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## Product Summary

Part Number	R1 (NOM)	R2 (NOM)	Marking
DDTC123JLP	2.2kΩ	47kΩ	N0
DDTC143ZLP	4.7kΩ	47kΩ	N1
DDTC114YLP	10kΩ	47kΩ	N2

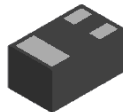
## Features

- Epitaxial Planar Die Construction
- Ultra-Small Leadless Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

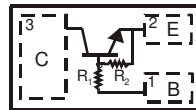
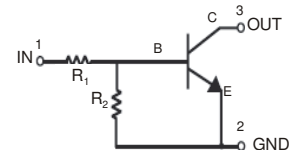
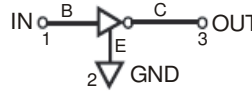
## Mechanical Data

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Marking Information
- Terminals: Finish — NiPdAu Solderable per MIL-STD-202, Method 208e4
- Weight: 0.0009 grams (Approximate)

X1-DFN1006-3



Bottom View


 Package Pin Out  
Configuration


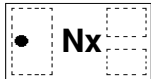
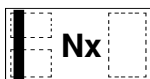

Device Schematics

## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC123JLP-7	N0	7	8	3,000
DDTC143ZLP-7	N1	7	8	3,000
DDTC114YLP-7	N2	7	8	3,000
DDTC123JLP-7B	N0	7	8	10,000
DDTC143ZLP-7B	N1	7	8	10,000
DDTC114YLP-7B	N2	7	8	10,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

<b>DDTC123JLP-7</b> <b>DDTC143ZLP-7</b> <b>DDTC114YLP-7</b>	 Top View Dot Denotes Collector Side	 Top View Bar Denotes Base and Emitter Side
<b>DDTC123JLP-7B</b> <b>DDTC143ZLP-7B</b> <b>DDTC114YLP-7B</b>	 Top View Bar Denotes Base and Emitter Side	Nx = Part Type Marking Code (see Ordering Information)

**Absolute Maximum Ratings** (@T<sub>A</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	
Maximum Collector Current		I <sub>C(MAX)</sub>	100	mA

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	250	mW
Power Deration above +25°C	P <sub>der</sub>	2	mW/°C
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	500	°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	P/N	Symbol	Min	Typ	Max	Unit	Test Condition
<b>Off Characteristics</b> (Note 6)							
Collector-Base Breakdown Voltage		BV <sub>CB0</sub>	50	—	—	V	I <sub>C</sub> = 50μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage (Note 7)		BV <sub>CEO</sub>	50	—	—	V	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage (Note 7)		BV <sub>EBO</sub>	4.5	—	—	V	I <sub>E</sub> = 50μA, I <sub>C</sub> = 0
Collector Cutoff Current (Note 7)		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</b> (Note 6)							
Base-Emitter Turn-On Voltage (Note 7)	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 (Note 7)	DDTC123JLP	V <sub>BE(SAT)</sub>	—	—	0.98	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA
	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

- Notes:
5. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
  6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
  7. Guaranteed by design.



**Derating Curve** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

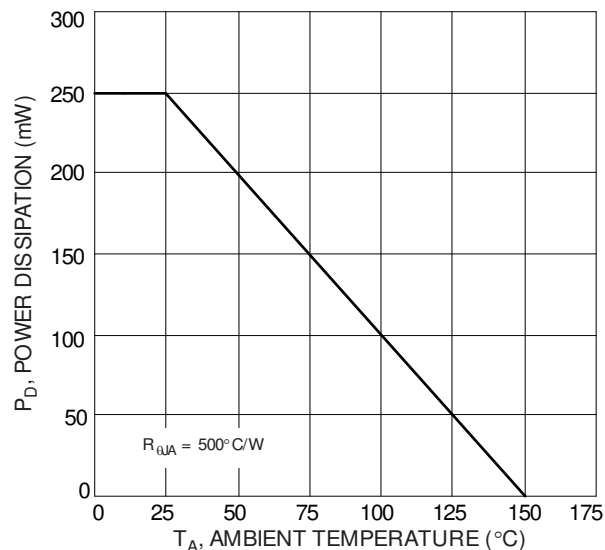


Fig. 1 Power Dissipation vs. Ambient temperature  
(Note 5)

