PRE-BIASED SMALL SIGNAL SURFACE MOUNT 100mA NPN TRANSISTOR

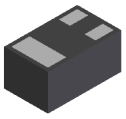
Features

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

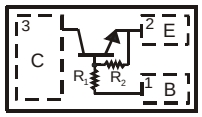
Part Number	R1 (NOM)	R2 (NOM)
DDTC123JLP	2.2K	47K
DDTC143ZLP	4.7K	47K
DDTC114YLP	10K	47K

Mechanical Data

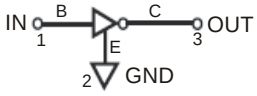
- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: Collector Dot (See Diagram and Marking Information)
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 6
- Ordering Information: See Page 6
- Weight: 0.0009 grams (approximate)

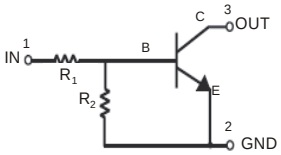


Bottom View



Package Pin Out Configuration





Device Schematics

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 3)	P_D	250	mW
Power Deration above 25 °C	P_{der}	2	mW/°C
Thermal Resistance, Junction to Ambient Air (Note 3) (Equivalent to one heated junction of NPN)	$R_{\theta JA}$	500	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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.
3. 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 page 6 or our website at http://www.diodes.com/datasheets/ap02001.pdf.

Electrical Characteristics @T_A = 25℃ unless otherwise specified

Characteristic	P/N	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics (Note 4)							
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	50	—	—	V	I_C = 10μA, I_E = 0
Collector-Emitter Breakdown Voltage *		$V_{(BR)CEO}$	50	—	—	V	I_C = 2mA, I_B = 0
Emitter-Base Breakdown Voltage *		$V_{(BR)EBO}$	4.5	—	—	V	I_E = 50μA, I_C = 0
Collector Cutoff Current *		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 4)							
Base-Emitter Turn-On Voltage*	DDTC123JLP	$V_{BE(ON)}$	—	—	0.85	V	V_{CE} = 5V, I_C = 2mA
	DDTC143ZLP		—	—	0.85		
	DDTC114YLP		—	—	0.95		
Base-Emitter Saturation Voltage*	DDTC123JLP	$V_{BE(SAT)}$	—	—	0.98	V	I_C = 10mA, I_B = 1mA, V_{CE}=5V
	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

