NPN PRE-BIASED SMALL-SIGNAL TRANSISTORS IN U-DFN1006-3

Features

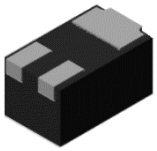
- Built-In Biasing Resistors, R1 = R2
- P_D = 0.89W Power Dissipation
- 0.6mm² Package Footprint, 13 Times Smaller than SOT23
- 0.5mm-High Package Minimizing Off-Board Profile
- Sidewall Tin Plating for Wettable Flanks in AOI
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ADTC144ELP4WQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

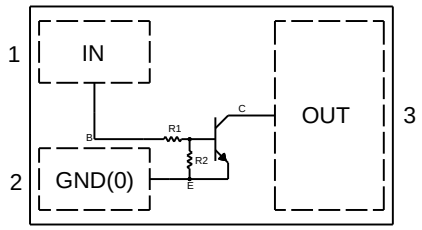
- Package: U-DFN1006-3
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.0008 grams (Approximate)

R1, R2 (NOM)
47kΩ

U-DFN1006-3/SWP
(Type UX)



Bottom View



Device Schematic

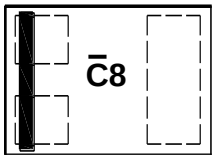
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ADTC144ELP4WQ-7	U-DFN1006-3/SWP (Type UX)	C8	7	8	3,000	Reel
ADTC144ELP4WQ-7B	U-DFN1006-3/SWP (Type UX)	C8	7	8	10,000	Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

U-DFN1006-3/SWP
(Type UX)



$\overline{C}8$ = See Ordering Information for Product Type Marking Code

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Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Supply Voltage <Pin: (3) to (2)>	V_{CC}	50	V
Input Voltage <Pin: (1) to (2)>	V_{IN}	-10 to +40	V
Output Current	I_O	100	mA
Output Current	I_C (Max)	100	mA

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.255	W
	(Note 6)		0.890	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	490	°C/W
	(Note 6)		140	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	49	°C/W
Operating and Storage and Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
5. For a device mounted on the minimum recommended pad layout of 2oz copper on a single-sided 1.6mm FR4 PCB; device is measured under still-air conditions whilst operating in steady-state condition.
6. Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
7. Thermal resistance from junction to solder-point (on the exposed collector pad).

