

## Features

- $BV_{CEO} > 450V$
- $BV_{CES} > 700V$
- $BV_{EBO} > 9V$
- $I_C = 1.5A$  high Continuous Collector Current
- Integrated Collector-Emitter Diode to act as free-wheeling diode
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Applications

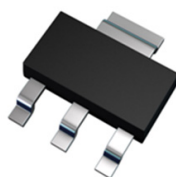
Low power AC-DC SMPS for:

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

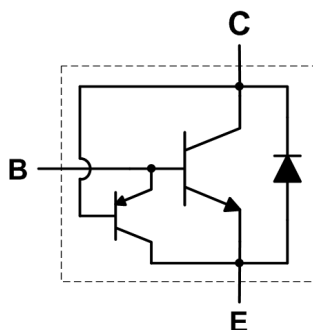
## Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic. "Green" Molding Compound  
UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per  
MIL-STD-202, Method 208 @3
- Weight: 0.112 grams (approximate)

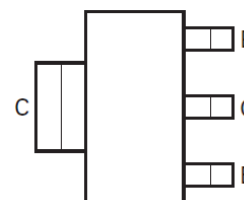
SOT223



Top View



Device Schematic



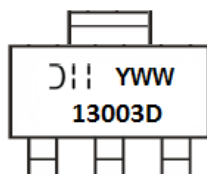
Top View  
Pin-Out

## Ordering Information (Note 4)

Product	Package	Marking	Tape Width (mm)	Quantity
DXT13003DG-13	SOT223	DXT13003D	12	2,500

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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



13003D = Product Type Marking Code  
YWW = Date Code Marking  
Y = Last Digit of the Year (ex: 3 =2013)  
WW = Week Code 01-52

## 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	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.)

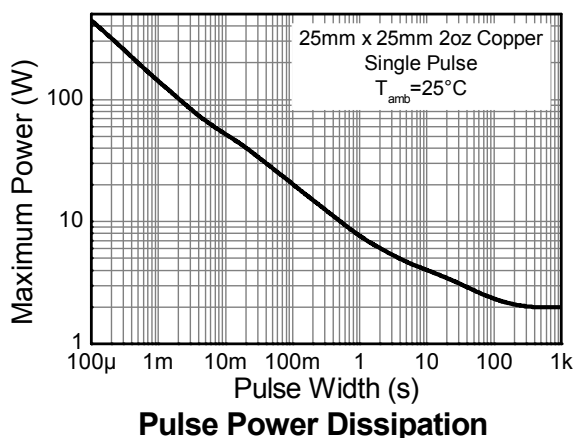
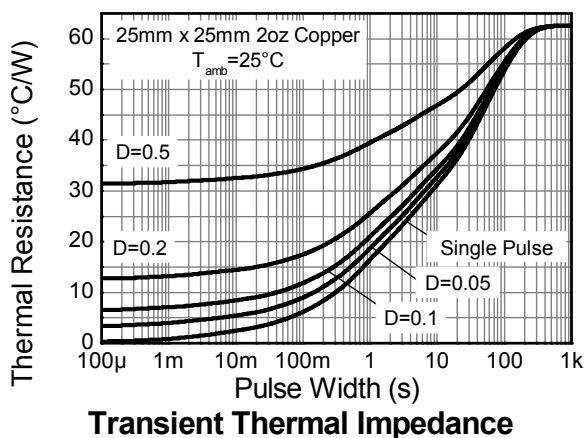
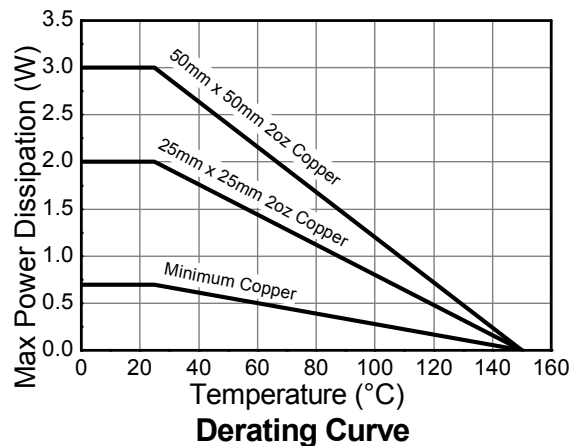
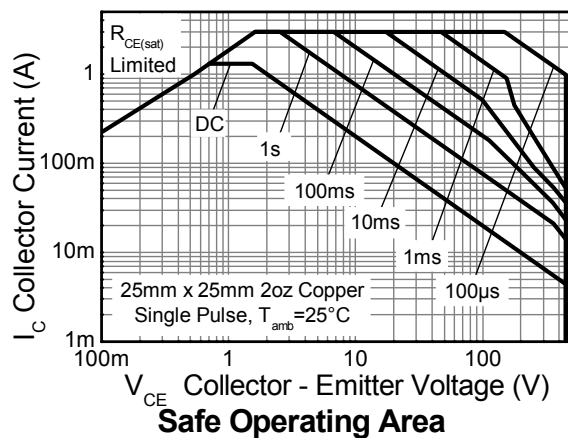
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	3	W
		2	
		0.7	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	42	°C/W
	R <sub>θJA</sub>	62.5	
	R <sub>θJA</sub>	178	
Thermal Resistance Junction to Lead	R <sub>θJL</sub>	17	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