*Guaranteed by design

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

Typical Characteristics Curves @T_A = 25℃ unless otherwise specified

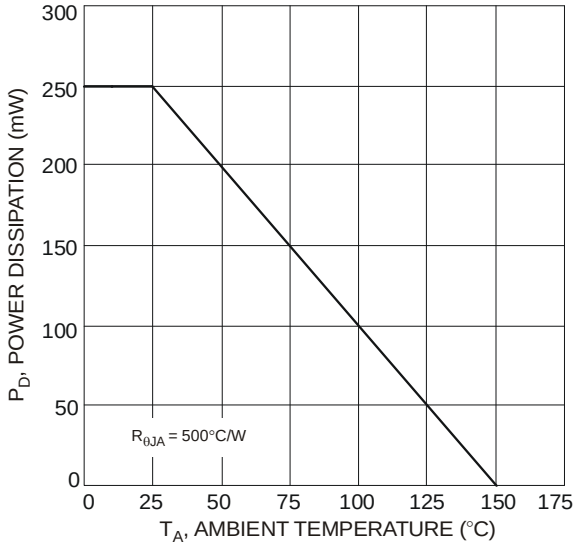


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

Characteristics Curves of DDTC123JLP

@T_A = 25℃ unless otherwise specified

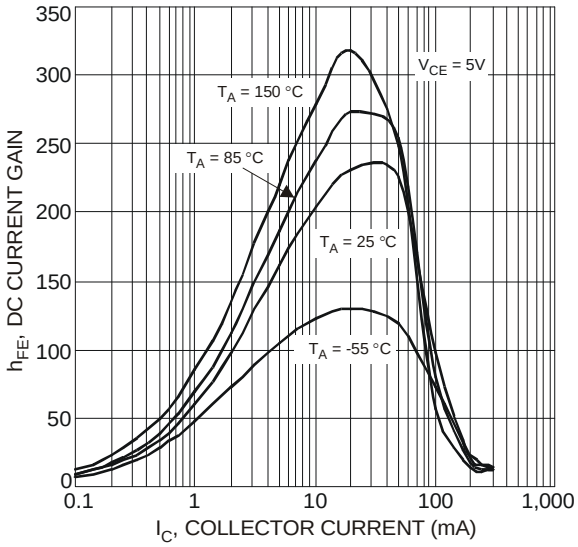


Fig. 2 Typical DC Current Gain vs. Collector Current

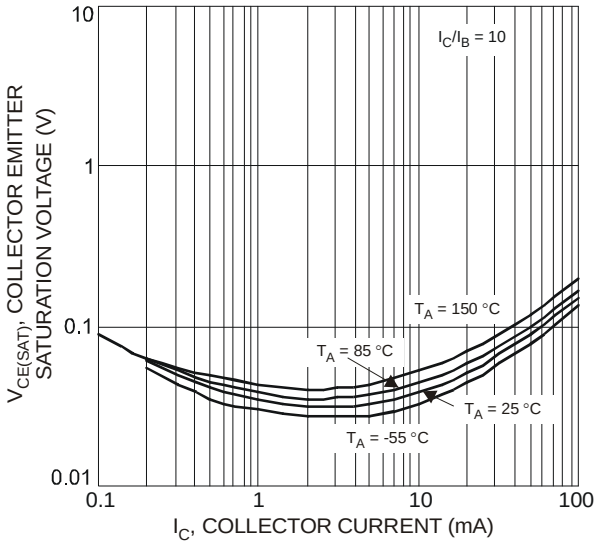


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

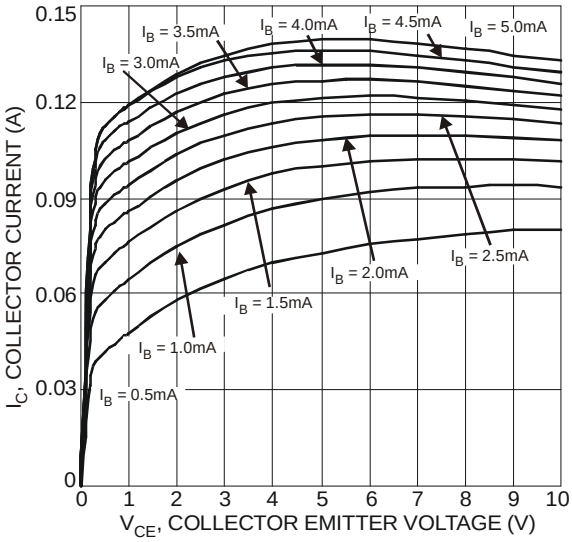


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

