

### Features

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

### Mechanical Data

- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: Collector Dot (See Diagram)
- Terminals: Finish — NiPdAu annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 6
- Ordering Information: See Page 6
- Weight: 0.001 grams (approximate)

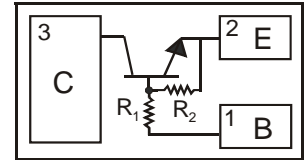
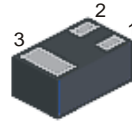
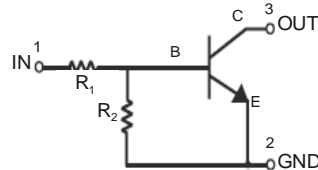
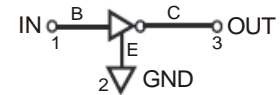


Fig. 1



Schematic and Pin Configuration



Equivalent Inverter Circuit

Fig. 2

Component P/N	R1(NOM)	R2(NOM)	Figure
DDTC123JLP	2.2K	47K	2
DDTC143ZLP	4.7K	47K	2
DDTC114YLP	10K	47K	2

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

Characteristic	P/N	Symbol	Value	Unit
Supply Voltage		V <sub>CC</sub>	50	V
Input Voltage	DDTC123JLP	V <sub>IN</sub>	-5 to +12	V
	DDTC143ZLP		-5 to +30	
	DDTC114YLP		-5 to +40	
Output Voltage	DDTC123JLP	I <sub>O</sub>	100	mA
	DDTC143ZLP		100	
	DDTC114YLP		70	
Power Dissipation (Note 3)		P <sub>D</sub>	250	mW
Power Deration above 25 °C		P <sub>der</sub>	2	mW/°C
Maximum Collector Current		I <sub>C(max)</sub>	100	mA

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Junction Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C
Thermal Resistance, Junction to Ambient Air (Note 3) (Equivalent to one heated junction of NPN)	R <sub>θJA</sub>	400	°C/W

- 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 inchx0.85inchx0.062inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on page 6 or our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

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

Characteristic	P/N	Symbol	Min	Typ	Max	Unit	Test Condition
<b>Off Characteristics (Note 4)</b>							
Collector-Base Breakdown Voltage		V <sub>(BR)CBO</sub>	50	—	—	V	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage *		V <sub>(BR)CEO</sub>	50	—	—	V	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage *		V <sub>(BR)EBO</sub>	4.5	—	—	V	I <sub>E</sub> = 50μA, I <sub>C</sub> = 0
Collector Cutoff Current *		I <sub>CEX</sub>	—	—	0.5	μA	V <sub>CE</sub> = 50V, V <sub>EB(OFF)</sub> = 3.0V
Base Cutoff Current (I <sub>BEX</sub> )		I <sub>BL</sub>	—	—	0.5	μA	V <sub>CE</sub> = 50V, V <sub>EB(OFF)</sub> = 3.0V
Collector-Base Cut Off Current		I <sub>CBO</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0
Collector-Emitter Cut Off Current, I <sub>O(OFF)</sub>		I <sub>CEO</sub>	—	—	0.5	μA	V <sub>CE</sub> = 50V, I <sub>B</sub> = 0
Emitter-Base Cut Off Current		I <sub>EBO</sub>	—	—	0.5	mA	V <sub>EB</sub> = 5V, I <sub>C</sub> = 0
Input-Off Voltage		V <sub>I(OFF)</sub>	—	—	0.5	V	V <sub>CE</sub> = 5V, I <sub>C</sub> = 100μA
<b>On Characteristics (Note 4)</b>							
Base-Emitter Turn-On Voltage*	DDTC123JLP	V <sub>BE(ON)</sub>	—	—	0.85	V	V <sub>CE</sub> = 5V, I <sub>C</sub> = 2mA
	DDTC143ZLP		—	—	0.85		
	DDTC114YLP		—	—	0.95		
Base-Emitter Saturation Voltage*	DDTC123JLP	V <sub>BE(SAT)</sub>	—	—	0.98	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA, V <sub>CE</sub> =5V
	DDTC143ZLP		—	—	0.998		
	DDTC114YLP		—	—	0.98		
Input-On Voltage		V <sub>I(ON)</sub>	1.1	—	—	V	V <sub>O</sub> = 0.3V, I <sub>C</sub> = 5mA
Input Current	DDTC123JLP	I <sub>I</sub>	—	—	7.2	mA	V <sub>I</sub> = 5V
	DDTC143ZLP		—	—	1.5		
	DDTC114YLP		—	—	7.2		
DC Current Gain		h <sub>FE</sub>	50	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 1mA
			70	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 2mA
			125	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA
			150	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 10mA
			180	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 50mA
Collector-Emitter Saturation Voltage		V <sub>CE(SAT)</sub>	—	—	0.15	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA
			—	—	0.2	V	I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
Output On Voltage (Same as V <sub>CE(SAT)</sub> )		V <sub>O(ON)</sub>	—	—	0.3		I <sub>J</sub> = 2.5mA, I <sub>O</sub> = 50mA
Input Resistor +/-30%		ΔR1	-30	—	30	%	—
Resistor Ratio		Δ (R2/R1)	-20	—	-20	%	—
<b>Small Signal Characteristics</b>							
Transition Frequency (gain bandwidth product)		F <sub>t</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

