

**General Descriptions**

- DDC144NS features discrete dual NPN transistors that can support continuous maximum current up to 100 mA. It is suited for applications where the load needs to be turned on and off using circuits like micro-controllers, comparators, etc., particularly at a point of load. The component devices can be used as a part of a circuit or as a stand alone discrete device.

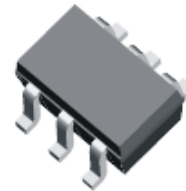


Fig. 1: SOT-363

**Features**

- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

**Mechanical Data**

- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Figure 2
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.0065 grams (approximate)

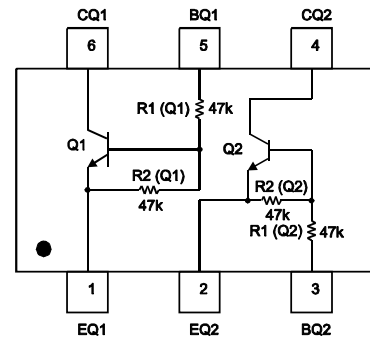


Fig. 2: Schematic and Pin Configuration

**Maximum Ratings, Total Device**

@T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3)                           | P <sub>d</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 3) | R <sub>θJA</sub>                  | 625         | °C/W |
| Operating and Storage Temperature Range              | T <sub>j</sub> , T <sub>STG</sub> | -55 to +150 | °C   |
| Collector Current                                    | I <sub>C(max)</sub>               | 100         | mA   |

**Maximum Ratings:**

**Sub-Component Device - Pre-Biased NPN Transistor**

@T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic | Symbol          | Value      | Unit |
|----------------|-----------------|------------|------|
| Supply Voltage | V <sub>CC</sub> | 50         | V    |
| Input Voltage  | V <sub>in</sub> | -10 to +40 | V    |
| Output Current | I <sub>O</sub>  | 100        | mA   |

**Electrical Characteristics:**

**Pre-Biased NPN Transistor**

@T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                | Symbol              | Min | Typ | Max  | Unit | Test Condition   |
|-------------------------------|---------------------|-----|-----|------|------|--|
| Input Voltage                 | V <sub>I(off)</sub> | 0.5 | 1.1 | —    | V    | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100uA             |
|                               | V <sub>I(on)</sub>  | —   | 1.5 | 3    | V    | V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA              |
| Output Voltage                | V <sub>O(on)</sub>  | —   | 0.1 | 0.3  | V    | I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA              |
| Input Current                 | I <sub>I</sub>      | —   | —   | 0.18 | mA   | V <sub>I</sub> = 5V                                      |
| Output Current                | I <sub>O(off)</sub> | —   | —   | 0.5  | uA   | V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V               |
| DC Current Gain               | G <sub>I</sub>      | 100 | —   | —    | —    | V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA                |
| Input Resistor (R1) Tolerance | Δ R1                | -30 | —   | +30  | %    | —  |
| Resistance Ratio Tolerance    | R2/R1               | -20 | —   | +20  | %    | —  |
| Gain-Bandwidth Product        | f <sub>T</sub>      | —   | 250 | —    | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100 MHz |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on page 4 or go to Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>

