

# Complementary Silicon Plastic Power Darlington

## BDV65B (NPN), BDV64B (PNP)

...for use as output devices in complementary general purpose amplifier applications.

### Features

- High DC Current Gain –  $HFE = 1000$  (min) @ 5 Adc
- Monolithic Construction with Built-in Base Emitter Shunt Resistors
- These are Pb-Free Devices\*

### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Max            | Unit                     |
|----------------------------------------------------------------------------------------|----------------|----------------|--------------------------|
| Collector-Emitter Voltage                                                              | $V_{CEO}$      | 100            | Vdc                      |
| Collector-Base Voltage                                                                 | $V_{CB}$       | 100            | Vdc                      |
| Emitter-Base Voltage                                                                   | $V_{EB}$       | 5.0            | Vdc                      |
| Collector Current – Continuous<br>– Peak                                               | $I_C$          | 10<br>20       | Adc                      |
| Base Current                                                                           | $I_B$          | 0.5            | Adc                      |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 125<br>1.0     | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range                                       | $T_J, T_{stg}$ | -65 to<br>+150 | $^\circ\text{C}$         |

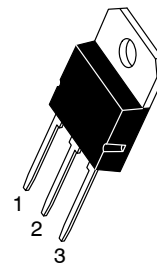
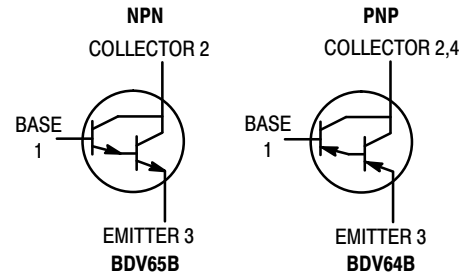
### THERMAL CHARACTERISTICS

| Characteristic                       | Symbol          | Max | Unit               |
|--------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.0 | $^\circ\text{C/W}$ |

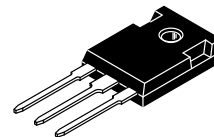
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

\*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## 10 AMPERE DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS 60–80–100–120 VOLTS, 125 WATTS



SOT-93  
(TO-218)  
CASE 340D



TO-247  
CASE 340L  
STYLE 3

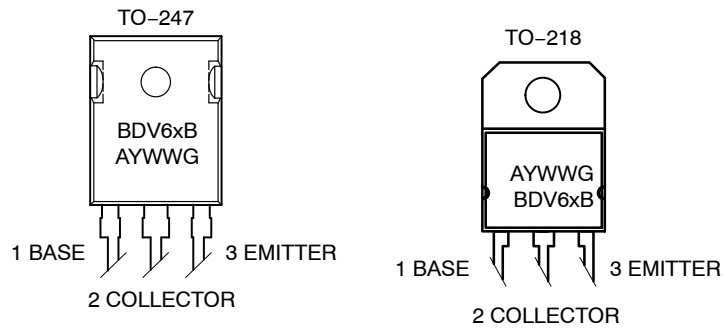
**NOTE:** Effective June 2012 this device will be available only in the TO-247 package. Reference FPCN# 16827.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

## BDV65B (NPN), BDV64B (PNP)

### MARKING DIAGRAMS



BDV6xB = Device Code  
x = 4 or 5  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

