

## Features

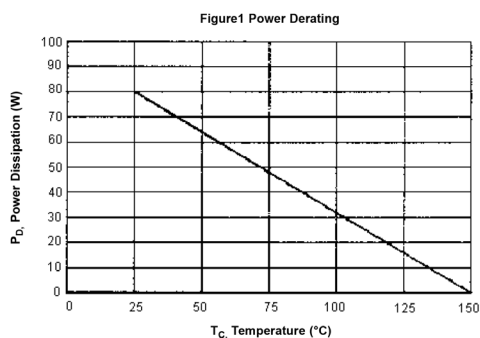
- Designed for general-purpose amplifier and low speed switching applications
- Collector-Emitter sustaining voltage  
 $V_{CEO(sus)} = 80V$  (Minimum) - BDW93B, BDW94B  
 $= 100V$  (Minimum) - BDW93C, BDW94C
- Collector-Emitter saturation voltage  
 $V_{CE(sat)} = 2V$  (Maximum) at  $I_C = 5A$
- Monolithic construction with Built-in Base-Emitter shunt resistor

## Maximum Ratings

| Characteristic                                                        | Symbol                            | BDW93B<br>BDW94B | BDW93C<br>BDW94C | Unit        |
|-----------------------------------------------------------------------|-----------------------------------|------------------|------------------|-------------|
| Collector - Emitter Voltage                                           | V <sub>CEO</sub>                  | 80               | 100              | V           |
| Collector - Base Voltage                                              | V <sub>CBO</sub>                  |                  |                  |             |
| Emitter - Base Voltage                                                | V <sub>EBO</sub>                  | 5                |                  |             |
| Collector Current - Continuous<br>- Peak                              | I <sub>C</sub><br>I <sub>CM</sub> | 12<br>15         |                  | A           |
| Base Current                                                          | I <sub>B</sub>                    | 0.2              |                  |             |
| Total Power Dissipation at T <sub>c</sub> = 25°C<br>Derate above 25°C | P <sub>D</sub>                    | 80<br>0.64       |                  | W<br>W / °C |
| Operating and Storage Junction<br>Temperature Range                   | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150      |                  | °C          |

## Thermal Characteristics

| Characteristic                      | Symbol          | Maximum | Unit           |
|-------------------------------------|-----------------|---------|----------------|
| Thermal Resistance Junction to case | $R_{\theta JC}$ | 1.56    | $^\circ C / W$ |

