

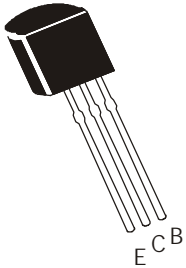
## SILICON PLANAR EPITAXIAL TRANSISTORS

**CLB764 PNP**

**CLD863 NPN**

**TO-92**

**Plastic Package**



Voltage Regulator, Relay Lamp Driver Electrical Equipment Applications

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ )

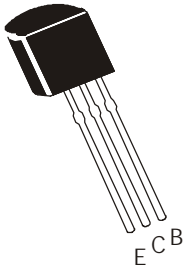
| DESCRIPTION                 | SYMBOL    | VALUE        | UNITS            |
|-----------------------------|-----------|--------------|------------------|
| Collector Base Voltage      | $V_{CBO}$ | 60           | V                |
| Collector Emitter Voltage   | $V_{CEO}$ | 50           | V                |
| Emitter Base Voltage        | $V_{EBO}$ | 5.0          | V                |
| Collector Current           | $I_C$     | 1.0          | A                |
| Peak Collector Current      | $I_{CP}$  | 2.0          | A                |
| Collector Power Dissipation | $P_C$     | 0.9          | W                |
| Junction Temperature        | $T_j$     | 150          | $^\circ\text{C}$ |
| Storage Temperature         | $T_{stg}$ | - 55 to +150 | $^\circ\text{C}$ |

### ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless specified otherwise)

| DESCRIPTION                          | SYMBOL        | TEST CONDITION                         | MIN | MAX        | UNITS         |
|--------------------------------------|---------------|--|-----|------------|---------------|
| Collector Base Voltage               | $V_{CBO}$     | $I_C=10\mu\text{A}$ , $I_E=0$          | 60  |            | V             |
| Collector Emitter Voltage            | $V_{CEO}$     | $I_C=1\text{mA}$ , $I_B=0$             | 50  |            | V             |
| Emitter Base Voltage                 | $V_{EBO}$     | $I_E=10\mu\text{A}$ , $I_C=0$          | 5.0 |            | V             |
| Collector Cut Off Current            | $I_{CBO}$     | $V_{CB}=50\text{V}$ , $I_E=0$          |     | 1.0        | $\mu\text{A}$ |
| Emitter Cut Off Current              | $I_{EBO}$     | $V_{EB}=4\text{V}$ , $I_C=0$           |     | 1.0        | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE}$      | $I_C=50\text{mA}$ , $V_{CE}=2\text{V}$ | 60  | 320        |               |
|                                      | $h_{FE}$      | $I_C=1\text{A}$ , $V_{CE}=2\text{V}$   | 30  |            |               |
| Collector Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=500\text{mA}$ , $I_B=50\text{mA}$ |     | 0.5<br>0.7 | V             |
|                                      |               | <b>NPN</b>                             |     |            |               |
|                                      |               | <b>PNP</b>                             |     |            |               |
| Base Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=500\text{mA}$ , $I_B=50\text{mA}$ |     | 1.2        | V             |

# SILICON PLANAR EPITAXIAL TRANSISTORS

**CLB764 PNP**  
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**TO-92**  
**Plastic Package**

## DYNAMIC CHARACTERISTICS

|                             |          |   |                |          |
|-----------------------------|----------|---|----------------|----------|
| <b>Transition Frequency</b> | $f_T$    | $V_{CE}=10V, I_C=50mA$                                  | TYP150         | MHz      |
| <b>Output Capacitance</b>   | $C_{ob}$ | $V_{CB}=10V, I_E=0, f=1MHz$<br><b>NPN</b><br><b>PNP</b> | TYP12<br>TYP20 | pF<br>pF |