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

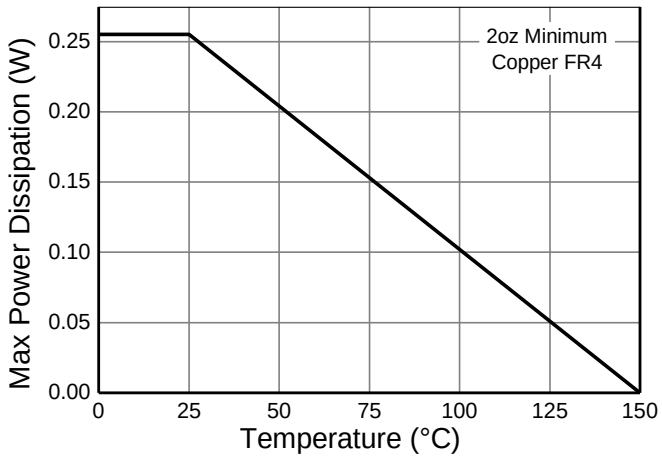


Fig.1 Derating Curve

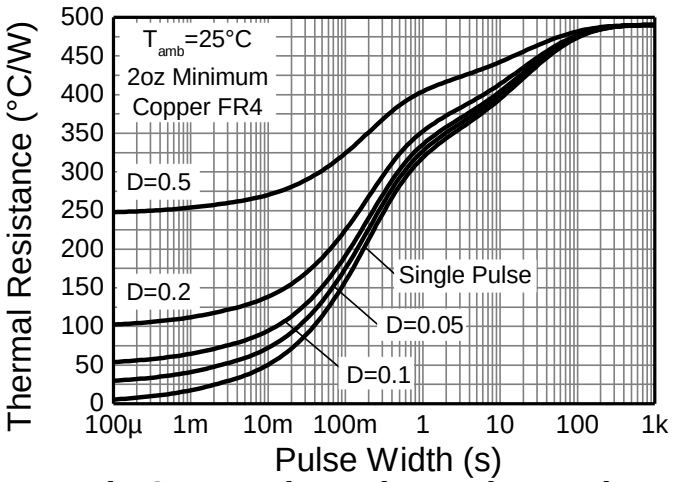


Fig.2 Transient Thermal Impedance

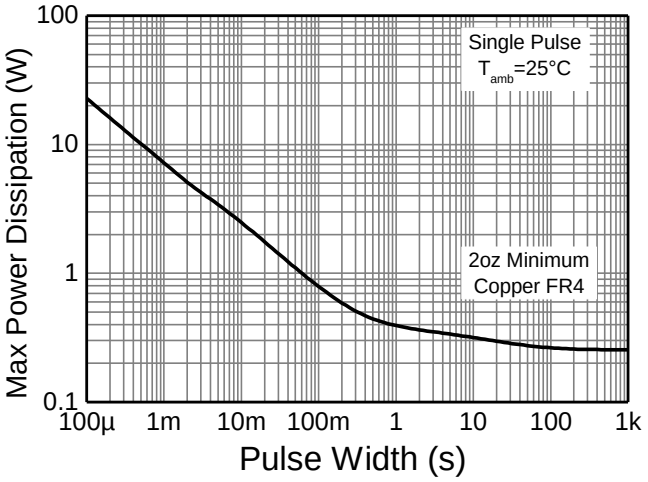


Fig.3 Pulse Power Dissipation

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Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$ (Note 8)	0.8	1.1	—	V	V_{CC} = 5V, I_O = 100µA
	$V_{I(on)}$ (Note 9)	—	1.4	3	V	V_O = 0.3V, I_O = 2mA
Output Voltage	$V_{O(on)}$	—	—	150	mV	I_O/I_I = 10mA/0.5mA
Input Current	I_I	—	—	0.18	mA	V_I = 5V
Output Current	$I_{O(off)}$	—	—	0.5	µA	V_{CC} = 50V, V_I = 0V
DC Current Gain	G_I	80	—	—	—	V_O = 5V, I_O = 5mA
Input Resistor Tolerance	ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance	$\Delta R_2/R_1$	0.8	1	1.2	%	—
Gain-Bandwidth Product (Note 10)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Notes: 8. Guarantees that the device will be switched OFF if the Input Voltage is less than 0.8V.
9. Guarantees that the device will be switched ON if the Input Voltage is more than 3V.
10. Transistor - For Reference Only.

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Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