**Typical Electrical Characteristics of DDTC123JLP** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

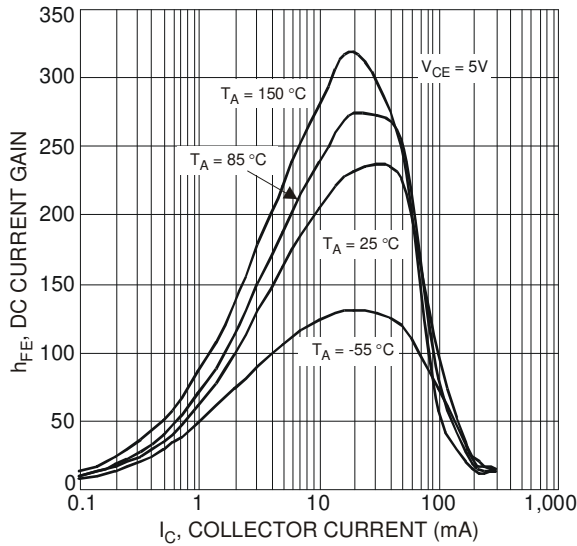


Fig. 2 Typical DC Current Gain vs. Collector Current

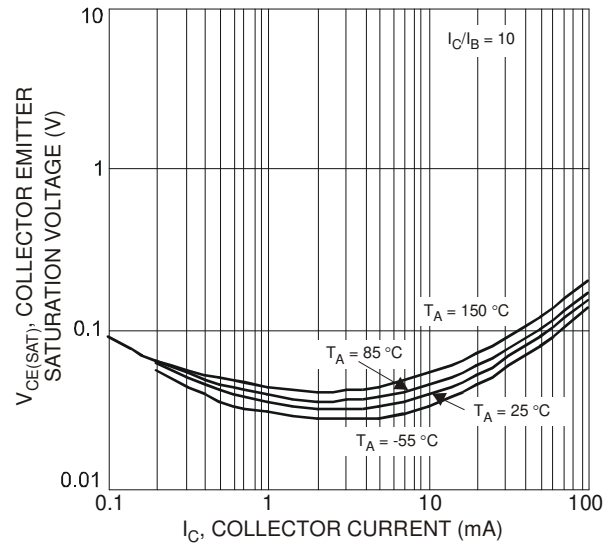


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

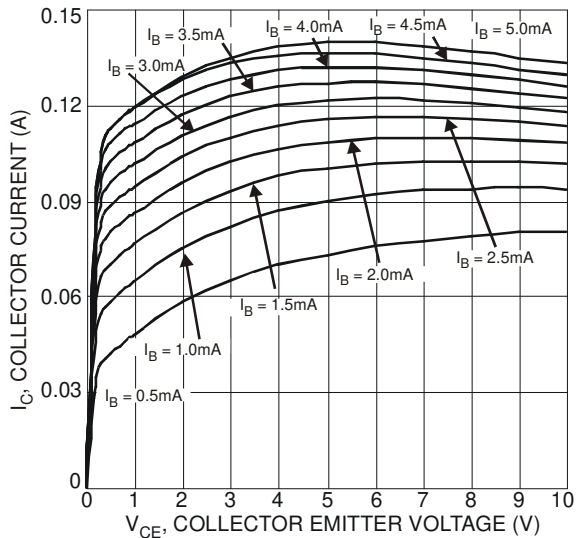


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

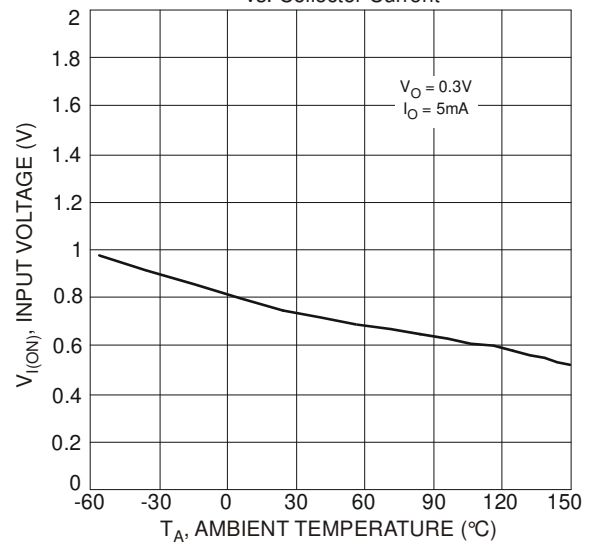


Fig. 5 Typical Input Voltage vs. Ambient Temperature

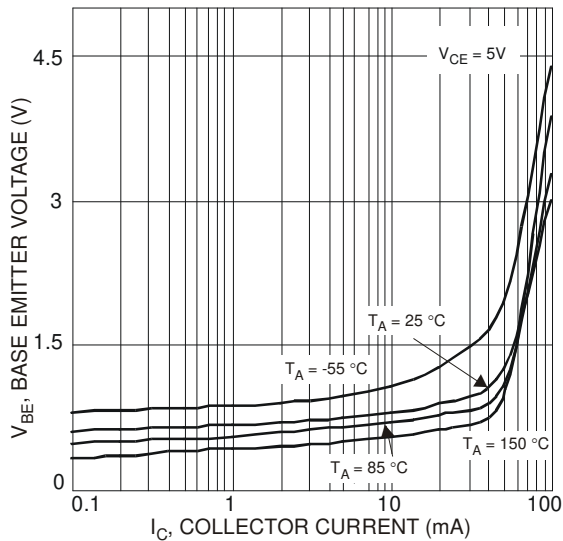


