

# NPN Epitaxial Silicon Transistor

## KSC2328A

### Features

- Audio Power Amplifier Application
- Complement to KSA928A
- 3 W Output Application

### ABSOLUTE MAXIMUM RATINGS

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

| Symbol    | Parameter                 | Value       | Unit             |
|-----------|---------------------------|-------------|------------------|
| $V_{CBO}$ | Collector–Base Voltage    | 30          | V                |
| $V_{CEO}$ | Collector–Emitter Voltage | 30          | V                |
| $V_{EBO}$ | Emitter–Base Voltage      | 5           | V                |
| $I_C$     | Collector Current         | 2           | A                |
| $T_J$     | Junction Temperature      | 150         | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature       | –55 to +150 | $^\circ\text{C}$ |

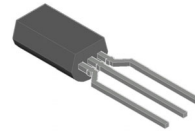
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

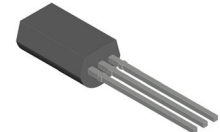
(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.) (Note 2)

| Symbol          | Parameter                               | Value | Unit                      |
|-----------------|-----------------------------------------|-------|---------------------------|
| $P_D$           | Power Dissipation                       | 1000  | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 8.0   | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction–to–Ambient | 125   | $^\circ\text{C}/\text{W}$ |

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

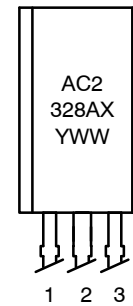


TO–92 3 LF  
CASE 135AM



TO–92 3  
CASE 135AP

### MARKING DIAGRAM



- 1: Emitter  
2: Collector  
3: Base

A = Assembly Code  
C2328A = Device Code  
X = O / Y  
YWW = Date Code

### ORDERING INFORMATION

| Device      | Package              | Shipping        |
|-------------|----------------------|-----------------|
| KSC2328AYTA | TO–92 3 LF (Pb–Free) | 2000 / Fan–Fold |

### DISCONTINUED (Note 1)

|             |                      |                 |
|-------------|----------------------|-----------------|
| KSC2328AOTA | TO–92 3 LF (Pb–Free) | 2000 / Fan–Fold |
| KSC2328AYBU | TO–92 3 (Pb–Free)    | 6000 / Bulk Bag |

- DISCONTINUED:** These devices are not recommended for new design. Please contact your onsemi representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

# KSC2328A

## 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     | $I_C = 100\ \mu\text{A}$ , $I_E = 0$                      | 30   | –    | –    | V    |
| $BV_{CEO}$    | Collector–Emitter Breakdown Voltage  | $I_C = 10\ \text{mA}$ , $I_B = 0$                         | 30   | –    | –    | V    |
| $BV_{EBO}$    | Emitter–Base Breakdown Voltage       | $I_E = 1\ \text{mA}$ , $I_C = 0$                          | 5    | –    | –    | V    |
| $I_{CBO}$     | Collector Cut–Off Current            | $V_{CB} = 30\ \text{V}$ , $I_E = 0$                       | –    | –    | 100  | nA   |
| $I_{EBO}$     | Emitter Cut–Off Current              | $V_{EB} = 5\ \text{V}$ , $I_C = 0$                        | –    | –    | 100  | nA   |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 2\ \text{V}$ , $I_C = 500\ \text{mA}$           | 100  | –    | 320  |      |
| $V_{BE(on)}$  | Base–Emitter On Voltage              | $V_{CE} = 2\ \text{V}$ , $I_C = 500\ \text{mA}$           | –    | –    | 1.0  | V    |
| $V_{CE(sat)}$ | Collector–Emitter Saturation Voltage | $I_C = 1.5\ \text{A}$ , $I_B = 0.03\ \text{A}$            | –    | –    | 2.0  | V    |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 2\ \text{V}$ , $I_C = 500\ \text{mA}$           | –    | 120  | –    | MHz  |
| $C_{ob}$      | Collector Output Capacitance         | $V_{CB} = 10\ \text{V}$ , $I_E = 0$ , $f = 1\ \text{MHz}$ | –    | 30   | –    | pF   |

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.

