

# NPN Epitaxial Silicon Transistor

## KSC1845

### Features

- Audio Frequency Low-Noise Amplifier
- Complement to KSA992
- This is a Pb-Free Device

### MAXIMUM RATINGS (Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.)

| Symbol    | Parameter                 | Value      | Unit             |
|-----------|---------------------------|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage    | 120        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage | 120        | V                |
| $V_{EBO}$ | Emitter-Base Voltage      | 5          | V                |
| $I_C$     | Collector Current         | 50         | mA               |
| $I_B$     | Base Current              | 10         | mA               |
| $T_J$     | Junction Temperature      | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature       | -55 to 150 | $^\circ\text{C}$ |

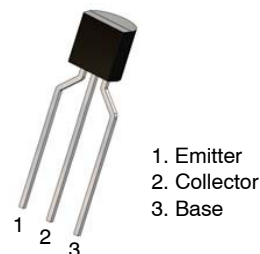
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.) (Note 1)

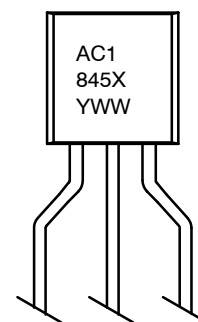
| Symbol          | Parameter                               | Value | Unit                      |
|-----------------|-----------------------------------------|-------|---------------------------|
| $P_D$           | Power Dissipation                       | 500   | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 4     | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 250   | $^\circ\text{C}/\text{W}$ |

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.



TO-92 3 4.83x4.76  
LEADFORMED  
CASE 135AR

### MARKING DIAGRAM



A = Assembly Code  
C1845 = Device Code  
X = F  
YWW = Date Code

### ORDERING INFORMATION

| Device     | Package              | Shipping        |
|------------|----------------------|-----------------|
| KSC1845FTA | TO-92 3 LF (Pb-Free) | 2000 / Fan-Fold |

# KSC1845

## 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     | $I_C = 100\ \mu\text{A}$ , $I_A = 0$                                                                     | 120  | –    | –    | V    |
| $BV_{CEO}$    | Collector-Emitter Breakdown Voltage  | $I_C = 1\ \text{mA}$ , $I_B = 0$                                                                         | 120  | –    | –    | V    |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage       | $I_E = 100\ \mu\text{A}$ , $I_C = 0$                                                                     | 5    | –    | –    | V    |
| $I_{CBO}$     | Collector Cut-Off Current            | $V_{CB} = 120\ \text{V}$ , $I_E = 0$                                                                     | –    | –    | 50   | nA   |
| $I_{EBO}$     | Emitter Cut-Off Current              | $V_{EB} = 5\ \text{V}$ , $I_C = 0$                                                                       | –    | –    | 50   | nA   |
| $h_{FE1}$     | DC Current Gain                      | $V_{CE} = 6\ \text{V}$ , $I_C = 0.1\ \text{mA}$                                                          | 150  | 580  | –    |      |
| $h_{FE2}$     |                                      | $V_{CE} = 6\ \text{V}$ , $I_C = 1\ \text{mA}$                                                            | 300  | 450  | 600  |      |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $V_{CE} = 6\ \text{V}$ , $I_C = 1\ \text{mA}$                                                            | 0.55 | 0.59 | 0.65 | V    |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10\ \text{mA}$ , $I_B = 1\ \text{mA}$                                                             | –    | 0.07 | 0.30 | V    |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 6\ \text{V}$ , $I_C = 1\ \text{mA}$                                                            | 50   | 100  | –    | MHz  |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = 30\ \text{V}$ , $I_E = 0$ , $f = 1\ \text{MHz}$                                                | –    | 1.6  | 2.5  | pF   |
| NF            | Noise Figure                         | $V_{CE} = -5\ \text{V}$ , $I_C = -1.0\ \text{mA}$ ,<br>$R_S = 100\ \text{k}\Omega$ , $f = 1\ \text{kHz}$ | –    | 7    | –    | dB   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## TYPICAL PERFORMANCE CHARACTERISTICS