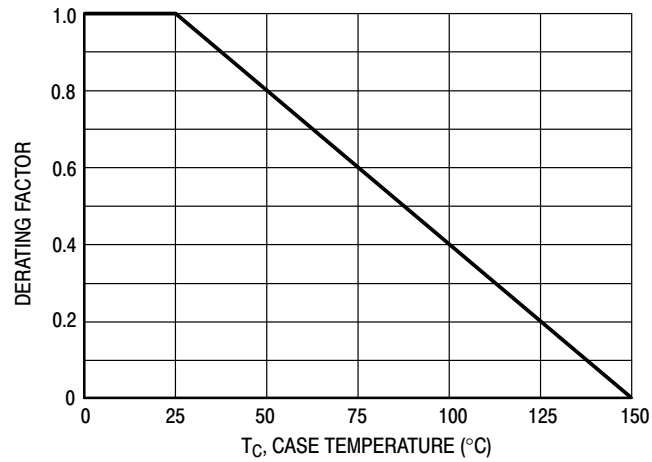


Figure 1. Power Derating

## BDV65B (NPN), BDV64B (PNP)

### ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

#### OFF CHARACTERISTICS

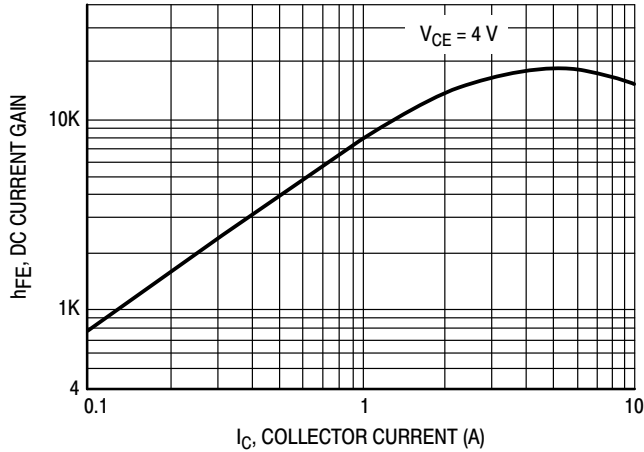
|                                                                                                   |                |     |     |      |
|---------------------------------------------------------------------------------------------------|----------------|-----|-----|------|
| Collector–Emitter Sustaining Voltage (1)<br>( $I_C = 30 \text{ mAdc}$ , $I_B = 0$ )               | $V_{CEO(sus)}$ | 100 | –   | Vdc  |
| Collector Cutoff Current<br>( $V_{CE} = 50 \text{ Vdc}$ , $I_B = 0$ )                             | $I_{CEO}$      | –   | 1.0 | mAdc |
| Collector Cutoff Current<br>( $V_{CB} = 100 \text{ Vdc}$ , $I_E = 0$ )                            | $I_{CBO}$      | –   | 0.4 | mAdc |
| Collector Cutoff Current<br>( $V_{CB} = 50 \text{ Vdc}$ , $I_E = 0$ , $T_C = 150^\circ\text{C}$ ) | $I_{CBO}$      | –   | 2.0 | mAdc |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0 \text{ Vdc}$ , $I_C = 0$ )                              | $I_{EBO}$      | –   | 5.0 | mAdc |

#### ON CHARACTERISTICS

|                                                                                                |               |      |     |     |
|------------------------------------------------------------------------------------------------|---------------|------|-----|-----|
| DC Current Gain<br>( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 4.0 \text{ Vdc}$ )                    | $h_{FE}$      | 1000 | –   | –   |
| Collector–Emitter Saturation Voltage<br>( $I_C = 5.0 \text{ Adc}$ , $I_B = 0.02 \text{ Adc}$ ) | $V_{CE(sat)}$ | –    | 2.0 | Vdc |
| Base–Emitter Saturation Voltage<br>( $I_C = 5.0 \text{ Adc}$ , $V_{CE} = 4.0 \text{ Vdc}$ )    | $V_{BE(on)}$  | –    | 2.5 | Vdc |

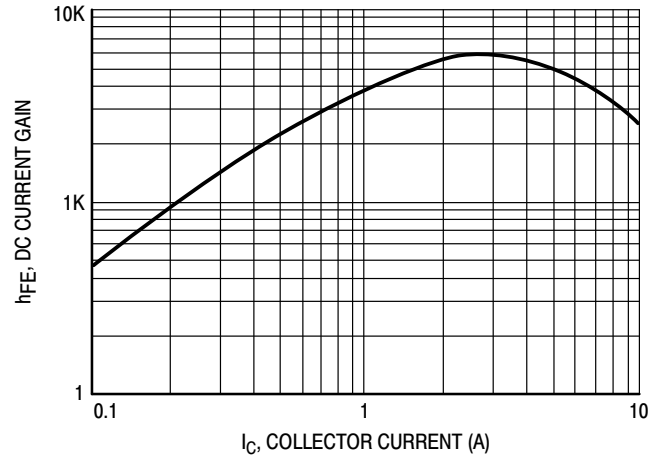
## BDV65B (NPN), BDV64B (PNP)