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

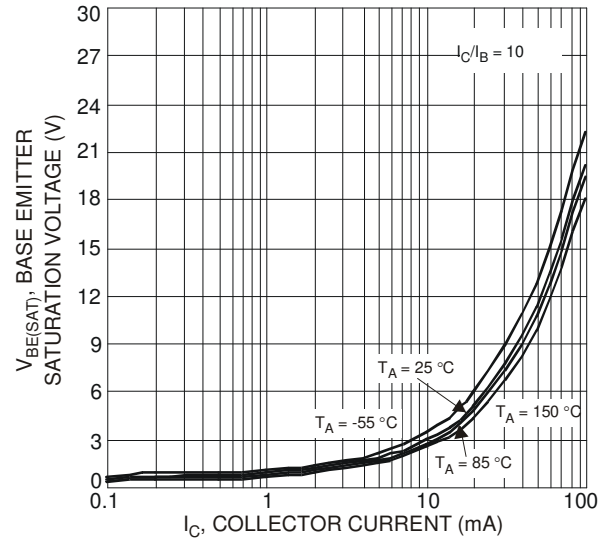


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

**Typical Electrical Characteristics of DDTC143ZLP (@T<sub>A</sub> = +25°C, unless otherwise specified.)**

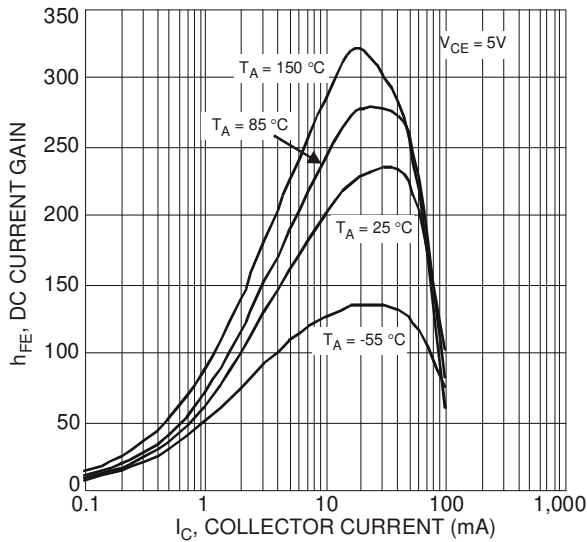


Fig. 8 Typical DC Current Gain vs. Collector Current

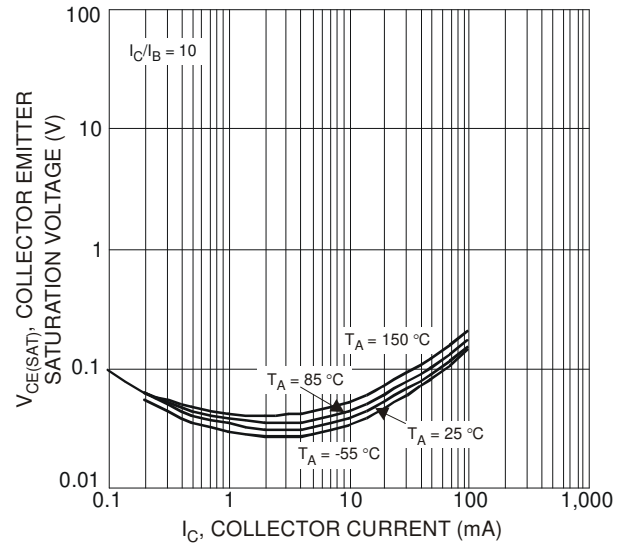


Fig. 9 Typical Collector Emitter Saturation Voltage vs. Collector Current

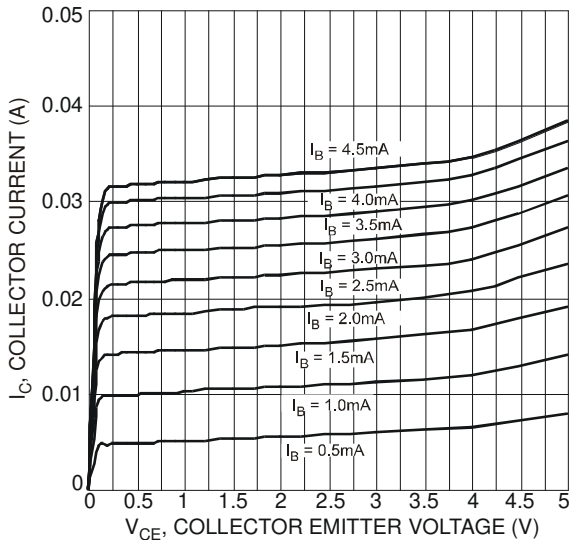


