

**450V NPN HIGH VOLTAGE POWER TRANSISTOR**

**Features**

- $BV_{CEO} > 450V$
- $BV_{CES} > 700V$
- $BV_{EBO} > 9V$
- $I_C = 1.3A$  High Continuous Collector Current
- **Lead-Free Finish; 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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

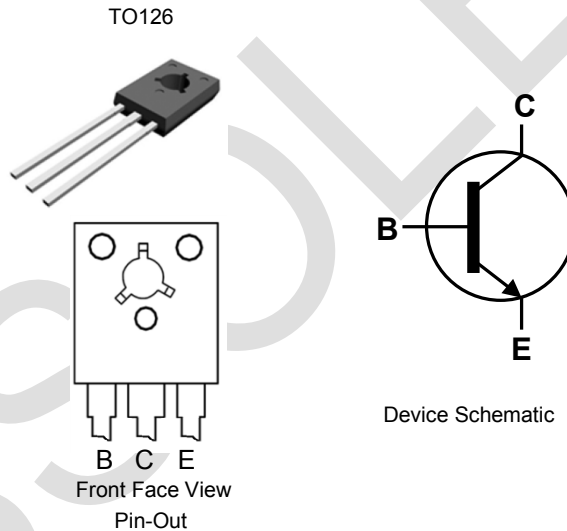
**Mechanical Data**

- Case: TO126
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 400mg (Approximate)

**Applications**

Low Power AC-DC SMPS for:

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

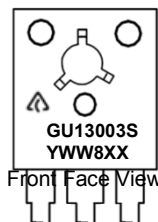


**Ordering Information** (Note 4)

Product	Package	Marking	Quantity
APT13003SU-G1	TO126	GU13003S	4000 Bulk, Loose per 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**



- ▲ = Manufacturers' code marking
- GU13003S = Product Type Marking ID
- YWW = Date Code Marking  
e.g. 312 = Year 2013, 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>	700	V
Collector-Emitter Voltage	V <sub>CEO</sub>	450	V
Emitter-Base Voltage	V <sub>EBO</sub>	9	V
Continuous Collector Current	I <sub>C</sub>	1.3	A
Peak Pulse Collector Current (Note 5)	I <sub>CM</sub>	2.6	A
Continuous Base Current	I <sub>B</sub>	0.65	A
Peak Pulse Base Current (Note 5)	I <sub>BM</sub>	1.3	A

Note: 5. Pulse test for Pulse Width < 5ms, Duty Cycle ≤ 10%.

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

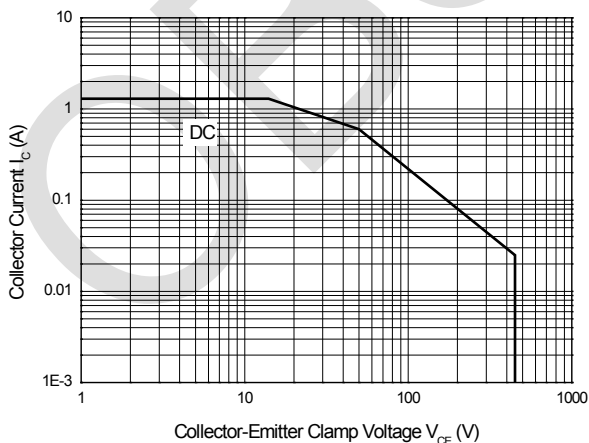
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	20	W
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	96	°C/W
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	6.25	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-65 to +150	°C

**ESD Ratings** (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	8000	V	3B
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

Note: 6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Safe Operating Area and Derating Information** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



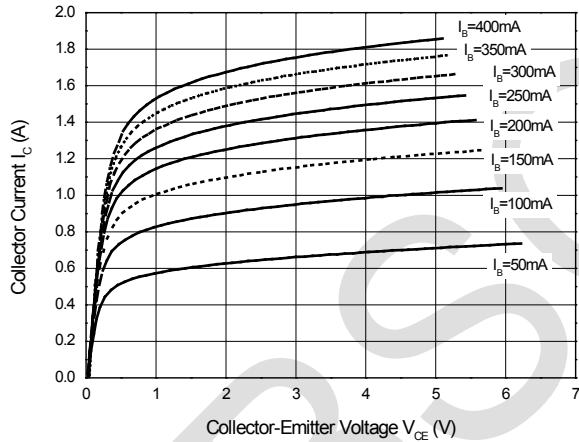
Safe Operating Areas (TO126 Package)