\*Guaranteed by design

- Notes: 4. Short duration pulse test used to minimize self-heating effect.  
Pulse Test: Pulse width, t<sub>p</sub><300 uS, Duty Cycle, d<=0.02

## Typical Characteristics Curves @T<sub>A</sub> = 25°C unless otherwise specified

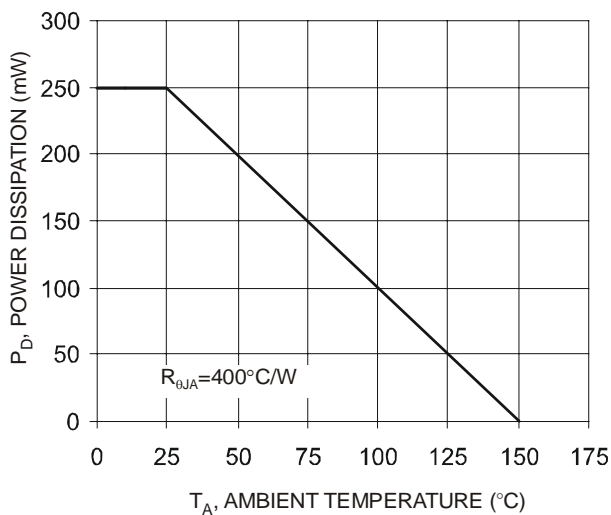


Fig. 3 Power Derating Curve

**Characteristics Curves of DDTC123JLP**

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

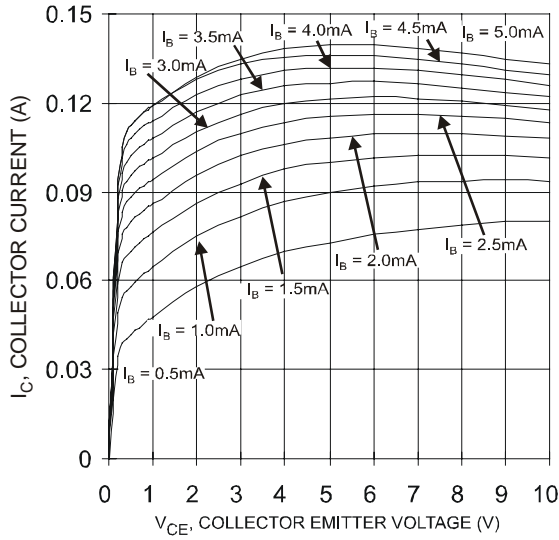


Fig. 4  $I_C$  vs  $V_{CE}$