## ESD Ratings (Note 9)

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

- Notes:
- For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as note (5), except the device is mounted on 25mm x 25mm 2oz copper.
  - Same as note (5), except the device is mounted on minimum recommended pad layout.
  - Thermal resistance from junction to solder-point (at the end of the collector lead).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

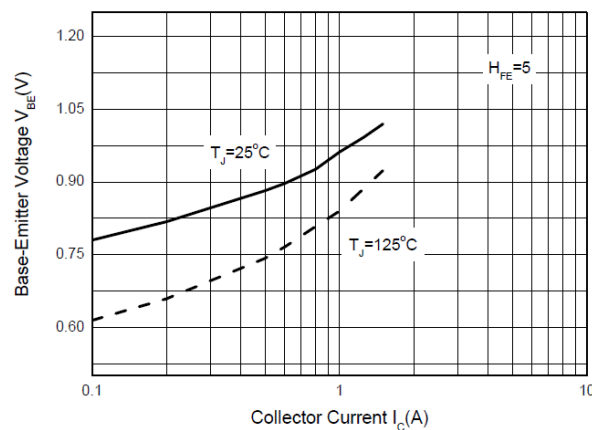
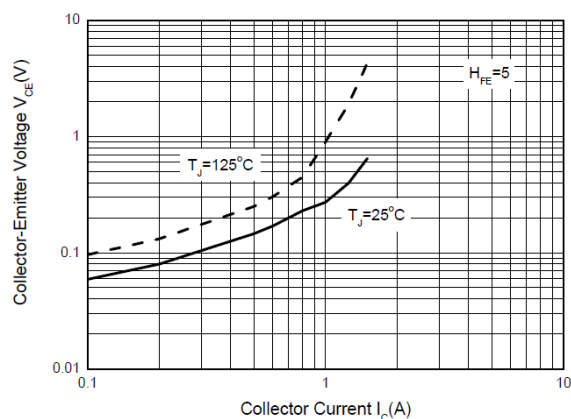
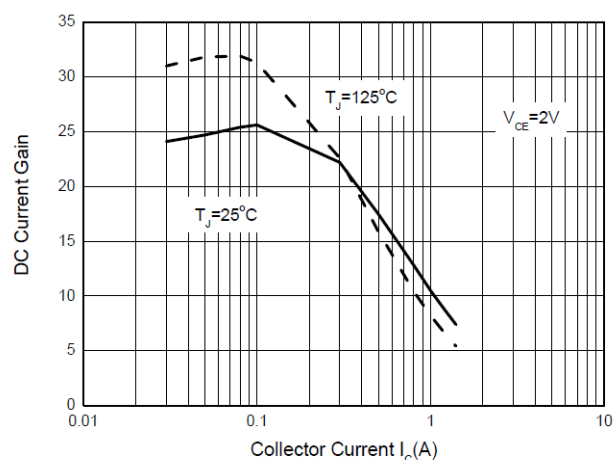
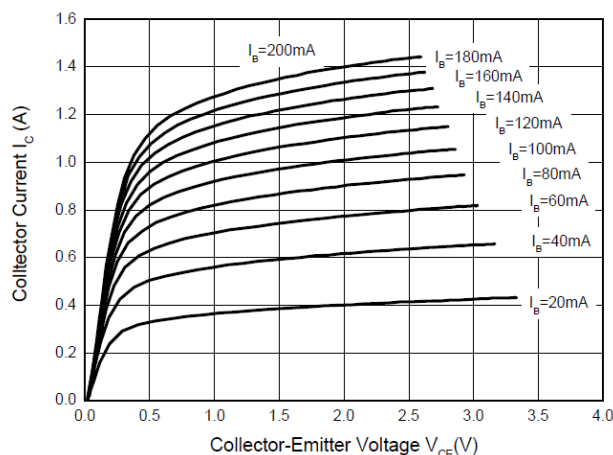
**Safe Operating Areas and Derating Information** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



