NPN PRE-BIASED (R1≠R2) SMALL SIGNAL IN DFN1006

Product Summary

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

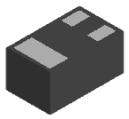
Features

- 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**

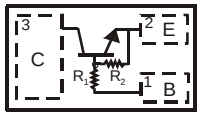
Mechanical Data

- 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 208 e4
- Weight: 0.0009 grams (Approximate)

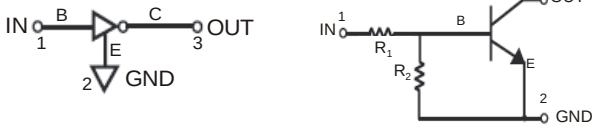
X1-DFN1006-3



Bottom View



Package Pin Out Configuration



Device Schematics

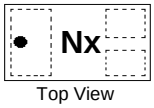
Ordering Information (Note 4)

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 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.

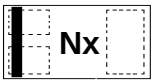
Marking Information

DDTC123JLP-7
DDTC143ZLP-7
DDTC114YLP-7

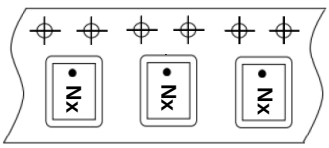


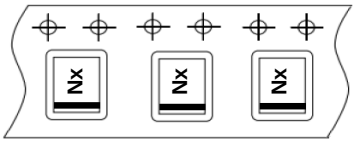
Top View
Dot Denotes Collector Side

From date code 1527 (YYWW), this changes to:

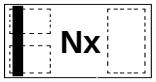


Top View
Bar Denotes Base and Emitter Side

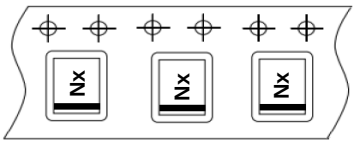




DDTC123JLP-7B
DDTC143ZLP-7B
DDTC114YLP-7B



Top View
Bar Denotes Base and Emitter Side



Nx = Part Type Marking Code
(see Ordering Information)

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	P/N	Symbol	Value	Unit
Supply Voltage		V_{CC}	50	V
Input Voltage	DDTC123JLP	V_{IN}	-5 to +12	V
	DDTC143ZLP		-5 to +30	
	DDTC114YLP		-5 to +40	
Output Voltage	DDTC123JLP	I_O	100	mA
	DDTC143ZLP		100	
	DDTC114YLP		70	
Maximum Collector Current		$I_{C(MAX)}$	100	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	250	mW
Power Deration above +25°C	P_{der}	2	mW/°C
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	500	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	P/N	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics (Note 6)							
Collector-Base Breakdown Voltage		BV_{CBO}	50	—	—	V	I_C = 50µA, I_E = 0
Collector-Emitter Breakdown Voltage (Note 7)		BV_{CEO}	50	—	—	V	I_C = 2mA, I_B = 0
Emitter-Base Breakdown Voltage (Note 7)		BV_{EBO}	4.5	—	—	V	I_E = 50µA, I_C = 0
Collector Cutoff Current (Note 7)		I_{CEX}	—	—	0.5	µA	V_{CE} = 50V, $V_{EB(OFF)}$ = 3.0V
Base Cutoff Current (I_{BEX})		I_{BL}	—	—	0.5	µA	V_{CE} = 50V, $V_{EB(OFF)}$ = 3.0V
Collector-Base Cut Off Current		I_{CBO}	—	—	0.5	µA	V_{CB} = 50V, I_E = 0
Collector-Emitter Cut Off Current, $I_{O(OFF)}$		I_{CEO}	—	—	0.5	µA	V_{CE} = 50V, I_B = 0
Emitter-Base Cut Off Current		I_{EBO}	—	—	0.5	mA	V_{EB} = 5V, I_C = 0
Input-Off Voltage		$V_{I(OFF)}$	0.5	—	—	V	V_{CE} = 5V, I_C = 100µA
On Characteristics (Note 6)							
Base-Emitter Turn-On Voltage (Note 7)	DDTC123JLP	$V_{BE(ON)}$	—	—	0.85	V	V_{CE} = 5V, I_C = 2mA
	DDTC143ZLP		—	—	0.85		
	DDTC114YLP		—	—	0.95		
Base-Emitter Saturation Voltage (Note 7)	DDTC123JLP	$V_{BE(SAT)}$	—	—	0.98	V	I_C = 10mA, I_B = 1mA
	DDTC143ZLP		—	—	0.998		
	DDTC114YLP		—	—	0.98		
Input-On Voltage		$V_{I(ON)}$	—	—	1.1	V	V_O = 0.3V, I_C = 5mA
Input Current	DDTC123JLP	I_I	—	—	7.2	mA	V_I = 5V
	DDTC143ZLP		—	—	1.5		
	DDTC114YLP		—	—	7.2		
DC Current Gain		h_{FE}	50	—	—	—	V_{CE} = 5V, I_C = 1mA
			70	—	—	—	V_{CE} = 5V, I_C = 2mA
			125	—	—	—	V_{CE} = 5V, I_C = 5mA
			150	—	—	—	V_{CE} = 5V, I_C = 10mA
			180	—	—	—	V_{CE} = 5V, I_C = 50mA
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	—	0.15	V	I_C = 10mA, I_B = 1mA
			—	—	0.2	V	I_C = 50mA, I_B = 5mA
Output On Voltage (Same as $V_{CE(SAT)}$)		$V_{O(ON)}$	—	—	0.3		I_J = 2.5mA, I_O = 50mA
Input Resistor +/-30%		ΔR1	-30	—	30	%	—
Resistor Ratio		Δ (R2/R1)	-20	—	-20	%	—
Small Signal Characteristics							
Transition Frequency (gain bandwidth product)		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 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_A = +25°C, unless otherwise specified.)