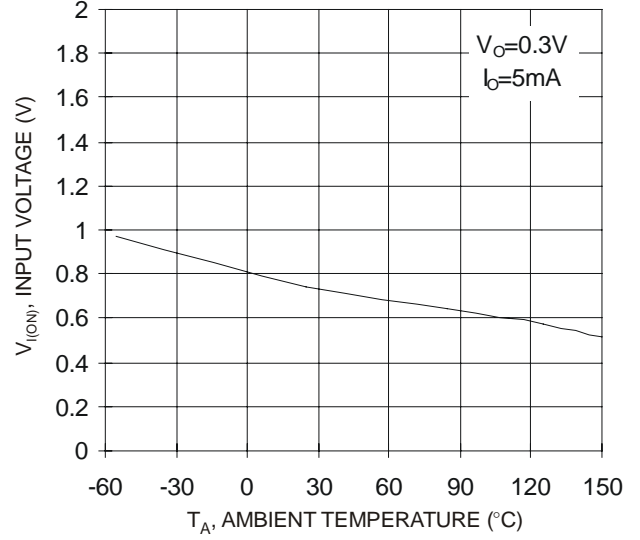


Fig. 5 Input Voltage vs.  $T_A$

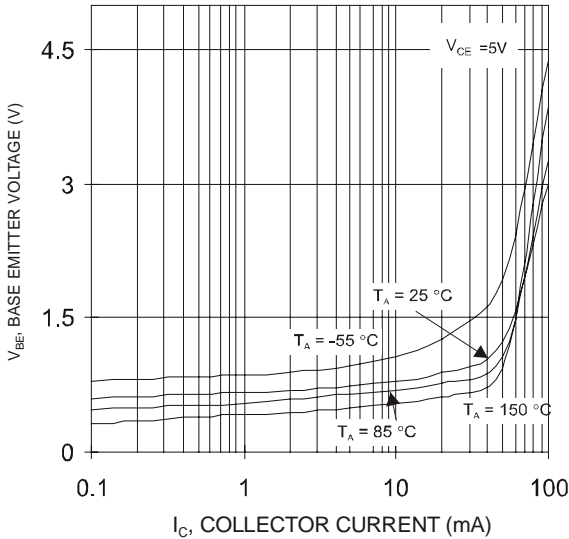


Fig. 6  $V_{BE}$  vs  $I_C$

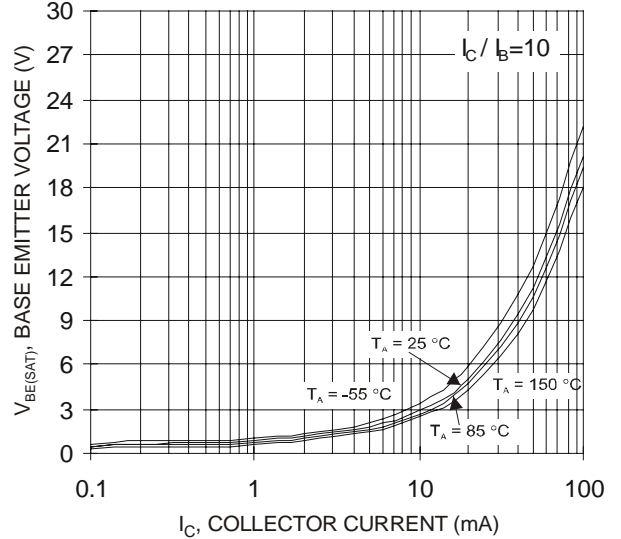


Fig. 7  $V_{BE(SAT)}$  vs.  $I_C$

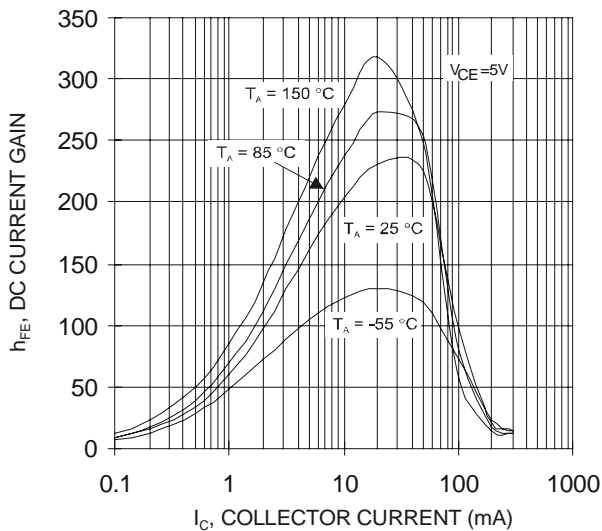


Fig. 8 DC Current Gain

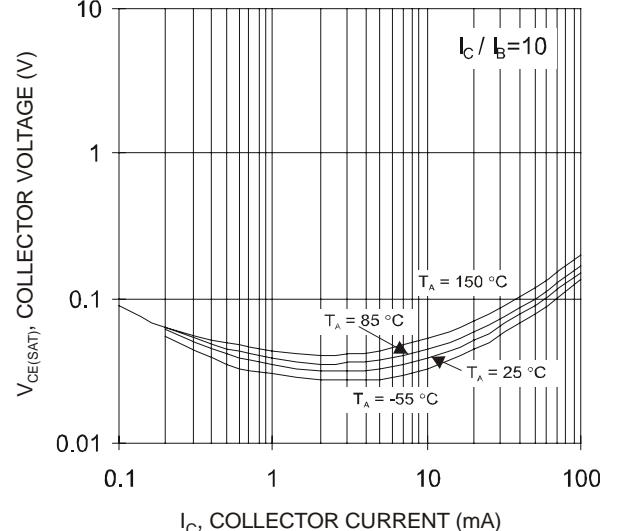


Fig. 9  $V_{CE(SAT)}$  vs.  $I_C$

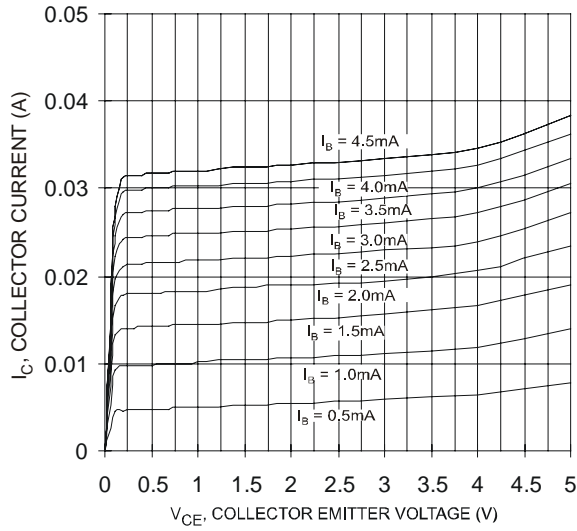


Fig. 10 I<sub>C</sub> vs V<sub>CE</sub>

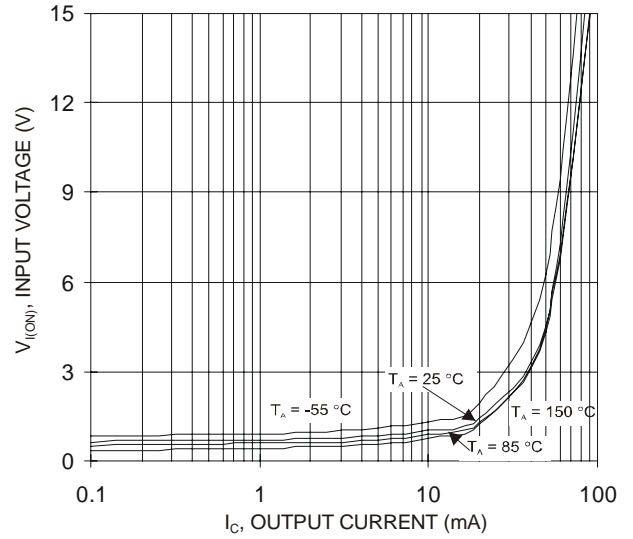


