



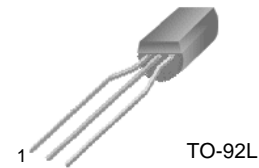
November 2014

# KSC2331

## NPN Epitaxial Silicon Transistor

### Features

- Low-Frequency Amplifier and Medium Speed Switching
- Complement to KSA931
- High Collector-Base Voltage:  $V_{CBO} = 80\text{ V}$
- Collector Current:  $I_C = 700\text{ mA}$



1. Emitter 2. Collector 3. Base

### Ordering Information

| Part Number | Top Mark | Package  | Packing Method |
|-------------|----------|----------|----------------|
| KSC2331YTA  | C2331 Y- | TO-92 3L | Ammo           |

### Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol    | Parameter                 | Value       | Unit             |
|-----------|---------------------------|-------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage    | 80          | V                |
| $V_{CEO}$ | Collector-Emitter Voltage | 60          | V                |
| $V_{EBO}$ | Emitter-Base Voltage      | 8           | V                |
| $I_C$     | Collector Current         | 700         | mA               |
| $T_J$     | Junction Temperature      | 150         | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature       | -55 to +150 | $^\circ\text{C}$ |

**Thermal Characteristics<sup>(1)</sup>**

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                               | Value | Unit                      |
|-----------------|---|-------|---------------------------|
| $P_D$           | Power Dissipation                       | 1     | W                         |
|                 | Derate Above $25^\circ\text{C}$         | 8.0   | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 125   | $^\circ\text{C}/\text{W}$ |

**Note:**

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

**Electrical Characteristics**

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol        | Parameter                            | Conditions   | Min. | Typ. | Max. | Unit          |
|---------------|--------------------------------------|--|------|------|------|---------------|
| $BV_{CBO}$    | Collector-Base Breakdown Voltage     | $I_C = 100 \mu\text{A}$ , $I_E = 0$                          | 80   |      |      | V             |
| $BV_{CEO}$    | Collector-Emitter Breakdown Voltage  | $I_C = 10 \text{ mA}$ , $I_B = 0$                            | 60   |      |      | V             |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage       | $I_E = 10 \mu\text{A}$ , $I_C = 0$                           | 8    |      |      | V             |
| $I_{CBO}$     | Collector Cut-Off Current            | $V_{CB} = 60 \text{ V}$ , $I_E = 0$                          |      |      | 0.1  | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-Off Current              | $V_{EB} = 5 \text{ V}$ , $I_C = 0$                           |      |      | 0.1  | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 2 \text{ V}$ , $I_C = 50 \text{ mA}$               | 40   |      | 240  |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 500 \text{ mA}$ , $I_B = 50 \text{ mA}$               |      | 0.2  | 0.7  | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = 500 \text{ mA}$ , $I_B = 50 \text{ mA}$               |      | 0.86 | 1.20 | V             |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 10 \text{ V}$ , $I_C = 50 \text{ mA}$              | 30   | 50   |      | MHz           |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = 10 \text{ V}$ , $I_E = 0$ ,<br>$f = 1 \text{ MHz}$ |      | 8    |      | pF            |

 **$h_{FE}$  Classification**

| Classification | R       | O        | Y         |
|----------------|---------|----------|-----------|
| $h_{FE}$       | 40 ~ 80 | 70 ~ 140 | 120 ~ 240 |

