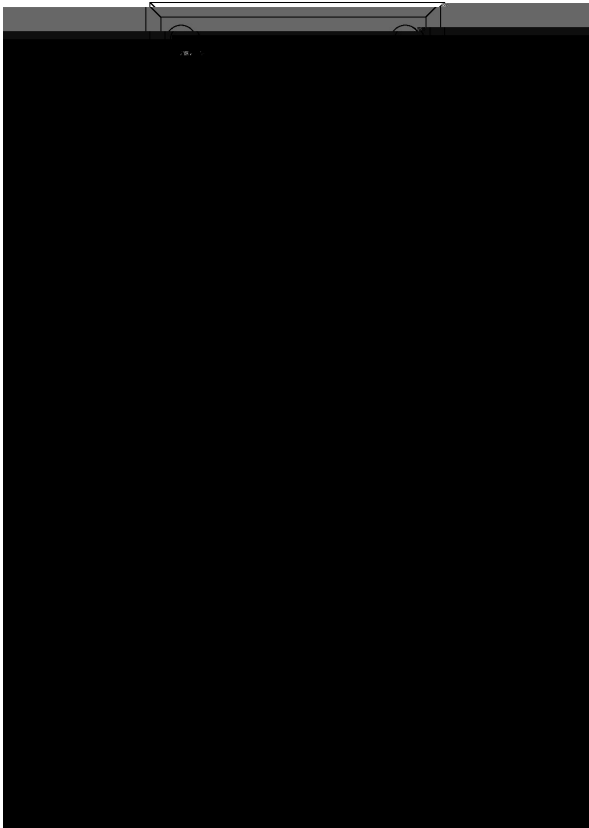


Figure 19. Typical Diode Forward Characteristics

/ Package Dimensions



/ Marking Instructions



9UR\$kyrC5xQ6SJPQPrC5xaLQ\$umA9dApEpPSQyQsAd@pPUep6D@pPUTQyPQ5m

