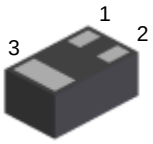
DDTC114ELP

PRE-BIASED (R1 = R2) SMALL SIGNAL SURFACE MOUNT 100mA NPN TRANSISTOR

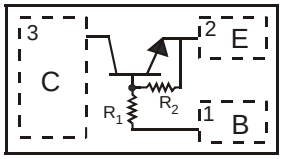
NEW PRODUCT

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**



Bottom View

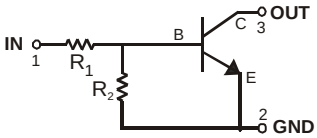


Top View

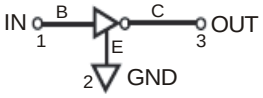
DFN1006-3

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 Code N5, Dot denotes Collector Side
- Ordering Information: See Page 4
- Weight: 0.0009 grams (approximate)



Schematic and Pin Configuration



Equivalent Inverter Circuit

Component P/N	R1(NOM)	R2(NOM)
DDTC114ELP	10K	10K

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	50	V
Input Voltage	V_{IN}	-10 to +40	V
Output Current	I_O	50	mA
Collector Current	$I_{c(max)}$	100	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @T_A = 25°C	P_D	250	mW
Power Derating above 25°C	P_{der}	2	mW/°C
Thermal Resistance, Junction to Ambient Air (Note 3) @T_A = 25°C (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" x 0.85" x 0.062"; pad layout as shown on page 5 or Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

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Electrical Characteristics @T_A = 25°C unless otherwise specified

Characteristic	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 = 1.0mA, I_B = 0
Emitter-Base Breakdown Voltage*	$V_{(BR)EBO}$	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}	—	—	1	μA	V_{CB} = 50V, I_B = 0
Emitter-Base Cut Off Current	I_{EBO}	—	—	0.4	mA	V_{EB} = 4V, I_C = 0
Input Off Voltage	$V_{I(OFF)}$	—	1.16	0.5	V	V_{CC} = 5V, I_O = 100uA
On Characteristics (Note 4)						
DC Current Gain	h_{FE}	10	—	—	—	V_{CE} = 5V, I_C = 1mA
		15	—	—	—	V_{CE} = 5V, I_C = 2mA
		60	—	—	—	V_{CE} = 5V, I_C = 10mA
		100	—	—	—	V_{CE} = 5V, I_C = 50mA
		90	—	—	—	V_{CE} = 5V, I_C = 70mA
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
		—	—	0.25	V	I_C = 50mA, I_B = 2.5mA
		—	—	0.25	V	I_C = 50mA, I_B = 10mA
		—	—	0.3	V	I_C = 70mA, I_B = 10mA
Base-Emitter Turn-On Voltage*	$V_{BE(ON)}$	—	—	0.85	V	V_{CE} = 5V, I_C = 2mA
		—	—	0.95	V	V_{CE} = 5V, I_C = 10mA
Base-Emitter Saturation Voltage*	$V_{BE(SAT)}$	—	—	0.98	V	I_C = 10mA, I_B = 1mA, V_{CE} = 5V
		—	—	1.2	V	I_C = 50mA, I_B = 5mA, V_{CE} = 5V
Input-On Voltage	$V_{I(ON)}$	2.5	1.6	—	V	V_O = 0.3V, I_O = 50mA
Input Current	I_I	—	—	0.88	mA	V_I = 5V
Output On Voltage (Same as $V_{CE(SAT)}$)	$V_{O(ON)}$	—	—	0.3	V	I_I = 2.5mA, I_O = 50mA
Input Resistance	R1	7	10	13	KΩ	—
Resistance Ratio	(R2/R1)	0.8	1	1.2	—	—
Small Signal Characteristics						
Current Gain-Bandwidth Product	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 1MHz

* Guaranteed by design.

Note: 4. Short duration pulse test used to minimize self-heating effect.
Pulse Test: Pulse width tp<300 us, Duty Cycle, d<=2%.

