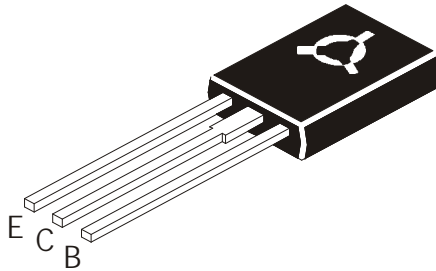


## EPITAXIAL SILICON POWER TRANSISTORS



|              |              |
|--------------|--------------|
| <b>BD233</b> | <b>BD234</b> |
| <b>BD235</b> | <b>BD236</b> |
| <b>BD237</b> | <b>BD238</b> |
| <b>NPN</b>   | <b>PNP</b>   |

**TO126**  
**Plastic Package**

Intended for use in Medium Power Linear Switching Applications

### ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION   | SYMBOL         | BD233<br>BD234 | BD235<br>BD236 | BD237<br>BD238 | UNIT       |
|---|----------------|----------------|----------------|----------------|------------|
| Collector Base Voltage  | $V_{CBO}$      | 45             | 60             | 100            | V          |
| Collector Emitter Voltage   | $V_{CEO}$      | 45             | 60             | 80             | V          |
| Collector Emitter Voltage ( $R_{BE}=1KW$ )                        | $V_{CER}$      | 45             | 60             | 100            | V          |
| Emitter Base Voltage  | $V_{EBO}$      | 5.0            |                |                | V          |
| Collector Current   | $I_C$          | 2.0            |                |                | A          |
| Collector Peak Current  | $I_{CM}$       | 6.0            |                |                | A          |
| Total Dissipation @ $T_C=25^\circ C$                              | $P_D$          | 25             |                |                | W          |
| Total Dissipation @ $T_a=25^\circ C$<br>Derate above $25^\circ C$ | $P_D$          | 1.25<br>10     |                |                | W<br>mW/°C |
| Operating and Storage Junction<br>Temperature Range               | $T_j, T_{stg}$ | - 65 to +150   |                |                | °C         |

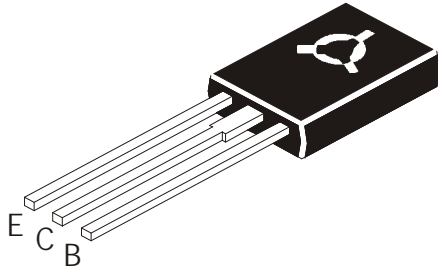
### THERMAL CHARACTERISTICS

|                                 |               |     |      |
|---------------------------------|---------------|-----|------|
| Junction to Case                | $R_{th(j-c)}$ | 5.0 | °C/W |
| Junction to Ambient in free air | $R_{th(j-a)}$ | 100 | °C/W |

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ C$ unless specified otherwise)

| DESCRIPTION                           | SYMBOL          | TEST CONDITION                        | MIN | TYP | MAX | UNIT    |    |
|---------------------------------------|-----------------|---------------------------------------|-----|-----|-----|---------|----|
| Collector Cut off Current             | $I_{CBO}$       | $V_{CB}=45V, I_E=0$ <b>BD233/234</b>  |     |     | 100 | $\mu A$ |    |
|                                       |                 | $V_{CB}=60V, I_E=0$ <b>BD235/236</b>  |     |     | 100 | $\mu A$ |    |
|                                       |                 | $V_{CB}=100V, I_E=0$ <b>BD237/238</b> |     |     | 100 | $\mu A$ |    |
|                                       |                 | $T_C = 150^\circ C$                   |     |     |     |         |    |
|                                       |                 | $V_{CB}=45V, I_E=0$ <b>BD233/234</b>  |     |     |     | 2.0     | mA |
|                                       |                 | $V_{CB}=60V, I_E=0$ <b>BD235/236</b>  |     |     |     | 2.0     | mA |
| $V_{CB}=100V, I_E=0$ <b>BD237/238</b> |                 |                                       |     | 2.0 | mA  |         |    |
| Emitter Cut off Current               | $I_{EBO}$       | $V_{EB}=5V, I_C=0$                    |     |     | 1.0 | mA      |    |
| Collector Emitter Sustaining Voltage  | $*V_{CEO(sus)}$ | $I_C=0.1A, I_B=0$ <b>BD233/234</b>    | 45  |     |     | V       |    |
|                                       |                 | <b>BD235/236</b>                      | 60  |     |     | V       |    |
|                                       |                 | <b>BD237/238</b>                      | 80  |     |     | V       |    |
| Collector Emitter Saturation Voltage  | $*V_{CE(sat)}$  | $I_C=1.0A, I_B=0.1A$                  |     |     | 0.6 | V       |    |
| Base Emitter Voltage                  | $*V_{BE(on)}$   | $I_C=1.0A, V_{CE}=2V$                 |     |     | 1.3 | V       |    |

