

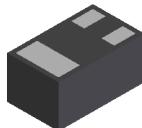
## Product Summary

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

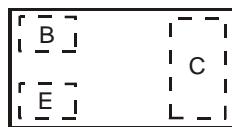
## Features

- 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
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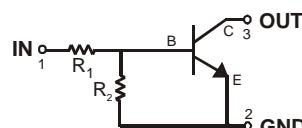
X1-DFN1006-3



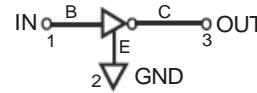
Bottom View



Top View  
Pin-Out



Device Symbol



Equivalent Inverter  
Circuit

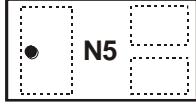
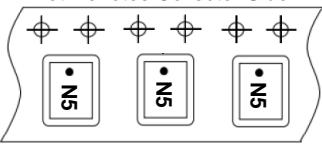
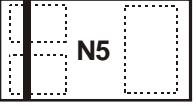
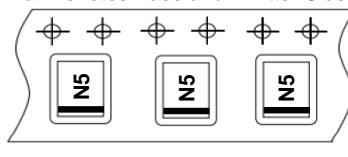
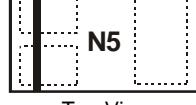
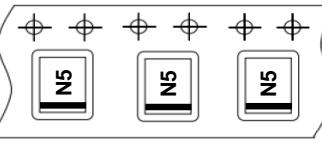
## Ordering Information (Note 4)

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:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information

<b>DDTC114ELP-7</b>	 <p>Top View Dot Denotes Collector Side</p> 	<p>From date code 1527 (YYWW), this changes to:</p>  <p>Top View Bar Denotes Base and Emitter Side</p> 
<b>DDTC114ELP-7B</b>	 <p>Top View Bar Denotes Base and Emitter Side</p> 	<p>N5 = Product Type Marking Code</p>

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$ , 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	$I_C(\text{MAX})$	100	mA

 Thermal Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

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

 Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>Off Characteristics (Note 6)</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	50	—	—	V	$I_C = 50\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	50	—	—	V	$I_C = 1.0\text{mA}, I_B = 0$
Collector Cutoff Current	$I_{CEX}$	—	—	0.5	$\mu\text{A}$	$V_{CE} = 50\text{V}, V_{EB(\text{OFF})} = 3.0\text{V}$
Collector-Base Cut Off Current	$I_{CBO}$	—	—	0.1	$\mu\text{A}$	$V_{CB} = 50\text{V}, I_E = 0$
Collector-Emitter Cut Off Current, $I_{O(\text{OFF})}$	$I_{CES}$	—	—	0.1	$\mu\text{A}$	$V_{CB} = 50\text{V}, I_B = 0$
Emitter-Base Cut Off Current	$I_{EBO}$	—	—	800	$\mu\text{A}$	$V_{EB} = 10\text{V}, I_C = 0$
Input Off Voltage	$V_{I(\text{off})}$	0.5	1.16	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
Input On Voltage	$V_{I(\text{on})}$	—	—	2.5	V	$V_{CC} = 0.3\text{V}, I_O = 10\text{mA}$
<b>On Characteristics (Notes 6 &amp; 7)</b>						
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	$V_{CE(\text{sat})}$	—	—	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	$I_C = 50\text{mA}, I_B = 10\text{mA}$
		—	—	0.3	V	$I_C = 70\text{mA}, I_B = 10\text{mA}$
		—	—	—	—	—
Base-Emitter Turn-On Voltage	$V_{BE(\text{on})}$	—	—	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	$V_{BE(\text{sat})}$	—	—	0.98	V	$I_C = 10\text{mA}, I_B = 1\text{mA}$
		—	—	1.2	V	$I_C = 50\text{mA}, I_B = 5\text{mA}$
Input Current	$I_I$	—	—	0.88	mA	$V_I = 5\text{V}$
Output On Voltage (Same as $V_{CE(\text{sat})}$ )	$V_{O(\text{on})}$	—	—	0.25	V	$I_I = 2.5\text{mA}, I_O = 50\text{mA}$
Input Resistance	$R_1$	7	10	13	$\text{k}\Omega$	—
Resistance Ratio	( $R_2/R_1$ )	0.8	1	1.2	—	—
<b>Small Signal Characteristics</b>						
Current Gain-Bandwidth Product	$f_T$	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 1\text{MHz}$

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  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .
7. Guaranteed by design.

