

DDTC114ELP-7 Datasheet



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DiGi Electronics Part Number	DDTC114ELP-7-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DDTC114ELP-7
Description	TRANS PREBIAS NPN 50V 0.1A 3DFN
Detailed Description	Pre-Biased Bipolar Transistor (BJT) NPN - Pre-Biased 50 V 100 mA 250 MHz 250 mW Surface Mount X1-DFN1006-3



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DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

DDTC114ELP-7

Series:

-

Transistor Type:

NPN - Pre-Biased

Voltage - Collector Emitter Breakdown (Max):

50 V

Resistor - Emitter Base (R2):

10 kOhms

Vce Saturation (Max) @ Ib, Ic:

300mV @ 10mA, 70mA

Frequency - Transition:

250 MHz

Mounting Type:

Surface Mount

Supplier Device Package:

X1-DFN1006-3

Manufacturer:

Diodes Incorporated

Product Status:

Active

Current - Collector (Ic) (Max):

100 mA

Resistor - Base (R1):

10 kOhms

DC Current Gain (hFE) (Min) @ Ic, Vce:

100 @ 50mA, 5V

Current - Collector Cutoff (Max):

1µA

Power - Max:

250 mW

Package / Case:

3-UFDNF

Base Product Number:

DDTC114

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



DDTC114ELP

50V NPN PRE-BIASED (R1=R2) SMALL SIGNAL TRANSISTOR IN DFN1006

Product Summary

Part Number	R1 (NOM)	R2 (NOM)	Marking
DDTC114ELP	10k Ω	10k Ω	N5

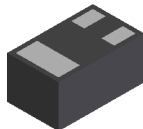
Features

- 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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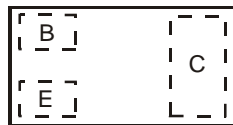
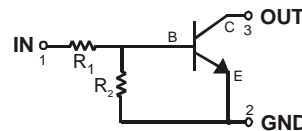
Mechanical Data

- Case: X1-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
Solderable per MIL-STD-202, Method 208 ^{e4}
- Weight: 0.0009 grams (Approximate)

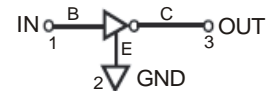
X1-DFN1006-3



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

Marking Information

DDTC114ELP-7	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View Dot Denotes Collector Side</p> </div> <div style="text-align: center;"> <p>From date code 1527 (YYWW), this changes to:</p> <p>Top View Bar Denotes Base and Emitter Side</p> </div> </div>
DDTC114ELP-7B	<div style="text-align: center;"> <p>Top View Bar Denotes Base and Emitter Side</p> </div> <p style="text-align: right;">N5 = Product Type Marking Code</p>



DDTC114ELP

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	$I_{C(MAX)}$	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_{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
Off Characteristics (Note 6)						
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	μA	$V_{CE} = 50\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Collector-Base Cut Off Current	I_{CBO}	—	—	0.1	μA	$V_{CB} = 50\text{V}, I_B = 0$
Collector-Emitter Cut Off Current, $I_{O(OFF)}$	I_{CES}	—	—	0.1	μA	$V_{CB} = 50\text{V}, I_E = 0$
Emitter-Base Cut Off Current	I_{EBO}	—	—	800	μA	$V_{EB} = 10\text{V}, I_C = 0$
Input Off Voltage	$V_{I(off)}$	0.5	1.16	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
Input On Voltage	$V_{I(on)}$	—	—	2.5	V	$V_{CC} = 0.3\text{V}, I_O = 10\text{mA}$
On Characteristics (Notes 6 & 7)						
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	$I_C = 50\text{mA}, I_B = 10\text{mA}$
		—	—	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	$I_C = 10\text{mA}, I_B = 1\text{mA}$
		—	—	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 $V_{CE(sat)}$)	$V_{O(on)}$	—	—	0.25	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	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 1\text{MHz}$

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.



