## BD243B, BD243C* (NPN) BD244B, BD244C* (PNP)

## BD243C and BD244C are Preferred Devices

## Complementary Silicon Plastic Power Transistors

These devices are designed for use in general purpose amplifier and switching applications.

## Features

- Collector - Emitter Saturation Voltage -

$$
\mathrm{V}_{\mathrm{CE}(\mathrm{sat})}=1.5 \mathrm{Vdc}(\mathrm{Max}) @ \mathrm{I}_{\mathrm{C}}=6.0 \mathrm{Adc}
$$

- Collector Emitter Sustaining Voltage -

$$
\begin{aligned}
\mathrm{V}_{\mathrm{CEO}(\mathrm{sus})} & =80 \mathrm{Vdc}(\mathrm{Min})-\mathrm{BD} 243 \mathrm{~B}, \mathrm{BD} 244 \mathrm{~B} \\
& =100 \mathrm{Vdc}(\mathrm{Min})-\mathrm{BD} 243 \mathrm{C}, \mathrm{BD} 244 \mathrm{C}
\end{aligned}
$$

- High Current Gain Bandwidth Product

$$
\mathrm{f}_{\mathrm{T}}=3.0 \mathrm{MHz}(\mathrm{Min}) @ \mathrm{I}_{\mathrm{C}}=500 \mathrm{mAdc}
$$

- $\mathrm{Pb}-$ Free Packages are Available*


## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
| :---: | :---: | :---: | :---: |
|  | $\mathrm{V}_{\text {CEO }}$ | $\begin{gathered} 80 \\ 100 \end{gathered}$ | Vdc |
| $\begin{array}{ll} \hline \text { Collector-Base Voltage } & \\ & \text { BD243B, BD244B } \\ & \text { BD243C, BD244C } \end{array}$ | $\mathrm{V}_{C B}$ | $\begin{gathered} 80 \\ 100 \end{gathered}$ | Vdc |
| Emitter-Base Voltage | $\mathrm{V}_{\mathrm{EB}}$ | 5.0 | Vdc |
| Collector Current - Continuous <br> - Peak | $I_{C}$ | $\begin{gathered} 6 \\ 10 \end{gathered}$ | Adc |
| Base Current | $\mathrm{I}_{\mathrm{B}}$ | 2.0 | Adc |
| Total Device Dissipation @ $\mathrm{T}_{\mathrm{C}}=25^{\circ} \mathrm{C}$ Derate above $25^{\circ} \mathrm{C}$ | $\mathrm{P}_{\mathrm{D}}$ | $\begin{gathered} \hline 65 \\ 0.52 \end{gathered}$ | $\begin{gathered} \mathrm{W} \\ \mathrm{~W} /{ }^{\circ} \mathrm{C} \end{gathered}$ |
| Operating and Storage Junction Temperature Range | $\mathrm{T}_{\mathrm{J}}, \mathrm{T}_{\mathrm{stg}}$ | -65 to +150 | ${ }^{\circ} \mathrm{C}$ |

THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max | Unit |
| :---: | :---: | :---: | :---: |
| Thermal Resistance, Junction-to-Case | R $_{\text {日JC }}$ | 1.92 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.
 download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## ON Semiconductor ${ }^{\circledR}$

http://onsemi.com

## 6 AMPERE <br> POWER TRANSISTORS COMPLEMENTARY SILICON 80-100 VOLTS 65 WATTS



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

Preferred devices are recommended choices for future use and best overall value.

## BD243B, BD243C* (NPN) BD244B, BD244C* (PNP)



Figure 1. Power Derating

ELECTRICAL CHARACTERISTICS ( $\mathrm{T}_{\mathrm{C}}=25^{\circ} \mathrm{C}$ unless otherwise noted)

| Characteristic |  | Symbol | Min | Max | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Collector-Emitter Sustaining Voltage (Note 1) $\left(\mathrm{I}_{\mathrm{C}}=30 \mathrm{mAdc}, \mathrm{I}_{\mathrm{B}}=0\right)$ | BD243B, BD244B BD243C, BD244C | $\mathrm{V}_{\text {CEO(sus) }}$ | $\begin{gathered} 80 \\ 100 \end{gathered}$ | - | Vdc |
| Collector Cutoff Current $\left(V_{C E}=60 \mathrm{Vdc}, \mathrm{I}_{\mathrm{B}}=0\right)$ | BD243B, BD243C, BD244B, BD244C | $I_{\text {CEE }}$ | - | 0.7 | mAdc |
| Collector Cutoff Current $\left(\mathrm{V}_{\mathrm{CE}}=80 \mathrm{Vdc}, \mathrm{~V}_{\mathrm{EB}}=0\right)$ <br> $\left(\mathrm{V}_{\mathrm{CE}}=100 \mathrm{Vdc}, \mathrm{V}_{\mathrm{EB}}=0\right)$ | BD243B, BD244B <br> BD243C, BD244C | $\mathrm{I}_{\text {CES }}$ | - | $\begin{aligned} & 400 \\ & 400 \end{aligned}$ | $\mu \mathrm{Adc}$ |
| Emitter Cutoff Current $\left(\mathrm{V}_{\mathrm{BE}}=5.0 \mathrm{Vdc}, \mathrm{I}_{\mathrm{C}}=0\right)$ |  | $\mathrm{I}_{\text {ebo }}$ | - | 1.0 | mAdc |