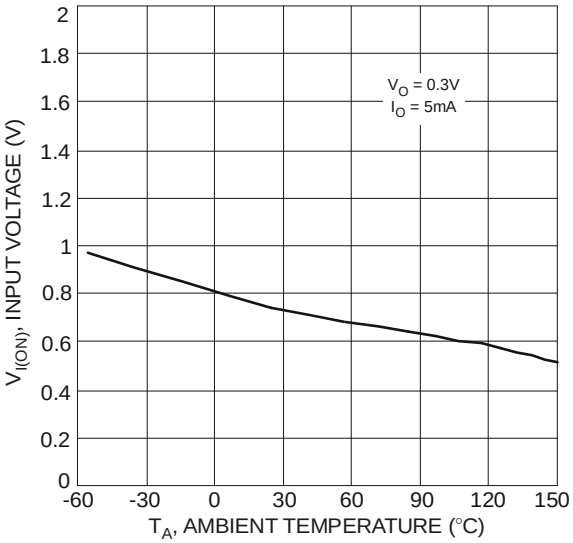


Fig. 5 Typical Input Voltage vs. Ambient Temperature

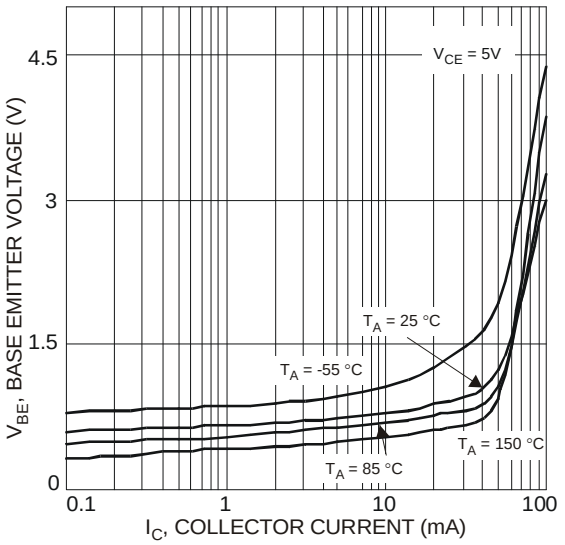


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

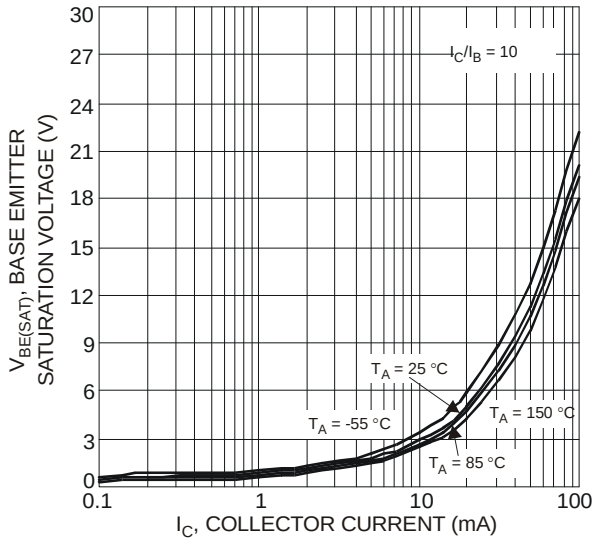


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

Characteristics Curves of DDTC143ZLP @T_A = 25℃ unless otherwise specified

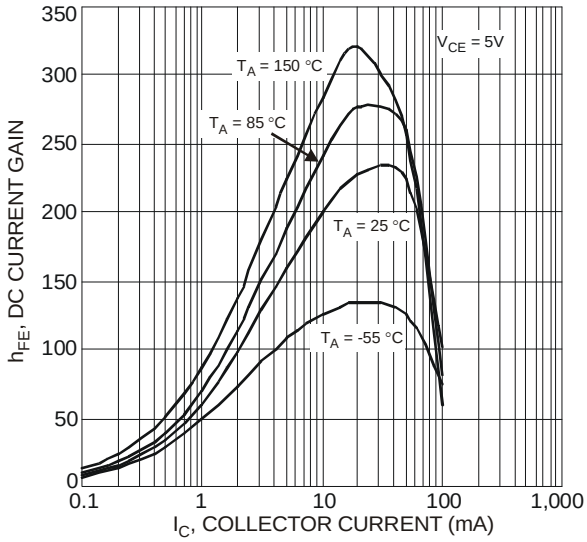


Fig. 8 Typical DC Current Gain vs. Collector Current

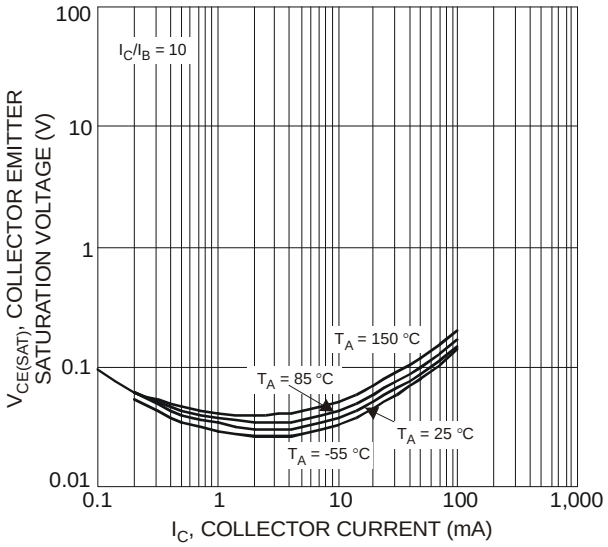


Fig. 9 Typical Collector Emitter Saturation Voltage vs. Collector Current

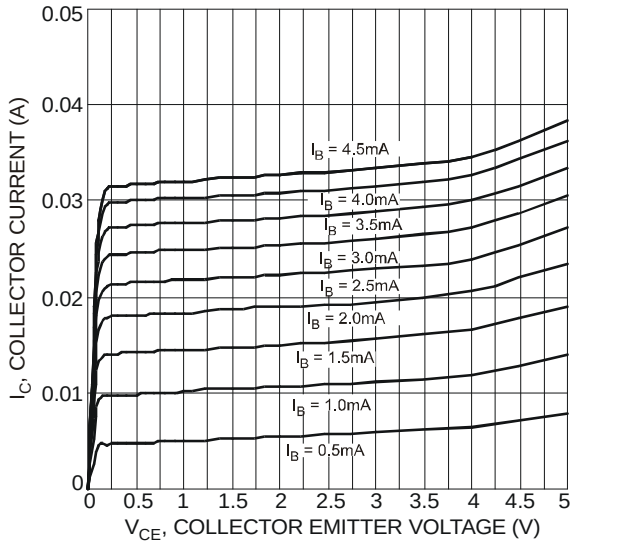