DDTC114ELP

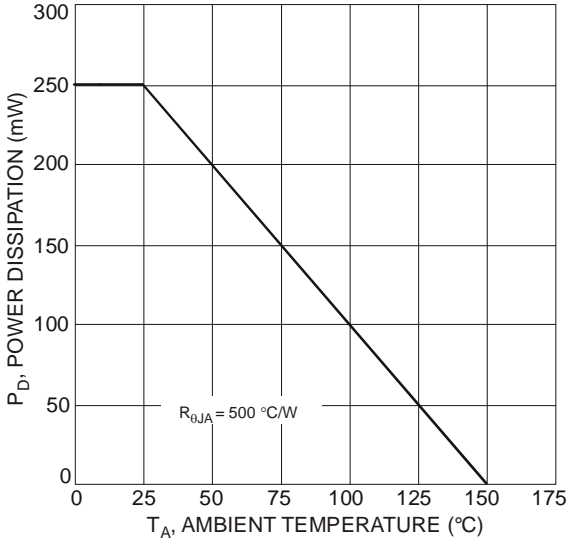


Fig. 1 Power Dissipation vs. Ambient Temperature

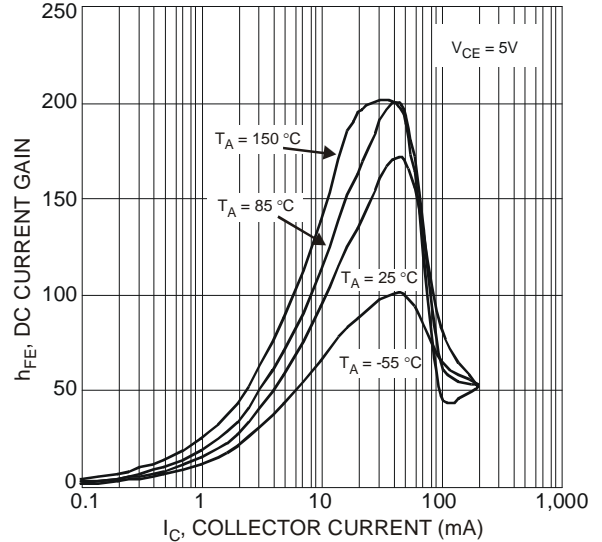


Fig. 2 Typical DC Current Gain vs. Collector Current

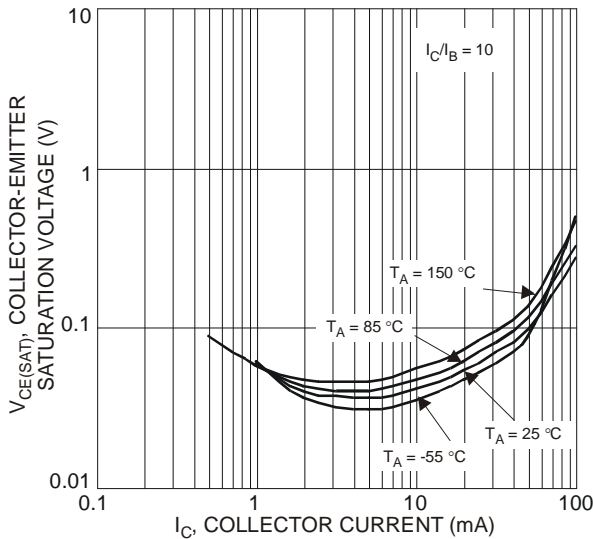


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

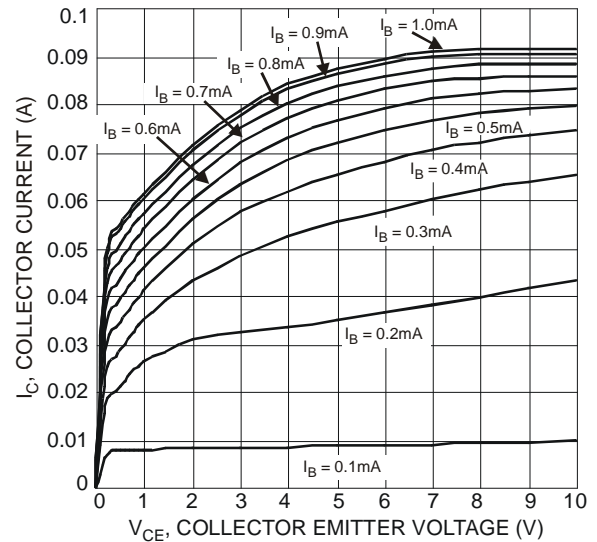


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

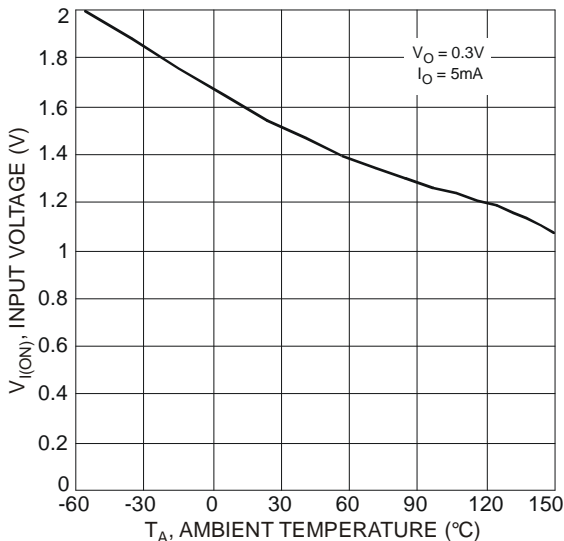