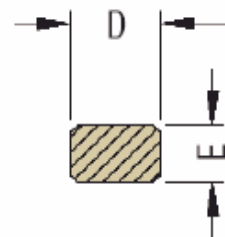
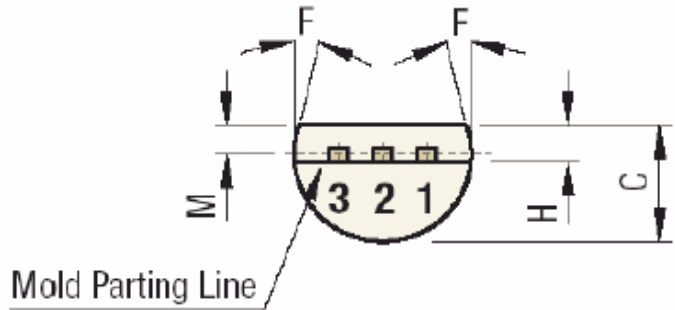
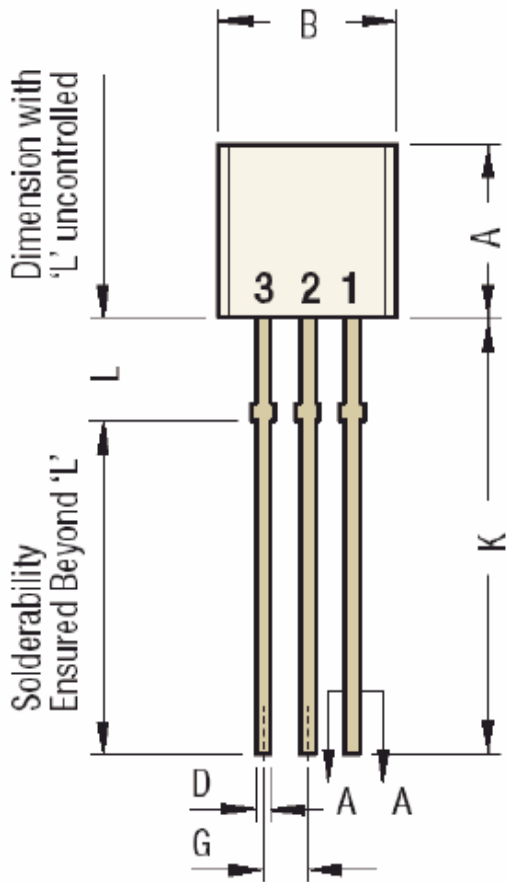
|                        |          |           |           |
|------------------------|----------|-----------|-----------|
| <b>CLASSIFICATION</b>  | <b>D</b> | <b>E</b>  | <b>F</b>  |
| <b>*h<sub>FE</sub></b> | 60 - 120 | 100 - 200 | 160 - 320 |

CLB764\_CLD863 Rev111209E

CLB764 PNP  
CLD863 NPN

TO-92  
Plastic Package

TO-92 Leaded Plastic Package

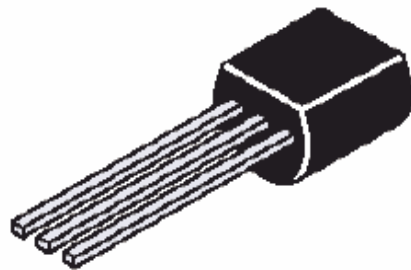


| DIM | Min  | Max  |
|-----|------|------|
| A   | 4.32 | 5.33 |
| B   | 4.45 | 5.20 |
| C   | 3.18 | 4.19 |
| D   | 0.41 | 0.55 |
| E   | 0.35 | 0.55 |
| F   | 5°   |      |

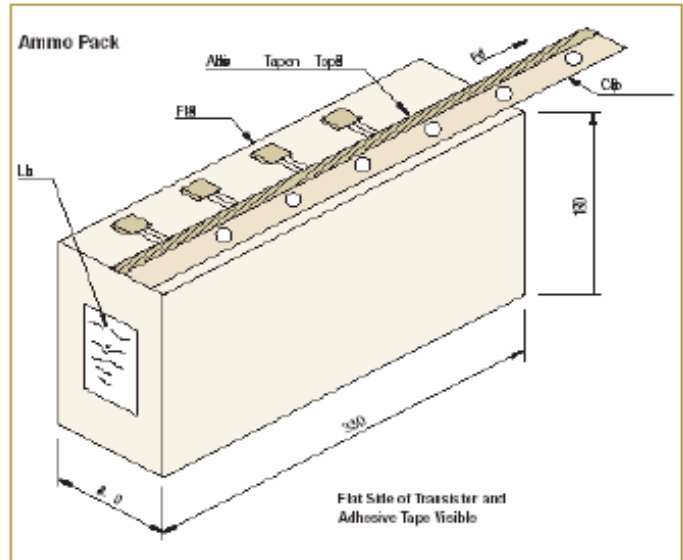
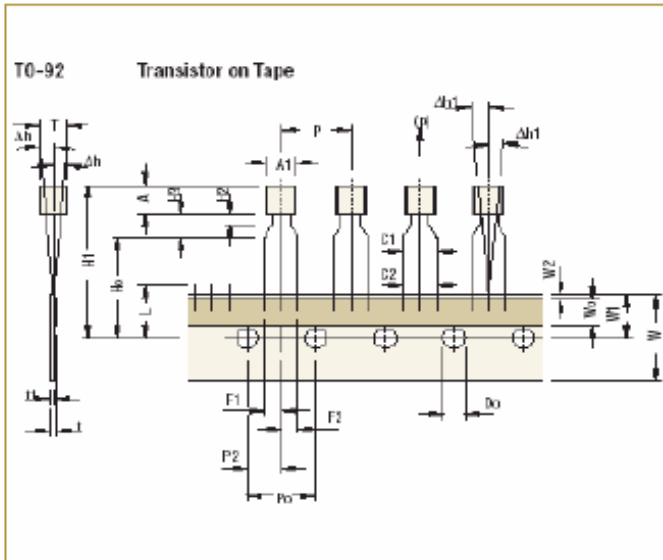
All Dimensions are in mm

