



**THE DATASHEET OF  
DPBT8105-7**



## Features

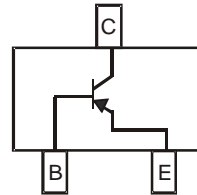
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- High Collector Current Rating
- Complementary Version Available (DNBT8105)
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOT23
- 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



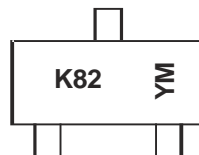
Device Schematic

## Ordering Information (Note 3)

| Part Number | Case  | Packaging        |
|-------------|-------|------------------|
| DPBT8105-7  | SOT23 | 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



K82 = 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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                 | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage         | $V_{CBO}$ | -80   | V    |
| Collector-Emitter Voltage      | $V_{CEO}$ | -60   | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | -5    | V    |
| Collector Current - Continuous | $I_C$     | -1    | A    |
| Peak Pulse Collector Current   | $I_{CM}$  | -2    | A    |

**Thermal Characteristics**

| Characteristic  | Symbol          | Value       | Unit                      |
|---|-----------------|-------------|---------------------------|
| Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$                       | $P_D$           | 600         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 4) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 209         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range                                     | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

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

| Characteristic                       | Symbol        | Min | Max          | Unit | Test Condition   |
|--------------------------------------|---------------|-----|--------------|------|--|
| <b>OFF CHARACTERISTICS (Note 5)</b>  |               |     |              |      |  |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | -80 | —            | V    | $I_C = -100\mu\text{A}, I_E = 0$   |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | -60 | —            | V    | $I_C = -10\text{mA}, I_B = 0$  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | -5  | —            | V    | $I_E = -100\mu\text{A}, I_C = 0$   |
| Collector Cutoff Current             | $I_{CBO}$     | —   | -100         | nA   | $V_{CB} = -60\text{V}, I_E = 0$  |
| Collector Cutoff Current             | $I_{CES}$     | —   | -100         | nA   | $V_{CE} = -60\text{V}$   |
| Emitter Cutoff Current               | $I_{EBO}$     | —   | -100         | nA   | $V_{EB} = -4\text{V}, I_C = 0$   |
| <b>ON CHARACTERISTICS (Note 5)</b>   |               |     |              |      |  |
| DC Current Gain                      | $h_{FE}$      | 100 | —            | —    | $I_C = -1\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -500\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -1\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{A}, V_{CE} = -5\text{V}$ |
|                                      |               | 100 | 300          |      |  |
|                                      |               | 80  | —            |      |  |
|                                      |               | 30  | —            |      |  |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —   | -0.3<br>-0.6 | V    | $I_C = -500\text{mA}, I_B = -50\text{mA}$<br>$I_C = -1\text{A}, I_B = -100\text{mA}$   |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | —   | -1.2         | V    | $I_C = -1\text{A}, I_B = -100\text{mA}$  |
| Base-Emitter Turn On Voltage         | $V_{BE(ON)}$  | —   | -1.0         | V    | $I_C = -1\text{A}, V_{CE} = -5\text{V}$  |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |     |              |      |  |
| Output Capacitance                   | $C_{obo}$     | —   | 12           | pF   | $V_{CB} = -10\text{V}, f = 1.0\text{MHz}$  |
| Current Gain-Bandwidth Product       | $f_T$         | 150 | —            | MHz  | $V_{CE} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$  |

- 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.

