



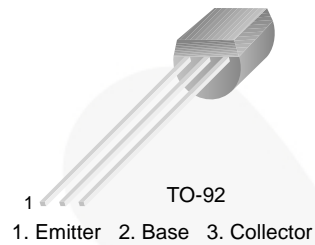
November 2014



# KSC945 NPN Epitaxial Silicon Transistor

## Features

- Audio Frequency Amplifier and High-Frequency OSC.
- Complimentary to KSA733
- Collector-Base Voltage:  $V_{CBO} = 60\text{ V}$
- High Current Gain Bandwidth Product:  $f_T = 300\text{ MHz}$  (Typical)
- Suffix “-C” means Center Collector (1. Emitter 2. Collector 3. Base)



## Ordering Information

| Part Number | Top Mark | Package  | Packing Method |
|-------------|----------|----------|----------------|
| KSC945YBU   | C945     | TO-92 3L | Bulk           |
| KSC945YTA   | C945     | TO-92 3L | Ammo           |
| KSC945GTA   | C945     | TO-92 3L | Ammo           |
| KSC945CYTA  | C945     | TO-92 3L | Ammo           |
| KSC945CGBU  | C945     | TO-92 3L | Bulk           |
| KSC945CGTA  | C945     | 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    | 60         | V                |
| $V_{CEO}$ | Collector-Emitter Voltage | 50         | V                |
| $V_{EBO}$ | Emitter-Base Voltage      | 5          | V                |
| $I_C$     | Collector Current         | 150        | 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                       | 250   | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 2.0   | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 500   | $^\circ\text{C}/\text{W}$ |

**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     | $I_C = 100 \mu\text{A}$ , $I_E = 0$   | 60   |      |      | V             |
| $BV_{CEO}$    | Collector-Emitter Breakdown Voltage  | $I_C = 10 \text{ mA}$ , $I_B = 0$   | 50   |      |      | V             |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage       | $I_E = 10 \mu\text{A}$ , $I_C = 0$  | 5    |      |      | V             |
| $I_{CBO}$     | Collector Cut-Off Current            | $V_{CB} = 40 \text{ V}$ , $I_E = 0$   |      |      | 0.1  | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-Off Current              | $V_{EB} = 3 \text{ V}$ , $I_C = 0$  |      |      | 0.1  | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 6 \text{ V}$ , $I_C = 1.0 \text{ mA}$   | 40   |      | 700  |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 100 \text{ mA}$ , $I_B = 10 \text{ mA}$  |      | 0.15 | 0.30 | V             |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 6 \text{ V}$ , $I_C = 10 \text{ mA}$  |      | 300  |      | MHz           |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = 6 \text{ V}$ , $I_E = 0$ ,<br>$f = 1 \text{ MHz}$                                   |      | 2.5  |      | pF            |
| NF            | Noise Figure                         | $V_{CE} = 6 \text{ V}$ , $I_C = 0.5 \text{ mA}$ ,<br>$f = 1 \text{ kHz}$ , $R_S = 500 \Omega$ |      | 4.0  |      | dB            |

 **$h_{FE}$  Classification**

| Classification | R       | O        | Y         | G         | L         |
|----------------|---------|----------|-----------|-----------|-----------|
| $h_{FE}$       | 40 ~ 80 | 70 ~ 140 | 120 ~ 240 | 200 ~ 400 | 350 ~ 700 |