NEW PRODUCT

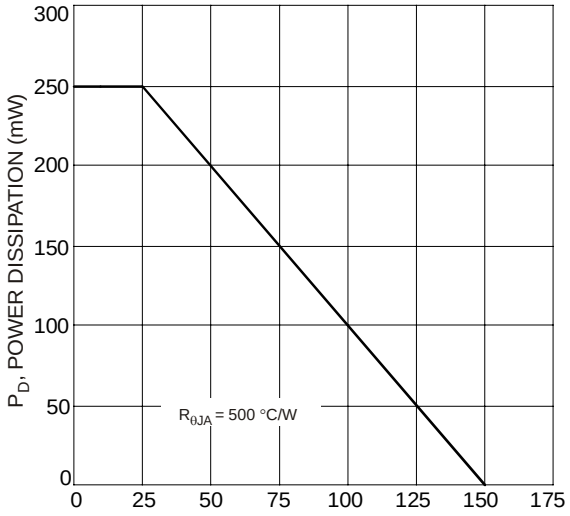

Fig. 1 Power Derating Curve

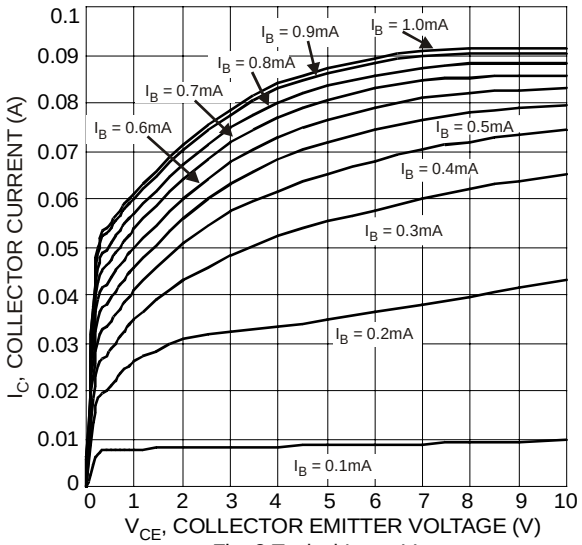

Fig. 2 Typical I_C vs. V_{CE}

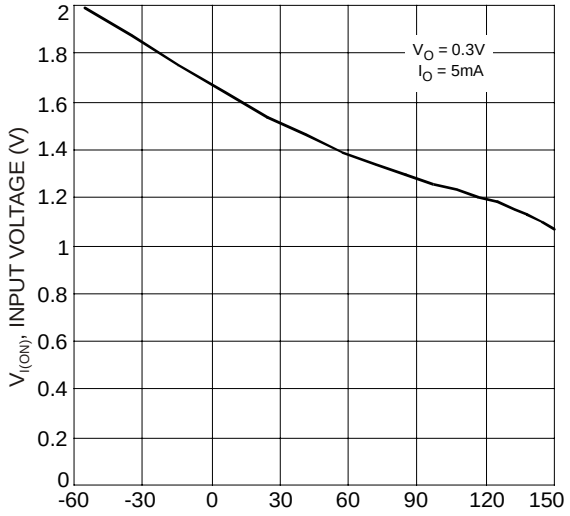

Fig. 3 Typical Input Voltage vs. T_A

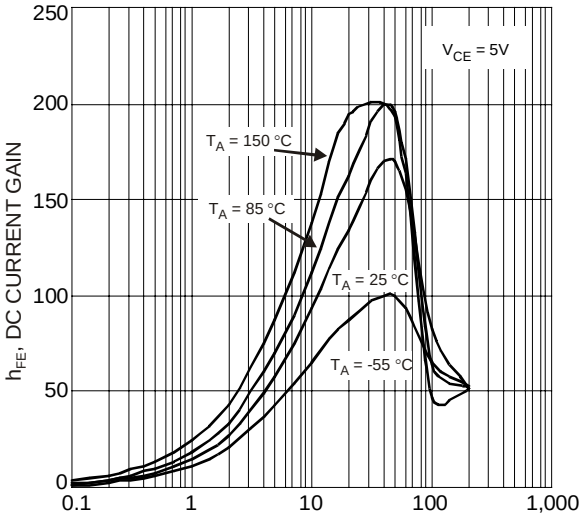

Fig. 4 Typical DC Current Gain

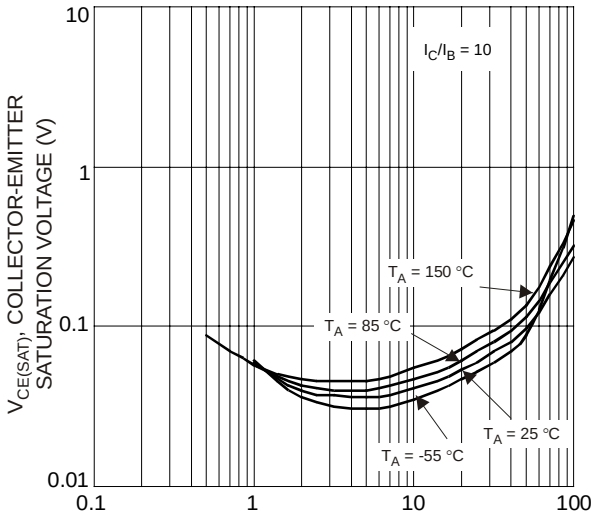

Fig. 5 Typical $V_{CE(SAT)}$ vs. I_C

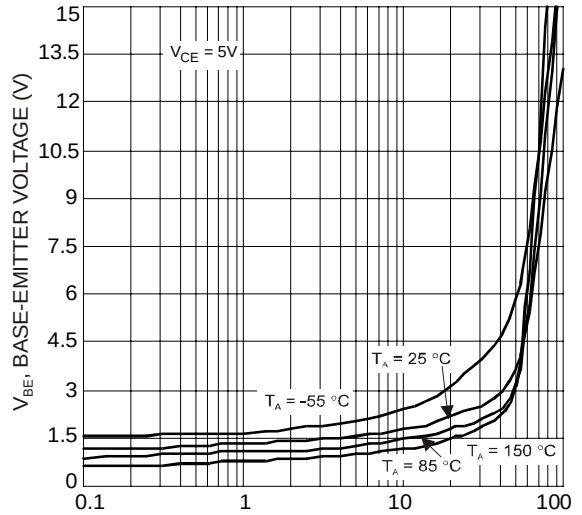

Fig. 6 Typical V_{BE} vs. I_C

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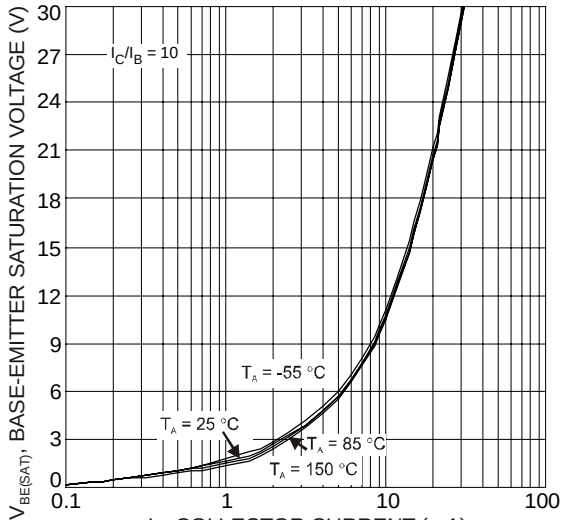


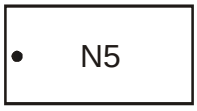