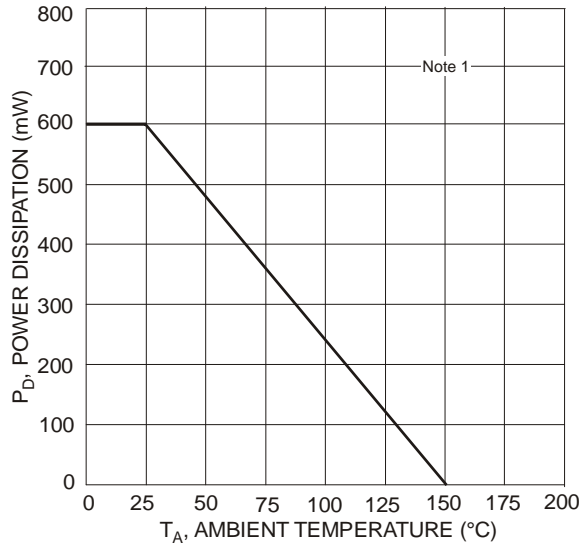


Fig. 1, Max Power Dissipation vs. Ambient Temperature

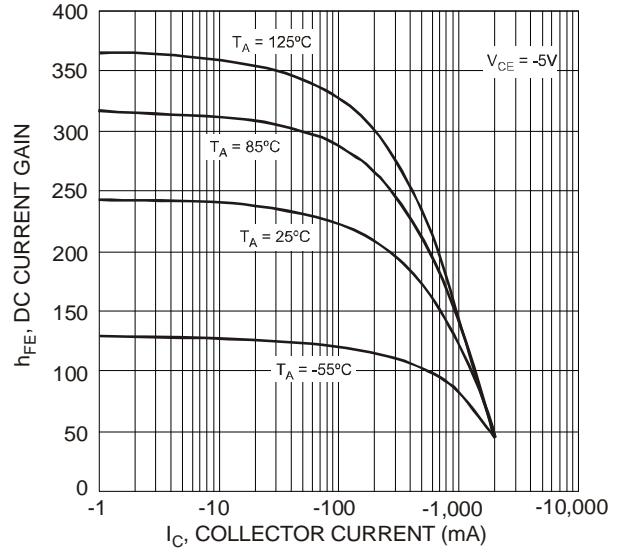


Fig. 2, DC Current Gain vs. Collector Current

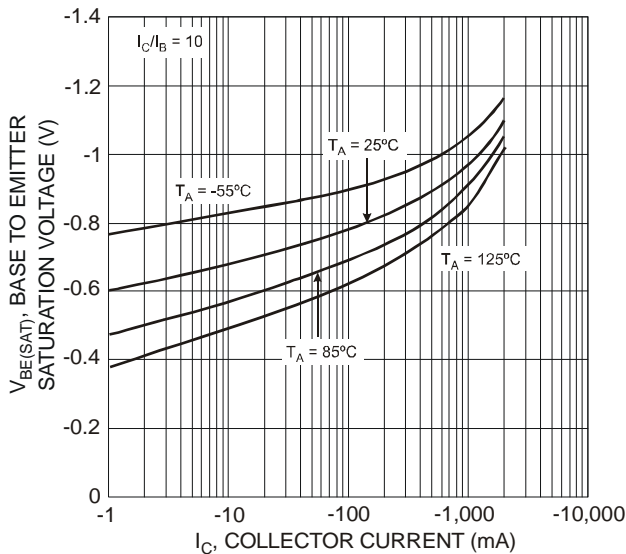


Fig. 3, Base-Emitter Saturation Voltage vs. Collector Current

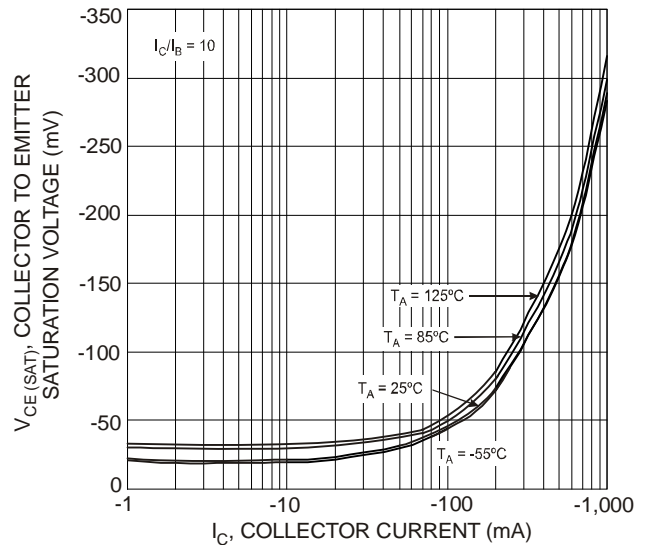


Fig. 4, Collector-Emitter Saturation Voltage vs. Collector Current

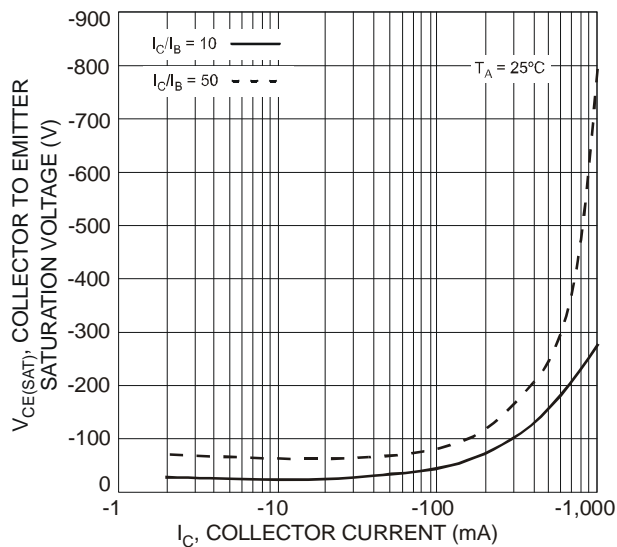


