

## Features

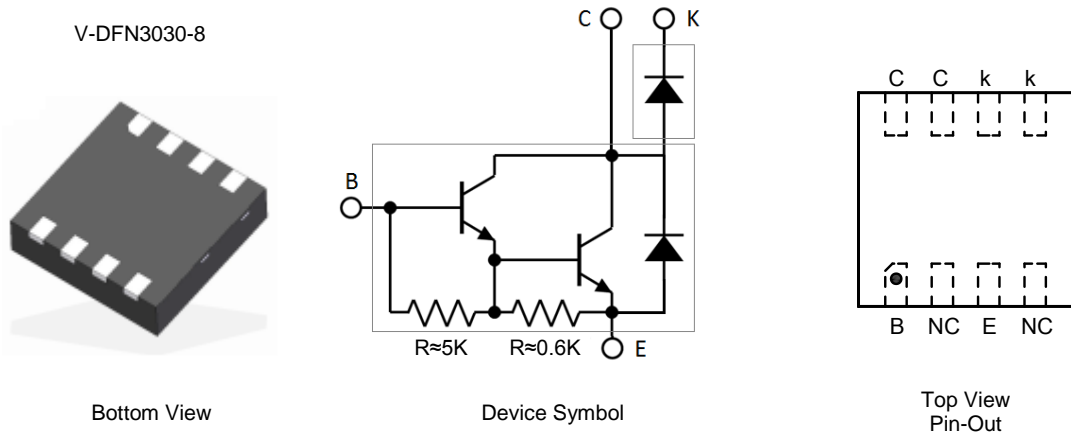
- Combination of 120V NPN Darlington Transistor and 120V Rectifier Diode
- High Current Gain:  $h_{FE} = 2000\text{min}$  @  $V_{CE} = 2V$ ,  $I_C = 1A$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Application

- Printer Head Driver

## Mechanical Data

- Case: V-DFN3030-8
- UL Flammability Rating 94V-0
- Case Material: Molded Plastic. "Green" Molding Compound. Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.02 grams (Approximate)

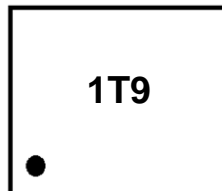


## Ordering Information (Note 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXPD4000DH-7	1T9	7	8	3,000

- 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



1T9 = Product Type Marking Code

**BJT Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	120	V
Emitter-Base Voltage	V <sub>EBO</sub>	8	V
Continuous Collector Current	I <sub>C</sub>	2	A
Peak Collector Current	I <sub>CP</sub>	3	A
Base Current	I <sub>B</sub>	0.5	A

**Diode Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Repetitive Peak Reverse Voltage	V <sub>RRM</sub>	120	V
Average Current	I <sub>F(AV)</sub>	1	A
Non-Repetitive Peak Forward Current (Surge Current), 1 Cycle (50Hz)	I <sub>FSM</sub>	15	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	0.9	W
Power Dissipation (Note 6)	P <sub>D</sub>	0.72	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	139	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	172	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 7)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

- Notes:
5. For a device surface mounted on 25mm X 25mm X 1.6mm FR-4 PCB with high coverage of single sided 1 oz copper, in still air conditions.
  6. Same as Note 5, except the device is mounted on minimum recommended pad layout.
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