Fig. 10 Typical Collector Current vs. Collector Emitter Voltage

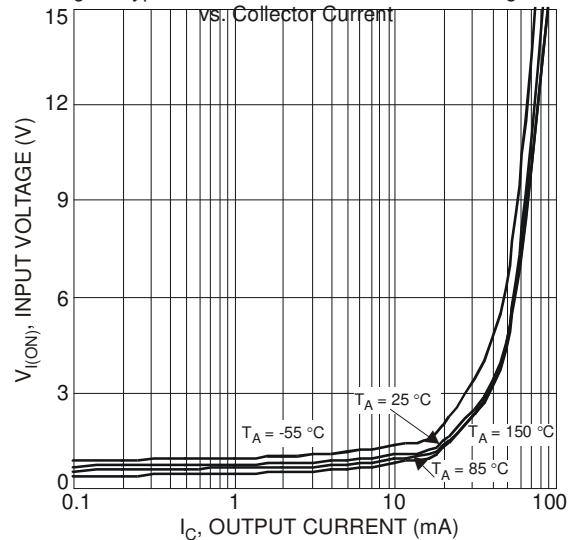


Fig. 11 Typical Input Voltage vs. Output Current

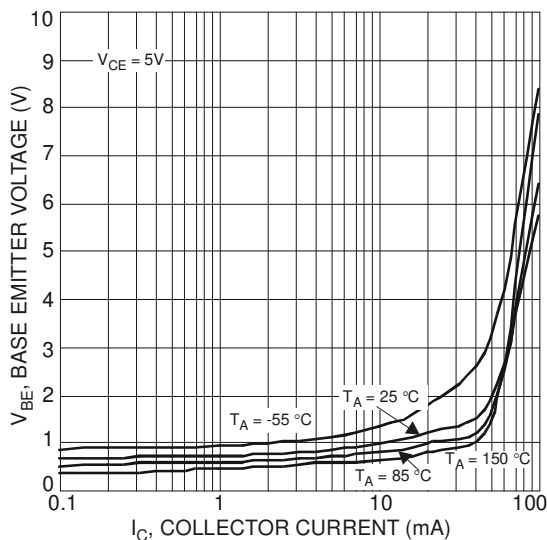


Fig. 12 Typical Base Emitter Voltage vs. Collector Current

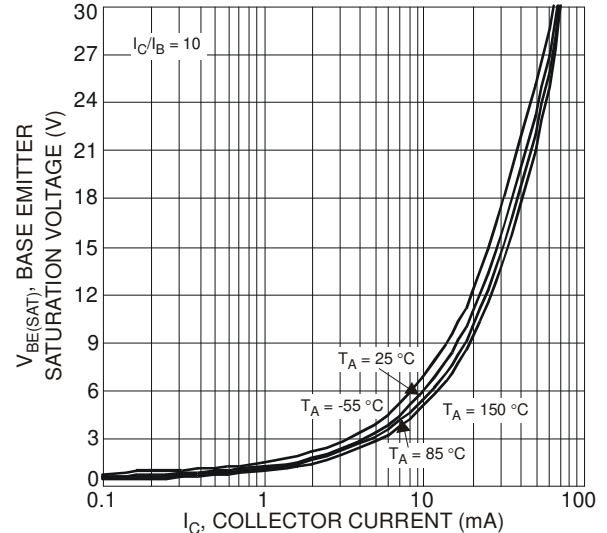


Fig. 13 Typical Base Emitter Saturation Voltage vs. Collector Current

**Typical Electrical Characteristics of DDTC114YLP (@T<sub>A</sub> = +25°C, unless otherwise specified.)**

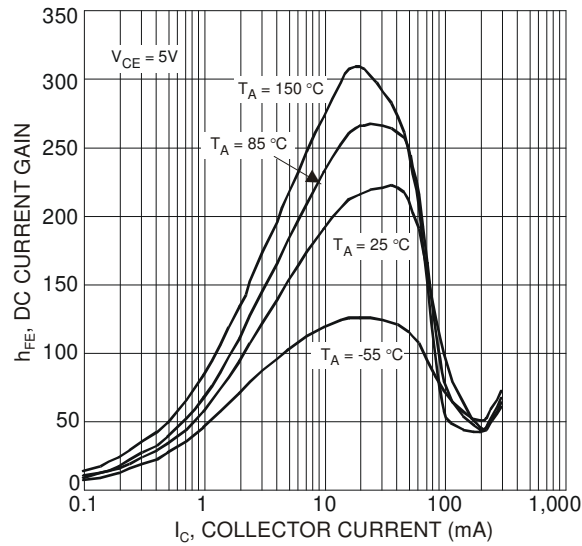