Fig. 5 Typical Input Voltage vs. Ambient Temperature

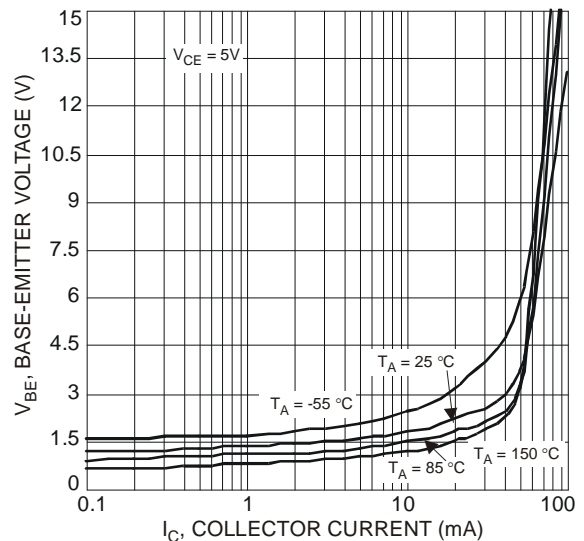


Fig. 6 Typical Base-Emitter Voltage vs. Collector Current



DDTC114ELP

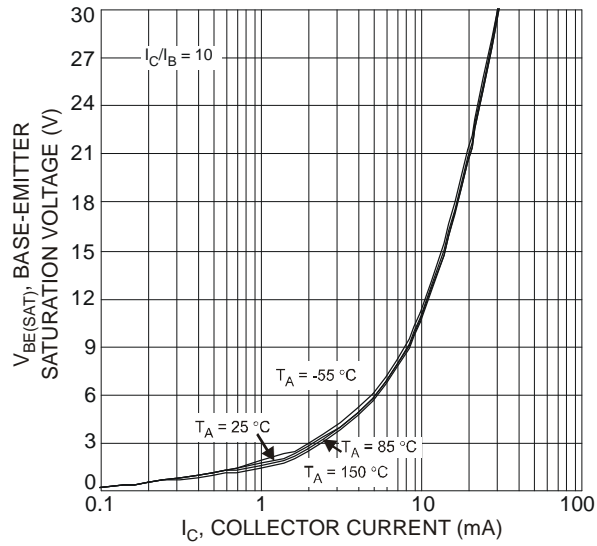
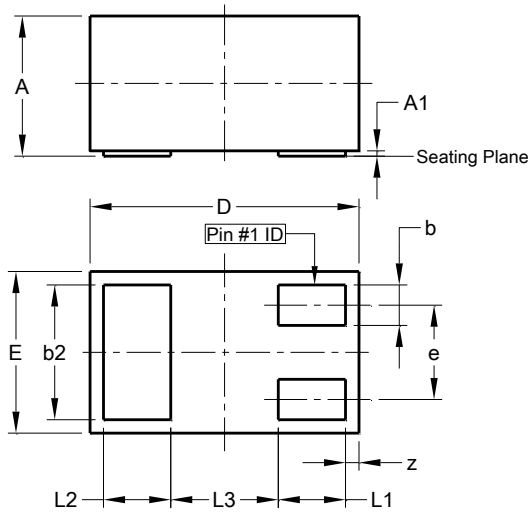


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

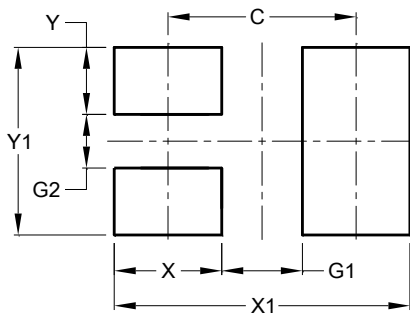
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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