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## TIP32E

### Silicon PNP Transistor

### General Purpose Amp, Switch

### TO-220 Type Package

**Features:**

- Collector–Emitter Sustaining Voltage:  $V_{CE(sus)} = 140V$  Min
- Current Gain Bandwidth Product:  $f_T = 3MHz$  Min @  $I_C = 1A$

**Absolute Maximum Ratings:**

|  |                               |
|--|-------------------------------|
| Collector–Emitter Voltage, $V_{CEO}$ .....             | 140V                          |
| Collector–Base Voltage, $V_{CBO}$ .....                | 180V                          |
| Emitter–Base Voltage, $V_{EBO}$ .....                  | 5V                            |
| Continuous Current, $I_C$                              |                               |
| Continuous .....                                       | 3A                            |
| Pulse .....  | 5A                            |
| Base Current, $I_B$ .....                              | 1A                            |
| Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ ..... | 40W                           |
| Derate Above $+25^\circ C$ .....                       | $0.32W/^\circ C$              |
| Operating Junction Temperature Range, $T_J$ .....      | $-65^\circ$ to $+150^\circ C$ |
| Storage Temperature Range, $T_{stg}$ .....             | $-65^\circ$ to $+150^\circ C$ |
| Thermal Resistance, Junction–to–Case, $R_{thJC}$ ..... | $3.125^\circ C/W$             |

**Electrical Characteristics:** ( $T_C = +25^\circ C$  unless otherwise specified)

| Parameter                            | Symbol        | Test Conditions                | Min | Typ | Max | Unit |
|--------------------------------------|---------------|--------------------------------|-----|-----|-----|------|
| <b>OFF Characteristics</b>           |               |                                |     |     |     |      |
| Collector–Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = 30mA, I_B = 0$ , Note 1 | 140 | –   | –   | V    |
| Collector Cutoff Current             | $I_{CEO}$     | $V_{CE} = 90V, I_B = 0$        | –   | –   | 0.3 | mA   |
|                                      | $I_{CES}$     | $V_{CE} = 180V, V_{BE} = 0$    | –   | –   | 0.2 | mA   |
| Emitter–Base Cutoff Current          | $I_{EBO}$     | $V_{EB} = 5V, I_C = 0$         | –   | –   | 1.0 | mA   |
| <b>ON Characteristics</b> (Note 1)   |               |                                |     |     |     |      |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = 4V, I_C = 1A$        | 25  | –   | –   |      |
|                                      |               | $V_{CE} = 4V, I_C = 3A$        | 5   | –   | –   |      |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 3A, I_B = 750mA$        | –   | –   | 2.5 | V    |
| Base–Emitter ON Voltage              | $V_{BE(on)}$  | $V_{CE} = 4V, I_C = 3A$        | –   | –   | 1.8 | V    |

Note 1. Pulsed: Pulse Duration  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

**Electrical Characteristics (Cont'd):** ( $T_C = +25^\circ\text{C}$  unless otherwise specified)

| Parameter                        | Symbol    | Test Conditions  | Min | Typ | Max | Unit          |
|----------------------------------|-----------|--|-----|-----|-----|---------------|
| <b>Dynamic Characteristics</b>   |           |  |     |     |     |               |
| Current Gain Bandwidth Product   | $f_T$     | $V_{CE} = 10\text{V}, I_C = 500\text{mA}, f = 1\text{MHz}$   | 3   | -   | -   | MHz           |
| Small Signal Current Gain        | $h_{fe}$  | $V_{CE} = 10\text{V}, I_C = 500\text{mA}, f = 1\text{kHz}$   | 20  | -   | -   |               |
| <b>Switching Characteristics</b> |           |  |     |     |     |               |
| Turn On Time                     | $t_{on}$  | $I_C = 1\text{A}, I_{B1} = -I_{B2} = 0.1\text{A},$<br>$V_{BE(off)} = -4.3\text{V}, R_L = 30\Omega$ | -   | -   | 0.6 | $\mu\text{s}$ |
| Turn Off Time                    | $t_{off}$ |  | -   | -   | 2.8 | $\mu\text{s}$ |

Note 1. Pulsed: Pulse Duration  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

Note 2.  $f_T = |h_{fe}| \cdot f_{TEST}$