## $h_{FE}$ CLASSIFICATION

| Classification | O         | Y         |
|----------------|-----------|-----------|
| $h_{FE}$       | 100 ~ 200 | 160 ~ 320 |

TYPICAL PERFORMANCE CHARACTERISTICS

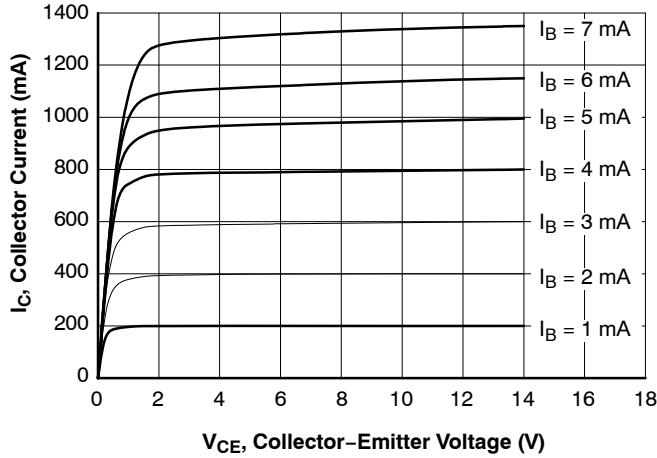


Figure 1. Static Characteristic

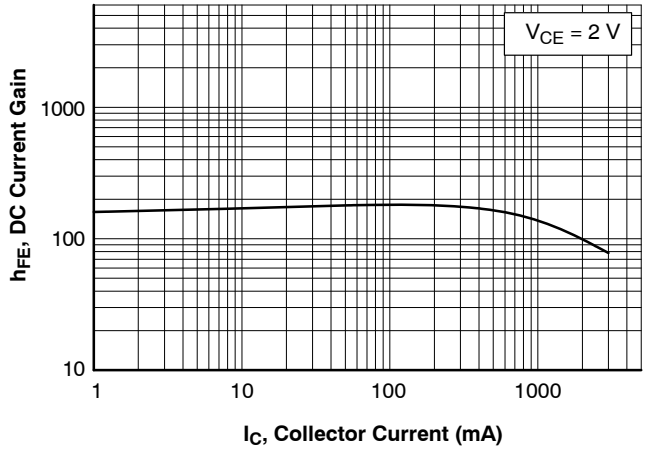


Figure 2. DC Current Gain