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

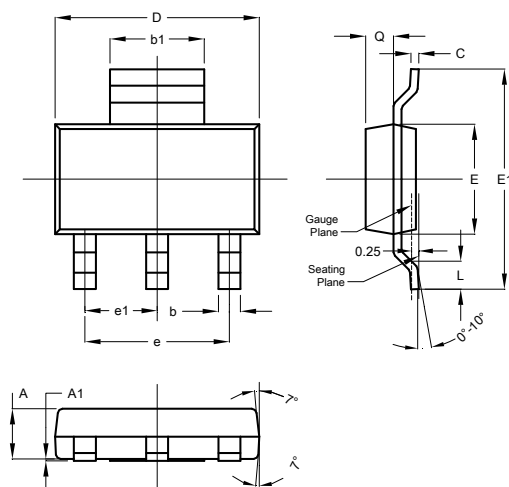
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	$BV_{CES}$	700	—	—	V	$I_C = 100\mu\text{A}$ , $V_{BE} = 0\text{V}$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	450	—	—	V	$I_C = 100\mu\text{A}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	9	—	—	V	$I_E = 100\mu\text{A}$
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 10)	$h_{FE}$	20	—	40	—	$I_C = 20\text{mA}$ , $V_{CE} = 10\text{V}$
		16	—	30		$I_C = 0.5\text{A}$ , $V_{CE} = 2\text{V}$
		5.0	—	25		$I_C = 1.0\text{A}$ , $V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	—	0.3	V	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$
		—	—	0.4		$I_C = 1\text{A}$ , $I_B = 0.25\text{A}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	—	1.0	V	$I_C = 0.5\text{A}$ , $I_B = 0.1\text{A}$
		—	—	1.2		$I_C = 1\text{A}$ , $I_B = 0.25\text{A}$
Output Capacitance	$C_{ob}$	—	18	—	pF	$V_{CB} = 10\text{V}$ , $f = 0.1\text{MHz}$
Transition Frequency	$f_T$	4	—	—	MHz	$I_C = 0.1\text{A}$ , $V_{CE} = 10\text{V}$
Turn-on Time with Resistive Load	$t_{on}$	—	—	0.7	$\mu\text{s}$	$I_C = 1\text{A}$ , $V_{CC} = 125\text{V}$ , $I_{B1} = 0.2\text{A}$ , $I_{B2} = -0.2\text{A}$
Storage Time with Resistive Load	$t_s$	—	—	3.0		
Fall Time with Resistive Load	$t_f$	—	—	0.35		

Note: 10. 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.)


## Package Outline Dimensions

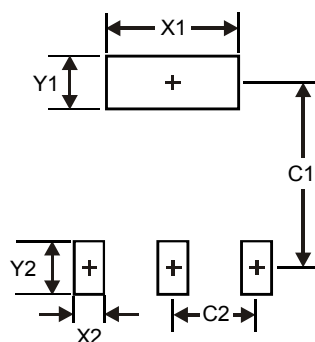
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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