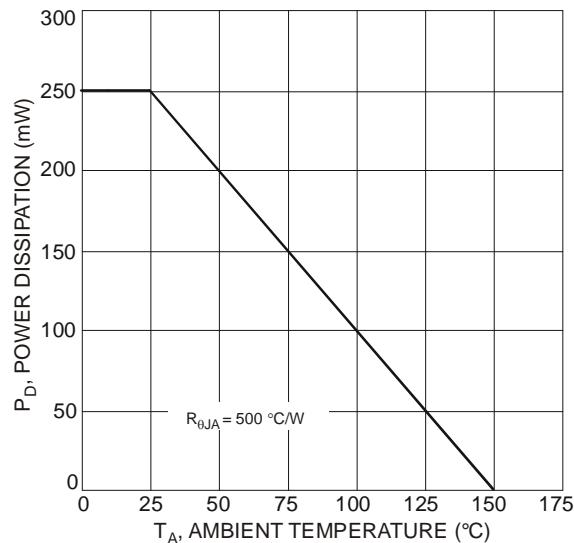


Fig. 1 Power Dissipation vs. Ambient Temperature

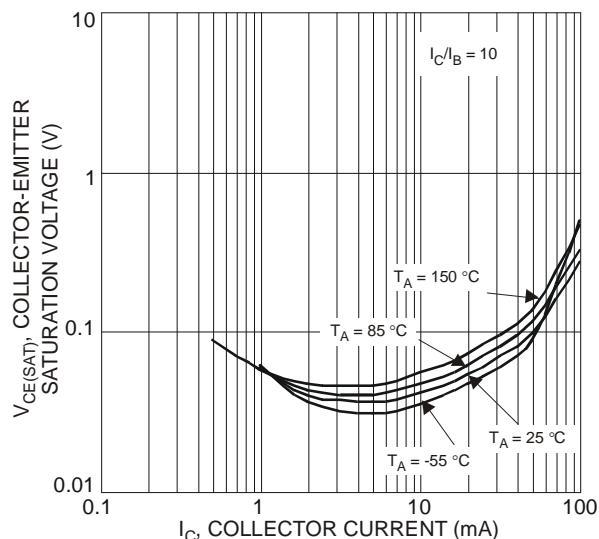


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

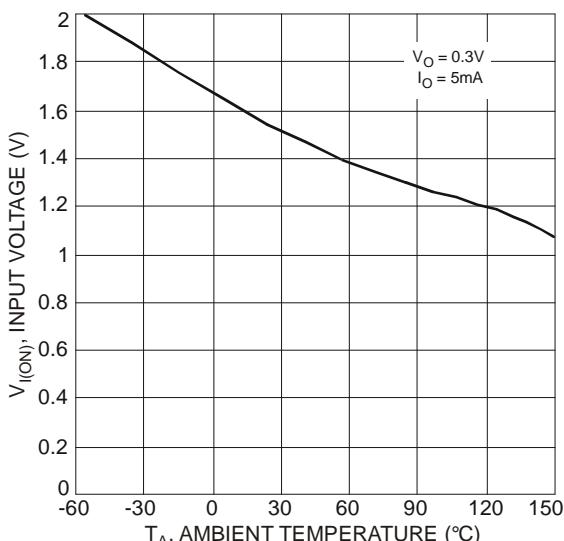


Fig. 5 Typical Input Voltage vs. Ambient Temperature

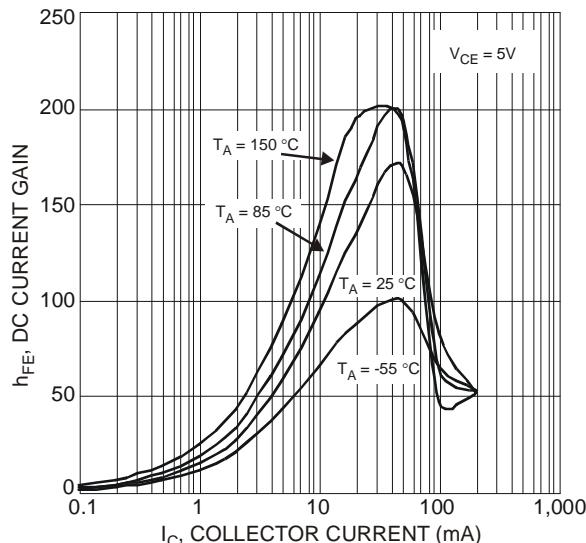


Fig. 2 Typical DC Current Gain vs. Collector Current

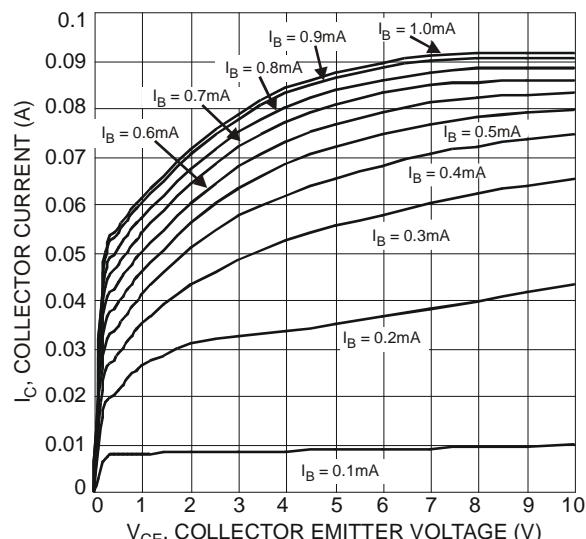


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

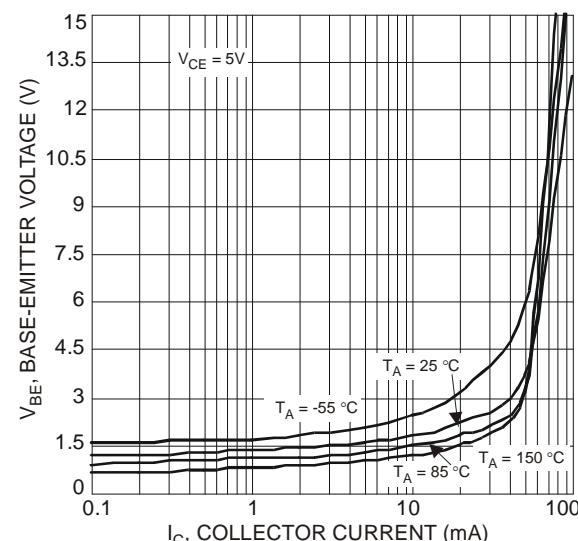