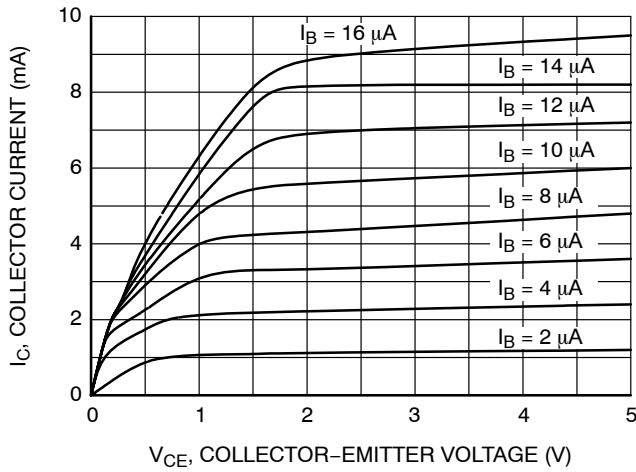


Figure 1. Static Characteristic

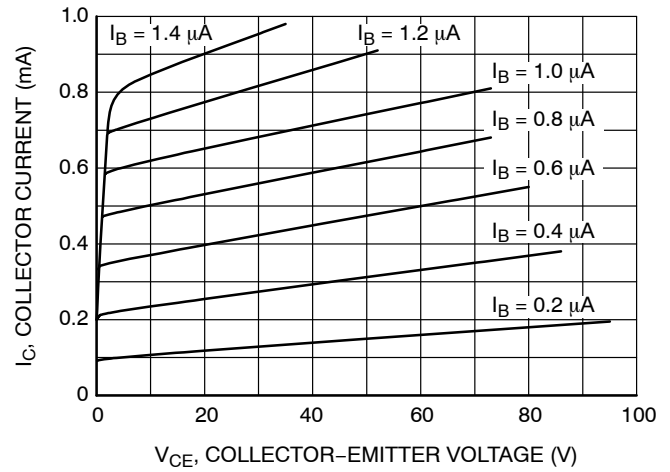


Figure 2. Static Characteristic

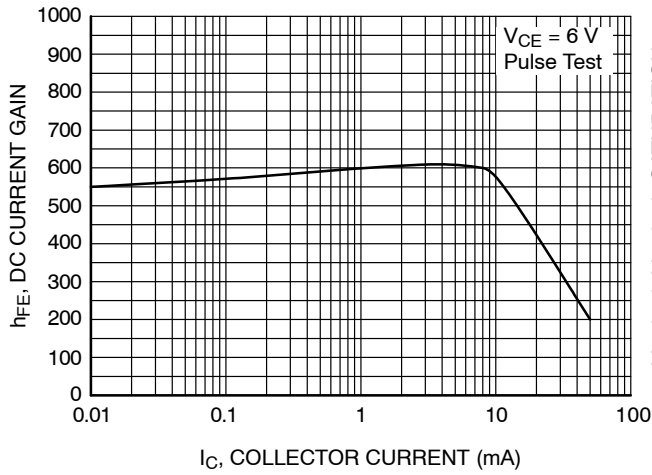


Figure 3. DC Current Gain

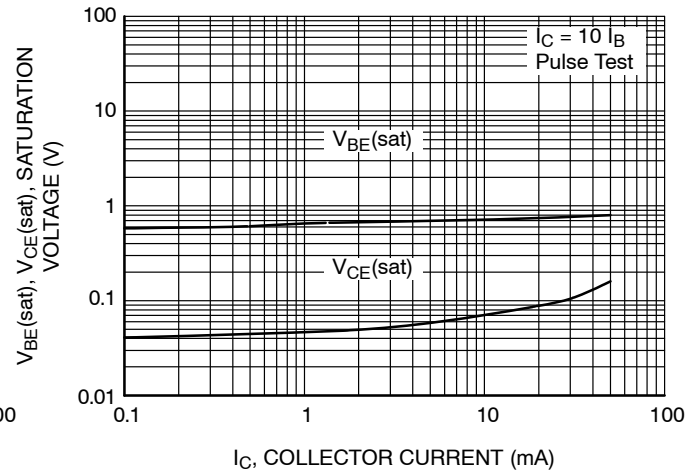


Figure 4. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

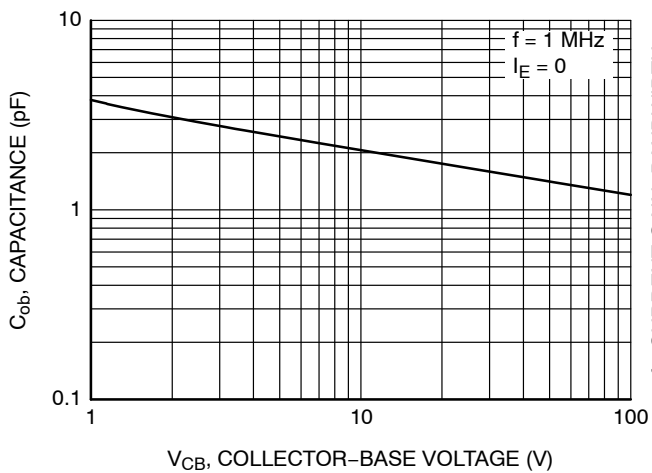


Figure 5. Collector Output Capacitance

