

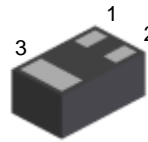
NEW PRODUCT

Features

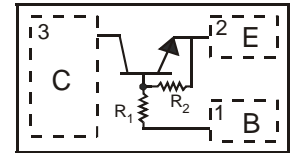
- Epitaxial Planar Die Construction
- Ultra-Small Leadless Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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)

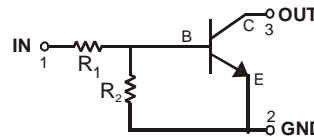


Bottom View

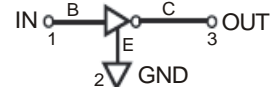


Top View

DFN1006-3



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 _{θJA}	500	°C/W
Operating and Storage Temperature Range	T _i , 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>.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics (Note 4)						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	—	—	V	$I_C = 10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	50	—	—	V	$I_C = 1.0\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage*	$V_{(BR)EBO}$	5	—	—	V	$I_E = 50\mu\text{A}, I_C = 0$
Collector Cutoff Current*	I_{CEX}	—	—	0.5	μA	$V_{CE} = 50\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Base Cutoff Current (I_{BEX})	I_{BL}	—	—	0.5	μA	$V_{CE} = 50\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Collector-Base Cut Off Current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 50\text{V}, I_E = 0$
Collector-Emitter Cut Off Current, $I_{O(OFF)}$	I_{CEO}	—	—	1	μA	$V_{CB} = 50\text{V}, I_B = 0$
Emitter-Base Cut Off Current	I_{EBO}	—	—	0.4	mA	$V_{EB} = 4\text{V}, I_C = 0$
Input Off Voltage	$V_{I(OFF)}$	—	1.16	0.5	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
On Characteristics (Note 4)						
DC Current Gain	h_{FE}	10	—	—	—	$V_{CE} = 5\text{V}, I_C = 1\text{mA}$
		15	—	—	—	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$
		60	—	—	—	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$
		100	—	—	—	$V_{CE} = 5\text{V}, I_C = 50\text{mA}$
		90	—	—	—	$V_{CE} = 5\text{V}, I_C = 70\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	0.15	V	$I_C = 10\text{mA}, I_B = 1\text{mA}$
		—	—	0.2	V	$I_C = 50\text{mA}, I_B = 5\text{mA}$
		—	—	0.25	V	$I_C = 50\text{mA}, I_B = 2.5\text{mA}$
		—	—	0.25	V	$I_C = 50\text{mA}, I_B = 10\text{mA}$
		—	—	0.3	V	$I_C = 70\text{mA}, I_B = 10\text{mA}$
Base-Emitter Turn-On Voltage*	$V_{BE(ON)}$	—	—	0.85	V	$V_{CE} = 5\text{V}, I_C = 2\text{mA}$
		—	—	0.95	V	$V_{CE} = 5\text{V}, I_C = 10\text{mA}$
Base-Emitter Saturation Voltage*	$V_{BE(SAT)}$	—	—	0.98	V	$I_C = 10\text{mA}, I_B = 1\text{mA}, V_{CE} = 5\text{V}$
		—	—	1.2	V	$I_C = 50\text{mA}, I_B = 5\text{mA}, V_{CE} = 5\text{V}$
Input-On Voltage	$V_{I(ON)}$	2.5	1.6	—	V	$V_O = 0.3\text{V}, I_O = 50\text{mA}$
Input Current	I_I	—	—	0.88	mA	$V_I = 5\text{V}$
Output On Voltage (Same as $V_{CE(SAT)}$)	$V_{O(ON)}$	—	—	0.3	V	$I_I = 2.5\text{mA}, I_O = 50\text{mA}$
Input Resistance	R1	7	10	13	K Ω	—
Resistance Ratio	(R2/R1)	0.8	1	1.2	—	—
Small Signal Characteristics						
Current Gain-Bandwidth Product	f_T	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 1\text{MHz}$

* Guaranteed by design.

Note: 4. Short duration pulse test used to minimize self-heating effect.
Pulse Test: Pulse width $t_p < 300\mu\text{s}$, Duty Cycle, $d \leq 2\%$.

