

PRE-BIASED (R1 = R2) 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", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

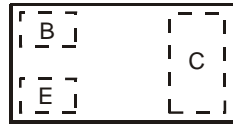
- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0009 grams (approximate)

Part Number	R1 (NOM)	R2 (NOM)	Marking
DDTC114ELP	10K	10K	N5

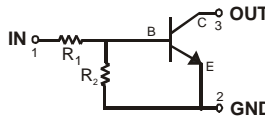
DFN1006-3



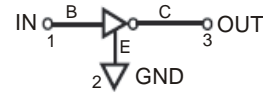
Bottom View



Top View
Pin-Out



Device Symbol



Equivalent Inverter
Circuit

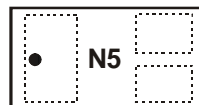
Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC114ELP-7	N5	7	8	3,000
DDTC114ELP-7B	N5	7	8	10,000

- Notes:
1. No purposefully added lead.
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

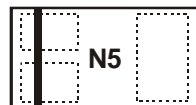
Marking Information

DDTC114ELP-7



Top View
Dot Denotes
Collector Side

DDTC114ELP-7B



Top View
Bar Denotes Base
and Emitter Side

N5 = Product Type Marking Code

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 @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P _D	250	mW
Power Derating above 25°C	P _{der}	2	mW/°C
Thermal Resistance, Junction to Ambient Air (Note 4) (Equivalent to one heated junction of NPN)	R _{θJA}	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	Symbol	Min	Typ	Max	Unit	Test Condition
Off Characteristics (Note 5)						
Collector-Base Breakdown Voltage	BV _{CBO}	50	—	—	V	I _C = 10μA, I _E = 0
Collector-Emitter Breakdown Voltage	BV _{CEO}	50	—	—	V	I _C = 1.0mA, I _B = 0
Emitter-Base Breakdown Voltage	BV _{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 (Notes 5 & 6)						
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	R ₁	7	10	13	KΩ	—
Resistance Ratio	(R ₂ /R ₁)	0.8	1	1.2	—	—
Small Signal Characteristics						
Current Gain-Bandwidth Product	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 1MHz

- Notes: 4. Device mounted on FR-4 PCB, 1" x 0.85" x 0.062"
 5. Short duration pulse test used to minimize self-heating effect. Pulse Test: Pulse width tp < 300 μs, Duty Cycle, d ≤ 2%.
 6. Guaranteed by design.