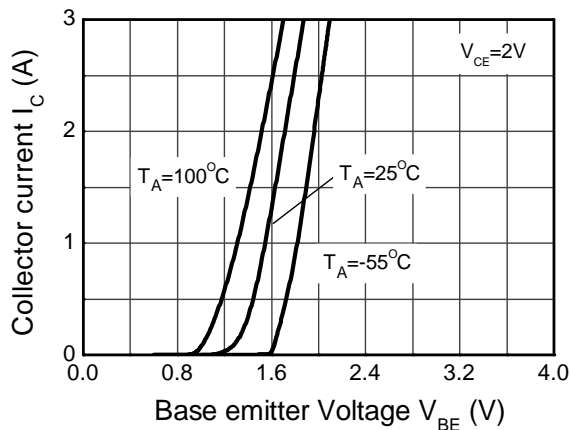
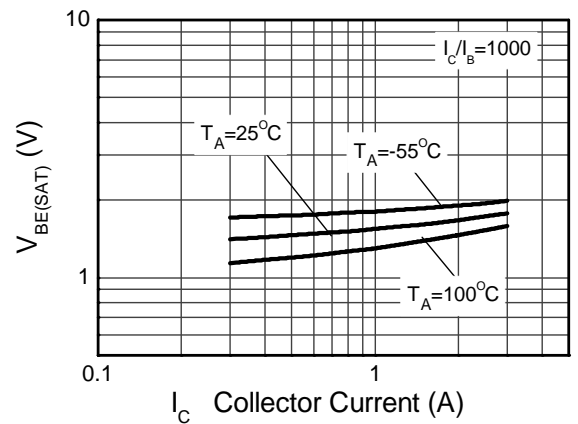
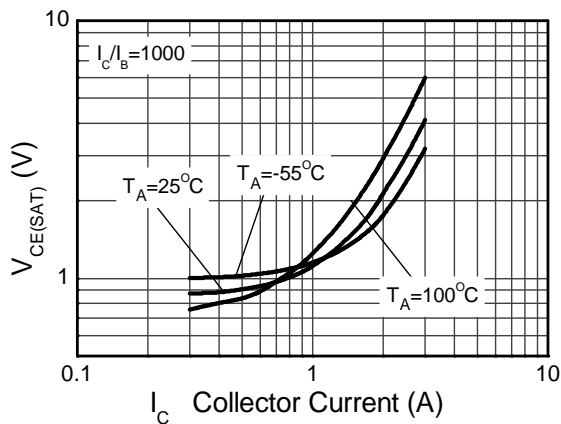
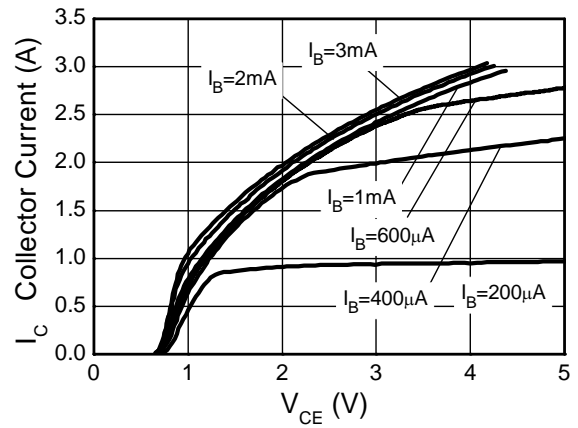
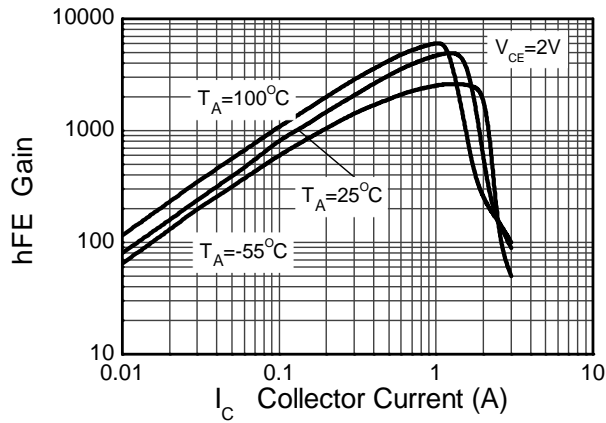
**BJT Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector Cutoff Current	I <sub>CBO</sub>	-	-	10	μA	V <sub>CB</sub> = 120V, I <sub>E</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>	1	-	2.67	mA	V <sub>EB</sub> = 8V, I <sub>C</sub> = 0
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	120	-	-	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0
DC Current Gain	h <sub>FE</sub>	2000	-	9000	-	V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	-	1.5	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 1mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	-	-	2	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 1mA
Output Capacitance	C <sub>obo</sub>	-	12	-	pF	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz
Delay Time	t <sub>D</sub>	-	0.34	-	μs	V <sub>CC</sub> = 30V, R <sub>L</sub> = 30Ω, I <sub>B1</sub> = -I <sub>B2</sub> = 1mA
Rise Time	t <sub>R</sub>	-	1.8	-	μs	
Storage time	t <sub>STG</sub>	-	0.2	-	μs	
Fall Time	t <sub>F</sub>	-	0.15	-	μs	

