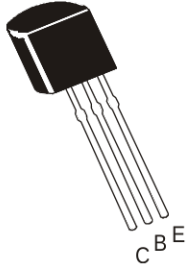


PNP SILICON PLANAR EPITAXIAL TRANSISTORS



**BC212, A, B
BC213, A, B, C
BC214, B, C**

**TO-92
Plastic Package**

Silicon Small Signal General Purpose Amplifier

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

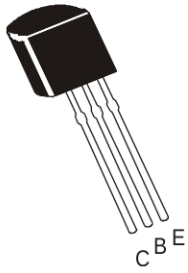
| DESCRIPTION | SYMBOL | BC212 | BC213 | BC214 | UNITS |
|--|----------------|-------------|-------|-------|----------------------|
| Collector Emitter Voltage | V_{CEO} | 50 | 30 | 30 | V |
| Collector Base Voltage | V_{CBO} | 60 | 45 | 45 | V |
| Emitter Base Voltage | V_{EBO} | | 5 | | V |
| Collector Current Continuous | I_C | | 100 | | mA |
| Power Dissipation @ $T_a=25^\circ\text{C}$ | P_D | | 350 | | mW |
| Derate Above 25°C | | | 2.8 | | mW/ $^\circ\text{C}$ |
| Power Dissipation @ $T_c=25^\circ\text{C}$ | P_D | | 1 | | W |
| Derate Above 25°C | | | 8 | | mW/ $^\circ\text{C}$ |
| Operating And Storage Junction Temperature Range | T_j, T_{stg} | -55 to +150 | | | $^\circ\text{C}$ |

THERMAL RESISTANCE

| | | | |
|---------------------------------|---------------|-----|--------------------|
| Junction to Ambient in free air | $R_{th(j-a)}$ | 357 | $^\circ\text{C/W}$ |
| Junction to case | $R_{th(j-c)}$ | 125 | $^\circ\text{C/W}$ |

PNP SILICON PLANAR EPITAXIAL TRANSISTORS

BC212, A, B
BC213, A, B, C
BC214, B, C



TO-92
Plastic Package

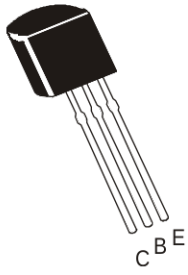
ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNITS |
|---|---------------|--|-----|------|------|-------|
| Collector Emitter Voltage | V_{CEO} | $I_C=2\text{mA}, I_B=0$ | | | | |
| BC212 | | | 50 | | | V |
| BC213, BC214 | | | 30 | | | V |
| Collector Base Voltage | V_{CBO} | $I_C=10\mu\text{A}, I_E=0$ | | | | |
| BC212 | | | 60 | | | V |
| BC213, BC214 | | | 45 | | | V |
| Emitter Base Voltage | V_{EBO} | $I_E=10\mu\text{A}, I_C=0$ | 5 | | | V |
| Collector Cut off Current | I_{CBO} | $V_{CB}=30\text{V}, I_E=0$ | | | 15 | nA |
| Emitter Cut off Current | I_{EBO} | $V_{EB}=4\text{V}, I_C=0$ | | | 15 | nA |
| DC Current Gain | | | | | | |
| BC212, BC213 | h_{FE} | $I_C=10\mu\text{A}, V_{CE}=5\text{V}$ | 40 | | | |
| BC214 | | | 100 | | | |
| BC212 | h_{FE} | $I_C=2\text{mA}, V_{CE}=5\text{V}$ | 60 | | | |
| BC213 | | | 80 | | | |
| BC214 | | | 140 | | 600 | |
| BC212, BC214 | h_{FE} | $I_C=100\text{mA}, V_{CE}=5\text{V}^*$ | | 120 | | |
| BC213 | | | | 140 | | |
| Collector Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=10\text{mA}, I_B=0.5\text{mA}$ | | 0.10 | | V |
| | | $I_C=100\text{mA}, I_B=5\text{mA}^*$ | | 0.25 | 0.6 | V |
| Base Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C=100\text{mA}, I_B=5\text{mA}^*$ | | 1.00 | 1.4 | V |
| Base Emitter On Voltage | $V_{BE(on)}$ | $I_C=2\text{mA}, V_{CE}=5\text{V}$ | 0.6 | 0.62 | 0.72 | V |

*Pulse Condition: Pulse Width = 300 μs , Duty Cycle = 2%.

