

## Features

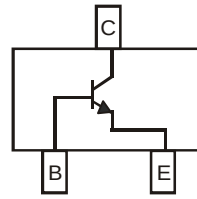
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- High Collector Current Rating
- Complementary Version Available (DPBT8105)
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)



Top View



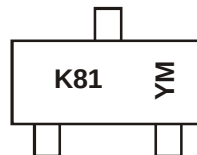
Device Schematic

## Ordering Information (Note 3)

| Part Number | Case   | Packaging        |
|-------------|--------|------------------|
| DNBT8105-7  | SOT-23 | 3000/Tape & Reel |

- Notes:
1. No purposefully added lead.
  2. Diode's 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. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



K81 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: S = 2005)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year  | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code  | R    | S    | T    | U    | V    | W    | X    | Y    | Z    | A    | B    | C    |
| 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    |

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

| Characteristic                 | Symbol           | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage         | V <sub>CBO</sub> | 80    | V    |
| Collector-Emitter Voltage      | V <sub>CEO</sub> | 60    | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | 5     | V    |
| Collector Current - Continuous | I <sub>C</sub>   | 1     | A    |
| Peak Pulse Collector Current   | I <sub>CM</sub>  | 2     | A    |

**Thermal Characteristics**

| Characteristic                                                           | Symbol                            | Value       | Unit |
|--------------------------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 4) @ T <sub>A</sub> = 25°C                       | P <sub>D</sub>                    | 600         | mW   |
| Thermal Resistance, Junction to Ambient (Note 4) @ T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 209         | °C/W |
| Operating and Storage Temperature Range                                  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

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

| Characteristic                       | Symbol               | Min | Max         | Unit | Test Condition                                                                               |
|--------------------------------------|----------------------|-----|-------------|------|----------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 5)</b>  |                      |     |             |      |                                                                                              |
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | 80  | —           | V    | I <sub>C</sub> = 100μA, I <sub>E</sub> = 0                                                   |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | 60  | —           | V    | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0                                                    |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | 5   | —           | V    | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0                                                   |
| Collector Cutoff Current             | I <sub>CBO</sub>     | —   | 100         | nA   | V <sub>CB</sub> = 60V, I <sub>E</sub> = 0                                                    |
| Collector Cutoff Current             | I <sub>CES</sub>     | —   | 100         | nA   | V <sub>CE</sub> = 60V                                                                        |
| Emitter Cutoff Current               | I <sub>EBO</sub>     | —   | 100         | nA   | V <sub>EB</sub> = 4V, I <sub>C</sub> = 0                                                     |
| <b>ON CHARACTERISTICS (Note 5)</b>   |                      |     |             |      |                                                                                              |
| DC Current Gain                      | h <sub>FE</sub>      | 100 | —           | —    | I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V                                                   |
|                                      |                      | 100 | 300         |      | I <sub>C</sub> = 500mA, V <sub>CE</sub> = 5V                                                 |
|                                      |                      | 80  | —           |      | I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V                                                    |
|                                      |                      | 30  | —           |      | I <sub>C</sub> = 2A, V <sub>CE</sub> = 5V                                                    |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | —   | 0.25<br>0.5 | V    | I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA |
| Base-Emitter Saturation Voltage      | V <sub>BE(SAT)</sub> | —   | 1.1         | V    | I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA                                                  |
| Base-Emitter Turn On Voltage         | V <sub>BE(ON)</sub>  | —   | 1.0         | V    | I <sub>C</sub> = 1A, V <sub>CE</sub> = 5V                                                    |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |                      |     |             |      |                                                                                              |
| Output Capacitance                   | C <sub>obo</sub>     | —   | 10          | pF   | V <sub>CB</sub> = 10V, f = 1.0MHz                                                            |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | 150 | —           | MHz  | V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz                                     |

- Notes:
- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  - Short duration pulse test used to minimize self-heating effect.