ON CHARACTERISTICS (Note 1)

| DC Current Gain $\left(\mathrm{I}_{\mathrm{C}}=0.3 \mathrm{Adc}, \mathrm{V}_{\mathrm{CE}}=4.0 \mathrm{Vdc}\right)$ $\left(\mathrm{I}_{\mathrm{C}}=3.0 \mathrm{Adc}, \mathrm{V}_{\mathrm{CE}}=4.0 \mathrm{Vdc}\right)$ | $\mathrm{h}_{\text {FE }}$ | $\begin{aligned} & 30 \\ & 15 \end{aligned}$ | - | - |
| :---: | :---: | :---: | :---: | :---: |
| Collector-Emitter Saturation Voltage $\left(\mathrm{I}_{\mathrm{C}}=6.0 \mathrm{Adc}, \mathrm{I}_{\mathrm{B}}=1.0 \mathrm{Adc}\right.$ ) | $\mathrm{V}_{\mathrm{CE} \text { (sat) }}$ | - | 1.5 | Vdc |
| Base-Emitter On Voltage $\left(\mathrm{I}_{\mathrm{C}}=6.0 \mathrm{Adc}, \mathrm{~V}_{\mathrm{CE}}=4.0 \mathrm{Vdc}\right)$ | $V_{B E \text { (on) }}$ | - | 2.0 | Vdc |

## DYNAMIC CHARACTERISTICS

| Current-Gain - Bandwidth Product (Note 2) <br> $\left(\mathrm{I}_{\mathrm{C}}=500 \mathrm{mAdc}, \mathrm{V}_{\mathrm{CE}}=10 \mathrm{Vdc}, \mathrm{f}_{\text {test }}=1.0 \mathrm{MHz}\right)$ | $\mathrm{f}_{\mathrm{T}}$ | 3.0 | - | MHz |
| :--- | :---: | :---: | :---: | :---: |
| Small-Signal Current Gain <br> $\left(\mathrm{I}_{\mathrm{C}}=0.5\right.$ Adc, $\left.\mathrm{V}_{\mathrm{CE}}=10 \mathrm{Vdc}, \mathrm{f}=1.0 \mathrm{kHz}\right)$ | $\mathrm{h}_{\mathrm{fe}}$ | 20 | - | - |

1. Pulse Test: Pulsewidth $\leq 300 \mu \mathrm{~s}$, Duty Cycle $\leq 2.0 \%$.
2. $\mathrm{f}_{\mathrm{T}}=\mathrm{h}_{\mathrm{fe}} \bullet \mathrm{f}_{\text {test }}$

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$\mathrm{R}_{\mathrm{B}}$ AND $\mathrm{R}_{\mathrm{C}}$ VARIED TO OBTAIN DESIRED CURRENT LEVELS
$\mathrm{D}_{1}$ MUST BE FAST RECOVERY TYPE eg.
1 N5825 USED ABOVE $\mathrm{I}_{\mathrm{B}} \approx 100 \mathrm{~mA}$
MSD6100 USED BELOW I $\mathrm{I}_{\mathrm{B}} \approx 100 \mathrm{~mA}$
Figure 2. Switching Time Test Circuit


Figure 3. Turn-On Time


Figure 4. Thermal Response


Figure 5. 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 $I_{C}-V_{C E}$ 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 5 is based on $\mathrm{T}_{\mathrm{J}(\mathrm{pk})}=150^{\circ} \mathrm{C}$ : $\mathrm{T}_{\mathrm{C}}$ is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to $10 \%$ provided $\mathrm{T}_{\mathrm{J}(\mathrm{pk})}$ $\leq 150^{\circ} \mathrm{C}, \mathrm{T}_{\mathrm{J}(\mathrm{pk})}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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Figure 6. Turn-Off Time

$\mathrm{I}_{\mathrm{c}}$, COLLECTOR CURRENT (AMP)
Figure 8. DC Current Gain


Figure 10. "On" Voltages


Figure 7. Capacitance


Figure 9. Collector Saturation Region


Figure 11. Temperature Coefficients

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Figure 12. Collector Cut-Off Region


Figure 13. Effects of Base-Emitter Resistance

ORDERING INFORMATION

| Device | Package | Shipping ${ }^{\dagger}$ |
| :---: | :---: | :---: |
| BD243B | TO-220 | 50 Units / Rail |
| BD243BG | $\begin{gathered} \hline \text { TO-220 } \\ \text { (Pb-Free) } \end{gathered}$ |  |
| BD243C | TO-220 | 50 Units / Rail |
| BD243CG | $\begin{gathered} \hline \text { TO-220 } \\ \text { (Pb-Free) } \end{gathered}$ |  |
| BD244B | TO-220 | 50 Units / Rail |
| BD244BG | $\begin{gathered} \text { TO-220 } \\ \text { (Pb-Free) } \end{gathered}$ |  |
| BD244C | TO-220 | 50 Units / Rail |
| BD244CG | $\begin{gathered} \text { TO-220 } \\ \text { (Pb-Free) } \end{gathered}$ |  |

$\dagger$ 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.

## PACKAGE DIMENSIONS

TO-220AB
CASE 221A-09
ISSUE AA


NOTES:

1. Dimensioning and tolerancing per ansi Y14.5M, 1982 .
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

|  | INCHES |  | MILLIMETERS |  |
| :---: | ---: | ---: | ---: | ---: |
| DIM | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.405 | 9.66 | 10.28 |
| C | 0.160 | 0.190 | 4.07 | 4.82 |
| D | 0.025 | 0.035 | 0.64 | 0.88 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.155 | 2.80 | 3.93 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| $\mathbf{Z}$ | --- | 0.080 | --- | 2.04 |

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

[^0]
## PUBLICATION ORDERING INFORMATION

## LITERATURE FULFILLMENT

Literature Distribution Center for ON Semiconductor P.O. Box 61312, Phoenix, Arizona 85082-1312 USA

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N. American Technical Support: 800-282-9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center 2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051 Phone: 81-3-5773-3850

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For additional information, please contact your local Sales Representative.


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