Fig. 14 Typical DC Current Gain vs. Collector Current

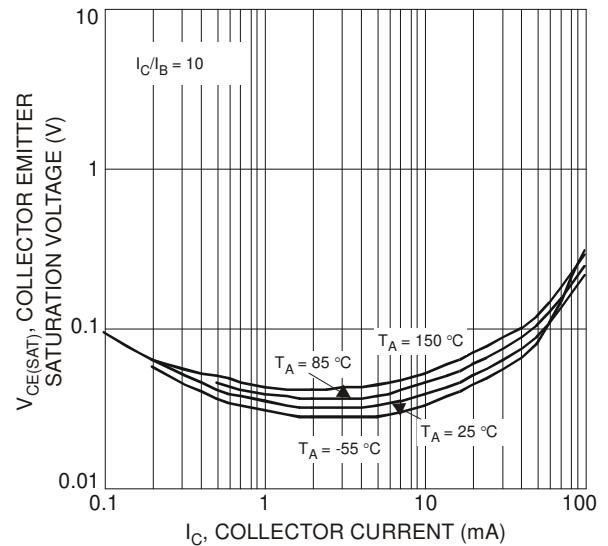


Fig. 15 Typical Collector Emitter Saturation Voltage vs. Collector Current

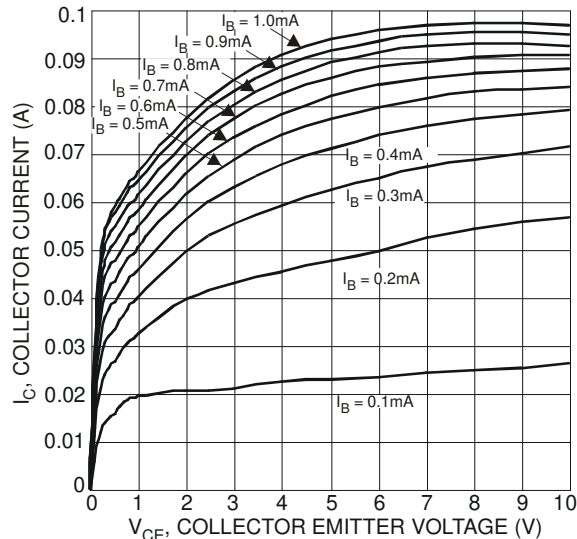


Fig. 16 Typical Collector Current vs. Collector Emitter Voltage

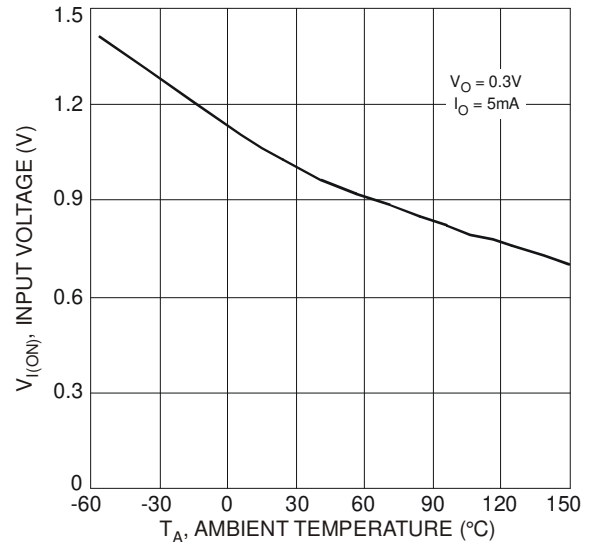


Fig. 17 Typical Input Voltage vs. Ambient Temperature

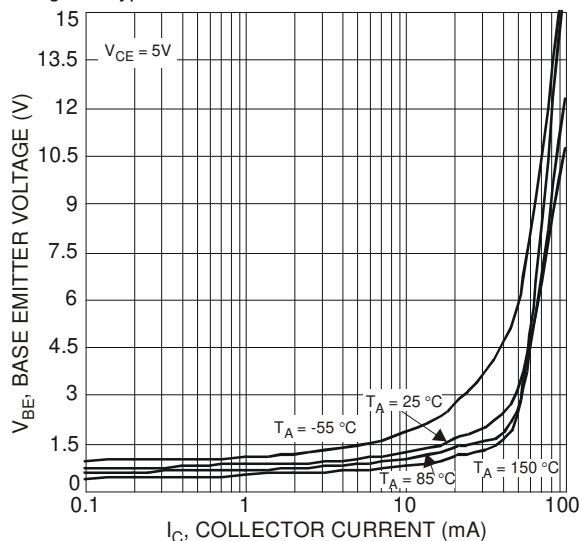


Fig. 18 Typical Base Emitter Voltage vs. Collector Current