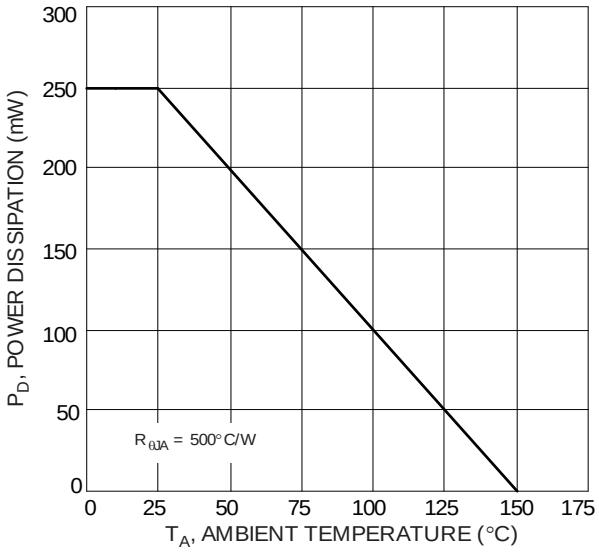


Fig. 1 Power Dissipation vs. Ambient temperature (Note 5)

Typical Electrical Characteristics of DDTC123JLP (@T_A = +25°C, unless otherwise specified.)