Typical Performance Characteristics

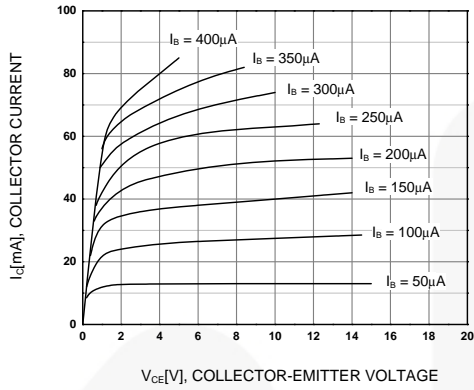


Figure 1. Static Characteristic

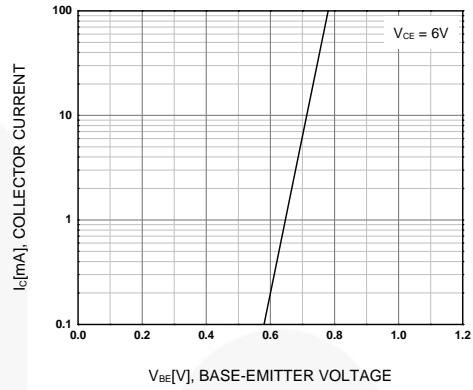


Figure 2. Transfer Characteristic

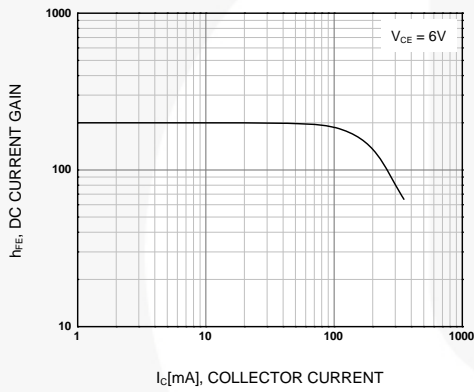


Figure 3. DC Current Gain

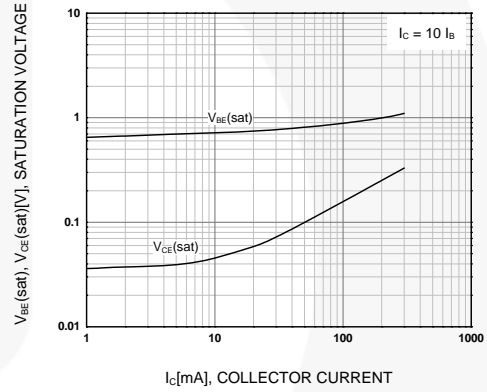


Figure 4. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

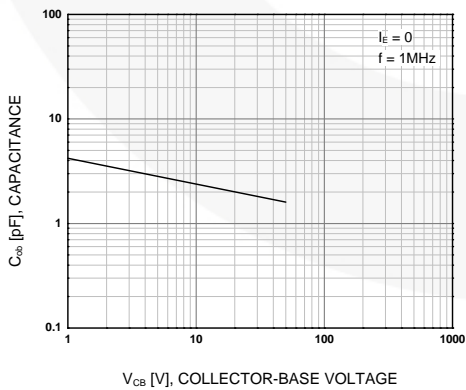


Figure 5. Output Capacitance

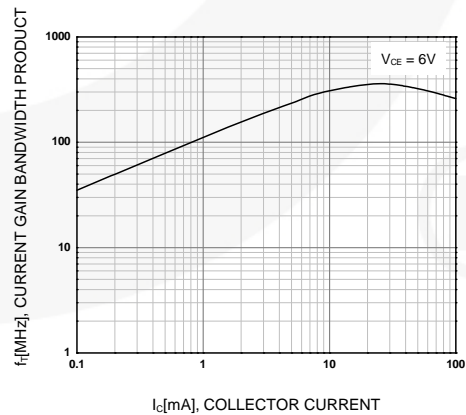
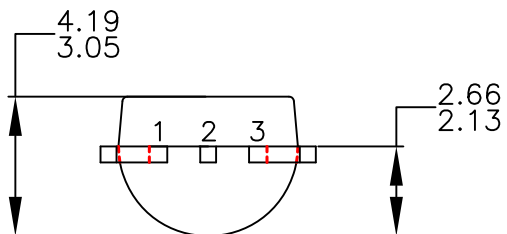


Figure 6. Current Gain Bandwidth Product



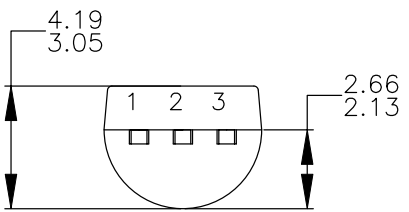
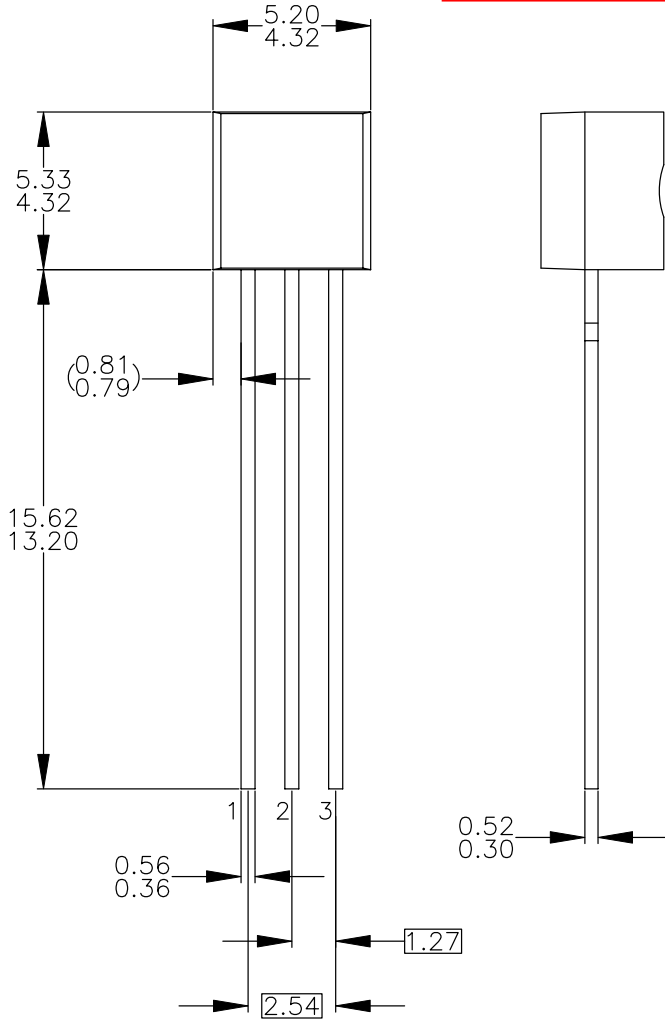
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- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
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**APPROVED**  
 July-14-2008