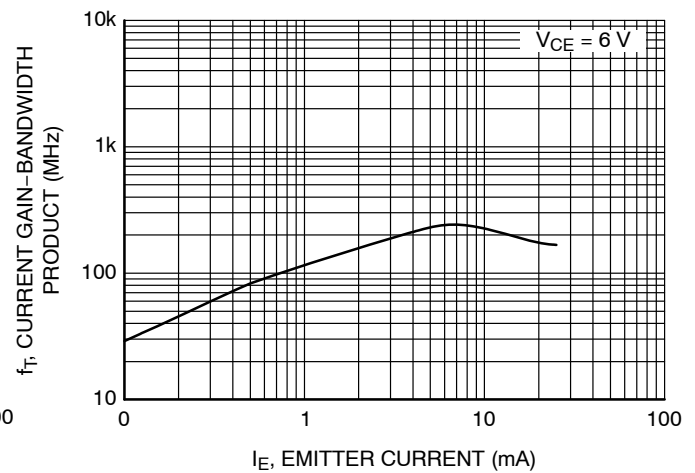


Figure 6. Current Gain Bandwidth Product

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

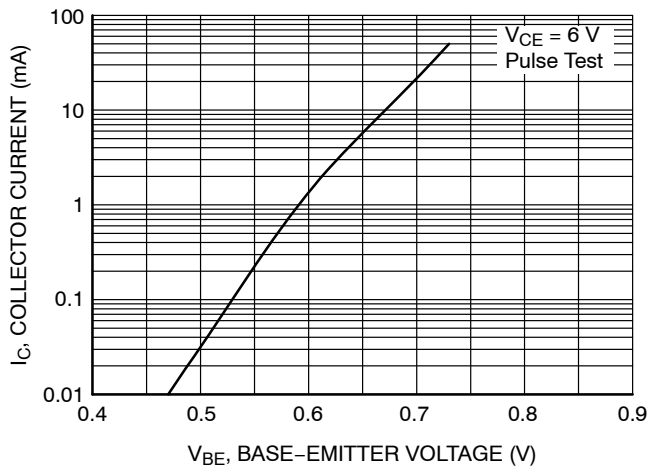


Figure 7. Collector Current vs. Base-Emitter Voltage

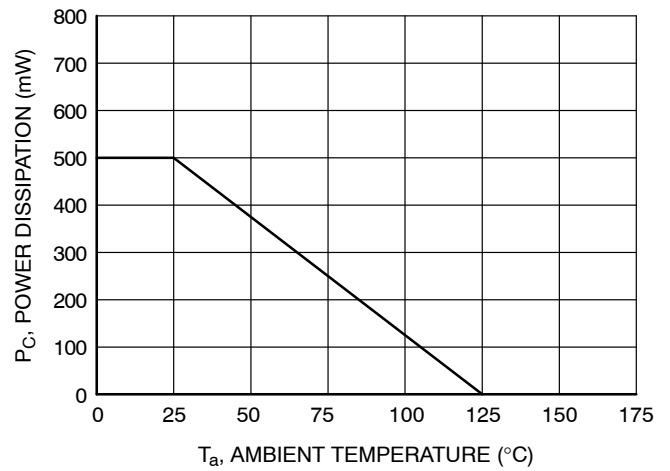
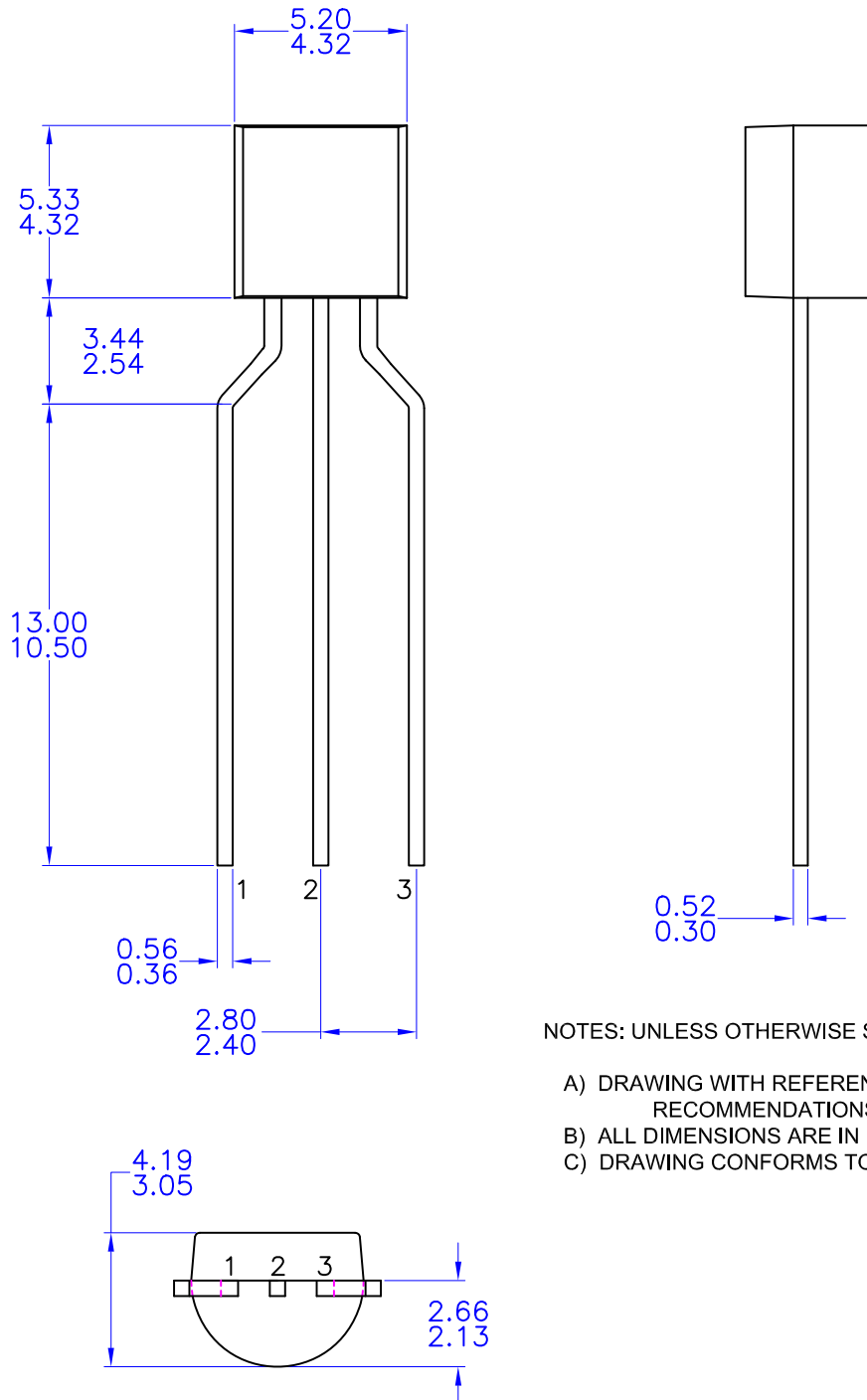


Figure 8. Power Derating

**TO-92 3 4.83x4.76 LEADFORMED**  
**CASE 135AR**  
**ISSUE O**

DATE 30 SEP 2016



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994

|                         |                                     |                                                                                                                                                                                     |
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