# EPITAXIAL SILICON POWER TRANSISTORS



|       |       |
|-------|-------|
| BD233 | BD234 |
| BD235 | BD236 |
| BD237 | BD238 |
| NPN   | PNP   |

**TO126**  
**Plastic Package**

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

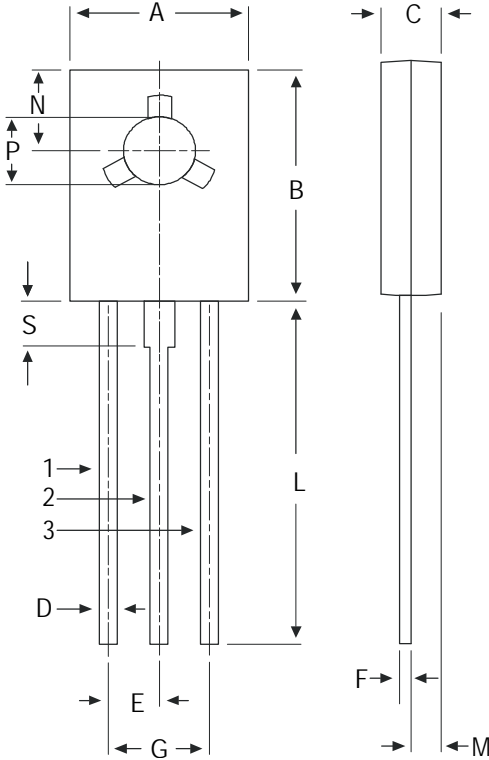
| DESCRIPTION                    | SYMBOL        | TEST CONDITION                        | MIN | TYP | MAX | UNIT |
|--------------------------------|---------------|---------------------------------------|-----|-----|-----|------|
| DC Current Gain                | $*h_{FE}$     | $I_C=150\text{mA}, V_{CE}=2\text{V}$  | 40  |     |     |      |
|                                |               | $I_C=1.0\text{A}, V_{CE}=2\text{V}$   | 25  |     |     |      |
| Current Gain Bandwidth Product | $f_T$         | $I_C=250\text{mA}, V_{CE}=10\text{V}$ | 3   |     |     | MHz  |
| $*h_{FE1} / h_{FE2}$           | Matched Pairs | $I_C=150\text{mA}, V_{CE}=2\text{V}$  |     | 1.6 |     |      |

\*Pulsed Pulse Duration=300ms, Duty Cycle=1.5%

|       |       |
|-------|-------|
| BD233 | BD234 |
| BD235 | BD236 |
| BD237 | BD238 |
| NPN   | PNP   |

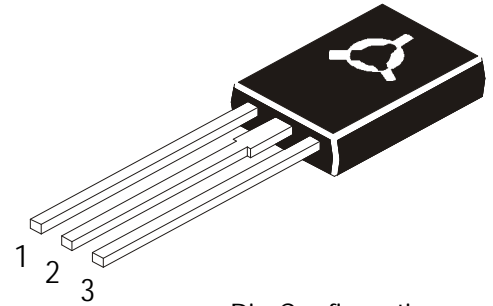
**TO126**  
**Plastic Package**

**TO-126 (SOT-32) Plastic Package**



| DIM | MIN       | MAX  |
|-----|-----------|------|
| A   | 7.4       | 7.8  |
| B   | 10.5      | 10.8 |
| C   | 2.4       | 2.7  |
| D   | 0.7       | 0.9  |
| E   | 2.25 TYP. |      |
| F   | 0.49      | 0.75 |
| G   | 4.5 TYP.  |      |
| L   | 15.7 TYP. |      |
| M   | 1.27 TYP. |      |
| N   | 3.75 TYP. |      |
| P   | 3.0       | 3.2  |
| S   | 2.5 TYP.  |      |