Fig. 11 Input Voltage vs. Output Current

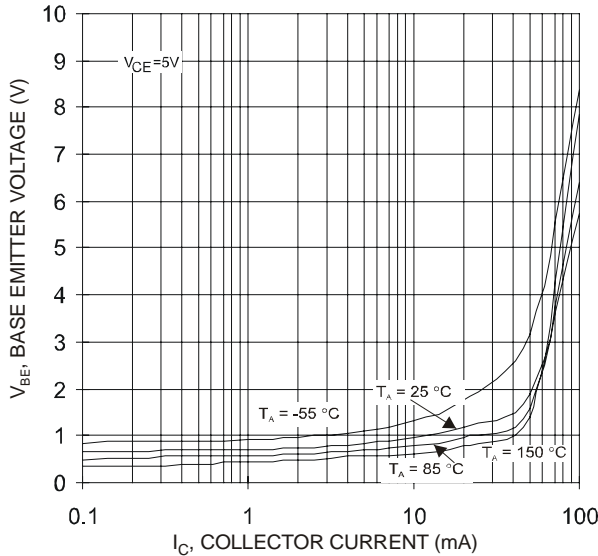


Fig. 12 V<sub>BE</sub> vs. I<sub>C</sub>

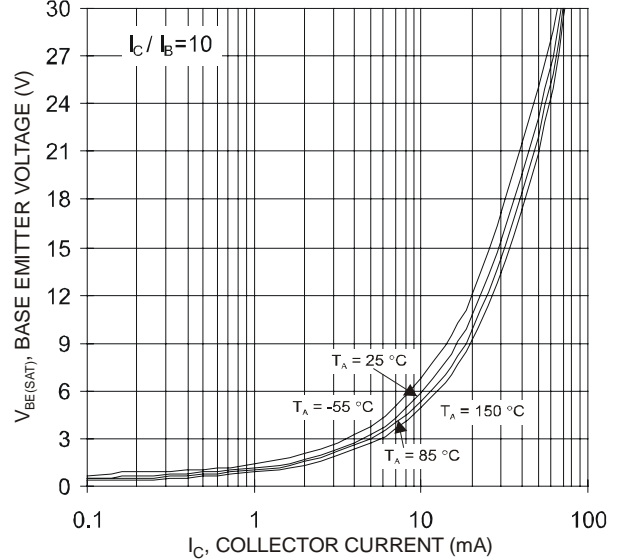


Fig. 13 V<sub>BE(SAT)</sub> vs. I<sub>C</sub>

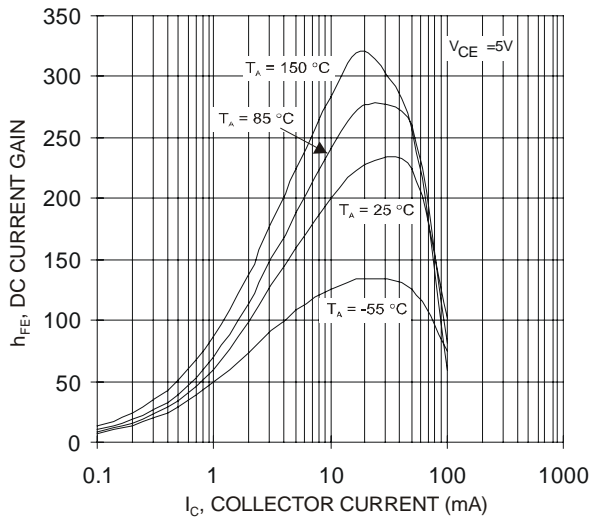


Fig. 14 DC Current Gain

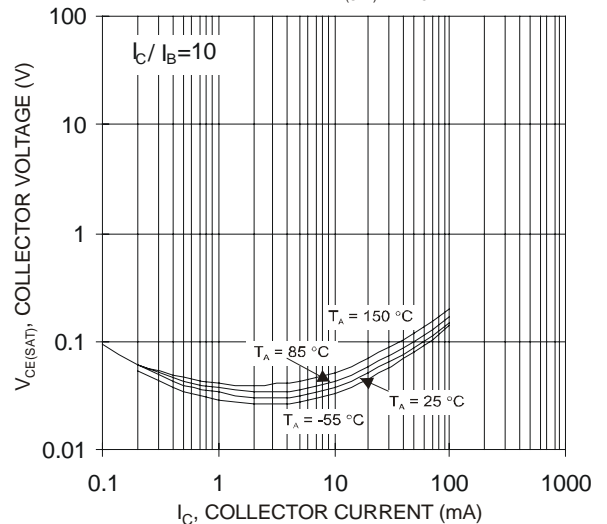


Fig. 15 V<sub>CE(SAT)</sub> vs. I<sub>C</sub>

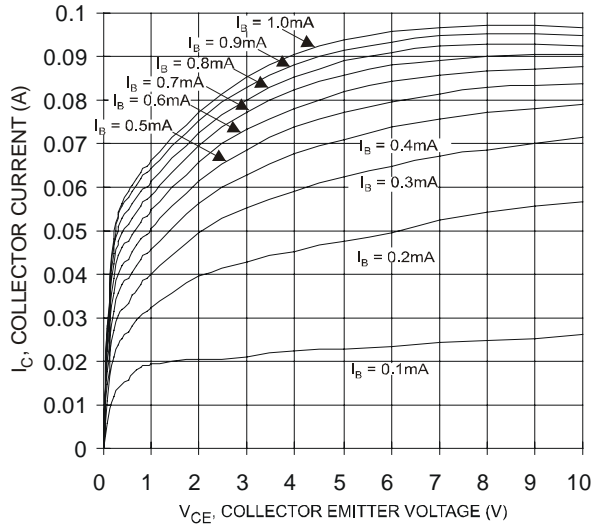


Fig. 16 I<sub>C</sub> vs V<sub>CE</sub>

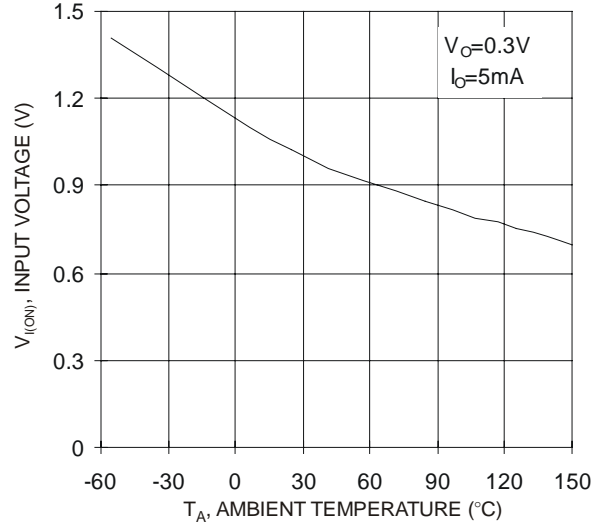