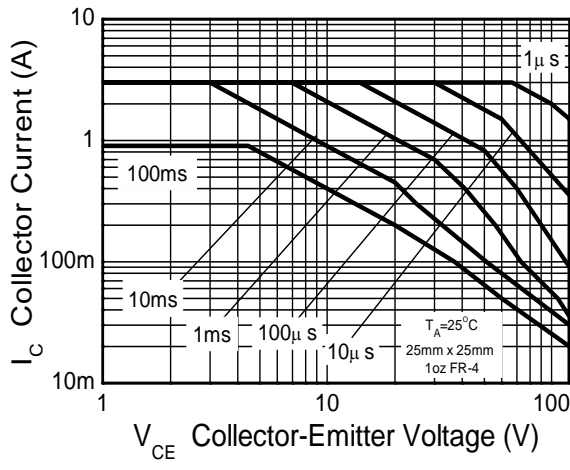
**Diode Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Peak Forward Voltage	V <sub>FM</sub>	-	-	0.98	V	I <sub>FM</sub> = 1 A
Reverse Leakage Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> = 120V
Reverse Recovery Time	t <sub>RR</sub>	-	300	450	ns	I <sub>F</sub> = 1A, di/dt = -20A/μs
Forward Recovery Time	t <sub>FR</sub>	-	150	300	ns	I <sub>F</sub> = 1A

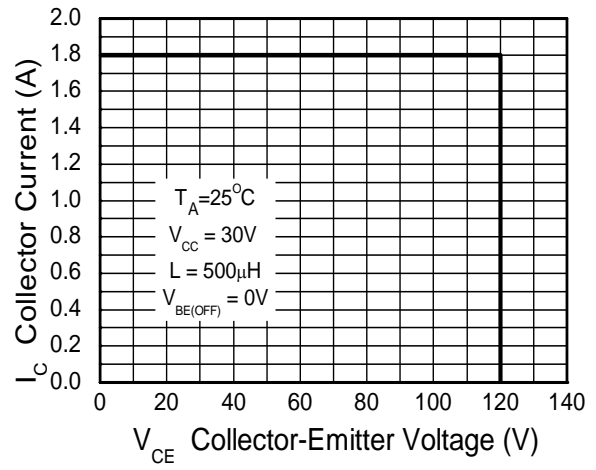
**BJT Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



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**Forward Bias Safe operating Area**

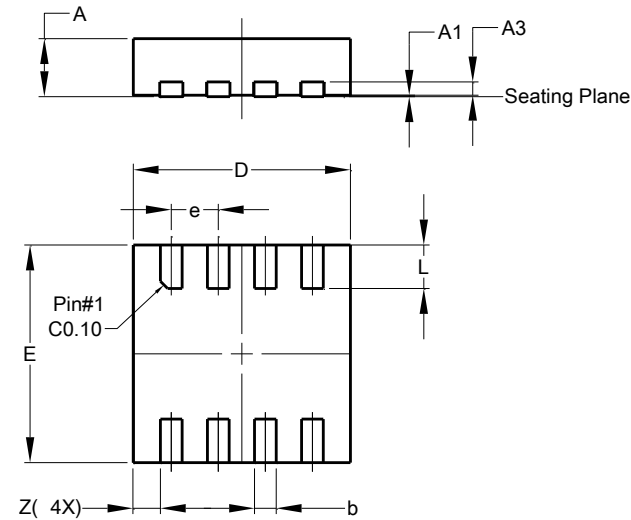


**Reverse Bias Safe operating Area**

**Package Outline Dimensions**

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

**V-DFN3030-8**

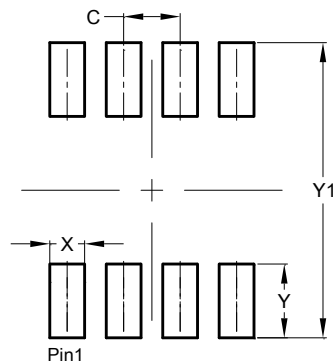


V-DFN3030-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.25	0.35	0.30
D	2.95	3.05	3.00
E	2.95	3.05	3.00
e	-	-	0.65
L	0.55	0.65	0.60
Z	-	-	0.375
All Dimensions in mm			

**Suggested Pad Layout**

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

**V-DFN3030-8**



Dimensions	Value (in mm)
C	0.650
X	0.400
Y	0.850
Y1	3.400

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