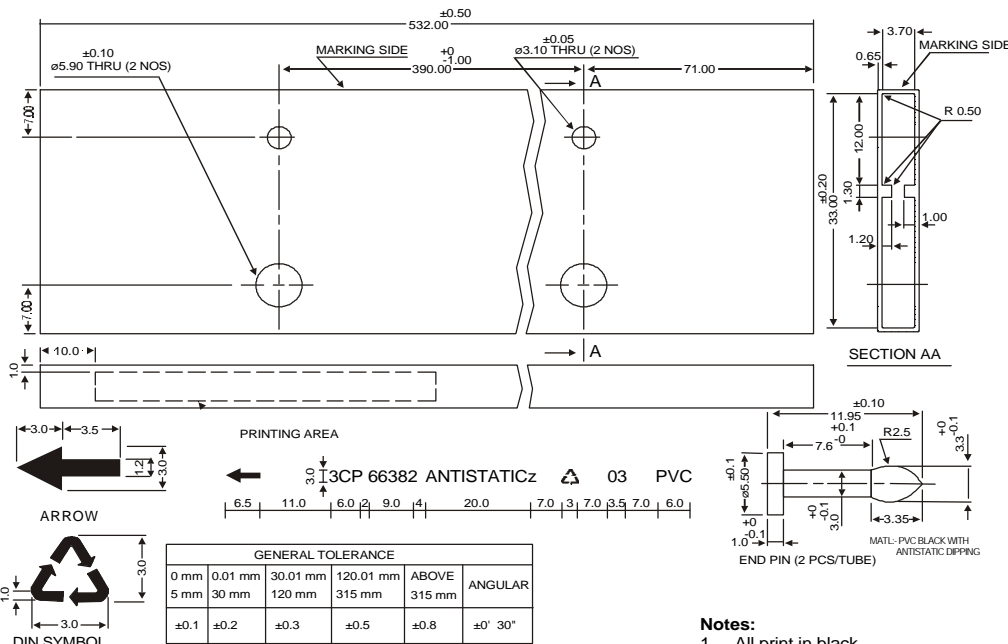
All dimensions in mm.



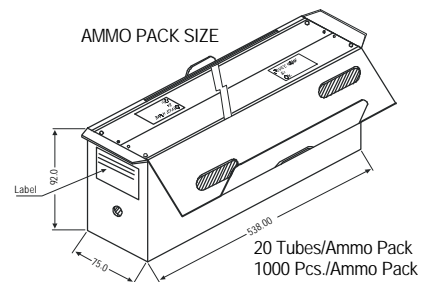
Pin Configuration

1. Emitter
2. Collector
3. Base

**TO-126 TUBE PACKING**



- Notes:**
1. All print in black.
  2. All text in Helvetia medium font.



**Packing Details**

| PACKAGE     | STANDARD PACK   |                | INNER CARTON BOX  |     | OUTER CARTON BOX  |     |        |
|-------------|-----------------|----------------|-------------------|-----|-------------------|-----|--------|
|             | Details         | Net Weight/Qty | Size              | Qty | Size              | Qty | Gr Wt  |
| TO-126 Bulk | 500 pcs/polybag | 340 gm/500 pcs | 3" x 7.5" x 7.5"  | 2K  | 17" x 15" x 13.5" | 32K | 31 kgs |
| TO-126 Tube | 50 pcs/tube     | 73 gm/50 pcs   | 3" x 3.7" x 21.5" | 1K  | 19" x 19" x 19"   | 10K | 15 kgs |

## Notes

|              |              |
|--------------|--------------|
| <b>BD233</b> | <b>BD234</b> |
| <b>BD235</b> | <b>BD236</b> |
| <b>BD237</b> | <b>BD238</b> |
| <b>NPN</b>   | <b>PNP</b>   |

**TO126**  
**Plastic Package**

### Disclaimer

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