

## Features

- $BV_{CEO} > 530V$
- $BV_{CES} > 900V$
- $BV_{EBO} > 10V$
- $I_C = 1.5A$  high Continuous Collector Current
- High Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

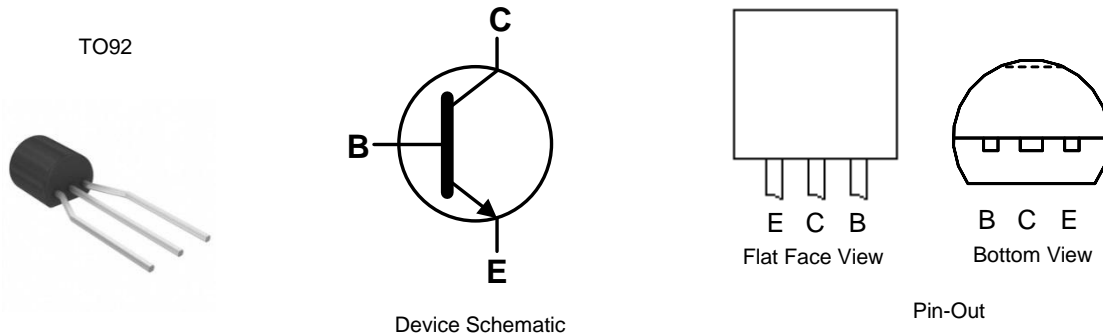
## Applications

Low Power AC-DC SMPS for:

- Battery Chargers for Mobile Phone / Tablets / Smartphones
- Power Supply for DVD / STB
- LED Lighting

## Mechanical Data

- Case: TO92
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 200mg (Approximate)

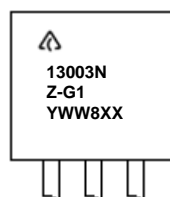


## Ordering Information (Note 4)

Product	Package	Marking	Quantity
APT13003NZTR-G1	TO92 (Joggled Legs)	13003NZ-G1	2,000 Taped, per Ammo Box

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. 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.
  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/products/packages.html>.

## Marking Information



Flat Face View

= Manufacturers' Code Marking  
 13003NZ-G1 = Product Type Marking ID  
 YWW = Date Code Marking  
 e.g. 512 = Year 2015, Week 12.  
 8 = Assembly Site Code  
 XX = Batch Number

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

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage (V <sub>BE</sub> = 0V)	V <sub>CES</sub>	900	V
Collector-Emitter Voltage	V <sub>CEO</sub>	530	V
Emitter-Base Voltage	V <sub>EBO</sub>	10	V
Continuous Collector Current	I <sub>C</sub>	1.5	A
Peak Pulse Collector Current	I <sub>CM</sub>	3	A
Continuous Base Current	I <sub>B</sub>	0.75	A
Peak Pulse Base Current	I <sub>BM</sub>	1.5	A