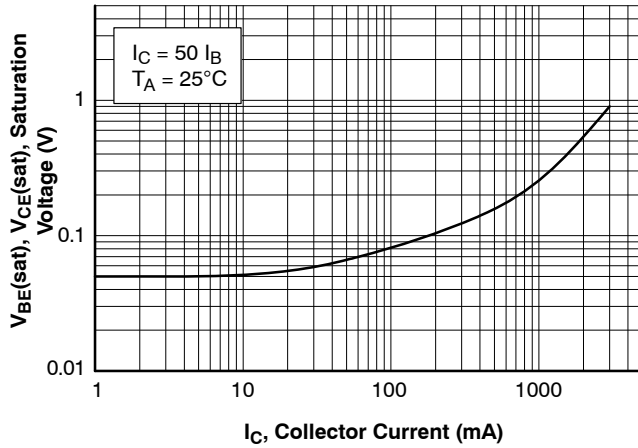


Figure 3. Collector-Emitter Saturation Voltage

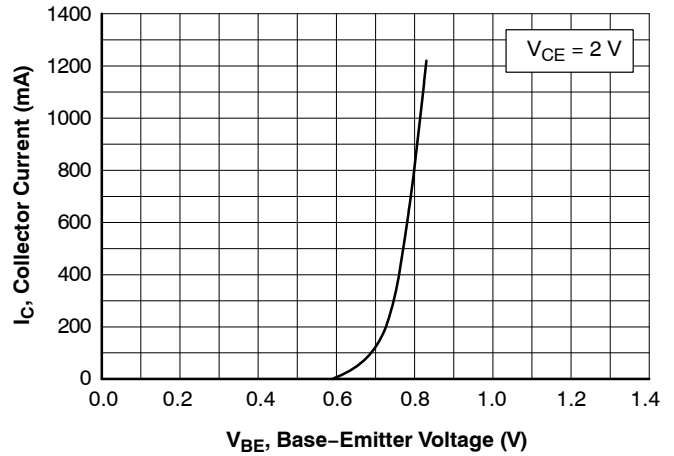


Figure 4. Base-Emitter On Voltage

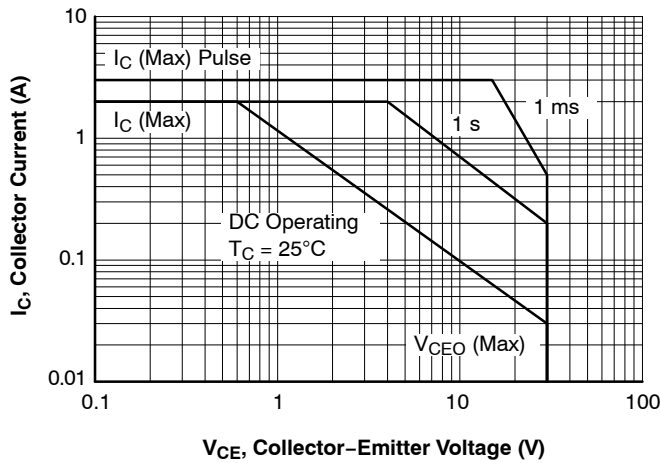


Figure 5. Safe Operating Area

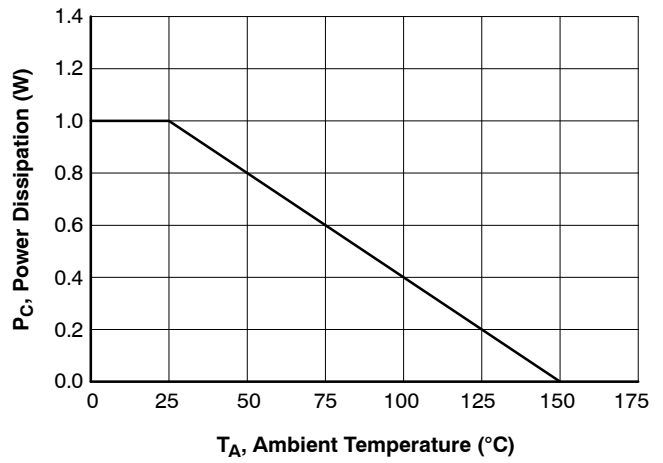
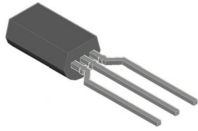
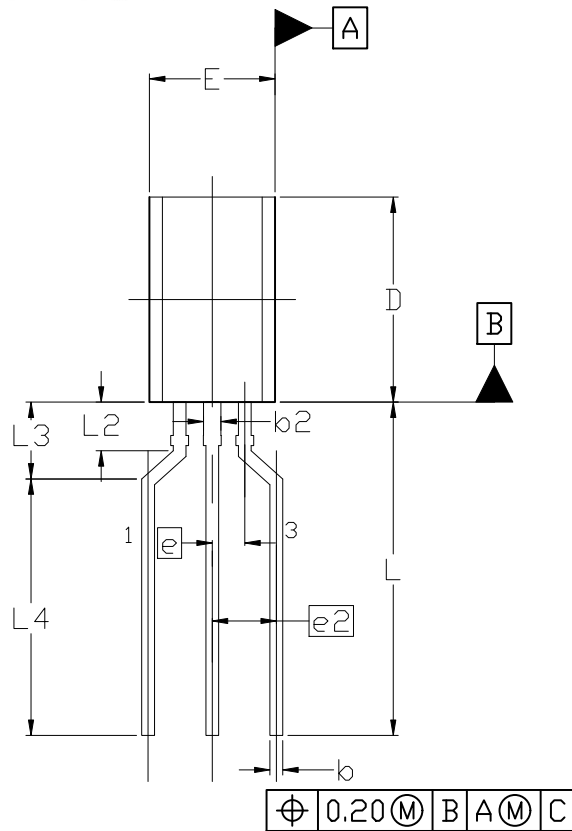