Fig. 10 Typical Collector Current vs. Collector Emitter Voltage

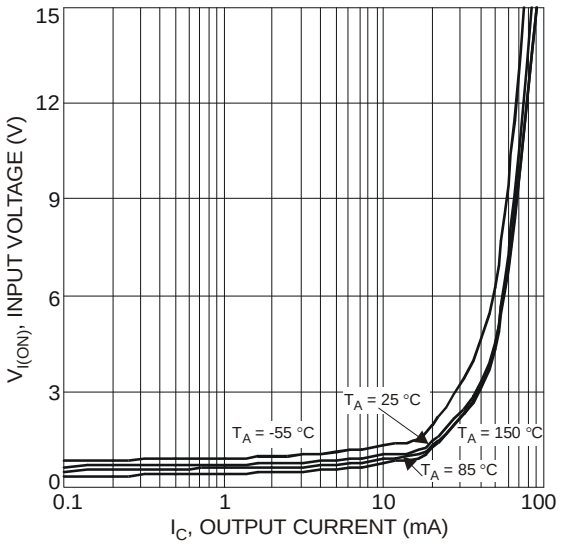


Fig. 11 Typical Input Voltage vs. Output Current

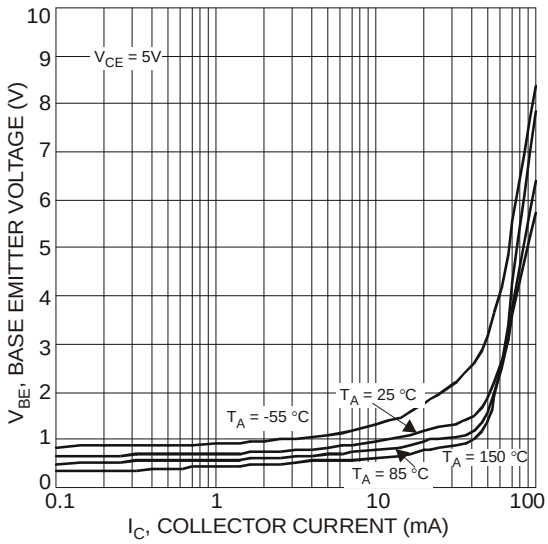


Fig. 12 Typical Base Emitter Voltage vs. Collector Current

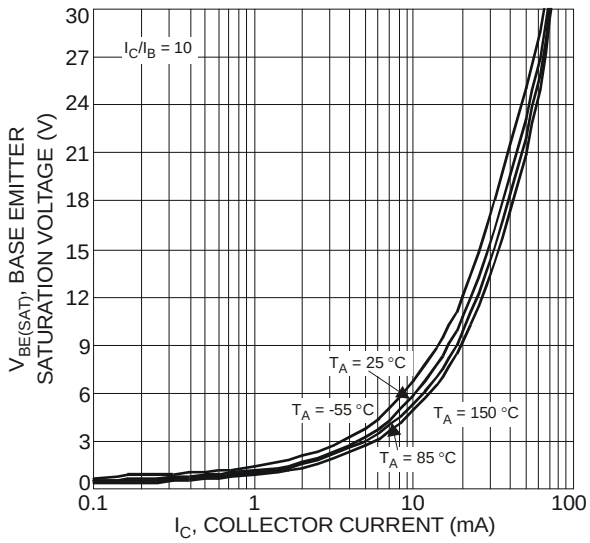


Fig. 13 Typical Base Emitter Saturation Voltage vs. Collector Current

Characteristics Curves of DDTC114YLP @T_A = 25℃ unless otherwise specified

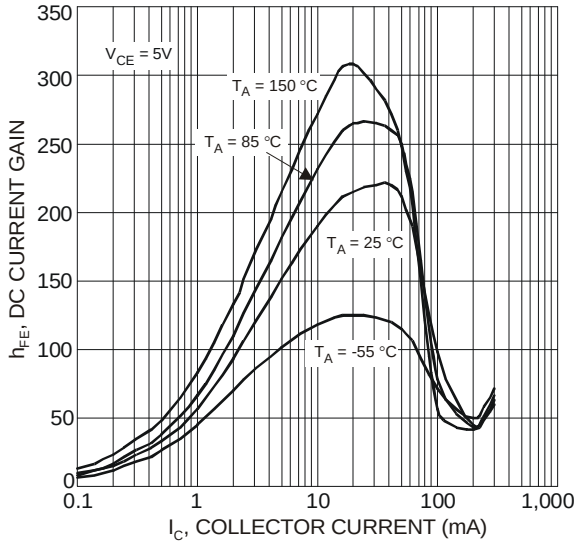


Fig. 14 Typical DC Current Gain vs. Collector Current

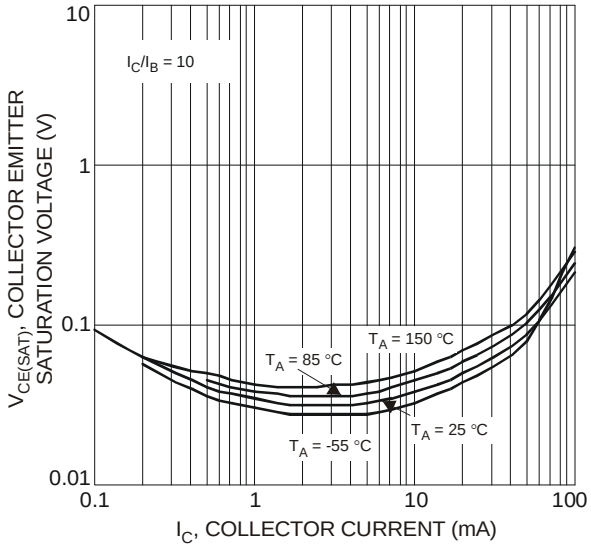