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

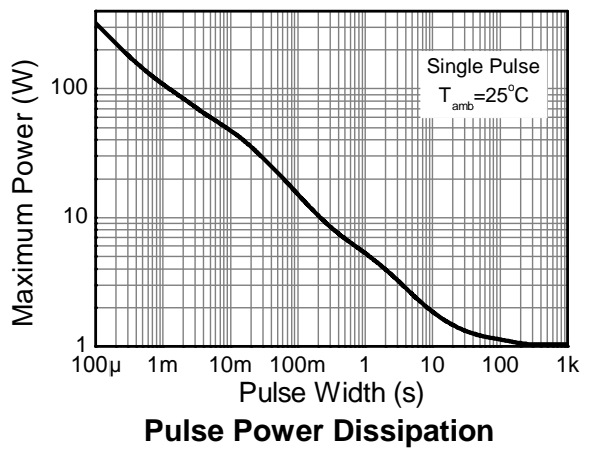
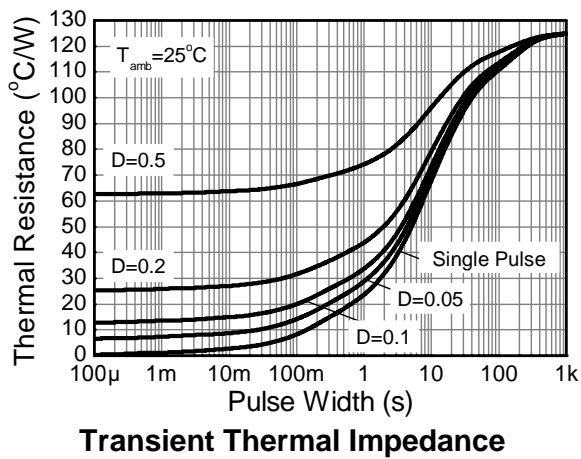
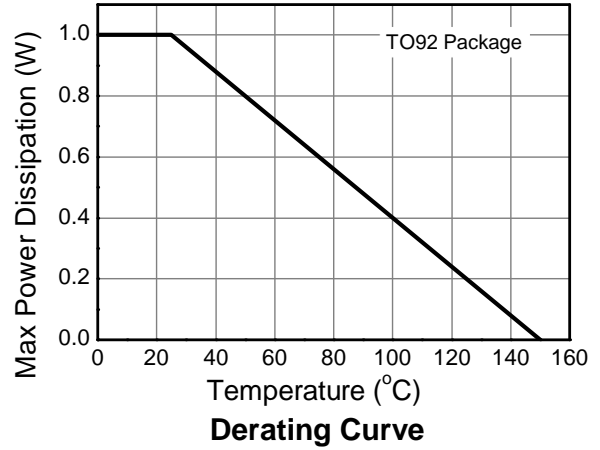
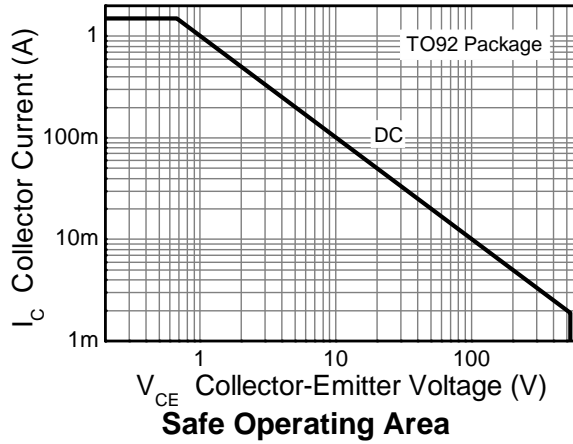
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	1.0	W
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	125	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	83.3	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 5)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8,000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Note: 5. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