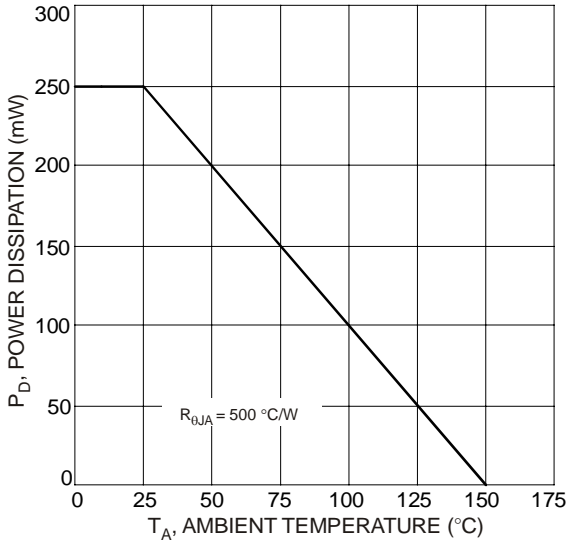


Fig. 1 Power Derating Curve

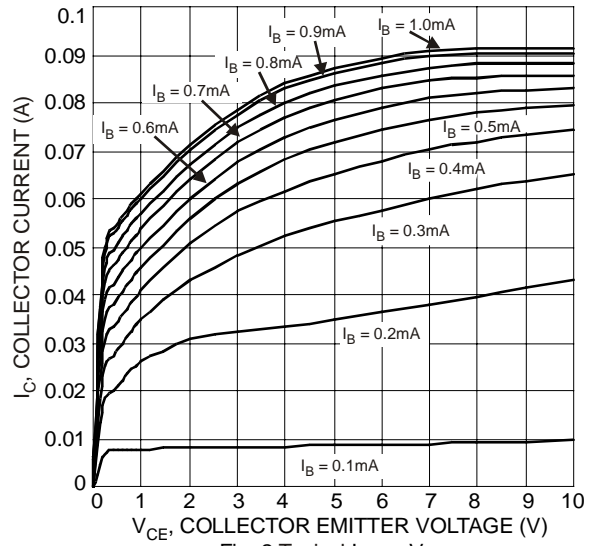


Fig. 2 Typical I_C vs. V_{CE}

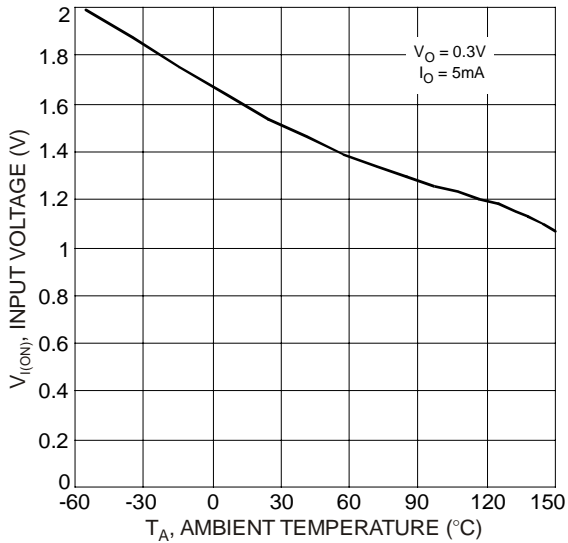


Fig. 3 Typical Input Voltage vs. T_A

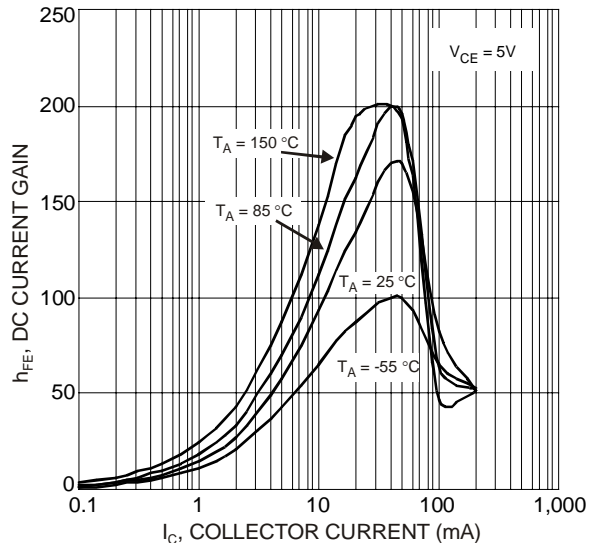


Fig. 4 Typical DC Current Gain

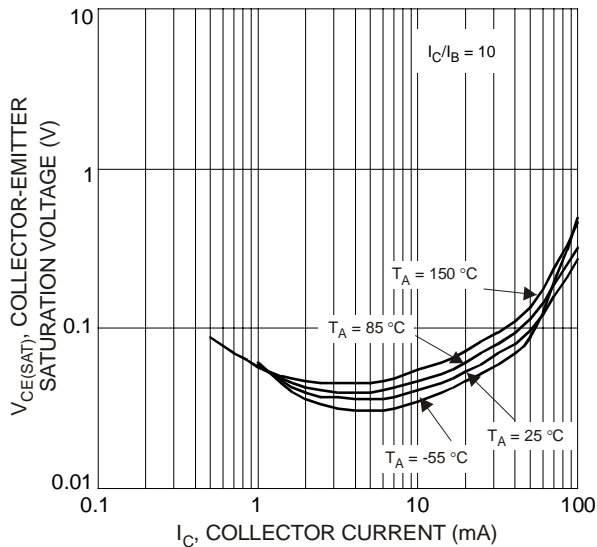


Fig. 5 Typical $V_{CE(SAT)}$ vs. I_C

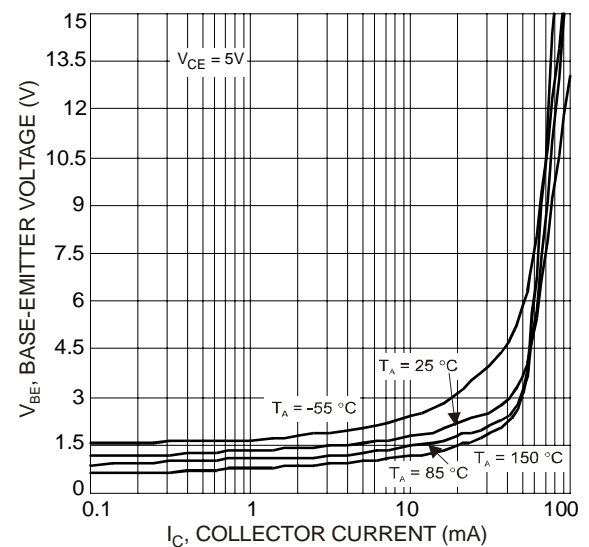
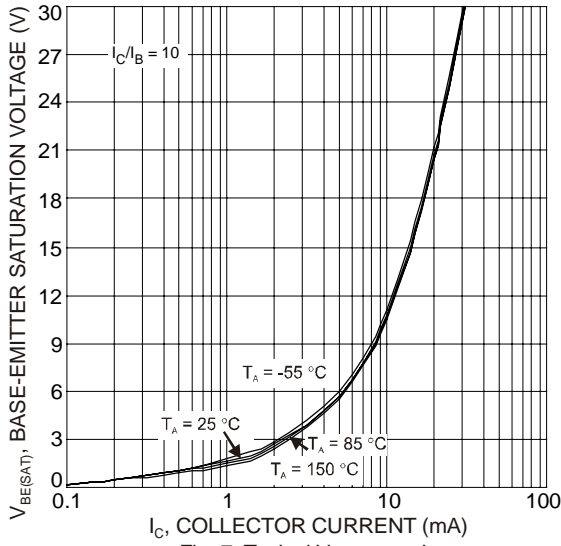


Fig. 6 Typical V_{BE} vs. I_C

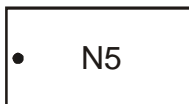


Ordering Information (Note 6)

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

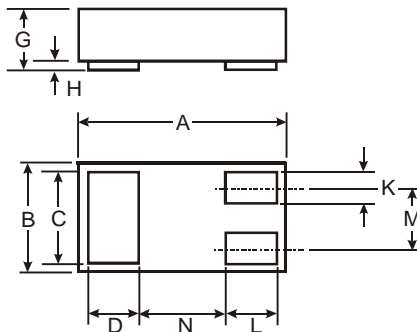
Notes: 6. For packaging details, please see page 5 or go to our website at <http://www.diodes.com/ap2007.pdf>.

Marking Information



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

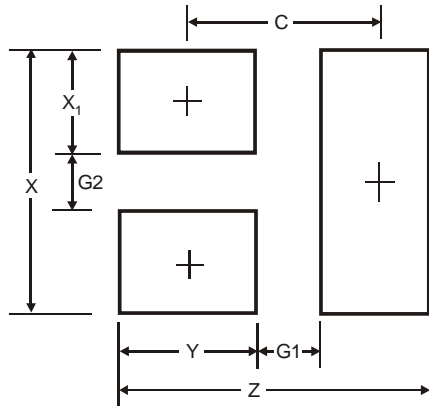
Package Outline Dimensions



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

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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