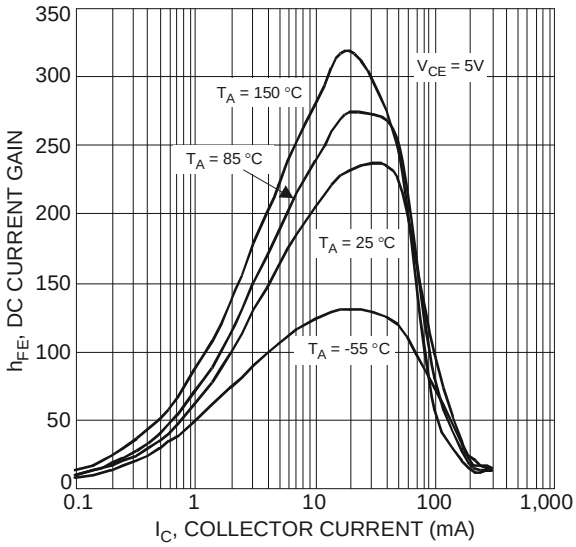


Fig. 2 Typical DC Current Gain vs. Collector Current

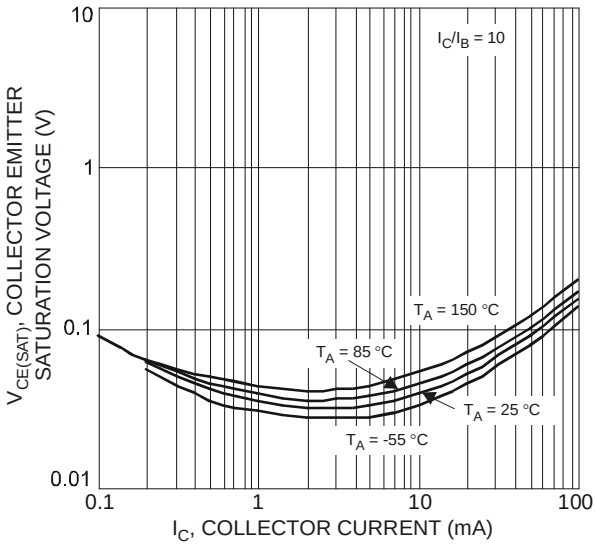


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

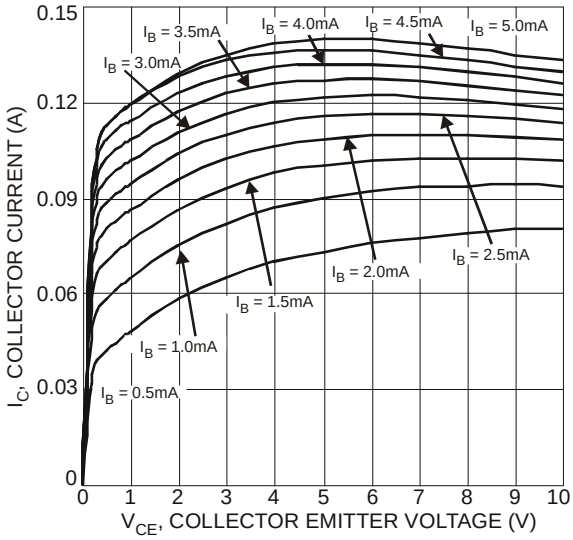


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

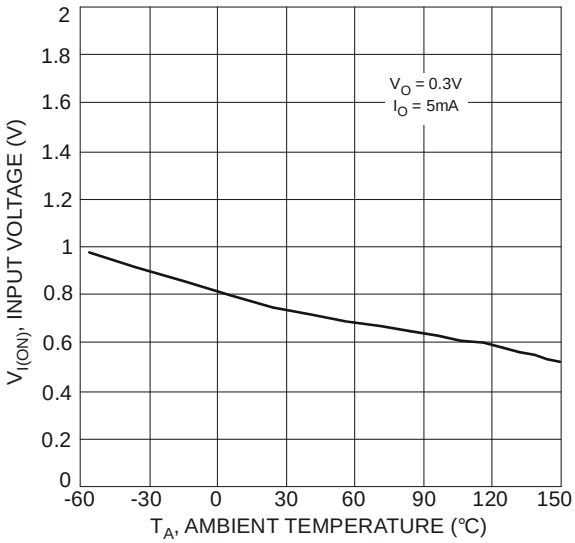


Fig. 5 Typical Input Voltage vs. Ambient Temperature

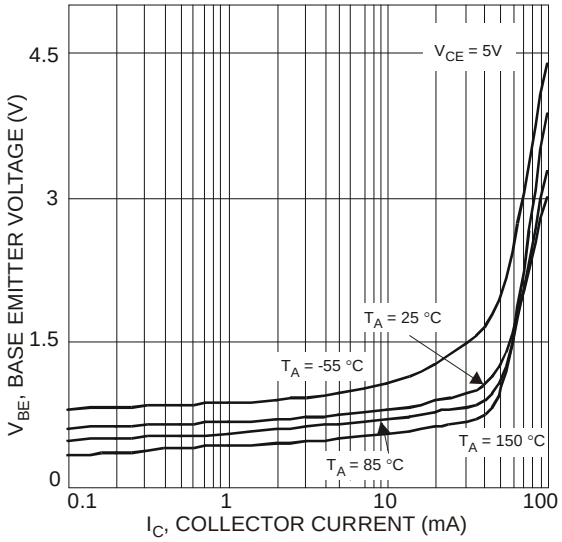


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

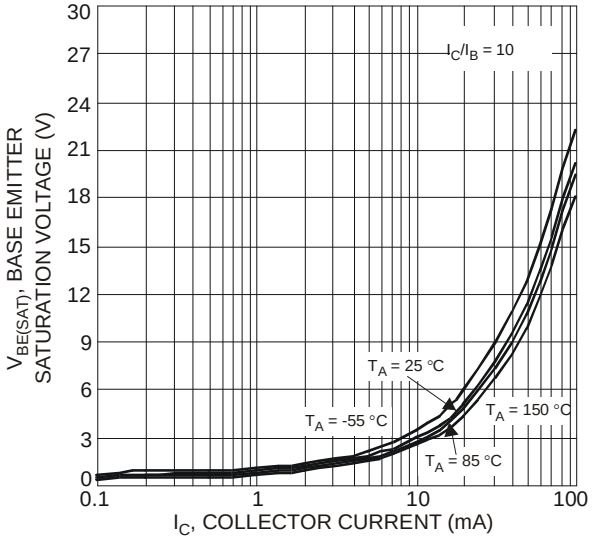


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

Typical Electrical Characteristics of DDTC143ZLP (@T_A = +25°C, unless otherwise specified.)