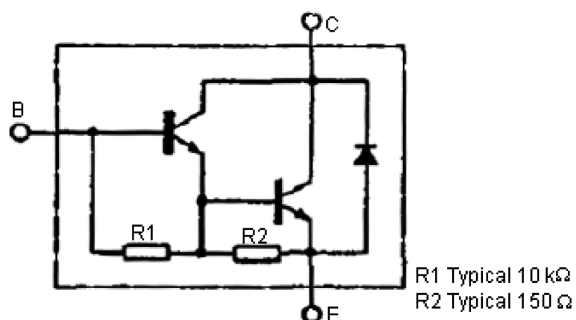


## Electrical Characteristics (T<sub>c</sub> = 25°C unless otherwise specified)

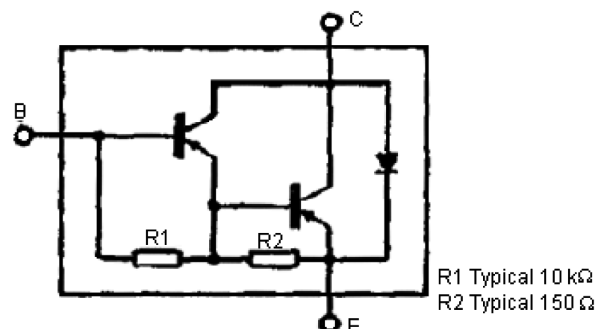
| Characteristic                                                                                                                                                | Symbol                 | Minimum             | Maximum  | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------|----------|------|
| <b>OFF Characteristics</b>                                                                                                                                    |                        |                     |          |      |
| Collector - Emitter Sustaining Voltage (1)<br>(I <sub>c</sub> = 100mA, I <sub>B</sub> = 25mA) BDW93B, BDW94B<br>BDW93C, BDW94C                                | V <sub>CEO (sus)</sub> | 80<br>100           | -        | V    |
| Collector Cut off Current<br>(V <sub>CE</sub> = 80V, I <sub>B</sub> = 0) BDW93B, BDW94B<br>BDW93C, BDW94C                                                     | I <sub>CEO</sub>       | -                   | 1        | mA   |
| Collector-Base Cut off Current<br>(V <sub>CB</sub> = Rated V <sub>CB</sub> , I <sub>E</sub> = 0)                                                              | I <sub>CBO</sub>       | -                   | 100      | μA   |
| Emitter-Base Cut off Current<br>(V <sub>EB</sub> = 5V, I <sub>C</sub> = 0)                                                                                    | I <sub>EBO</sub>       | -                   | 2        | mA   |
| <b>ON Characteristics (1)</b>                                                                                                                                 |                        |                     |          |      |
| DC Current Gain<br>(I <sub>c</sub> = 3A, V <sub>CE</sub> = 3V)<br>(I <sub>c</sub> = 5A, V <sub>CE</sub> = 3V)<br>(I <sub>c</sub> = 10A, V <sub>CE</sub> = 3V) | h <sub>FE</sub>        | 1,000<br>750<br>100 | 20,000   | -    |
| Collector-Emitter Saturation Voltage<br>(I <sub>c</sub> = 5A, I <sub>B</sub> = 20mA)<br>(I <sub>c</sub> = 10A, I <sub>B</sub> = 100mA)                        | V <sub>CE (sat)</sub>  | -                   | 2<br>3   | V    |
| Base-Emitter Saturation Voltage V<br>(I <sub>c</sub> = 5A, I <sub>B</sub> = 20mA)<br>(I <sub>c</sub> = 10A, I <sub>B</sub> = 100mA)                           | V <sub>BE (sat)</sub>  | -                   | 2.5<br>4 |      |

(1) Pulse Test : Pulse Width = 300μs, Duty Cycle = 2%

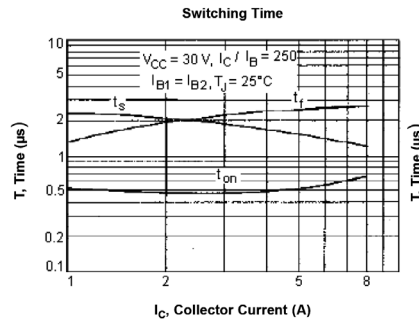
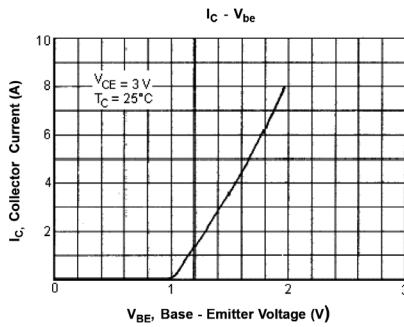
**BDW93 Series NPN**



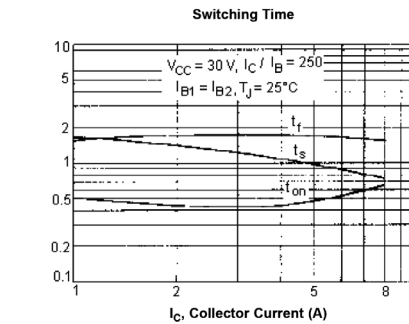
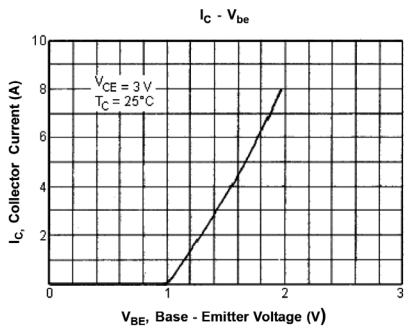
**BDW94 Series PNP**



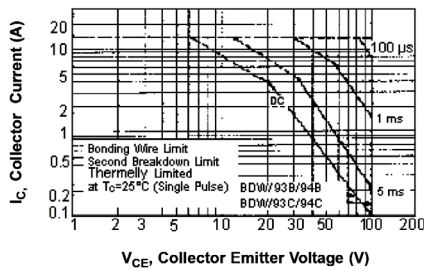
## BDW93 Series NPN



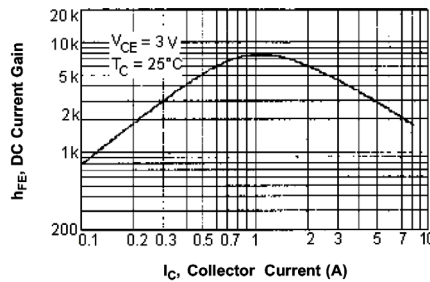
## BDW94 Series PNP



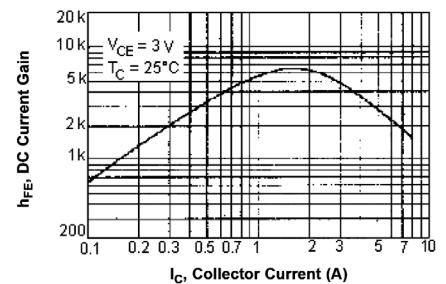
NPN BDW93B and C/PNP BDW94B and C  
Active-Region Safe Operating Area (SOA)