**NPN**

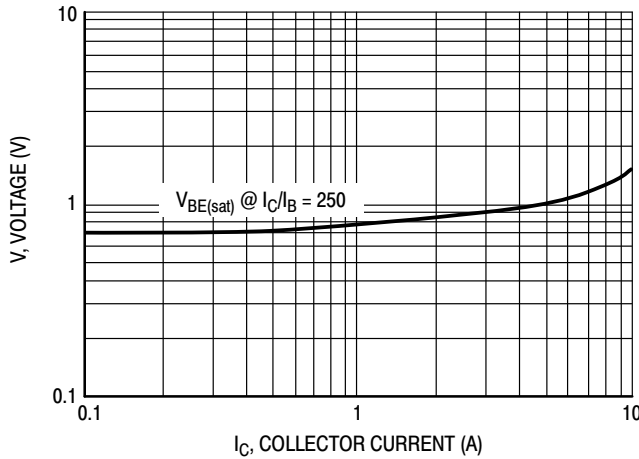


**Figure 2. DC Current Gain**

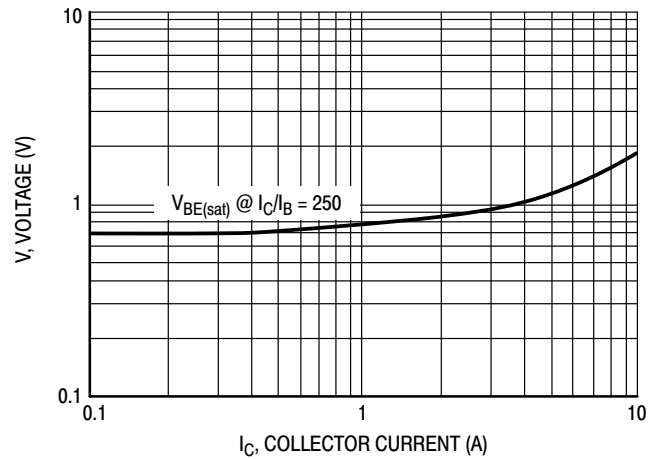
**PNP**



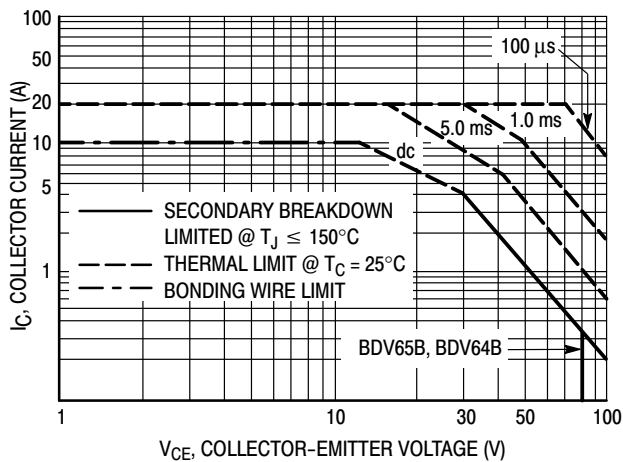
**Figure 3. DC Current Gain**



**Figure 4. "On" Voltages**



**Figure 5. "On" Voltages**



**Figure 6. Active Region Safe Operating Area**

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 6 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ,  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 7. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