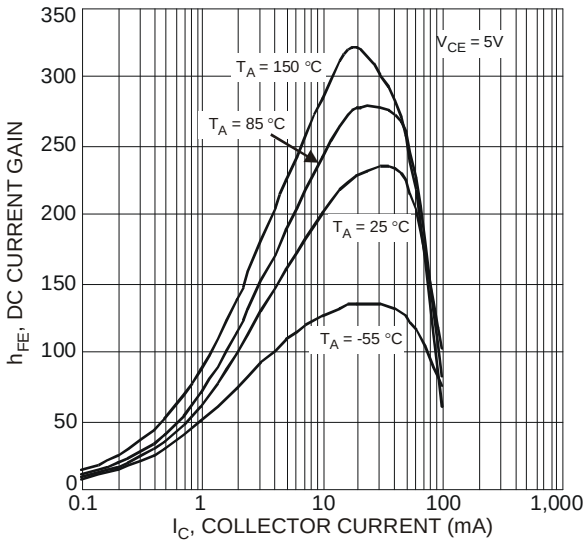


Fig. 8 Typical DC Current Gain vs. Collector Current

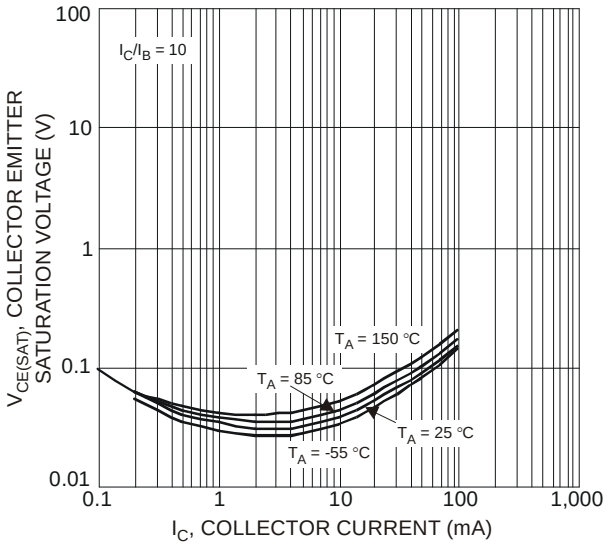


Fig. 9 Typical Collector Emitter Saturation Voltage vs. Collector Current

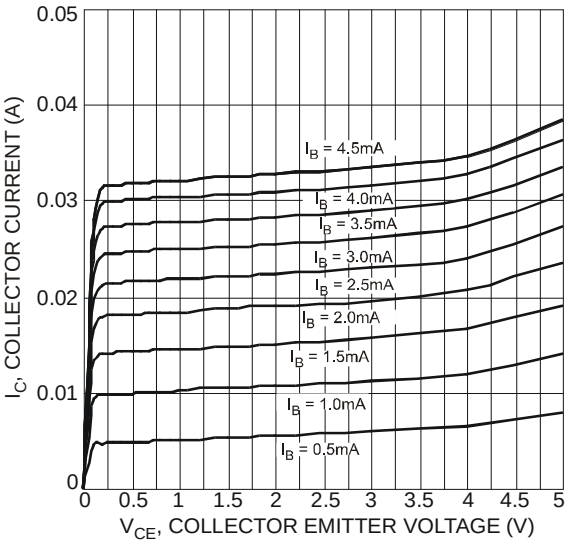


Fig. 10 Typical Collector Current vs. Collector Emitter Voltage

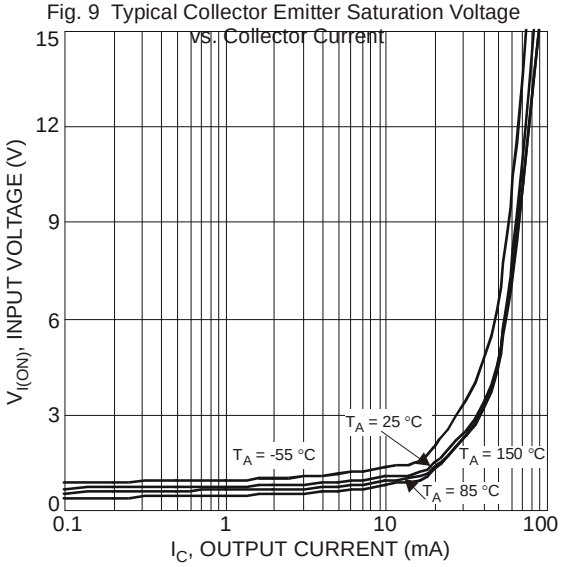