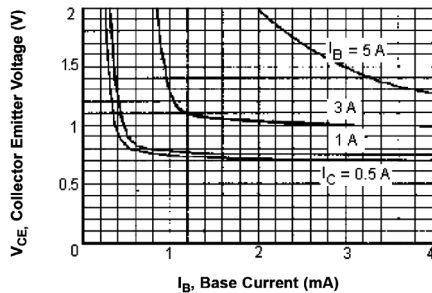
NPN BDW93B and C  
DC Current Gain



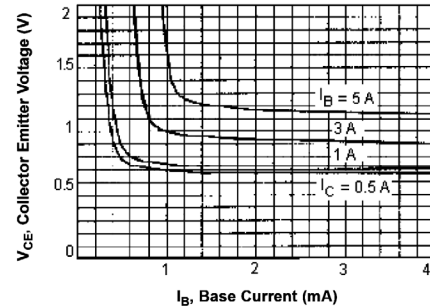
PNP BDW94B and C  
DC Current Gain



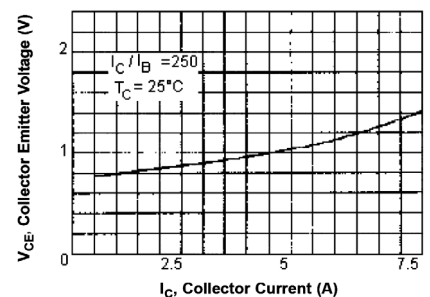
NPN BDW93B and C  
Collector Saturation Region

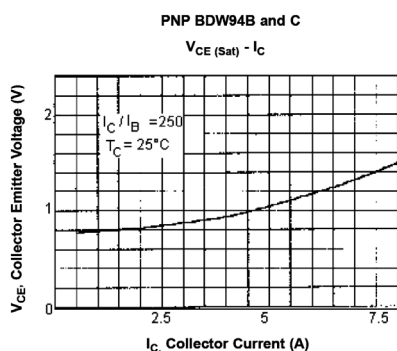


PNP BDW94B and C  
Collector Saturation Region

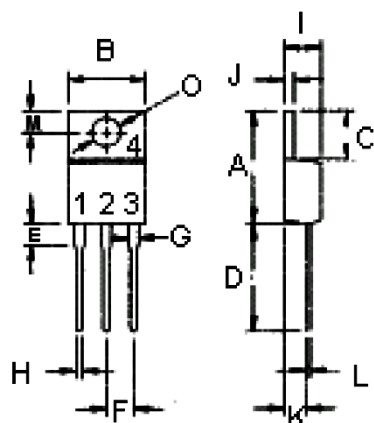


NPN BDW93B and C  
VCE (Sat) - IC





## Diagram



| Dimensions | Minimum | Maximum |
|------------|---------|---------|
| A          | 14.68   | 15.31   |
| B          | 9.78    | 10.42   |
| C          | 5.01    | 6.52    |
| D          | 13.06   | 14.62   |
| E          | 3.57    | 4.07    |
| F          | 2.42    | 3.66    |
| G          | 1.12    | 1.36    |

| Dimensions | Minimum | Maximum |
|------------|---------|---------|
| H          | 0.72    | 0.96    |
| I          | 4.22    | 4.98    |
| J          | 1.14    | 1.38    |
| K          | 2.2     | 2.97    |
| L          | 0.33    | 0.55    |
| M          | 2.48    | 2.98    |
| O          | 3.7     | 3.9     |

Dimensions : Millimetres

## Specification Table

| I <sub>c</sub> (AV)<br>Maximum<br>(A) | V <sub>CEO</sub><br>Maximum<br>(V) | h <sub>FE</sub><br>Minimum at<br>I <sub>c</sub> = 5A | P <sub>tot</sub><br>at 25°C<br>(W) | Package | Type | Part Number |
|---------------------------------------|------------------------------------|------------------------------------------------------|------------------------------------|---------|------|-------------|
| 12                                    | 80                                 | 750                                                  | 80                                 | TO-220  | NPN  | BDW94B      |
|                                       |                                    |                                                      |                                    |         |      | BDW93B      |
|                                       | 100                                |                                                      |                                    |         | PNP  | BDW93C      |
|                                       |                                    |                                                      |                                    |         |      | BDW94C      |

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