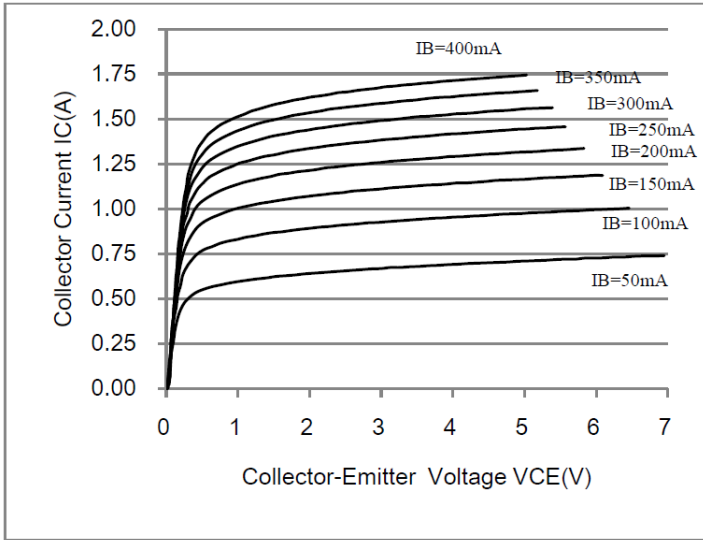


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

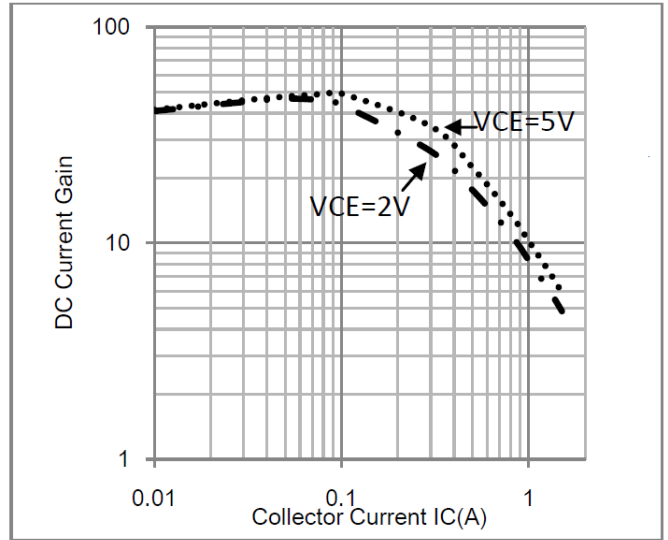
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>	900	—	—	V	I <sub>C</sub> = 100μA, V <sub>BE</sub> = 0V
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	530	—	—	V	I <sub>C</sub> = 100μA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	10	—	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CEV</sub>	—	—	10	μA	V <sub>CE</sub> = 900V
DC Current Transfer Static Ratio (Note 6)	h <sub>FE</sub>	15 5	17 —	30 25	— —	I <sub>C</sub> = 0.5A, V <sub>CE</sub> = 2V I <sub>C</sub> = 1.0A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 6)	V <sub>CE(SAT)</sub>	— —	0.17 0.30	0.3 0.4	V	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 0.1A I <sub>C</sub> = 1A, I <sub>B</sub> = 0.25A
Base-Emitter Saturation Voltage (Note 6)	V <sub>BE(SAT)</sub>	— —	— —	1.0 1.2	V	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 0.1A I <sub>C</sub> = 1A, I <sub>B</sub> = 0.25A
Transition Frequency	f <sub>T</sub>	4	—	—	MHz	I <sub>C</sub> = 0.1A, V <sub>CE</sub> = 10V
Turn-on Time with Resistive Load	t <sub>ON</sub>	—	—	1	μs	I <sub>C</sub> = 1A, V <sub>CC</sub> = 125V, I <sub>B1</sub> = 0.2A, I <sub>B2</sub> = -0.2A, t <sub>p</sub> = 25μs
Storage Time with Resistive Load	t <sub>S</sub>	—	—	3.5		
Fall Time with Resistive Load	t <sub>F</sub>	—	—	0.65		

Note: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

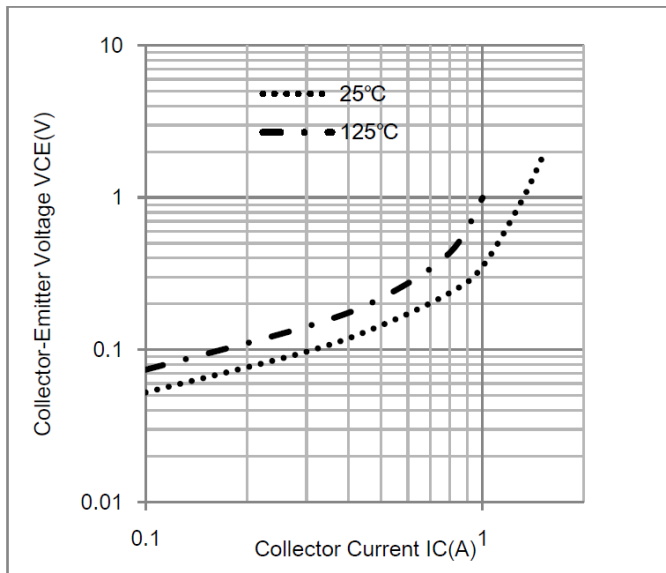
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