Fig. 11 Typical Input Voltage vs. Output Current

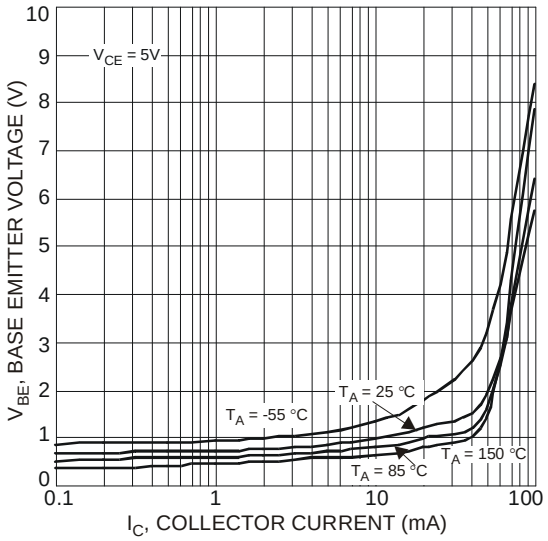


Fig. 12 Typical Base Emitter Voltage vs. Collector Current

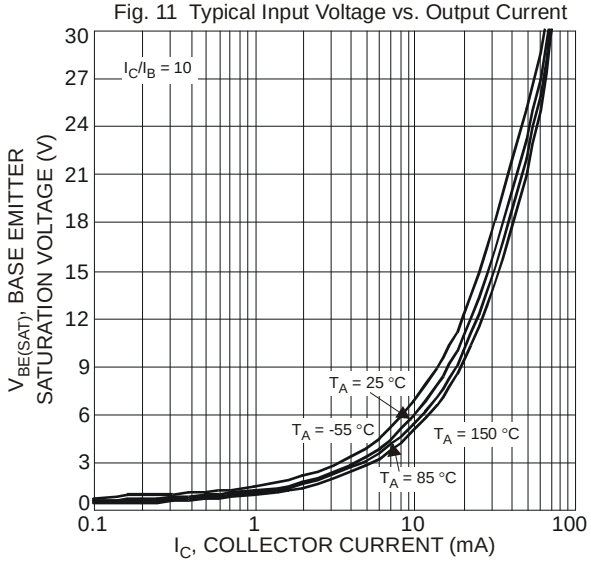


Fig. 13 Typical Base Emitter Saturation Voltage vs. Collector Current

Typical Electrical Characteristics of DDTC114YLP (@T_A = +25°C, unless otherwise specified.)