Fig. 17 Input Voltage vs. T<sub>A</sub>

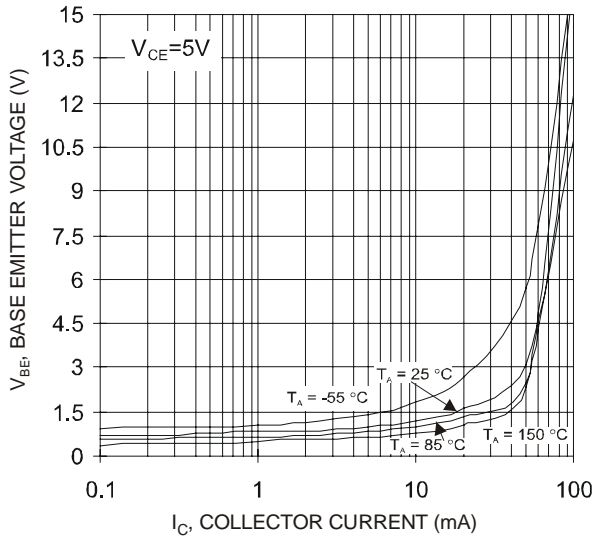


Fig. 18 V<sub>BE</sub> vs. I<sub>C</sub>

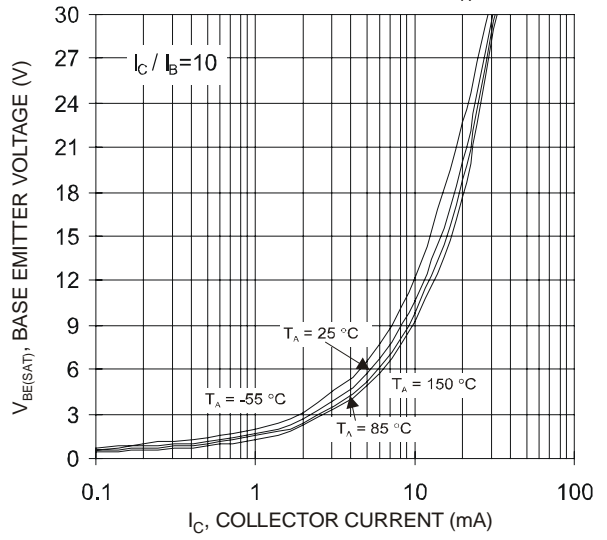


Fig. 19 V<sub>BE(SAT)</sub> vs. I<sub>C</sub>

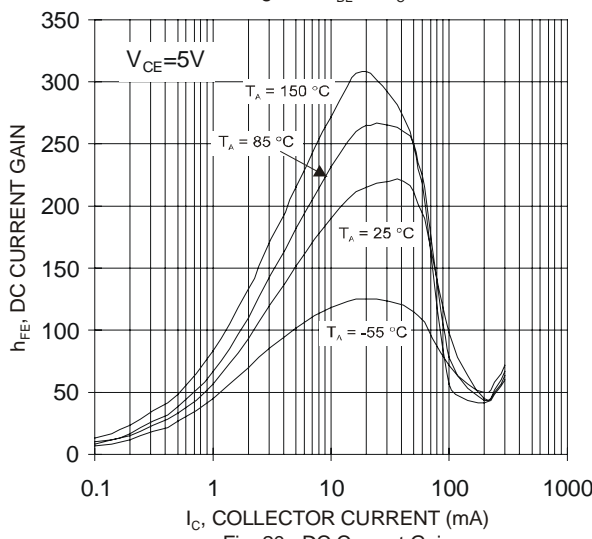


Fig. 20 DC Current Gain

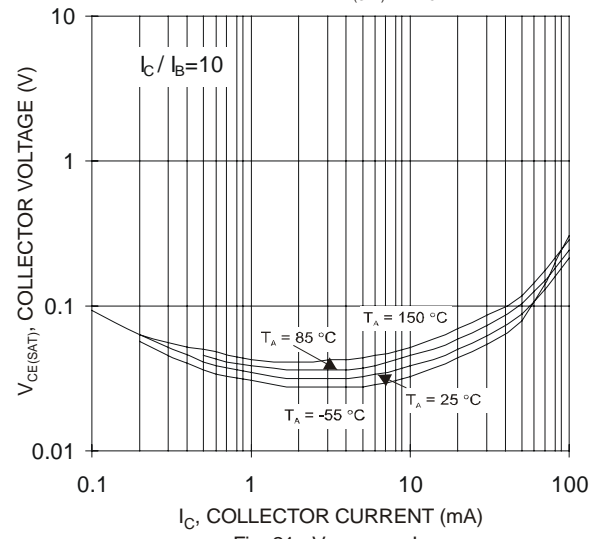


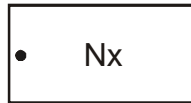
Fig. 21 V<sub>CE(SAT)</sub> vs. I<sub>C</sub>

## Ordering Information (Note 5)

Device	Marking Code	Packaging	Shipping
DDTC123JLP-7-F	N0	DFN1006-3	3000/Tape & Reel