Fig. 5, Collector-Emitter Saturation Voltage vs. Collector Current

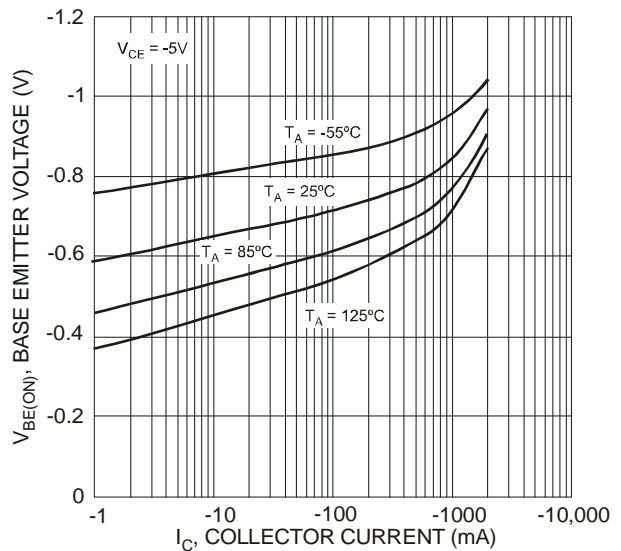


Fig. 6, Base-Emitter Voltage vs. Collector Current

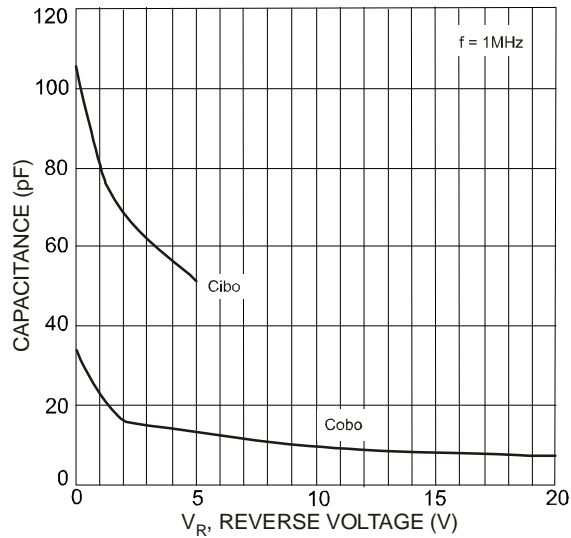
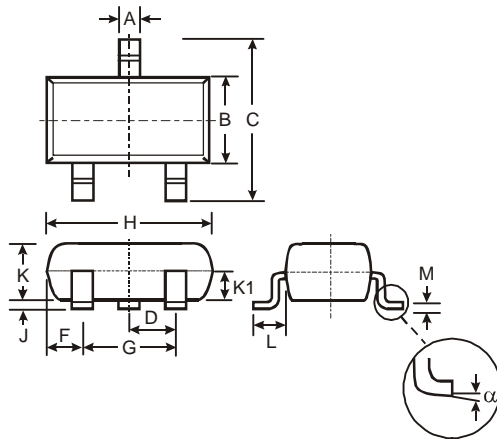


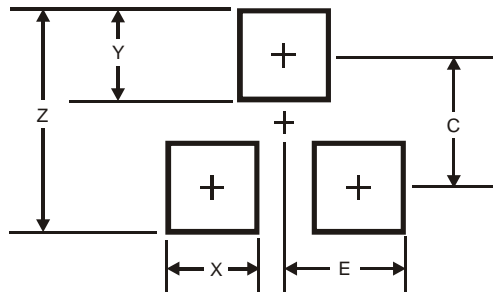
Fig. 7, Capacitance vs. Reverse Voltage

### 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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