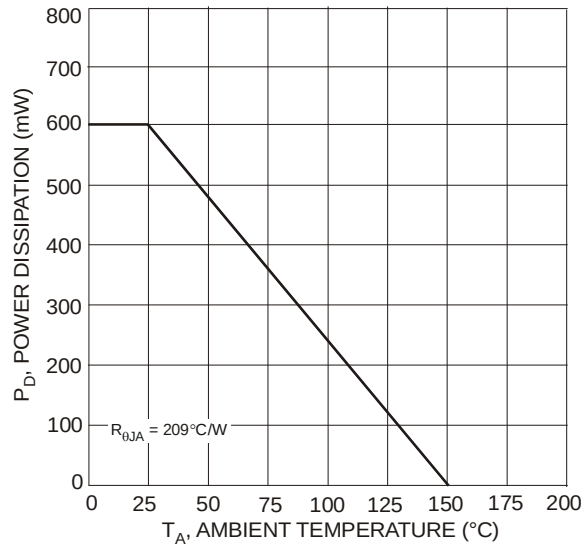


Fig. 1 Power Dissipation  
vs. Ambient Temperature (Note 1)

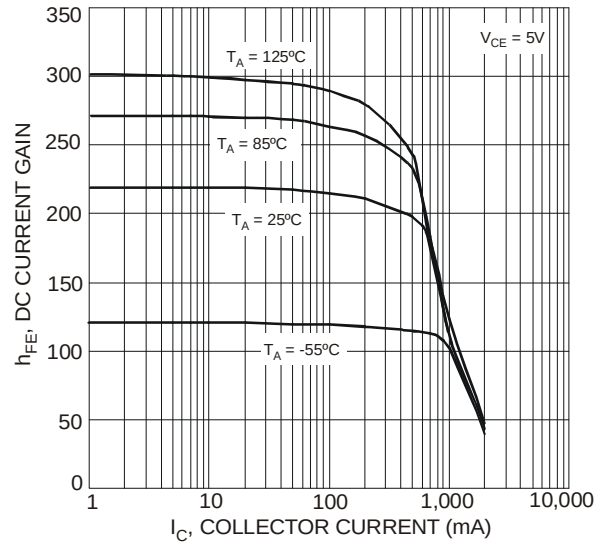


Fig. 2 DC Current Gain vs. Collector Current

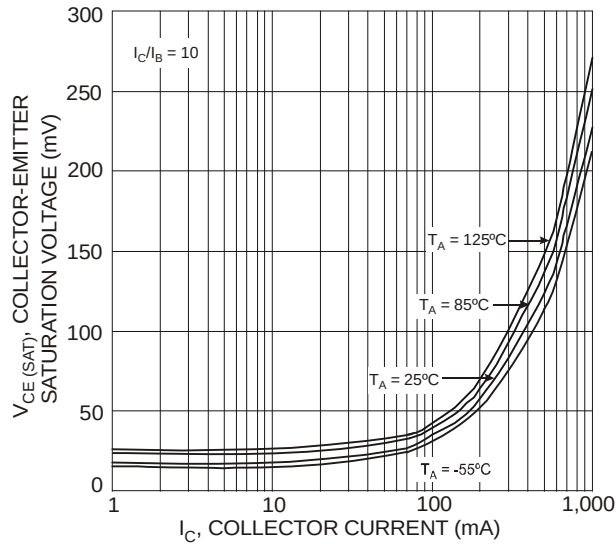


Fig. 3 Typical Collector-Emitter Saturation Voltage  
vs. Collector Current

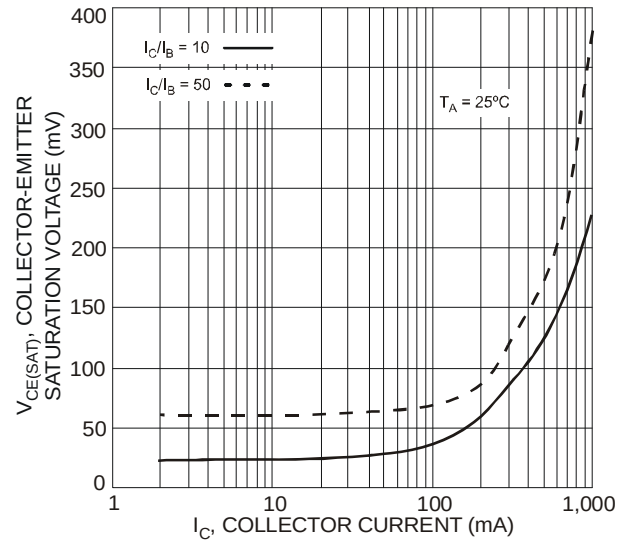


Fig. 4 Typical Collector-Emitter Saturation Voltage  
vs. Collector Current

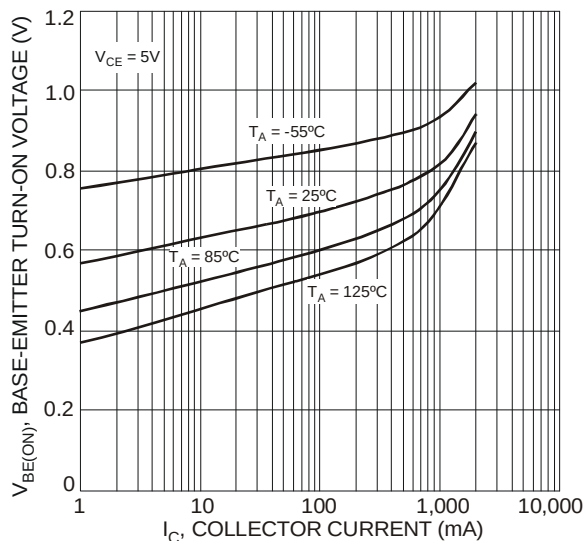


Fig. 5 Typical Base-Emitter Turn-On Voltage  