| DIM | Min   | Max   |
|-----|-------|-------|
| G   | 1.14  | 1.40  |
| H   | 1.20  | 1.80  |
| K   | 12.5  |       |
| L   | 1.982 | 2.082 |
| M   | 1.03  | 1.53  |

Pin 1 Base  
Pin 2 Collector  
Pin 3 Emitter



TO-92 Tape and Ammo Packaging



All Dimensions are in mm

Tape Specifications

| Item description                                   | Symbol | TO-92 |      |      |           |
|--|--------|-------|------|------|-----------|
|  |        | Min   | Nom  | Max  | Tol       |
| Body width   | A1     | 4.45  |      | 5.20 |           |
| Body height  | A      | 4.32  |      | 5.33 |           |
| Body thickness                                     | T      | 3.18  |      | 4.19 |           |
| Pitch of component <sup>§1</sup>                   | P      |       | 12.7 |      | ±1.0      |
| Feed hole pitch <sup>§1</sup>                      | Po     |       | 12.7 |      | ±0.3      |
| Feed hole center to component centre <sup>§2</sup> | P2     |       | 6.35 |      | ±0.4      |
| Comp. alignment, Side view <sup>§3</sup>           | Dh     |       | 0    | 1.0  |           |
| Comp. alignment, Front view <sup>§3</sup>          | Dh1    |       | 0    | 1.3  |           |
| Tape width <sup>Cr</sup>                           | W      |       | 18   |      | ±0.5      |
| Hold down tape width <sup>Cr</sup>                 | W0     |       | 6    |      | ±0.2      |
| Hole position                                      | W1     |       | 9    |      | +0.7 -0.5 |
| Hold-down tape position                            | W2     | 0.0   |      | 0.7  |           |
| Lead wire clinch height                            | Ho     |       | 16   |      | ±0.5      |
| Component height                                   | H1     |       |      | 24.0 |           |
| Length of snapped leads                            | L      |       |      | 11.0 |           |
| Feed hole diameter <sup>Cr</sup>                   | Do     |       | 4    |      | ±0.2      |
| Total tape thickness <sup>§4</sup>                 | t      |       |      | 1.2  |           |
| Lead-to-lead distance <sup>Cr</sup>                | F1, F2 | 2.4   |      | 2.7  |           |
| Stand off  | H2     | 0.45  |      | 1.45 |           |
| Clinch height                                      | H3     |       |      | 3.0  |           |
| Lead parallelism <sup>Cr</sup>                     | C1-C2  |       |      | 0.22 |           |
| Pull-out force                                     | (p)    | 6N    |      |      |           |

Taping Specification

- Maximum alignment deviation between leads not to be greater than 0.20 mm.
- Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
- Hold down tape not to exceed beyond the edge(s) carrier tape and there shall be no exposure of adhesive.
- No more than 3 consecutive missing components is permitted.
- A tape trailer, having at least three feed holes is required after the last component.
- Splices shall not interfere with the sprocket feed holes.

§1 Cumulative pitch error 1.0 mm/20 pitch.

§2 To be measured at bottom of clinch.

§3 At top of body.

§4 t1 = 0.3 – 0.6 mm

Cr Critical Dimension.

All Dimensions are in mm

**Packaging Information**

T & A: Tape and Ammo Pack; T & R: Tape and Red; Bulk: Loose in Poly bags; Tube: Tube and Ammo Pack; k: 1.000

| Package/Case Type | Packaging Type | Std. Packing |     | Inner Carton   |              | Outer Carton |                |              |
|-------------------|----------------|--------------|-----|----------------|--------------|--------------|----------------|--------------|
|                   |                | Qty          | Qty | Size L x W x H | Gross Weight | Qty          | Size L x W x H | Gross Weight |
|                   |                |              |     | (cm)           | (Kg)         |              | (cm)           | (Kg)         |
| TO-92             | Bulk           | 1,000        | 5K  | 19x19x8        | 1.10         | 80K          | 43x40x35       | 20.0         |
|                   | T&A            | 2,000        | 2K  | 32x4.5x20      | 0.70         | 40K          | 43x40x35       | 15.20        |

**Component Disposal Instructions**

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

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