PNP SILICON PLANAR EPITAXIAL TRANSISTORS

BC212, A, B
BC213, A, B, C
BC214, B, C



TO-92
Plastic Package

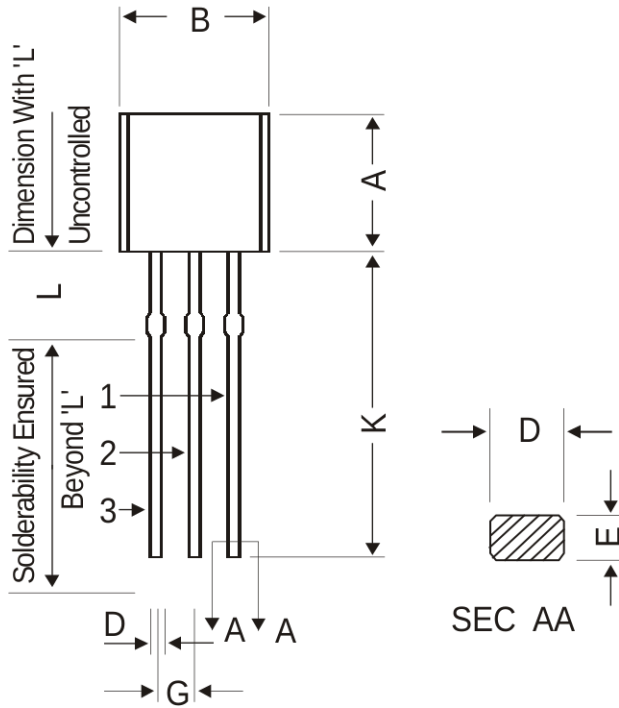
ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

DYNAMICS CHARACTERISTICS

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNITS |
|----------------------------------|----------|---|-----|-----|-----|-------|
| Transition Frequency | | | | | | |
| BC212 | f_T | $I_C=10\text{mA}$, $V_{CE}=5\text{V}$ | | 280 | | MHz |
| BC213 | | $f=50\text{MHz}$ | | 360 | | MHz |
| BC214 | | | | 320 | | MHz |
| Output Capacitance | | | | | | |
| | C_{ob} | $V_{CB}=10\text{V}$, $I_E=0$ | | | 6 | pF |
| Noise Figure | | | | | | |
| BC212, BC213 | NF | $I_C=200\mu\text{A}$, $V_{CE}=5\text{V}$ $R_S=2\text{K}\Omega$ $f=1\text{KHz}$ $f=200\text{Hz}$ | | | 10 | dB |
| BC214 | NF | $I_C=200\mu\text{A}$, $V_{CE}=5\text{V}$ $R_S=2\text{K}\Omega$ $f=30\text{Hz}$ to 15KHz | | | 2 | dB |
| Small Signal Current Gain | | | | | | |
| BC212 | h_{fe} | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ | 60 | | | |
| BC213 | | $f=1\text{KHz}$ | 80 | | | |
| BC214 | | | 140 | | | |
| BC212A, BC213A | h_{fe} | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ | 100 | | 300 | |
| BC212B, BC213B, BC214B | | $f=1\text{KHz}$ | 200 | | 400 | |
| BC213C, BC214C | | | 350 | | 600 | |

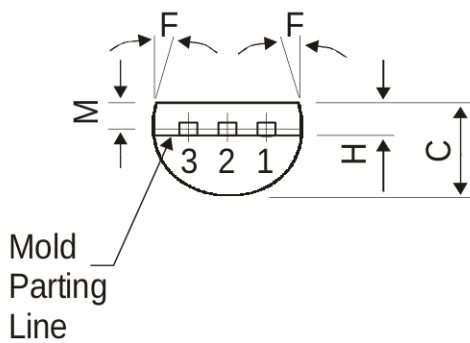
*Pulse Condition: Pulse Width = $300\mu\text{s}$, Duty Cycle = 2%.