## BDV65B (NPN), BDV64B (PNP)

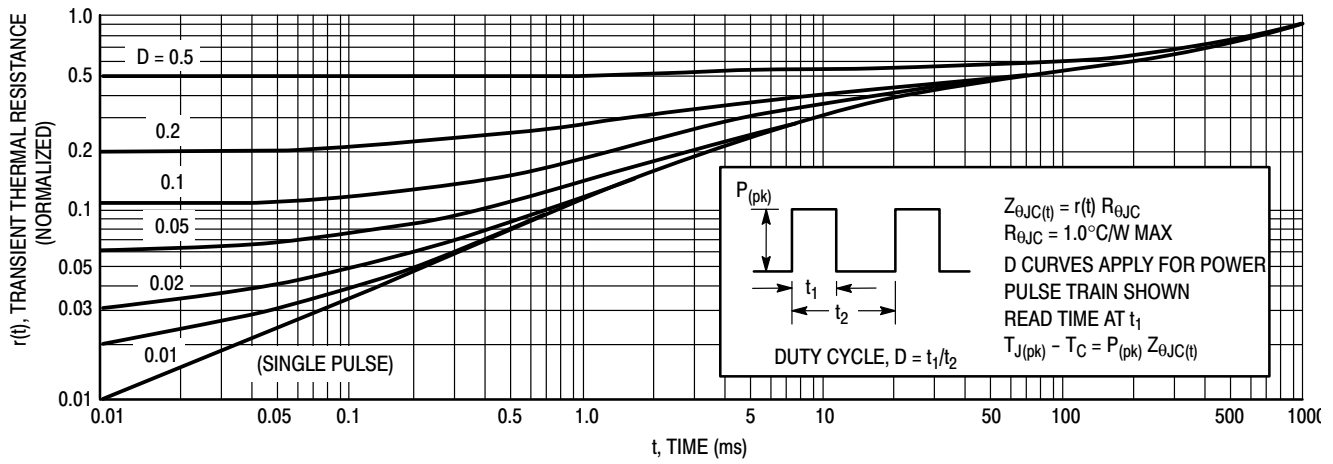


Figure 7. Thermal Response

### ORDERING INFORMATION

| Device Order Number | Package Type        | Shipping <sup>†</sup> |
|---------------------|---------------------|-----------------------|
| BDV64BG             | TO-247<br>(Pb-Free) | 30 Units / Rail       |

### DISCONTINUED (Note 1)

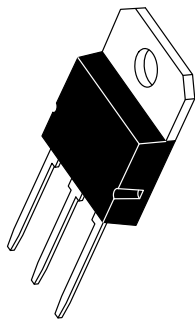
|         |                     |                 |
|---------|---------------------|-----------------|
| BDV65B  | TO-218              | 30 Units / Rail |
| BDV65BG | TO-247<br>(Pb-Free) | 30 Units / Rail |
| BDV64B  | TO-218              | 30 Units / Rail |

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

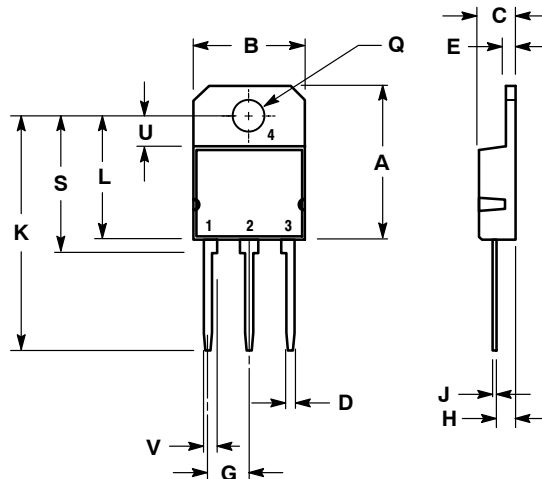
1. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

SOT-93 (TO-218)  
CASE 340D-02  
ISSUE E

DATE 03 JAN 2002



SCALE 1:1



STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: MILLIMETER.

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | ---         | 20.35 | ---       | 0.801 |
| B   | 14.70       | 15.20 | 0.579     | 0.598 |
| C   | 4.70        | 4.90  | 0.185     | 0.193 |
| D   | 1.10        | 1.30  | 0.043     | 0.051 |
| E   | 1.17        | 1.37  | 0.046     | 0.054 |
| G   | 5.40        | 5.55  | 0.213     | 0.219 |
| H   | 2.00        | 3.00  | 0.079     | 0.118 |
| J   | 0.50        | 0.78  | 0.020     | 0.031 |
| K   | 31.00 REF   |       | 1.220 REF |       |
| L   | ---         | 16.20 | ---       | 0.638 |
| Q   | 4.00        | 4.10  | 0.158     | 0.161 |
| S   | 17.80       | 18.20 | 0.701     | 0.717 |
| U   | 4.00 REF    |       | 0.157 REF |       |
| V   | 1.75 REF    |       | 0.069     |       |