Fig. 15 Typical Collector Emitter Saturation Voltage vs. Collector Current

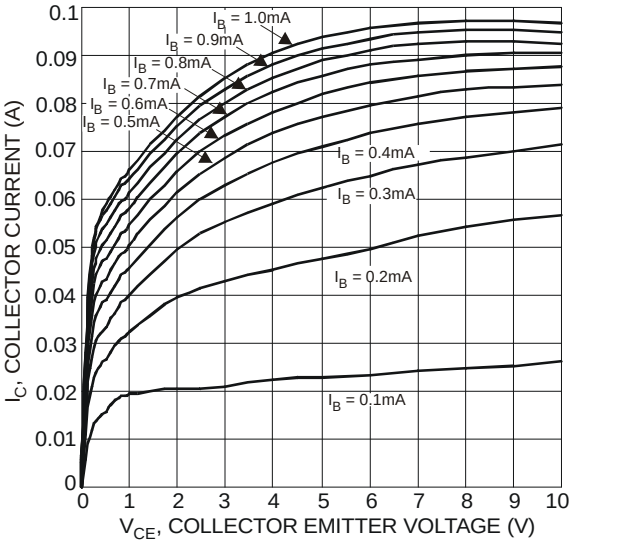


Fig. 16 Typical Collector Current vs. Collector Emitter Voltage

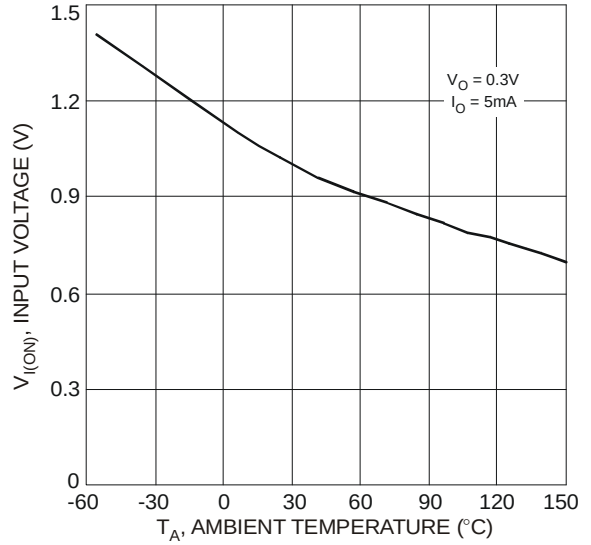


Fig. 17 Typical Input Voltage vs. Ambient Temperature

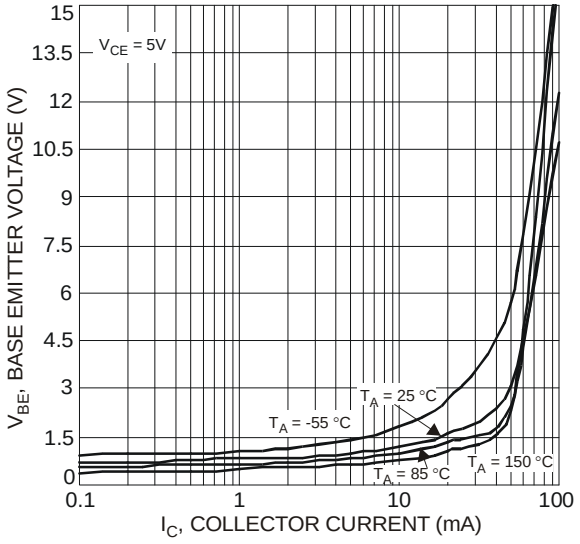


Fig. 18 Typical Base Emitter Voltage vs. Collector Current

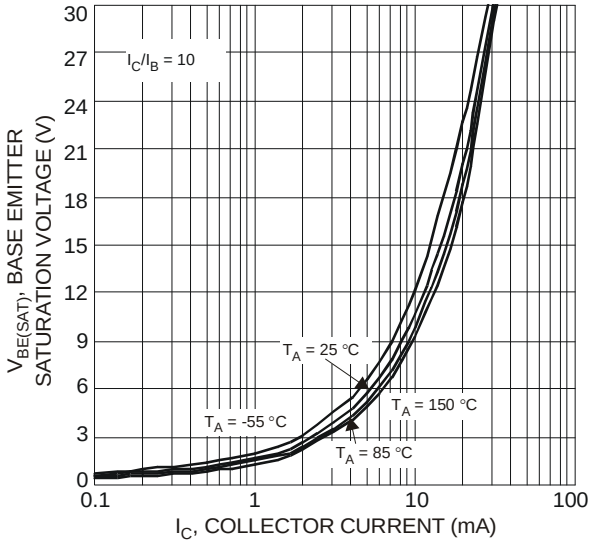


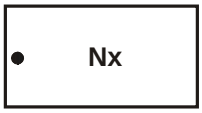
Fig. 19 Typical Base Emitter Saturation Voltage vs. Collector Current

Ordering Information (Note 5)

Part Number	Case	Packaging
DDTC123JLP-7	DFN1006-3	3000/Tape & Reel