| REVISIONS |   |          |           |
|-----------|---|----------|-----------|
| NO.       | DESCRIPTION   | DATE     | NAME/SITE |
| A         | RELEASE TO DOCUMENT CONTROL   | MAR.4'96 | RP        |
| B         | RDRW AS PER STD DWG TEMPLATE. CHG DIM REF FR DUAL DIM INCH(MM) TO SINGLE DIM MM. CHG LD PITCH DIM FR 1.14-1.40 TO 1.27 BSC. ADD DIM 2.54 BSC. CHG PKG WIDTH DIM FR 4.32- 4.70 TO 4.32-4.83; CHG PKG HEIGHT DIM FR 4.32-4.70 TO 4.32-4.78; CHG LD THICK DIM FR 0.30- 0.48 TO 0.30-0.52; DAMBAR-PKG DIM FR 1.27-1.65 TO 0.90-1.65; LD LGH DIM FR 14.47-15.64 TO 14.47-15.62; PKG DIM: 1.02-1.52 TO 0.92-1.52, 3.81-4.45 TO 3.40-4.80; NOTE 2: ADD DMOS "M" OPT'N AND LEGEND; NOTE B PKG 94 JFET OPT'N: CHG D TO S, CHG S TO D. ADD NOTE C. MOVE NOTE B INFO FR PKG 97&98 TO NEW NOTE D. | 4OCT1999 | RCM/MRG   |
| 3         | CHG LD LEN FR <del>1.81</del> TO <del>1.88</del> ; CHG MOLD BODY HT FR <del>1.33</del> TO <del>1.33</del> ; CHG PKG EDGE TO LD EDGE DIST FR (0.81) TO (0.81); CHG MOLD BODY WIDTH FR <del>1.33</del> TO <del>1.33</del> ; ADD PKG THICKNESS DIM "E"; CHG "S" DIM FR <del>2.13</del> TO <del>2.13</del> ; REMOVE DAMBAR & EJECTOR PIN LOCATOR FEATURES & DIMENSIONS; REMOVE MOLDED SURFACE & DRAFT ANGLE DIMS; ADD NOTE ON JEDEC REFERENCE; ADD NOTE ON ASME Y14.5M-1994; REMOVE NOTE ON L34Z OPTION; ADD NOTE ON DWG FILENAME.  | 12FEB08  | BMR/FSCP  |



- NOTES: UNLESS OTHERWISE SPECIFIED
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  - B) ALL DIMENSIONS ARE IN MILLIMETERS.
  - C) DRAWING CONFORMS TO ASME Y14.5M-1994.
  - D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

| PIN | 92 |   |   | 94 |   |   | 96 |   |   | 97 |   |   | 98 |   |   |
|-----|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|
|     | P  | F | M | P  | F | M | B  | F | M | P  | F | M | P  | F | M |
| 1   | E  | S | S | E  | S | S | B  | D | G | C  | G | D | C  | G | D |
| 2   | B  | D | G | C  | G | D | E  | S | S | B  | D | G | E  | S | S |
| 3   | C  | G | D | B  | D | G | C  | G | D | E  | S | S | B  | D | G |

LEGEND:

|             |               |            |
|-------------|---------------|------------|
| P - BIPOLAR | E - EMITTER   | D - DRAIN  |
| F - JFET    | B - BASE      | S - SOURCE |
| M - DMOS    | C - COLLECTOR | G - GATE   |






- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-ZA03DREV3.

|                                |           |   |
|--------------------------------|-----------|---|
| APPROVALS                      | DATE      | <br><b>FAIRCHILD</b><br>SEMICONDUCTOR™  |
| DRAWN:<br>J.U. COMPARATIVO JR. | 03APR2008 |   |
| CHECKED:<br>L. GALERA          |           |   |
| APPROVED:<br>M.R. GESTOLE      |           |   |
| G.S. BAJE                      |           | <b>3LD, TO-92, MOLDED<br/>         STD STRAIGHT LD<br/>         (NO EOL CODE)</b> |
|                                |           | SCALE: 1:1<br>SIZE: N/A<br>DRAWING NUMBER: MKT-ZA03D<br>FORMERLY: N/A             |
|                                |           | REV: 3<br>SHEET: 1 OF 1   |



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