## Typical Characteristics of NPN Transistor

@  $T_A = 25^\circ\text{C}$  unless otherwise specified

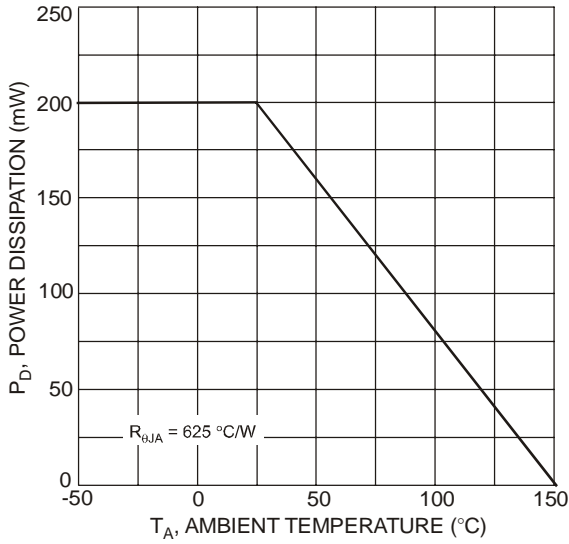


Fig. 3 Derating Curve

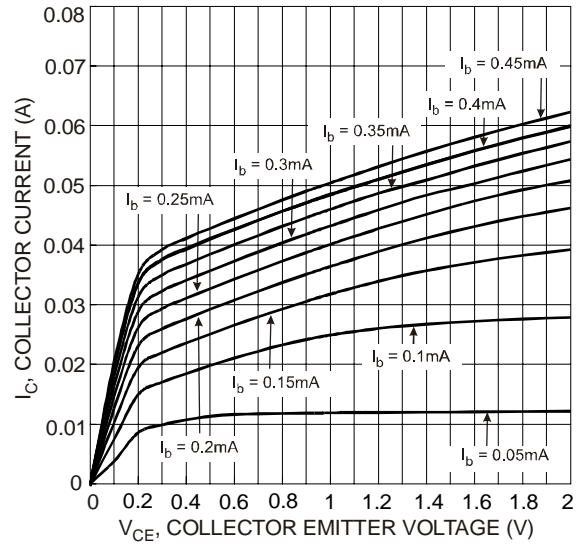


Fig. 4 Typical  $V_{CE}$  vs.  $I_C$

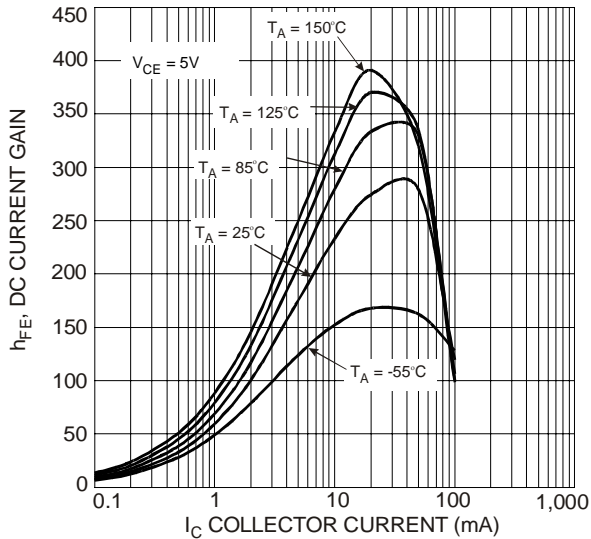


Fig. 5 Typical DC Current Gain

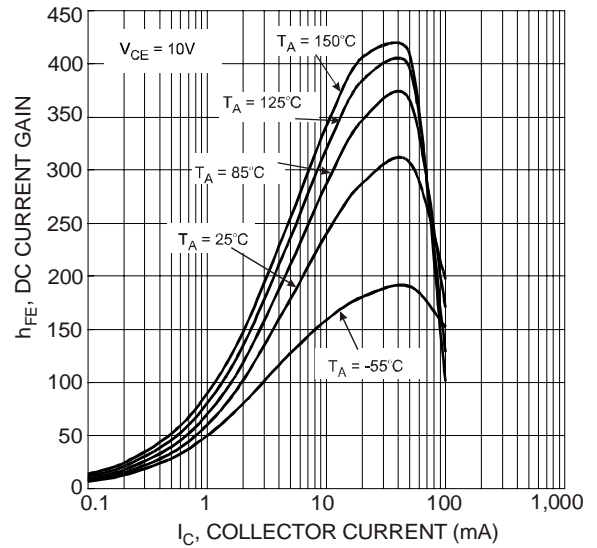


Fig. 6 Typical DC Current Gain

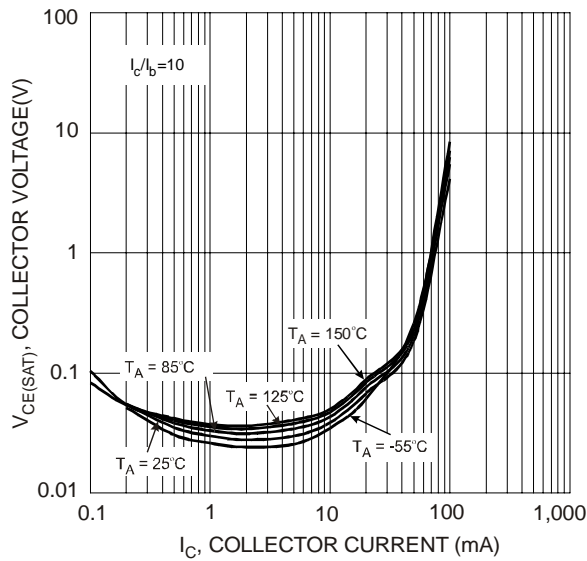


Fig. 7 Typical  $V_{CE(SAT)}$  vs.  $I_C$

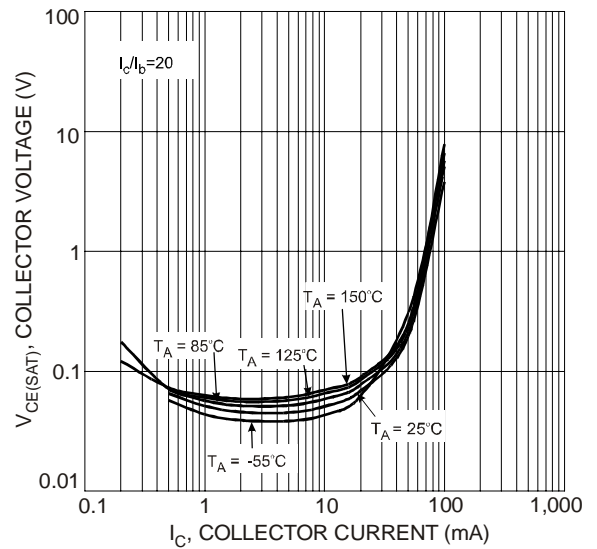


Fig. 8 Typical  $V_{CE(SAT)}$  vs.  $I_C$

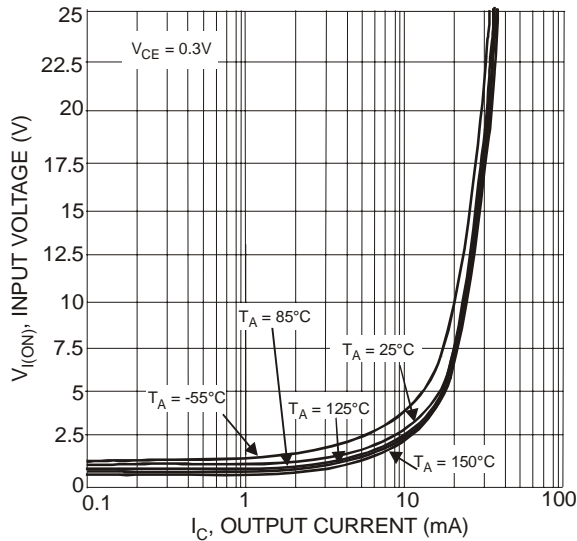


Fig. 9 Typical Input Voltage vs. Output Current

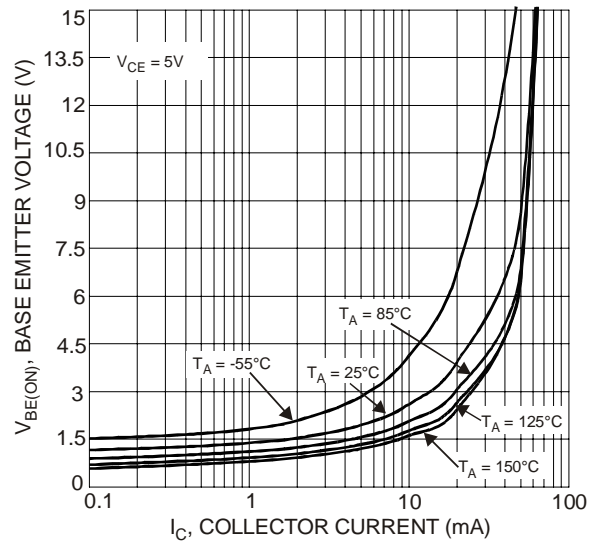


Fig. 10 Typical  $V_{BE(ON)}$  vs.  $I_C$

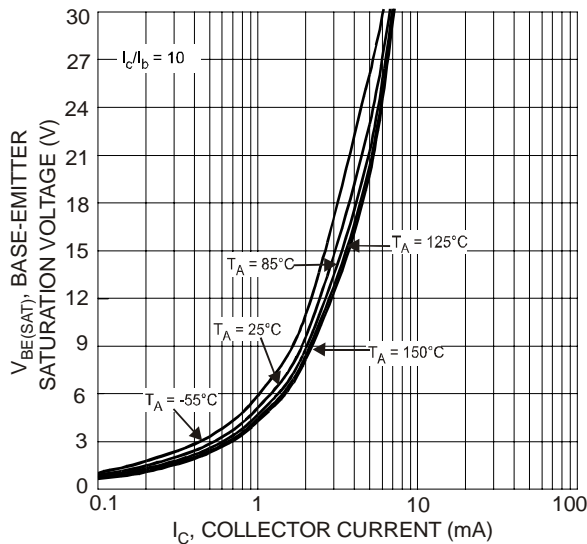


Fig. 11 Typical  $V_{BE(SAT)}$  vs.  $I_C$

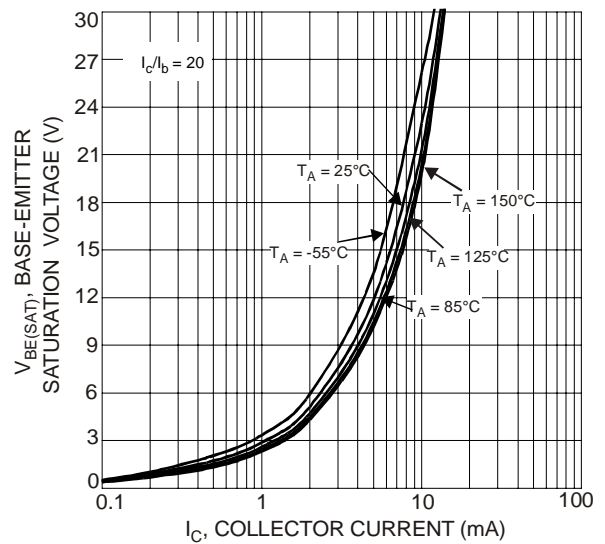


