



# DNBT8105

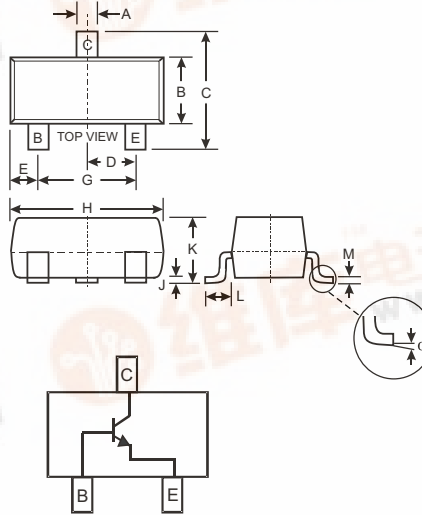
## 1A NPN SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- High Collector Current Rating
- Complementary Version Available (DPBT8105)
- Lead Free By Design/RoHS Compliant (Note 2)**
- "Green Device" (Note 3)**
- 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-020C
- Terminals: Finish Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking (See Page 4): K81
- Ordering & Date Code Information: See Page 4
- Weight: 0.008 grams (approximate)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
	0	8
All Dimensions in mm		

### 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	Typ	Max	Unit
Power Dissipation (Note 1) @ T <sub>A</sub> = 25 C	P <sub>d</sub>		300	mW
Thermal Resistance, Junction to Ambient (Note 1) @ T <sub>A</sub> = 25 C	R <sub>JA</sub>		417	C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>		-55 to +150	C

- 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>.
  - No purposefully added lead.
  - 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).





## Electrical Characteristics @ $T_A = 25\text{ C}$ unless otherwise specified

Characteristic	Symbol	Min	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>					
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	80		V	$I_C = 100\text{ A}, I_E = 0$
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	$I_E = 100\text{ A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$		100	nA	$V_{CB} = 60\text{V}, I_E = 0$
Collector Cutoff Current	$I_{CES}$		100	nA	$V_{CES} = 60\text{V}$
Emitter Cutoff Current	$I_{EBO}$		100	nA	$V_{EB} = 4\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>					
DC Current Gain	$h_{FE}$	100 100 80 30	300	V	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}$ $I_C = 1\text{A}, V_{CE} = 5\text{V}$ $I_C = 2\text{A}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$		0.25 0.5	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$ $I_C = 1\text{A}, I_B = 100\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$		1.1	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	$C_{obo}$		10	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	150		MHz	$V_{CE} = 10\text{V}, I_C = 50\text{mA}, f = 100\text{MHz}$

Note: 4. Short duration pulse test used to minimize self-heating effect.