Typical Performance Characteristics

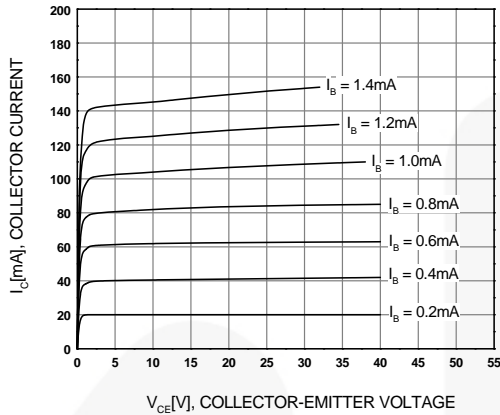


Figure 1. Static Characteristic

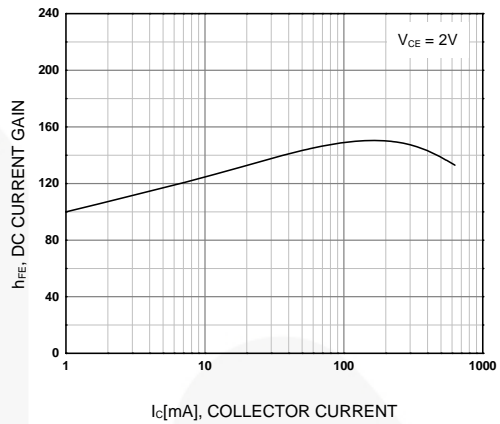


Figure 2. DC Current Gain

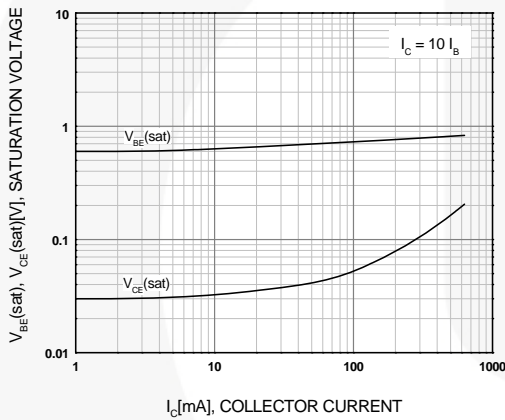


Figure 3. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

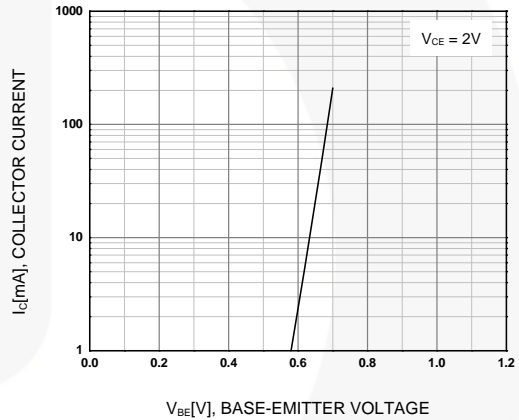


