

# SOT-223 Plastic-Encapsulate Transistors

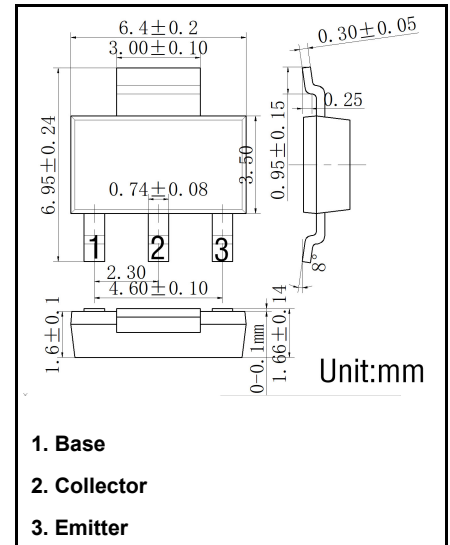
## FZT651 60 NPN Medium Power Transistor

### Features

- 60 Volt  $V_{CE0}$
- 3 Amp continuous current
- Low saturation voltage

COMPLEMENTARY TYPE – FZT751

PARTMARKING DETAIL – FZT651



### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Symbol    | Characteristic               | Value | Unit |
|-----------|------------------------------|-------|------|
| $V_{CBO}$ | Collector-Base Voltage       | 80    | V    |
| $V_{CEO}$ | Collector-Emitter Voltage    | 60    | V    |
| $V_{EBO}$ | Emitter-Base Voltage         | 5     | V    |
| $I_C$     | Continuous Collector Current | 3     | A    |
| $I_{CM}$  | Peak Pulse Current           | 6     | A    |

### Thermal Characteristics

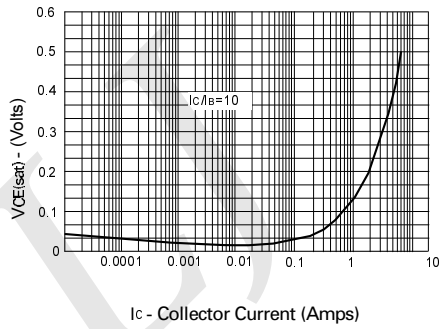
| Symbol         | Characteristic                                | Value       | Unit             |
|----------------|---|-------------|------------------|
| $P_D$          | Power Dissipation at $T_A = 25^\circ\text{C}$ | 2           | W                |
| $T_J, T_{STG}$ | Operating and Storage Temperature Range       | -55 to +150 | $^\circ\text{C}$ |

### Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

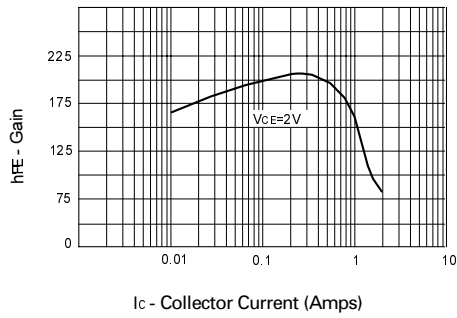
| Symbol        | Characteristic                                | Test Condition  | Min                   | Typ                     | Max                | Unit                           |
|---------------|---|---|-----------------------|-------------------------|--------------------|--------------------------------|
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage              | $I_C = 100\mu\text{A}$  | 80                    | –                       | –                  | V                              |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage (Note 2)  | $I_C = 10\text{mA}^*$   | 60                    | –                       | –                  | V                              |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage                | $I_E = 100\mu\text{A}$  | 5                     | –                       | –                  | V                              |
| $I_{CBO}$     | Collector Cut-off Current                     | $V_{CB} = 60\text{V}$<br>$V_{CB} = 60\text{V}, T_{amb} = 100^\circ\text{C}$   | –                     | –                       | 0.1<br>10          | $\mu\text{A}$<br>$\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-off Current                       | $V_{EB} = 4\text{V}$  | –                     | –                       | 0.1                | $\mu\text{A}$                  |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage (Note 2) | $I_C = 1\text{A}, I_B = 100\text{mA}^*$<br>$I_C = 3\text{A}, I_B = 300\text{mA}^*$  | –                     | 0.12<br>0.43            | 0.3<br>0.6         | V                              |
| $V_{BE(SAT)}$ | Base-Emitter Saturation Voltage (Note 2)      | $I_C = 1\text{A}, I_B = 100\text{mA}^*$   | –                     | 0.9                     | 1.25               | V                              |
| $V_{BE(ON)}$  | Base-Emitter Turn-On Voltage (Note 2)         | $I_C = 1\text{A}, V_{CE} = 2\text{V}^*$   | –                     | 0.8                     | 1.0                | mV                             |
| $h_{FE}$      | DC Current Gain (Note 2)                      | $I_C = 50\text{mA}, V_{CE} = 2\text{V}^*$<br>$I_C = 500\text{mA}, V_{CE} = 2\text{V}^*$<br>$I_C = 1\text{A}, V_{CE} = 2\text{V}^*$<br>$I_C = 2\text{A}, V_{CE} = 2\text{V}^*$ | 70<br>100<br>80<br>40 | 200<br>200<br>170<br>80 | –<br>300<br>–<br>– |                                |
| $f_T$         | Current Gain-Bandwidth Product (Note 2)       | $V_{CE} = 5\text{V}, I_C = 100\text{mA}$<br>$f = 100\text{MHz}$   | 140                   | 175                     | –                  | MHz                            |
| $t_{on}$      | Turn-On Time                                  | $V_{CC} = 10\text{V}, I_C = 500\text{mA}$   | –                     | 45                      | –                  | nA                             |
| $t_{off}$     | Turn-Off Time                                 | $I_{B1} = I_{B2} = 50\text{mA}$   | –                     | 800                     | –                  | nA                             |
| $C_{obo}$     | Output Capacitance (Note 2)                   | $V_{CB} = 10\text{V}, f = 1\text{MHz}$  | –                     | –                       | 30                 | pF                             |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$   
Spice parameter data is available upon request for this device

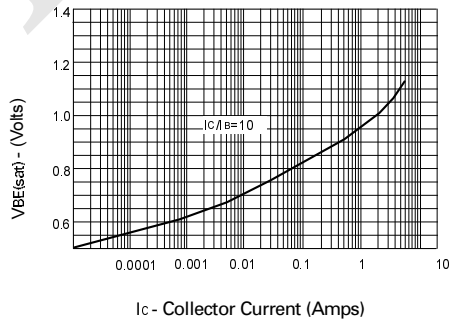
# Typical Characteristics



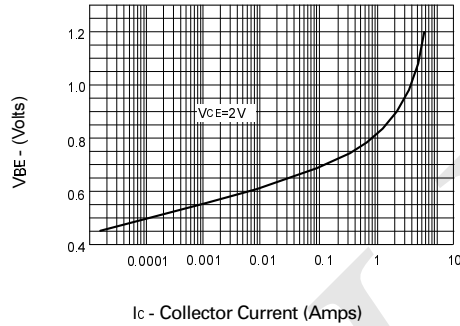
**$V_{CE(sat)}$  v  $I_C$**



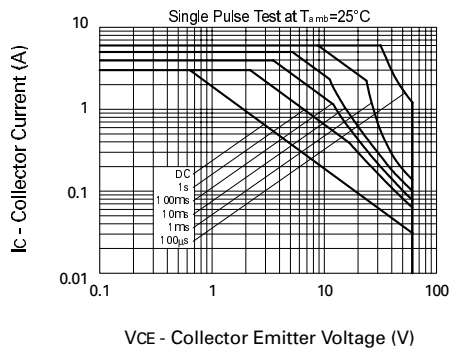
**$h_{FE}$  v  $I_C$**



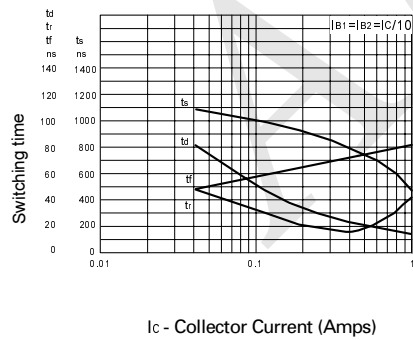
**$V_{BE(sat)}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**



**Safe Operating Area**



**Switching Speeds**