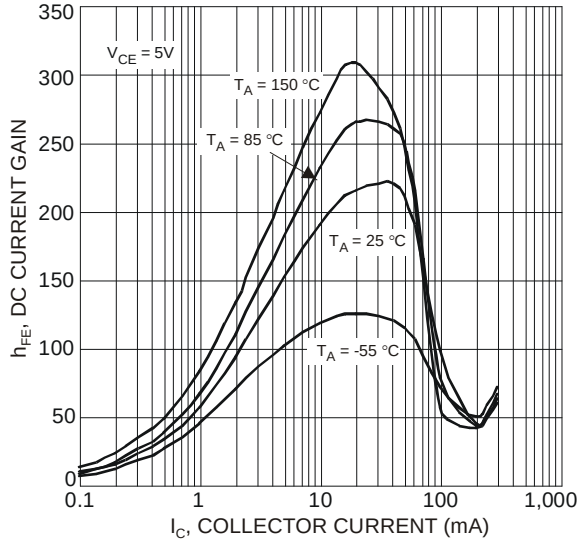


Fig. 14 Typical DC Current Gain vs. Collector Current

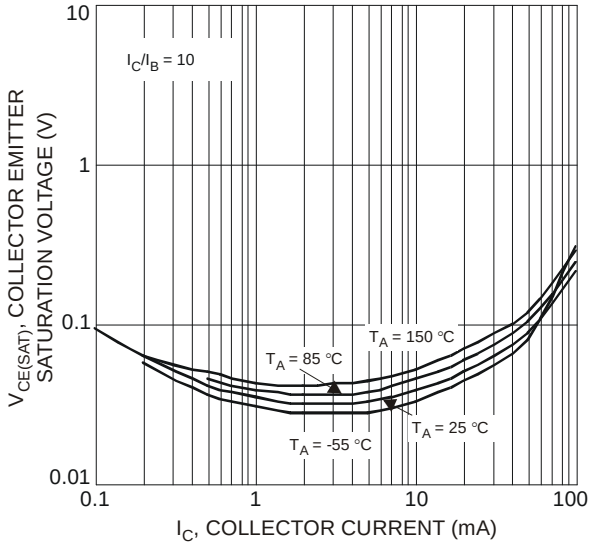


Fig. 15 Typical Collector Emitter Saturation Voltage vs. Collector Current

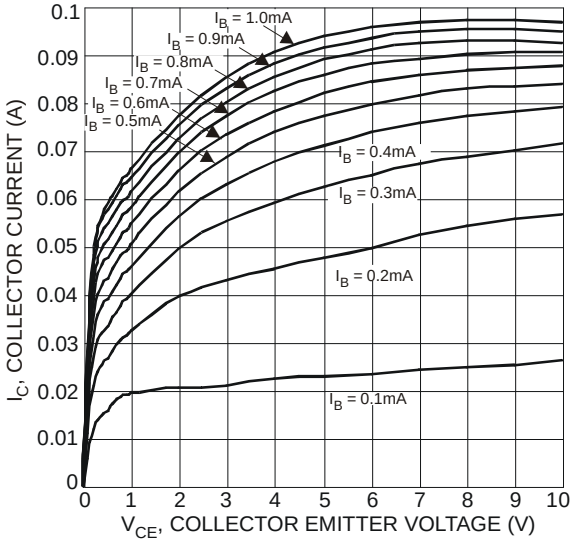


Fig. 16 Typical Collector Current vs. Collector Emitter Voltage

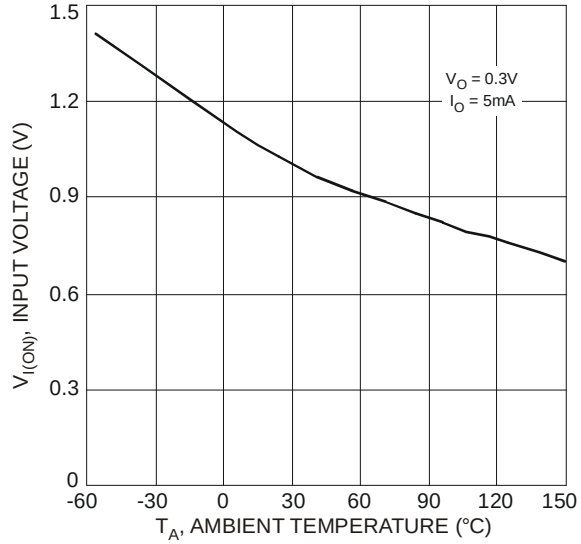


Fig. 17 Typical Input Voltage vs. Ambient Temperature

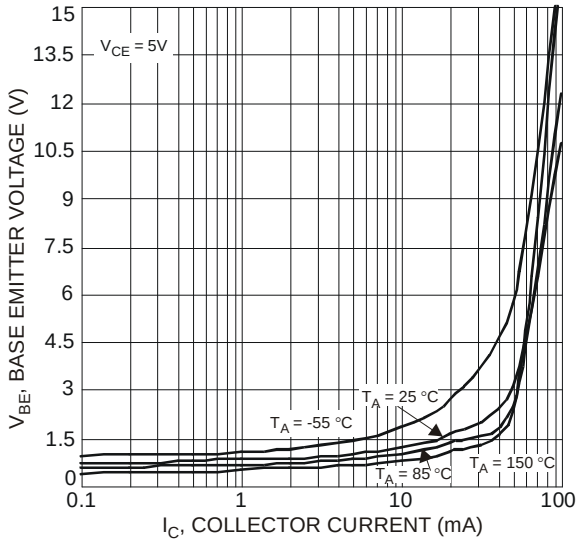


Fig. 18 Typical Base Emitter Voltage vs. Collector Current

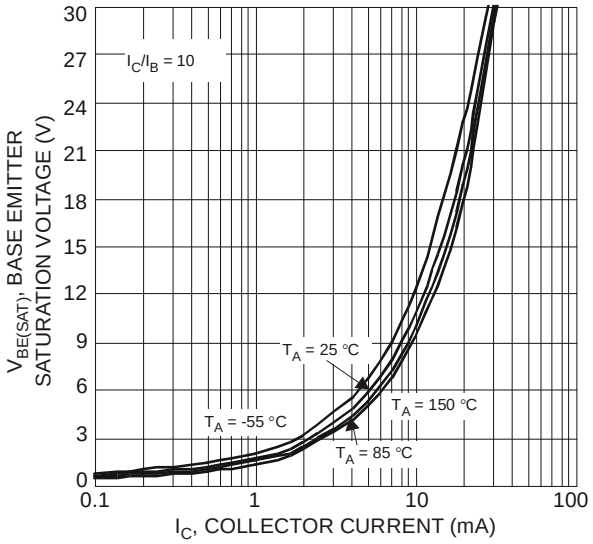
