50V NPN SMALL-SIGNAL TRANSISTOR IN X1-DFN1006-3

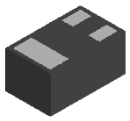
Features

- BV_{CEO} > 50V
- I_C = 100mA High Collector Current
- P_D = 1000mW Power Dissipation
- 0.60mm² Package Footprint, 13 Times Smaller than SOT23
- 0.5mm Height Package Minimizing Off-Board Profile
- Complementary PNP Type: 2DA1774QLP
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free, "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**

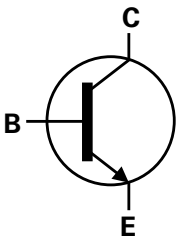
Mechanical Data

- Package: X1-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 — NiPdAu. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0009 grams (Approximate)

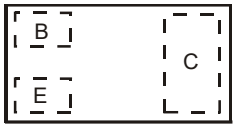
X1-DFN1006-3



Bottom View



Device Symbol



Top View
Device Schematic

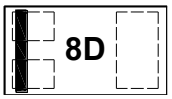
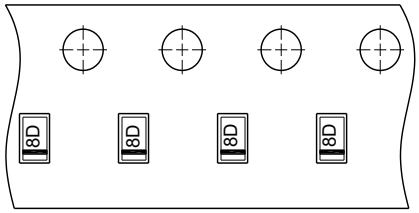
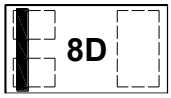
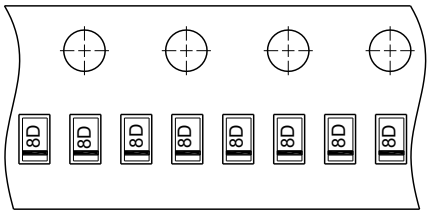
Ordering Information (Note 4)

Orderable Part Number	Package	Marking Code	Reel Size (Inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
2DC4617QLP-7	X1-DFN1006-3	8D	7	8	3,000	Reel
2DC4617QLP-7B	X1-DFN1006-3	8D	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/.

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Marking Information

2DC4617QLP-7	 8D = Product Type Marking Code Top View Bar Denotes Base and Emitter Side 
2DC4617QLP-7B	 8D = Product Type Marking Code Top View Bar Denotes Base and Emitter Side 

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	100	mA
Peak Collector Current	I_{CM}	200	mA

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

Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	400	mW
	(Note 6)		1000	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	310	°C/W
	(Note 6)		120	
Thermal Resistance, Junction to Lead	(Note 7)	$R_{\theta JL}$	120	°C/W
Operating and Storage and Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

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

Characteristic	Symbol	Min	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)					
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	V	I_C = 50µA
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5.0	—	V	I_E = 50µA
Collector Cutoff Current	I_{CBO}	—	100 5	nA µA	V_{CB} = 30V V_{CB} = 30V, T_A = +150°C
Emitter Cutoff Current	I_{EBO}	—	100	nA	V_{EB} = 4V
ON CHARACTERISTICS (Note 9)					
DC Current Gain	h_{FE}	120	270	—	V_{CE} = 6V, I_C = 1mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	0.2	V	I_C = 50mA, I_B = 5mA
SMALL-SIGNAL CHARACTERISTICS					
Output Capacitance	C_{obo}	—	3.5	pF	V_{CB} = 12V, f = 1.0MHz, I_E = 0
Current Gain-Bandwidth Product	f_T	100	—	MHz	V_{CE} = 12V, I_C = 2mA, f = 100MHz

Notes:
5. For the device mounted on minimum recommended pad layout 2oz copper that is 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).
8. Refer to JEDEC specifications JESD22-A114 and JESD22-A115.
9. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