Figure 4. Base-Emitter On Voltage

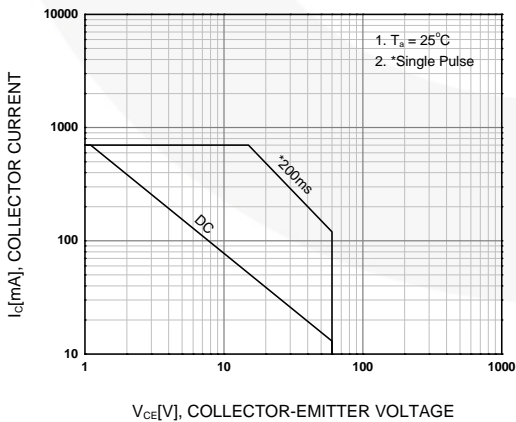


Figure 5. Safe Operating Area

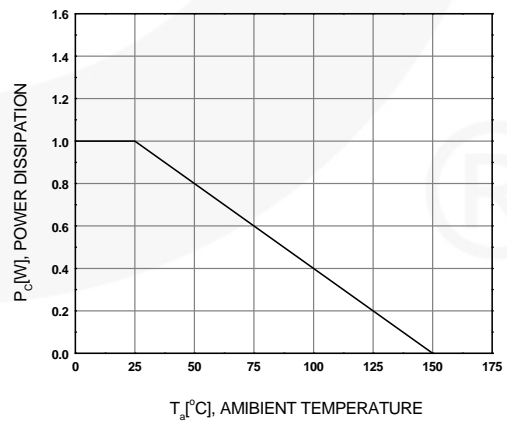
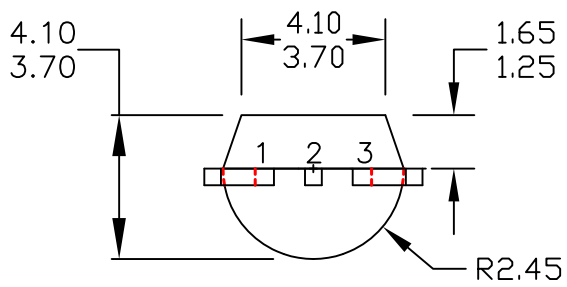
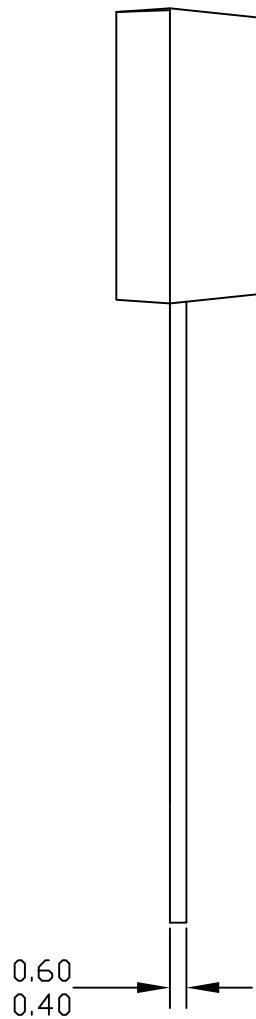
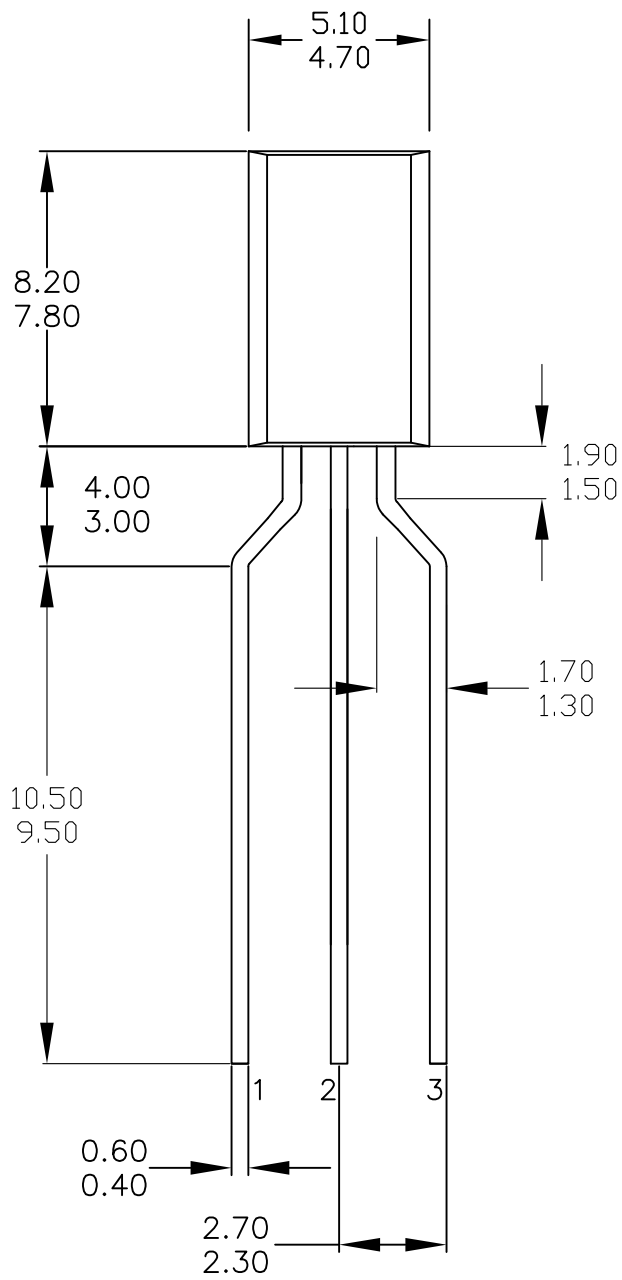


Figure 6. Power Derating








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