TO-92 Plastic Package



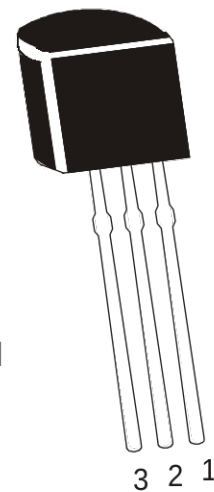
| DIM | MIN. | MAX. |
|-----|-------|-------|
| A | 4.32 | 5.33 |
| B | 4.45 | 5.20 |
| C | 3.18 | 4.19 |
| D | 0.41 | 0.55 |
| E | 0.35 | 0.50 |
| F | 5 DEG | |
| G | 1.14 | 1.40 |
| H | 1.20 | 1.40 |
| K | 12.70 | — |
| L | 1.982 | 2.082 |
| M | 1.03 | 1.20 |

All dimensions are in mm



PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR



The TO-92 Package, Tape and Ammo Pack drawings are correct as on the date of issue/revision of this Data Sheet.

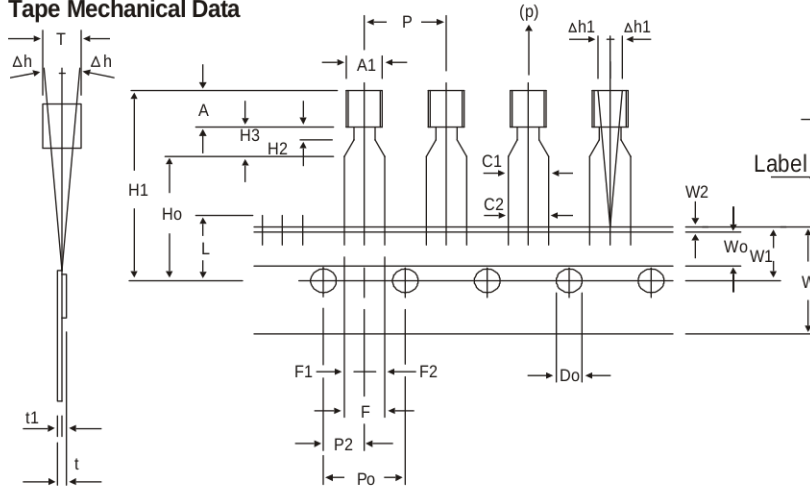
The currently valid dimensions and information, may please be confirmed from the TO-92 Drawing in the Packages and Packing Section of the Product Catalogue.