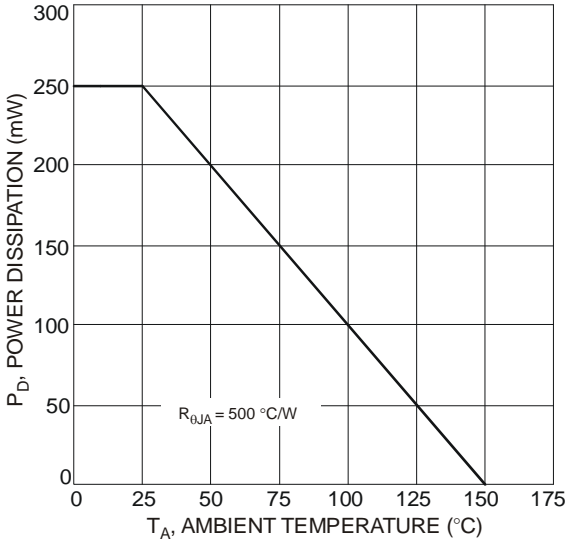


Fig. 1 Power Dissipation vs. Ambient Temperature

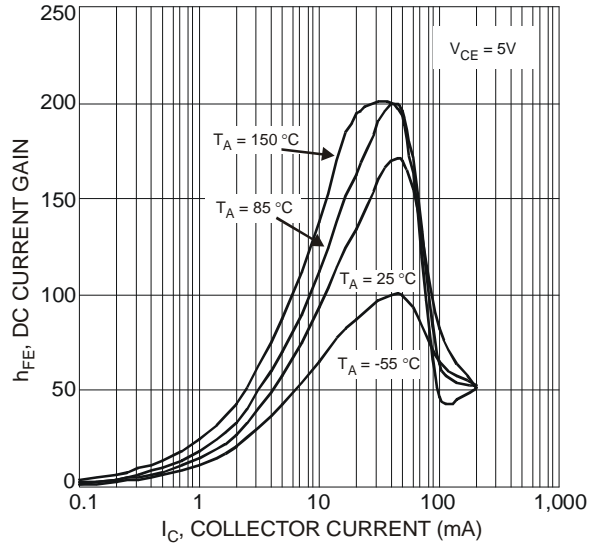


Fig. 2 Typical DC Current Gain vs. Collector Current

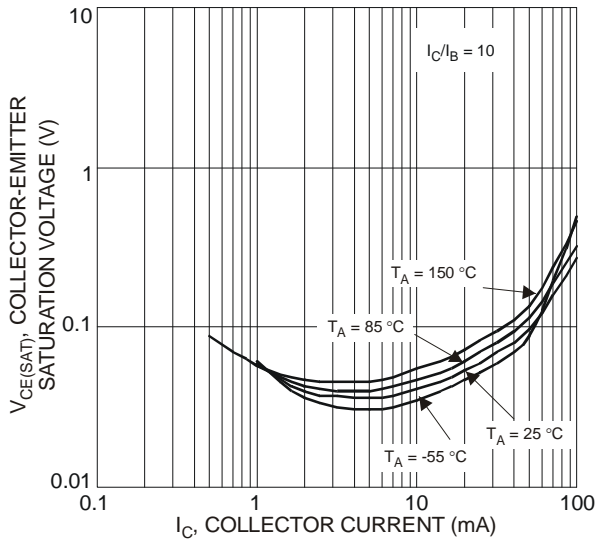


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

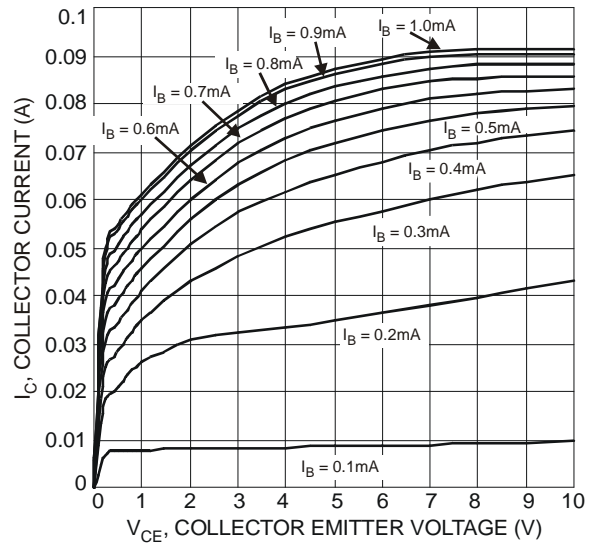


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

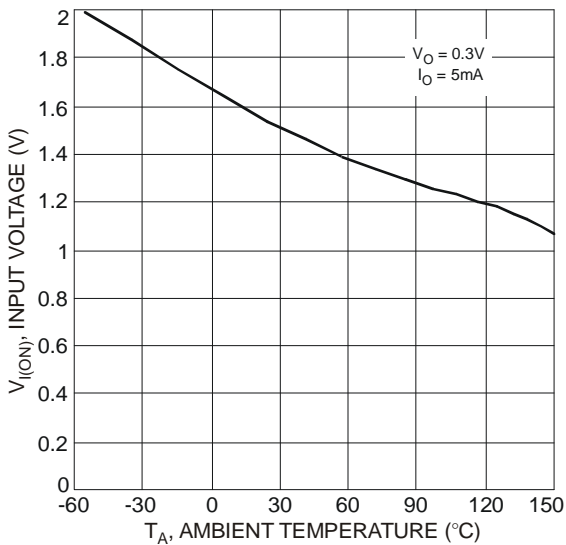


Fig. 5 Typical Input Voltage vs. Ambient Temperature

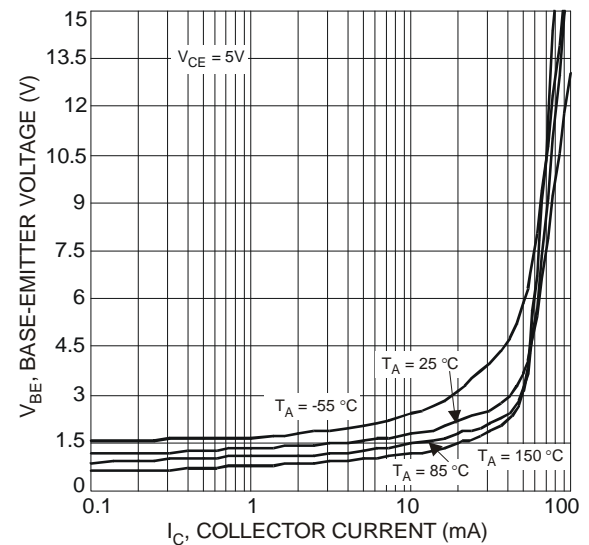


Fig. 6 Typical Base-Emitter Voltage vs. Collector Current

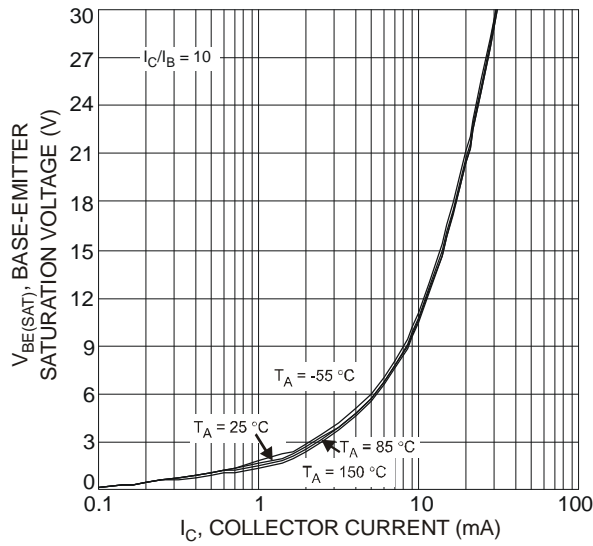
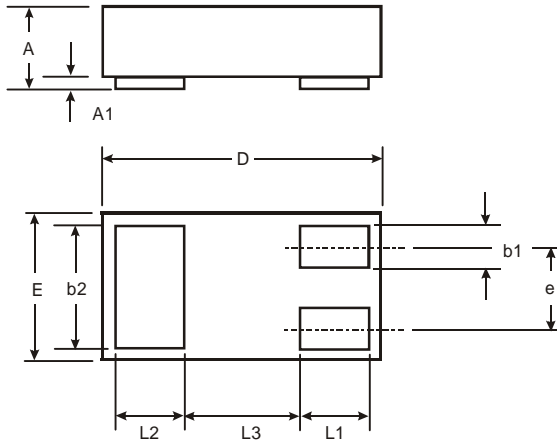


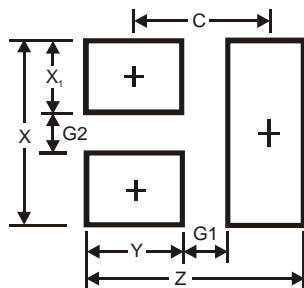
Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

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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