## Typical Characteristics @ $T_A = 25\text{ C}$ unless otherwise specified

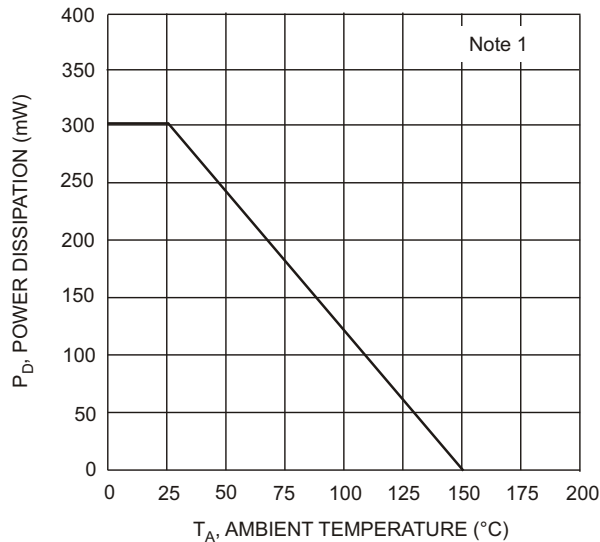


Fig. 1, Max Power Dissipation vs Ambient Temperature

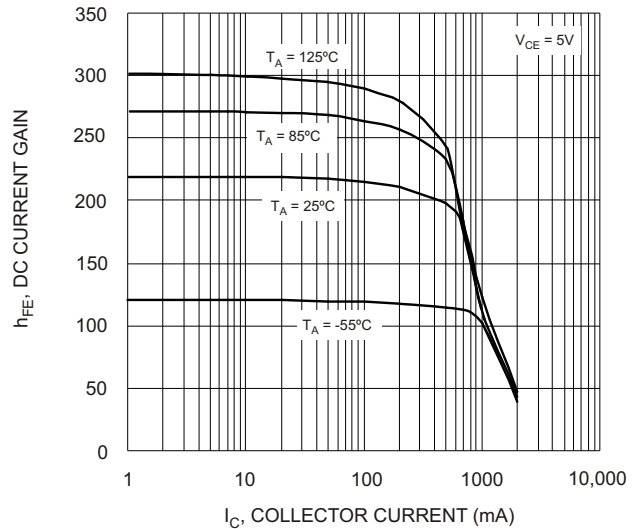


Fig. 2, DC Current Gain vs. Collector Current

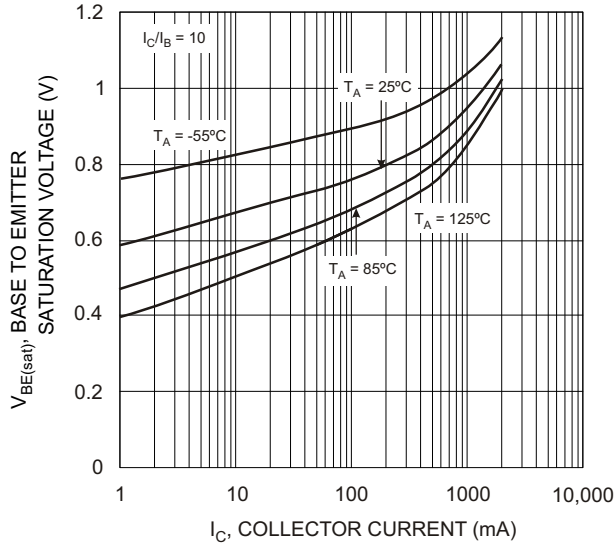


Fig. 3, Base-Emitter Saturation Voltage vs. Collector Current

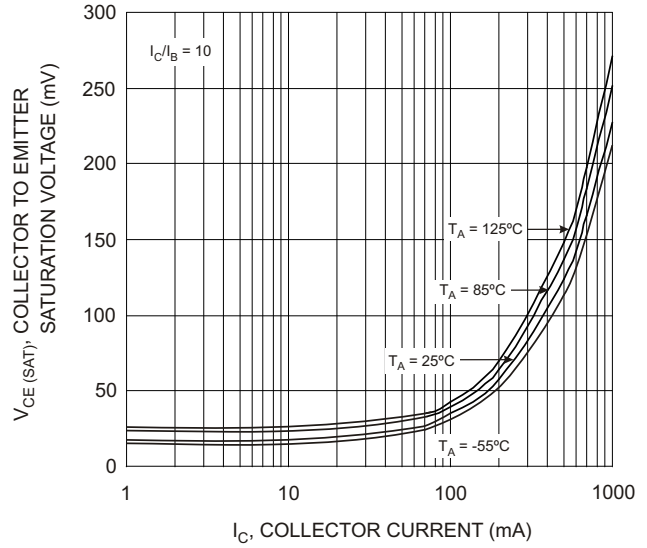


Fig. 4, Collector-Emitter Saturation Voltage vs. Collector Current

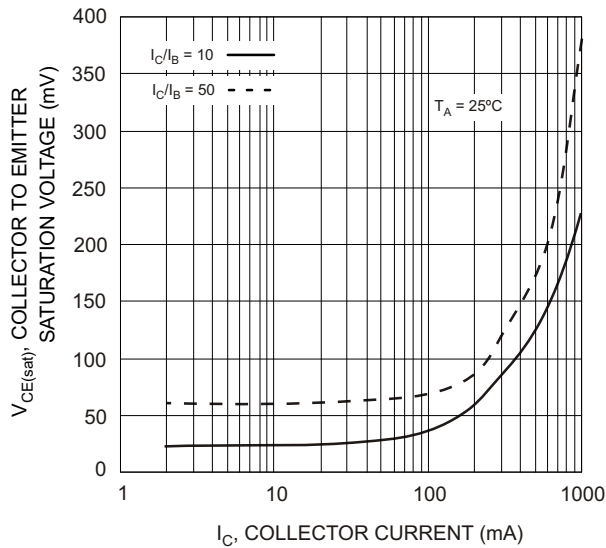


Fig. 5, Collector-Emitter Saturation Voltage vs. Collector Current

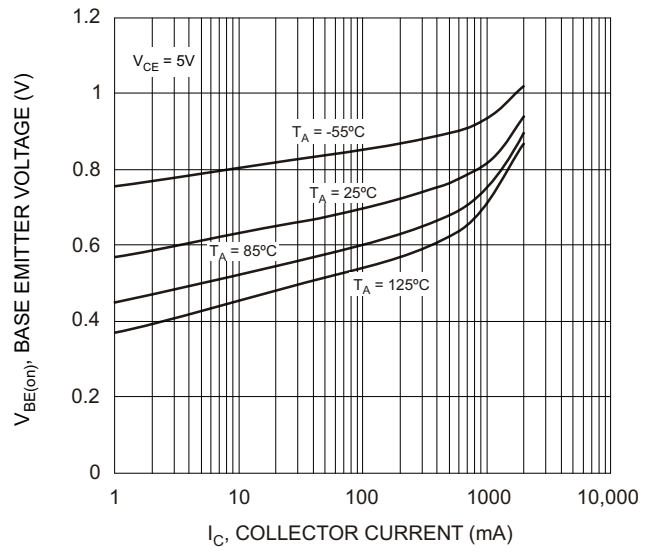


Fig. 6, Base-Emitter Voltage vs. Collector Current

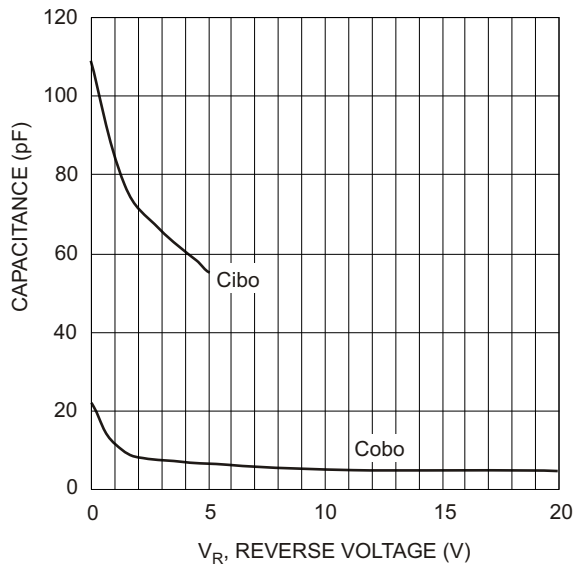


Fig. 7, Capacitance vs. Reverse Voltage

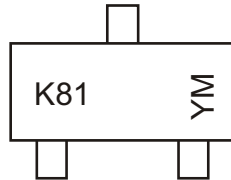


## Ordering Information (Note 5)

Device	Packaging	Shipping
DNBT8105-7	SOT-23	3000/Tape & Reel

Note: 5. 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
Code	R	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

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