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

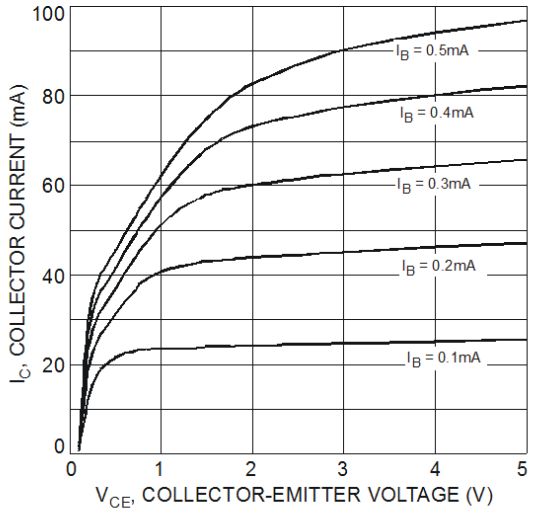


Fig. 1 Typical Collector Current
vs. Collector-Emitter Voltage

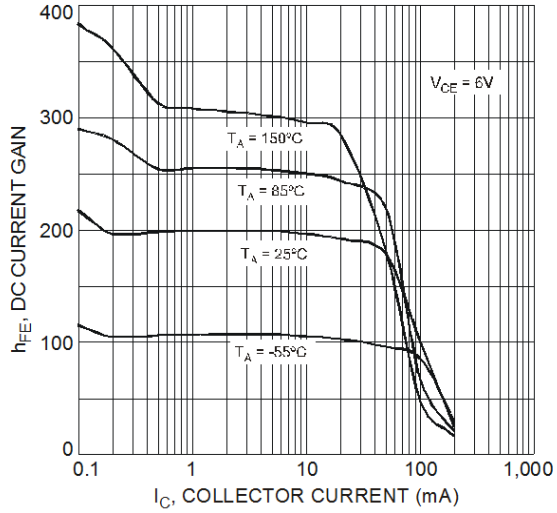


Fig. 2 Typical DC Current Gain
vs. Collector Current

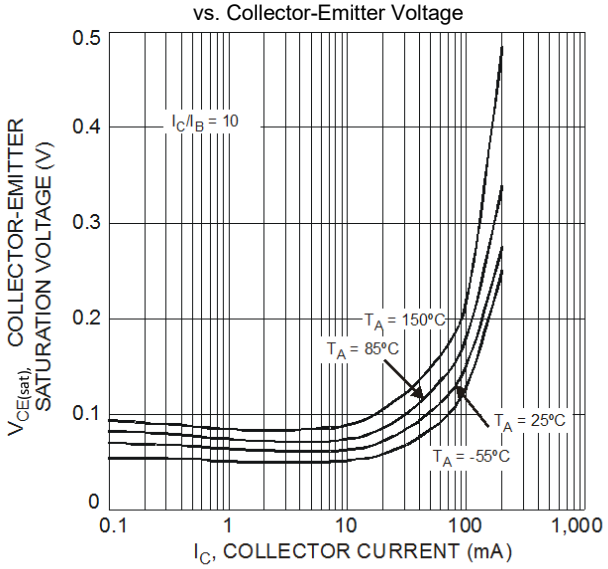


Fig. 3 Typical Collector-Emitter Saturation Voltage
vs. Collector Current

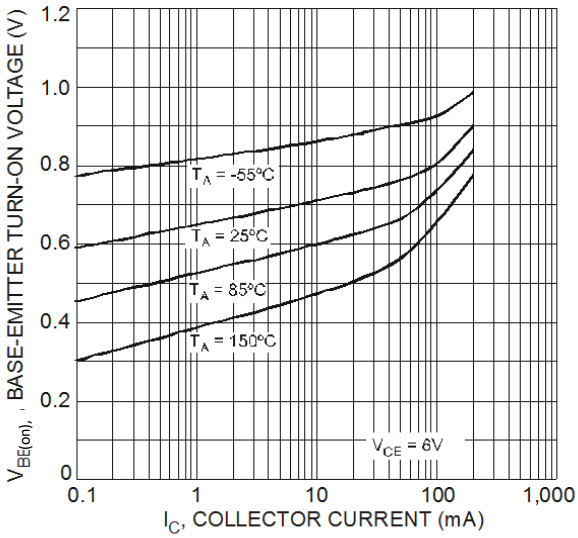


Fig. 4 Typical Base-Emitter Turn-On Voltage
vs. Collector Current

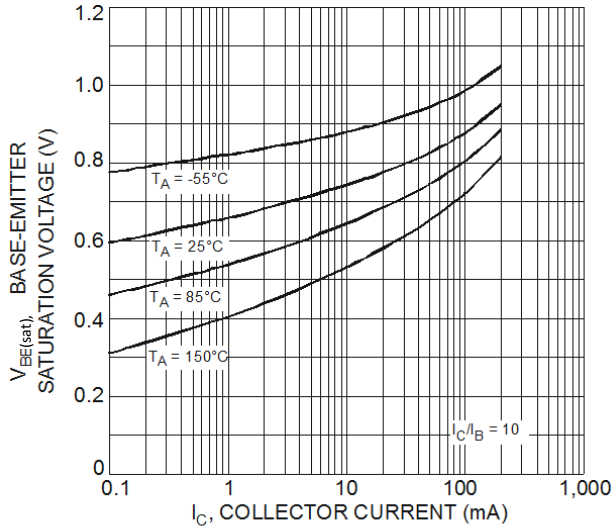


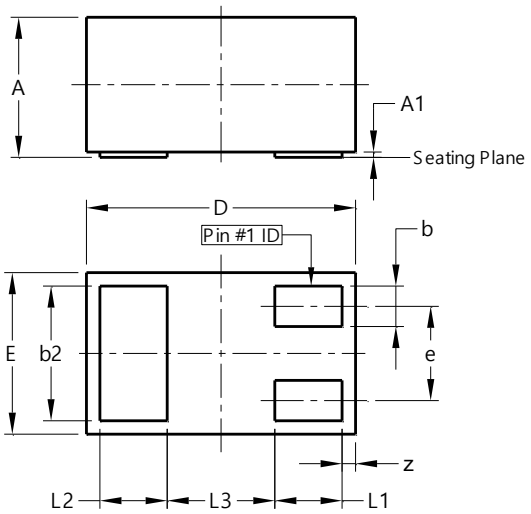
Fig. 5 Typical Base-Emitter Saturation Voltage
vs. Collector Current

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Package Outline Dimensions

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

X1-DFN1006-3

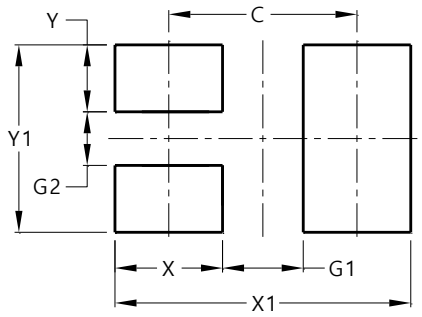


X1-DFN1006-3			
Dim	**Min**	**Max**	**Typ**
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
All Dimensions in mm			

Suggested Pad Layout

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

X1-DFN1006-3



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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