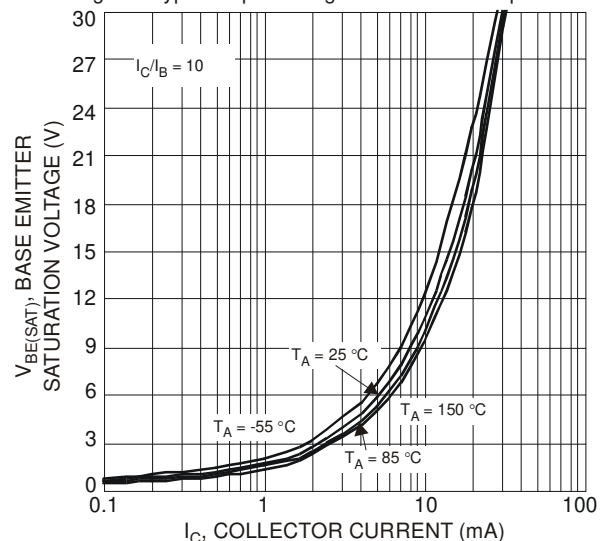
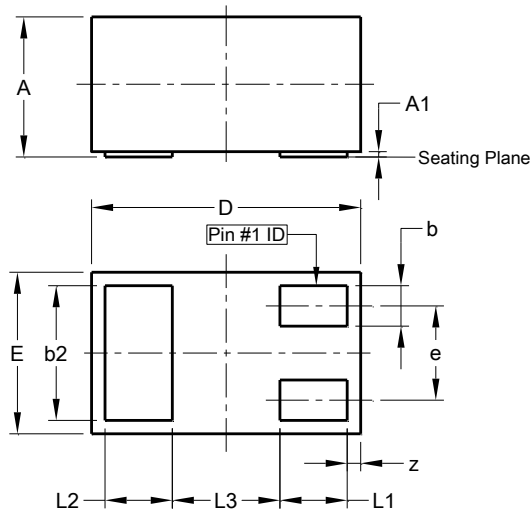


Fig. 19 Typical Base Emitter Saturation Voltage vs. Collector Current

## Package Outline Dimensions

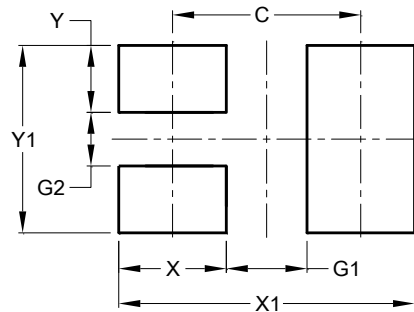
Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at [http://www.diodes.com/\\_files/datasheets/ap02001.pdf](http://www.diodes.com/_files/datasheets/ap02001.pdf) for the latest version.



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70



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