DDTC143ZLP-7	DFN1006-3	3000/Tape & Reel
DDTC114YLP-7	DFN1006-3	3000/Tape & Reel

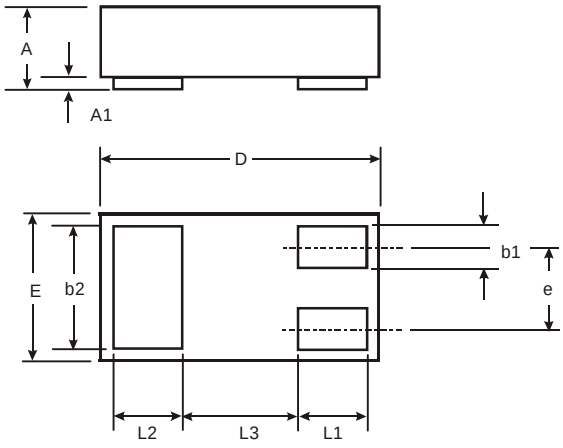
Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



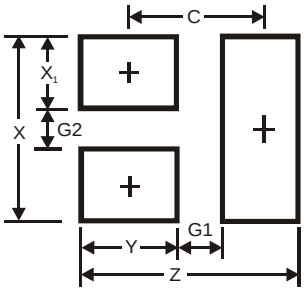
Nx = Product Type Marking Code:
DDTC123JLP = N0
DDTC143ZLP = N1
DDTC114YLP = N2
Dot Denotes Collector, Pin 3

Package Outline Dimensions



DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0	0.05	0.03
b1	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
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.1
G1	0.3
G2	0.2
X	0.7
X1	0.25
Y	0.4
C	0.7

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