Fig. 12 Typical  $V_{BE(SAT)}$  vs.  $I_C$

## Ordering Information (Note 4)

| Device     | Packaging | Shipping         |
|------------|-----------|------------------|
| DDC144NS-7 | SOT-363   | 3000/Tape & Reel |

Notes: 4. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information

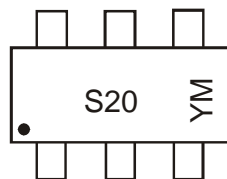


Fig. 13

S20 = Product Type Marking Code,  
 YM = Date Code Marking  
 Y = Year, e.g., T = 2006  
 M = Month, e.g., 9 = September

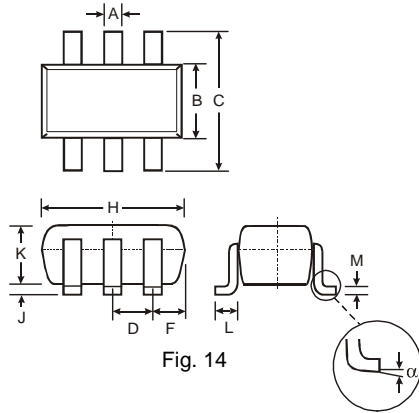
### Date Code Key

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|
| Code | S    | T    | U    | V    | W    | X    | Y    | Z    |

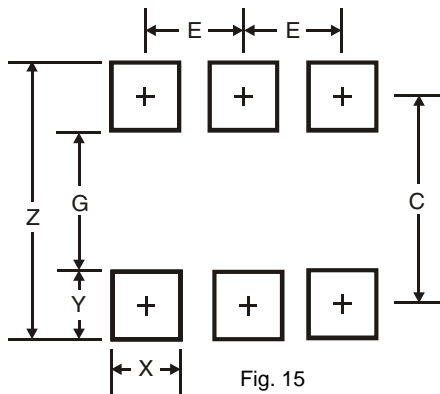
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Package Outline Dimensions**



| SOT-363              |              |      |
|----------------------|--------------|------|
| Dim                  | Min          | Max  |
| A                    | 0.10         | 0.30 |
| B                    | 1.15         | 1.35 |
| C                    | 2.00         | 2.20 |
| D                    | 0.65 Nominal |      |
| F                    | 0.30         | 0.40 |
| H                    | 1.80         | 2.20 |
| J                    | —            | 0.10 |
| K                    | 0.90         | 1.00 |
| L                    | 0.25         | 0.40 |
| M                    | 0.10         | 0.25 |
| $\alpha$             | 0°           | 8°   |
| All Dimensions in mm |              |      |

**Suggested Pad Layout**



| Dimensions | SOT-363* |
|------------|----------|
| Z          | 2.5      |
| G          | 1.3      |
| X          | 0.42     |
| Y          | 0.6      |
| C          | 1.9      |
| E          | 0.65     |

\* Typical dimensions in mm

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