GENERIC  
MARKING DIAGRAM\*

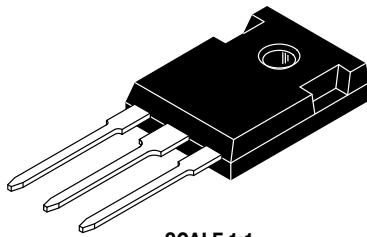


A = Assembly Location  
Y = Year  
WW = Work Week  
XXXXX = Device Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

|                  |                 |                                                                                                                                                                                     |
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| DESCRIPTION:     | SOT-93 (TO-218) | PAGE 1 OF 1                                                                                                                                                                         |

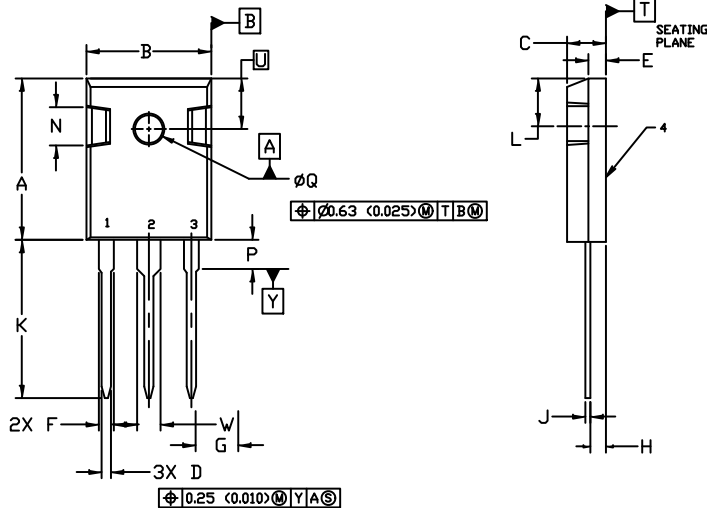
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TO-247  
CASE 340L  
ISSUE G

DATE 06 OCT 2021

SCALE 1:1

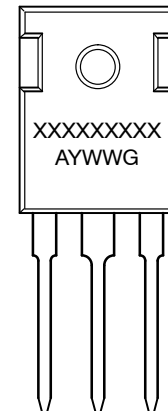


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER

|     | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
| DIM | MIN.        | MAX.  | MIN.      | MAX.  |
| A   | 20.32       | 21.08 | 0.800     | 0.830 |
| B   | 15.75       | 16.26 | 0.620     | 0.640 |
| C   | 4.70        | 5.30  | 0.185     | 0.209 |
| D   | 1.00        | 1.40  | 0.040     | 0.055 |
| E   | 1.90        | 2.60  | 0.075     | 0.102 |
| F   | 1.65        | 2.13  | 0.065     | 0.084 |
| G   | 5.45 BSC    |       | 0.215 BSC |       |
| H   | 1.50        | 2.49  | 0.059     | 0.098 |
| J   | 0.40        | 0.80  | 0.016     | 0.031 |
| K   | 19.81       | 20.83 | 0.780     | 0.820 |
| L   | 5.40        | 6.20  | 0.212     | 0.244 |
| N   | 4.32        | 5.49  | 0.170     | 0.216 |
| P   | ----        | 4.50  | ----      | 0.177 |
| Q   | 3.55        | 3.65  | 0.140     | 0.144 |
| U   | 6.15 BSC    |       | 0.242 BSC |       |
| W   | 2.87        | 3.12  | 0.113     | 0.123 |

GENERIC  
MARKING DIAGRAM\*



- STYLE 1:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN
- STYLE 2:  
PIN 1. ANODE  
2. CATHODE (S)  
3. ANODE 2  
4. CATHODE (S)
- STYLE 3:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR
- STYLE 4:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR
- STYLE 5:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE
- STYLE 6:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. MAIN TERMINAL 2

XXXXX = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

|                  |             |                                                                                                                                                                                  |
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