Packing Details

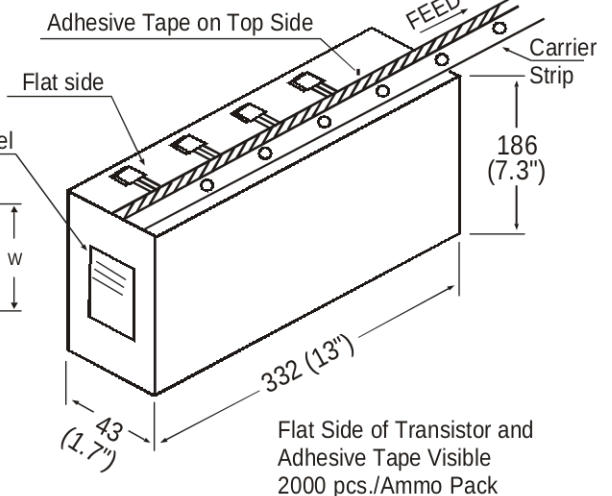
| PACKAGE | STANDARD PACK | | INNER CARTON BOX | | OUTER CARTON BOX | | |
|------------|---------------|----------------|-------------------|-----|-------------------|-----|----------|
| | Details | Net Weight/Qty | Size | Qty | Size | Qty | Gr Wt |
| TO-92 Bulk | 1K/polybag | 200 gm/1K pcs | 3' x 7.5' x 7.5' | 5K | 17' x 15' x 13.5" | 80K | 23 kgs |
| TO-92 T&A | 2K/ammo box | 645 gm/2K pcs | 12.5' x 8' x 1.8" | 2K | 17' x 15' x 13.5" | 32K | 12.5 kgs |

TO-92 Tape and Ammo Pack

Tape Mechanical Data



Ammo Pack Style



All dimensions are in mm

| ITEM | SYMBOL | SPECIFICATION | | | |
|---|---------|---------------|------|-------|----------------|
| | | MIN. | NOM. | MAX. | TOL. |
| BODY WIDTH | A1 | 4.0 | | 4.8 | |
| BODY HEIGHT | A | 4.8 | | 5.2 | |
| BODY THICKNESS | T | 3.9 | | 4.2 | |
| PITCH OF COMPONENT | P | | 12.7 | | ± 1.0 |
| *1 FEED HOLE PITCH | Po | | 12.7 | | ± 0.3 |
| *2 FEED HOLE CENTRE TO COMPONENT CENTRE | P2 | | 6.35 | | ± 0.4 |
| DISTANCE BETWEEN OUTER LEADS | F | | 5.08 | | + 0.6 - 0.2 |
| *3 COMPONENT ALIGNMENT SIDE VIEW | Δh | | 0 | 1.0 | |
| *4 COMPONENT ALIGNMENT FRONT VIEW | Δh1 | | 0 | 1.3 | |
| TAPE WIDTH | W | | 18 | | ± 0.5 |
| HOLD-DOWN TAPE WIDTH | W0 | | 6 | | ± 0.2 |
| HOLE POSITION | W1 | | 9 | | + 0.7 - 0.5 |
| HOLD-DOWN TAPE POSITION | W2 | | 0.5 | | ± 0.2 |
| LEAD WIRE CLINCH HEIGHT | Ho | | 16 | | ± 0.5 |
| COMPONENT HEIGHT | H1 | | | 23.25 | |
| LENGTH OF SNIPPED LEADS | L | | | 11.0 | |
| FEED HOLE DIAMETER | Do | | 4 | | ± 0.2 |
| *5 TOTAL TAPE THICKNESS | t | | | 1.2 | |
| LEAD - TO - LEAD DISTANCE | F1, F2 | | 2.54 | | + 0.4 - 0.1 |
| STAND OFF | H2 | 0.45 | | 1.45 | |
| CLINCH HEIGHT | H3 | | | 3.0 | |
| LEAD PARALLELISM | C1 - C2 | | | 0.22 | |
| PULL - OUT FORCE | (p) | 6N | | | |

NOTES

1. Maximum alignment deviation between leads will not to be greater than 0.2mm.
2. Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.
3. Holddown tape will not exceed beyond the edge(s) of carrier tape and there shall be no exposure of adhesive.
4. There will be no more than three (3) consecutive missing components in a tape.
5. A tape trailer, having at least three feed holes are provided after the last component in a tape.
6. Splices should not interfere with the sprocket feed holes.

REMARKS

- *1 Cumulative pitch error 1.0 mm/20 pitch
- *2 To be measured at bottom of clinch
- *3 At top of body
- *4 At top of body
- *5 t1 0.3 – 0.6 mm

Disclaimer

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