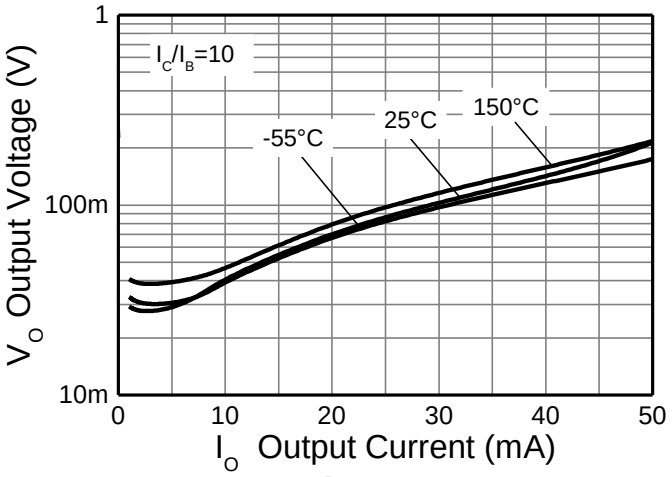


Fig.4 V_o v I_o

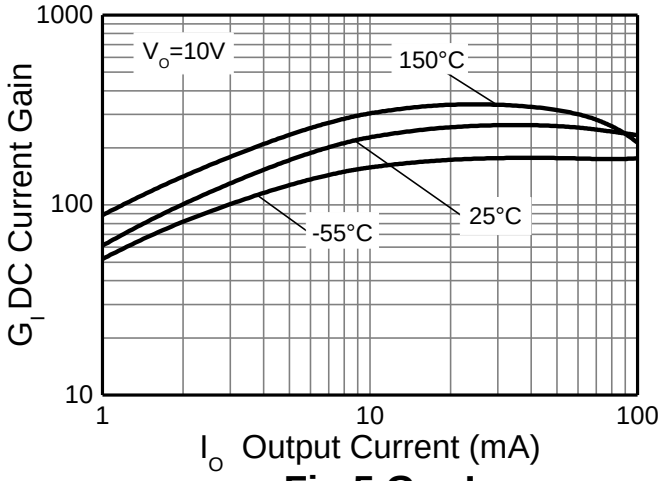


Fig.5 G_I v I_o

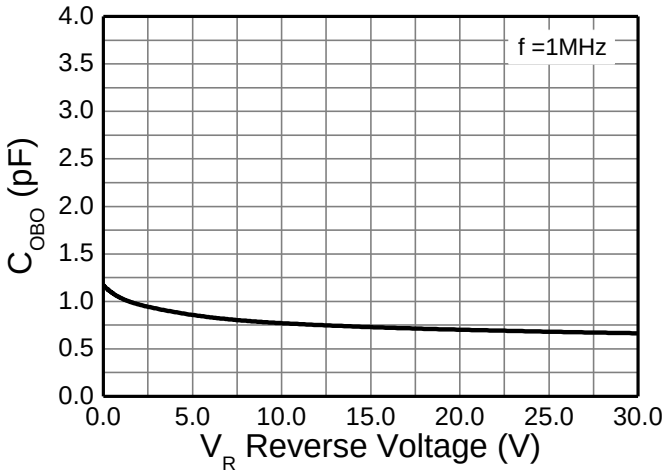


Fig.6 Output Capacitance

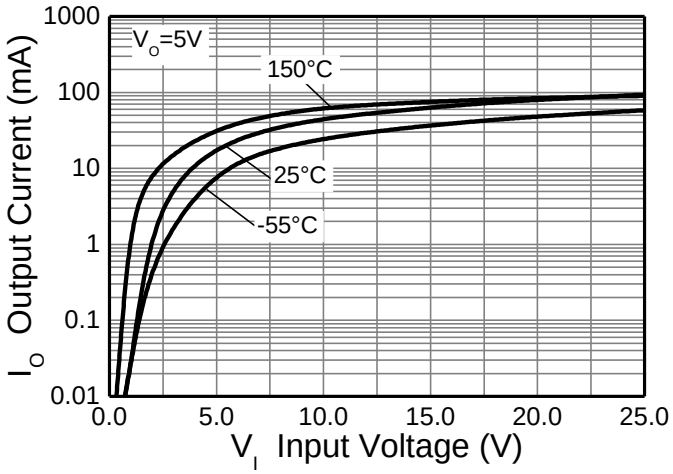


Fig.7 I_o v V_I

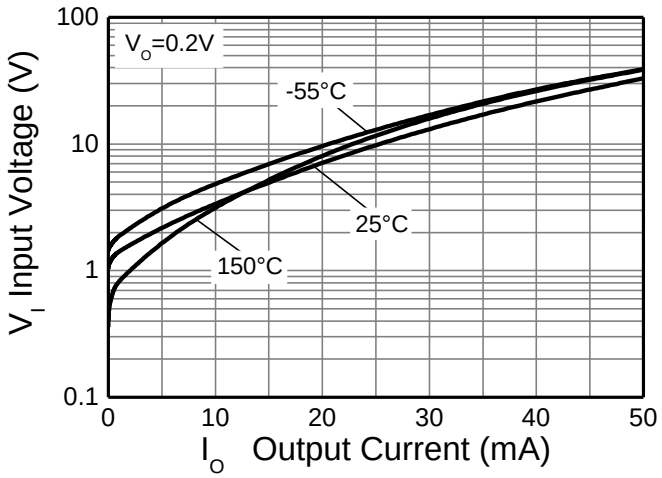


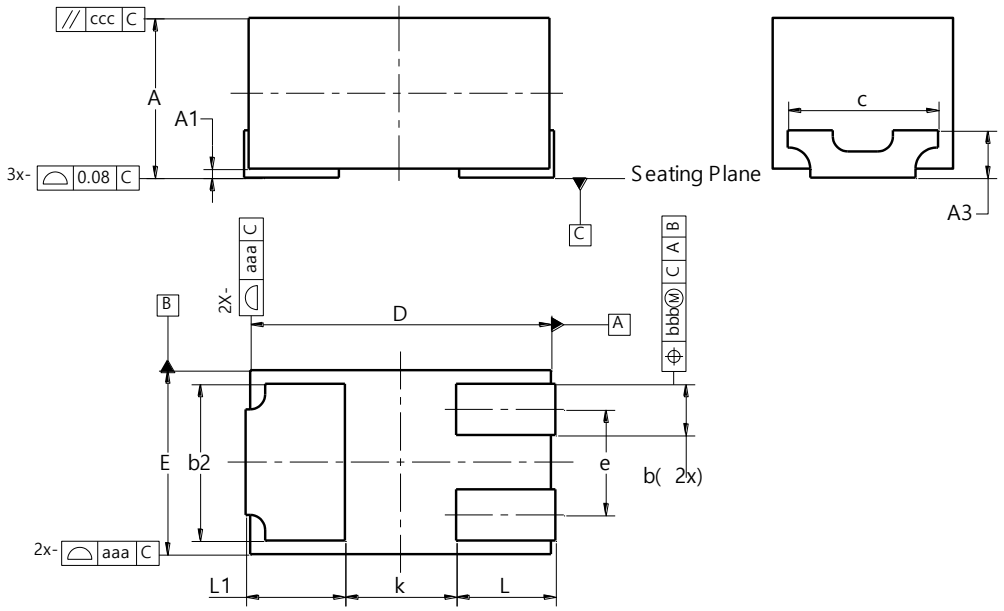
Fig.8 V_I v I_o

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN1006-3/SWP (Type UX)

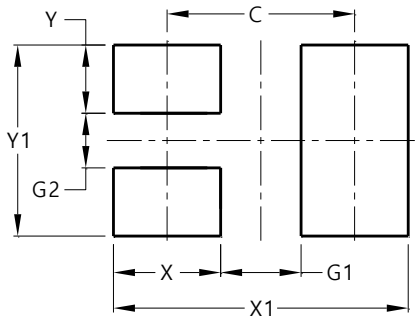


U-DFN1006-3/SWP (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
A3	0.17 REF		
b	0.12	0.22	0.17
b2	0.47	0.57	0.52
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	--	--	0.35
k	0.37 REF		
L	0.28	0.38	0.33
L1	0.28	0.38	0.33
c	0.50 REF		
aaa	0.15		
bbb	0.05		
ccc	0.05		
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

U-DFN1006-3/SWP (Type UX)



Dimensions	Value (in mm)
C	0.700
G	0.300
G1	0.200
X	0.400
X1	1.100
Y	0.250
Y1	0.700

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