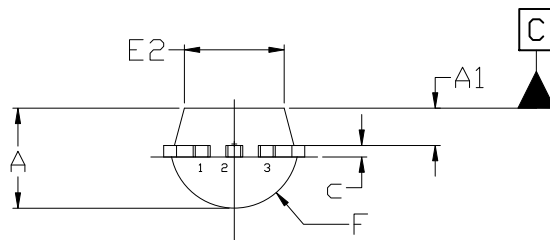
Figure 6. Power Derating


**TO-92 3 8.0x4.9 (LEADFORMED)**  
CASE 135AM  
ISSUE B

DATE 14 JAN 2021



TOP VIEW



END VIEW

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, GATE REMAINS AND TIE BAR PROTRUSIONS.
4. DIMENSION b AND b2 DOES NOT INCLUDE DAMBAR PROTRUSION. DIMENSION b2 LOCATED ABOVE THE DAMBAR PORTION OF MIDDLE LEAD.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 3.70        | 3.90 | 4.10 |
| A1  | 1.25        | 1.45 | 1.65 |
| b   | 0.35        | 0.50 | 0.60 |
| b2  | 0.62        | ---  | 0.78 |
| c   | 0.35        | 0.45 | 0.55 |
| D   | 7.80        | 8.00 | 8.20 |
| E   | 4.70        | 4.90 | 5.10 |
| E2  | 3.70        | 3.90 | 4.10 |
| e   | 1.27 BSC    |      |      |
| e2  | 2.50 BSC    |      |      |
| F   | 2.45 REF    |      |      |
| L   | 13.00 REF   |      |      |
| L2  | 1.50        | ---  | 1.90 |
| L3  | 2.60        | ---  | 3.40 |
| L4  | 10.40 REF   |      |      |

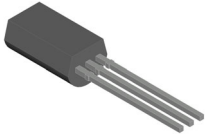
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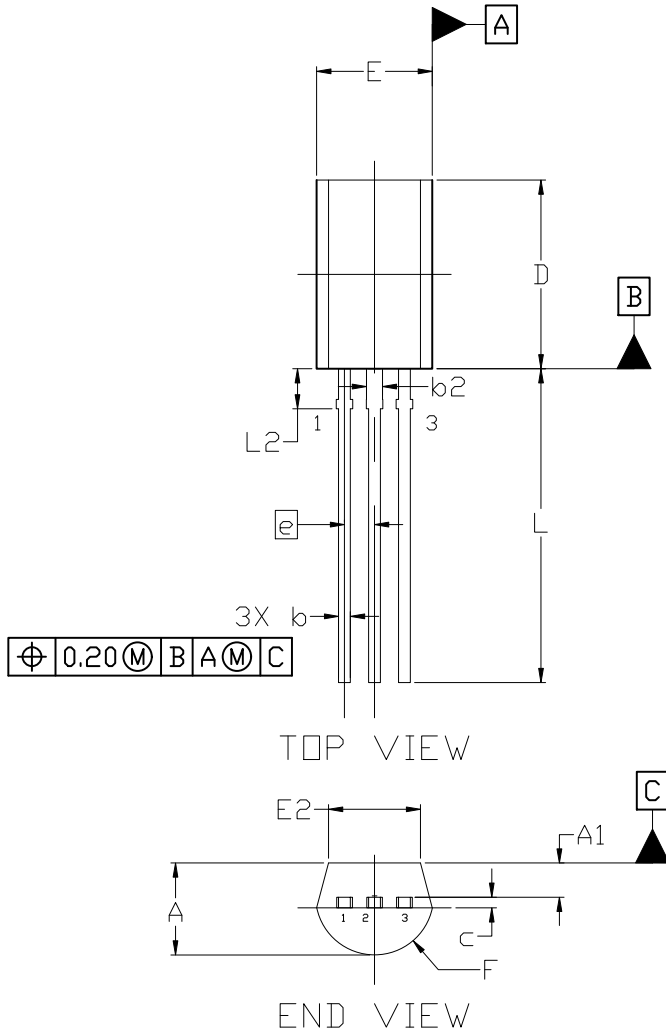
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**TO-92 3 8.0x4.9**  
CASE 135AP  
ISSUE A

DATE 13 JAN 2021


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
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3. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, GATE REMAINS AND TIE BAR PROTRUSIONS.
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| DIM | MILLIMETERS |      |       |
|-----|-------------|------|-------|
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| b   | 0.40        | 0.50 | 0.60  |
| b2  | 0.62        | ---  | 0.78  |
| c   | 0.35        | 0.45 | 0.55  |
| D   | 7.80        | 8.00 | 8.20  |
| E   | 4.70        | 4.90 | 5.10  |
| E2  | 3.70        | 3.90 | 4.10  |
| e   | 1.27 BSC    |      |       |
| F   | 2.45 REF    |      |       |
| L   | 13.30       | ---  | 14.20 |
| L2  | 1.70 REF    |      |       |

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