DDTC143ZLP-7-F	N1	DFN1006-3	3000/Tape & Reel
DDTC114YLP-7-F	N2	DFN1006-3	3000/Tape & Reel

Notes: 5. For Packaging Details, please see below or go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



Nx = Product Type Marking Code, see ordering information above  
 YM = Date Code Marking  
 Y = Year e.g. U = 2007  
 M = Month e.g. 9 = September

Fig. 22

### Date Code Key

Year	2007	2008	2009	2010	2011	2012
Code	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

## Mechanical Details

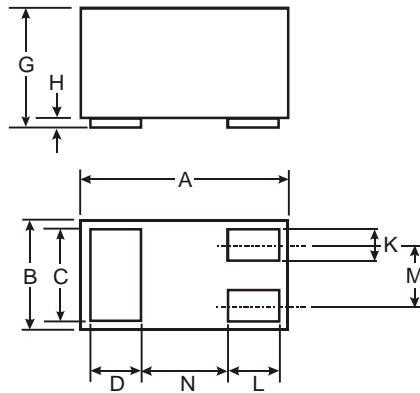


Fig. 23

DFN1006-3			
Dim	Min	Max	Typ
A	0.95	1.075	1.00
B	0.55	0.675	0.60
C	0.45	0.55	0.50
D	0.20	0.30	0.25
G	0.47	0.53	0.50
H	0	0.05	0.03
K	0.10	0.20	0.15
L	0.20	0.30	0.25
M	—	—	0.35
N	—	—	0.40

All Dimensions in mm

## Suggested Pad Layout: (Based on IPC-SM-782)

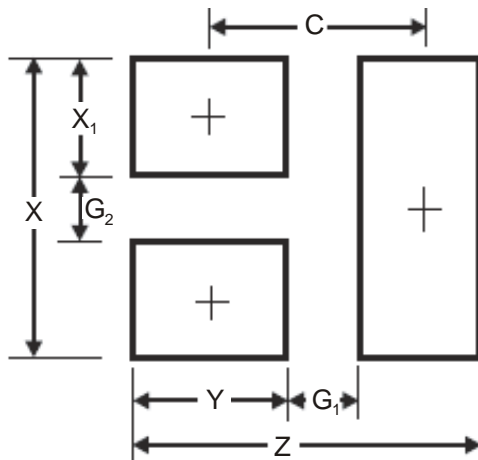


Fig. 24

DFN1006-3	
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

All Dimensions in mm

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