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

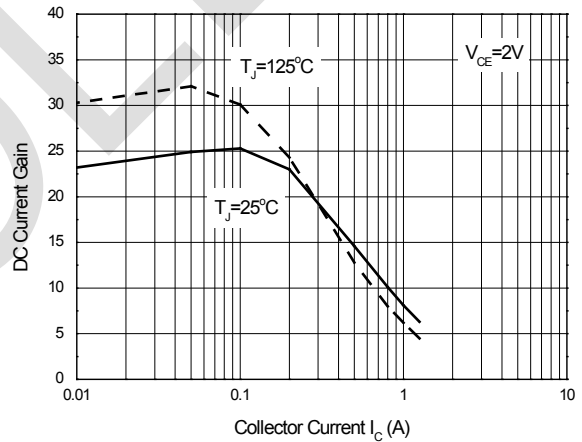
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	$BV_{CES}$	700	—	—	V	$I_C = 100\mu\text{A}$ , $V_{BE} = 0\text{V}$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	450	—	—	V	$I_C = 100\mu\text{A}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	9	—	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{CEV}$	—	—	10	$\mu\text{A}$	$V_{CE} = 700\text{V}$ , $V_{BE} = -1.5\text{V}$
DC Current Transfer Static Ratio (Note 7)	$h_{FE}$	13	—	30	—	$I_C = 0.5\text{A}$ , $V_{CE} = 2\text{V}$ $I_C = 1.0\text{A}$ , $V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(sat)}$	—	—	0.3	V	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$ $I_C = 1\text{A}$ , $I_B = 0.25\text{A}$
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	—	—	1.0	V	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$ $I_C = 1\text{A}$ , $I_B = 0.25\text{A}$
Transition Frequency	$f_T$	4	—	—	MHZ	$I_C = 0.1\text{A}$ , $V_{CE} = 10\text{V}$
Turn-on Time with Resistive Load	$t_{on}$	—	—	1	$\mu\text{s}$	$I_C = 1\text{A}$ , $V_{CC} = 125\text{V}$ , $I_{B1} = 0.2\text{A}$ , $I_{B2} = -0.2\text{A}$ , $t_p = 25\mu\text{s}$
Storage Time with Resistive Load	$t_s$	—	—	3		
Fall Time with Resistive Load	$t_f$	—	—	0.5		

Note: 7. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

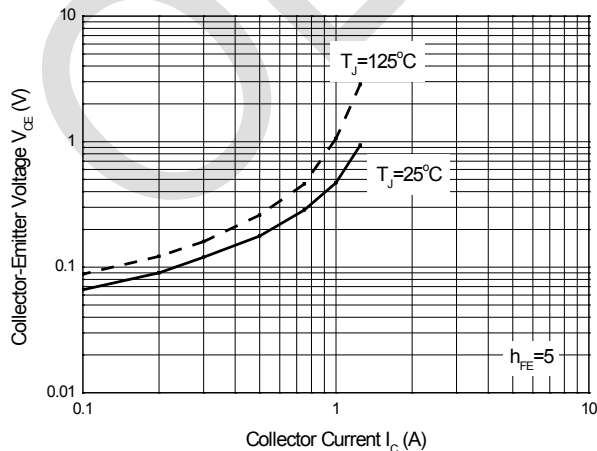
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



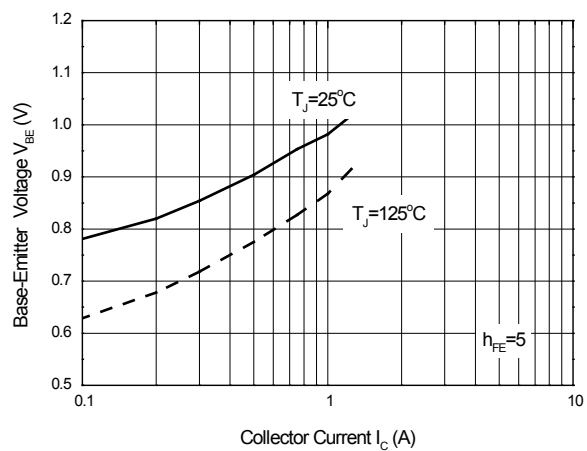
Static Characteristics



DC Current Gain



Collector-Emitter Saturation Voltage

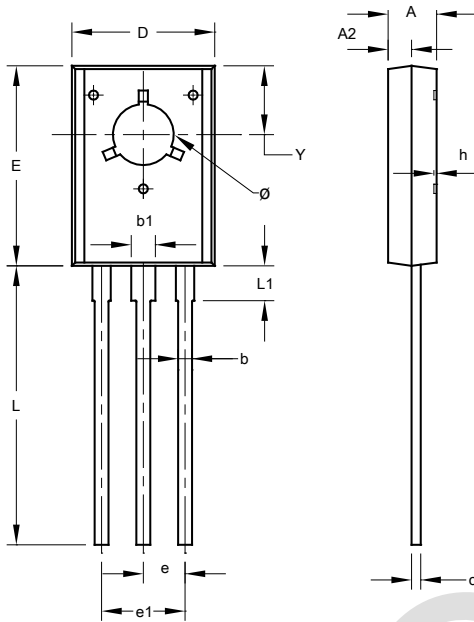


Base-Emitter Saturation Voltage

**Package Outline Dimensions**

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

TO126



TO126			
Dim	Min	Max	Typ
A	2.400	2.900	-
A2	1.060	1.500	-
b	0.660	0.860	-
b1	1.170	1.470	-
c	0.400	0.600	-
D	7.400	8.200	-
E	10.60	11.20	-
e	-	-	2.280
e1	-	-	4.560
h	0.00	0.30	-
L	14.50	15.90	-
L1	1.700	2.100	-
Y	3.600	3.900	-
ø	3.100	3.550	-
All Dimensions in mm			

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

OBSOLETE - PART DISCONTINUED

OBSOLETE

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