Fig. 7 Typical $V_{BE(SAT)}$ vs. I_C

Ordering Information (Note 6)

Device	Packaging	Shipping
DDTC114ELP-7	DFN1006-3	3000/Tape & Reel

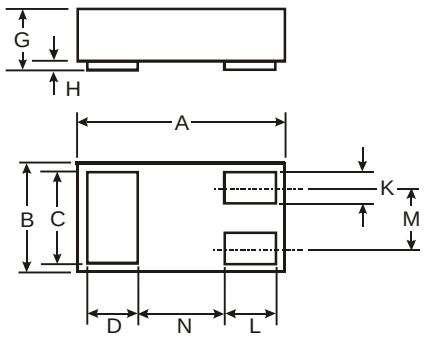
Notes: 6. For packaging details, please see page 5 or go to our website at http://www.diodes.com/ap2007.pdf.

Marking Information



N5 = Product Type Marking Code
Dot Denotes Collector, Pin 3

Package Outline Dimensions



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			

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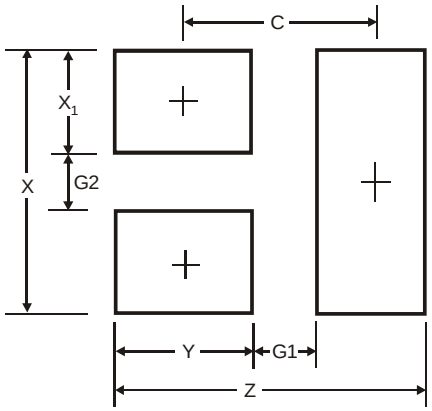
Suggested Pad Layout



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