Fig. 6 Typical Base-Emitter Voltage vs. Collector Current

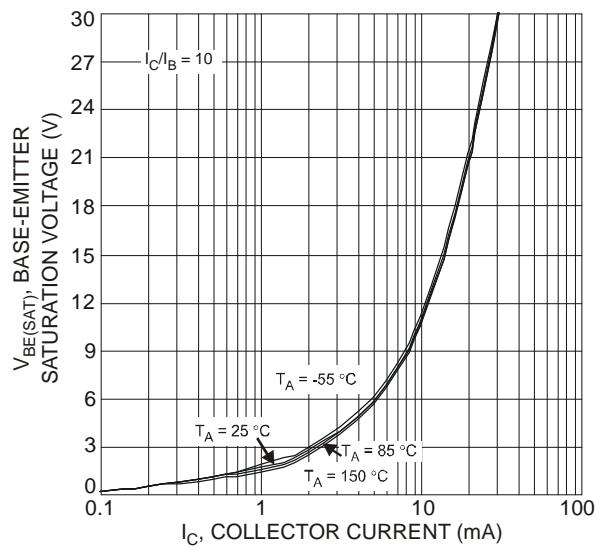
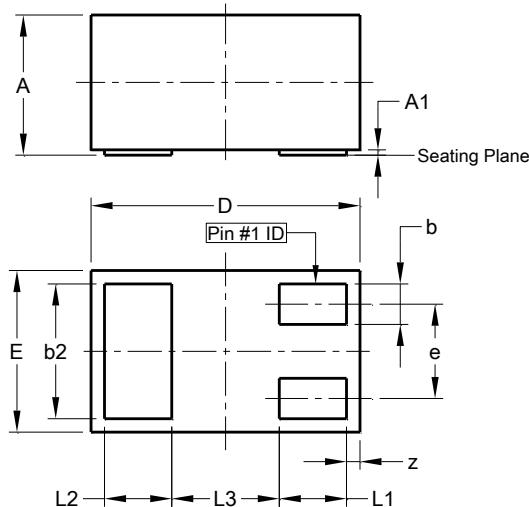


Fig. 7 Typical Base Emitter Saturation Voltage  
vs. Collector Current

## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.

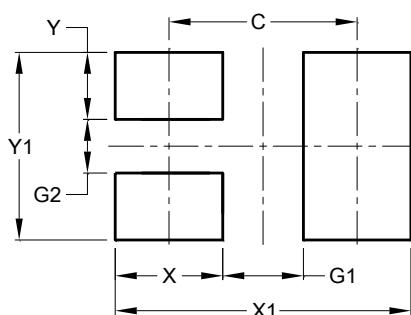


X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05

All Dimensions in mm

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/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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