vs. Collector Current

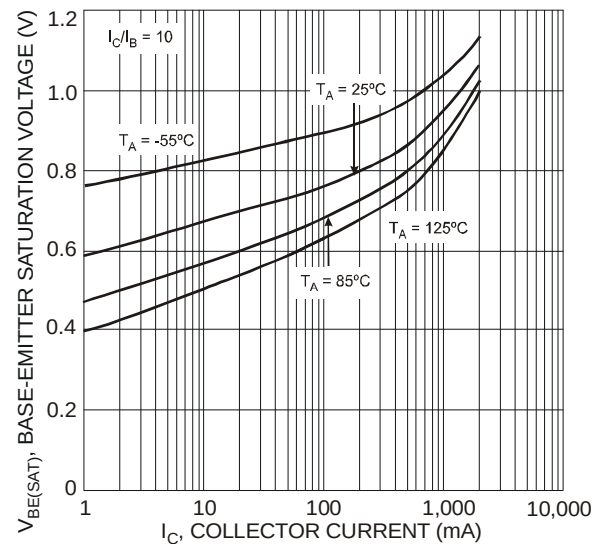
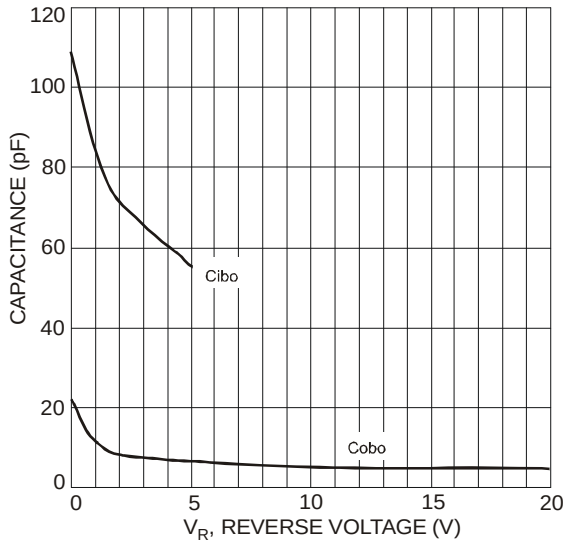
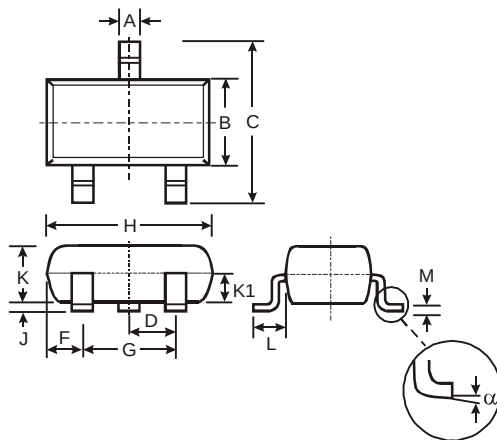


Fig. 6 Typical Base-Emitter Saturation Voltage  
vs. Collector Current

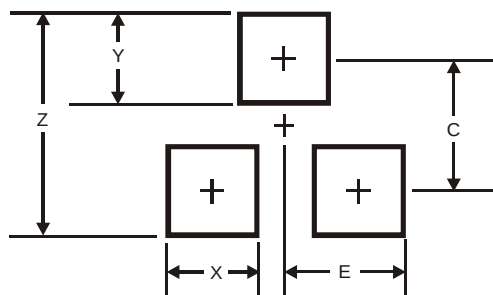


## Package Outline Dimensions



| SOT-23               |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| $\alpha$             | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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