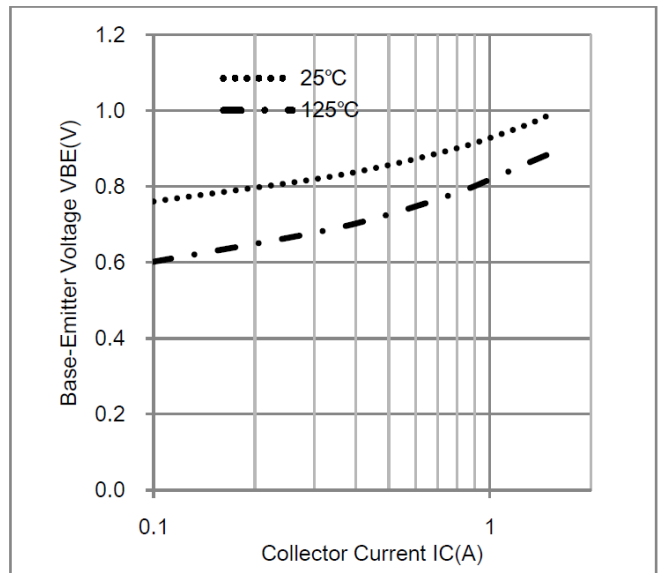
Static Characteristics



DC Current Gain



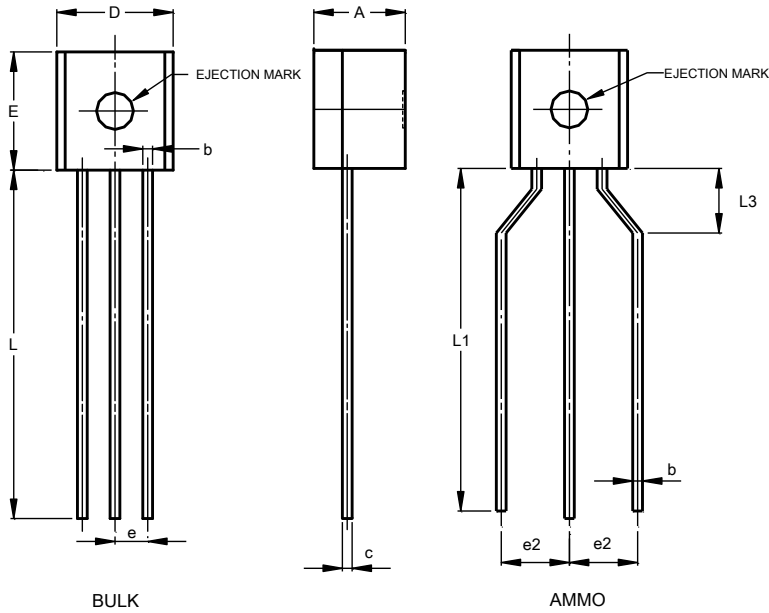
Collector-Emitter Saturation Region



Base-Emitter Saturation Voltage

**Package Outline Dimensions**

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



TO92 Type C			
Dim	Min	Max	Typ
A	3.30	3.70	-
A2	1.00	1.40	-
b	0.36	0.76	-
c	0.32	0.51	-
D	4.40	4.80	-
D1	3.430	-	-
E	4.30	4.70	-
e	-	-	1.27
e2	-	-	2.54
h	0.00	0.38	-
L	12.50	15.50	-
L1	12.50	14.50	-
L3	2.50	4.00	-
ø	-	1.60	-
All Dimensions in mm			

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to voltage spacing between terminals.

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