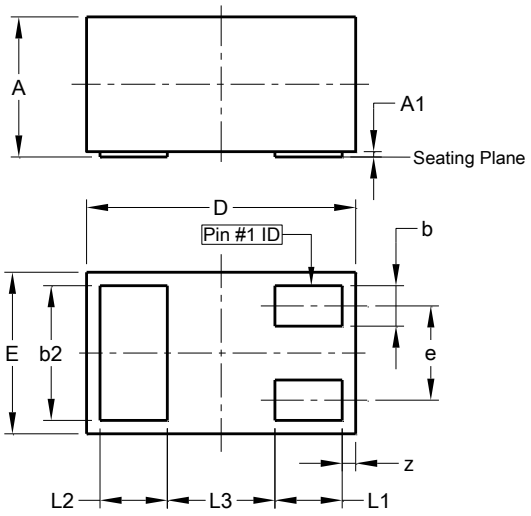


Fig. 19 Typical Base Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

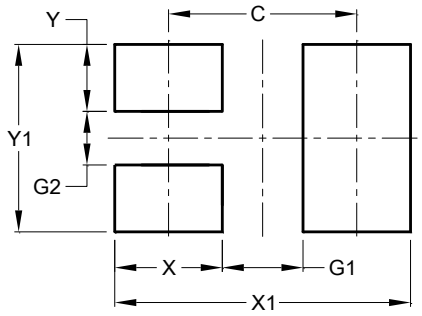
Please see AP02001 at http://www.diodes.com/_files/datasheets/ap02001.pdf for the latest version.



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 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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1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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