

## Features

- $BV_{CEO} > 450V$
- $BV_{CES} > 700V$
- $BVEBO > 9V$
- $I_C = 1.5A$  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)

## 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<sup>(e3)</sup>
- Weight: 0.112 grams (approximate)

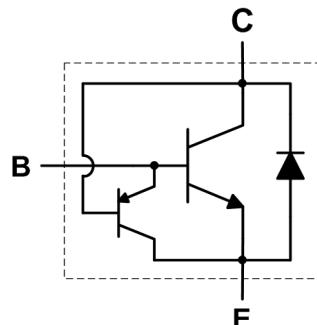
## Applications

Low power AC-DC SMPS for:

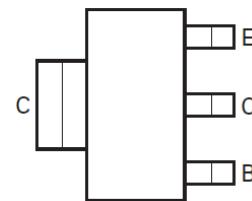
- Battery Chargers for Mobile Phone / Tablets / Smartphones
- Power Supply for DVD / STB
- LED Lighting



Top View



Device Schematic



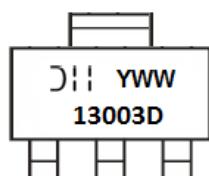
Top View  
Pin-Out

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

Characteristic	Symbol	Value	Unit
Collector-Emitter Voltage ( $V_{BE} = 0\text{V}$ )	$V_{CES}$	700	V
Collector-Emitter Voltage	$V_{CEO}$	450	V
Emitter-Base Voltage	$V_{EBO}$	9	V
Continuous Collector Current	$I_C$	1.3	A
Peak Pulse Collector Current	$I_{CM}$	3	A
Continuous Base Current	$I_B$	0.75	A
Peak Pulse Base Current	$I_{BM}$	1.5	A

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

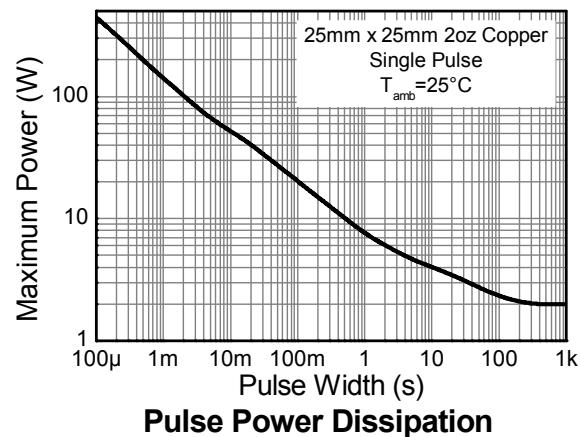
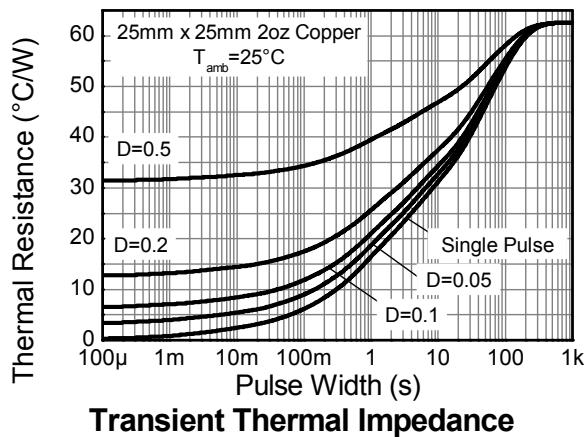
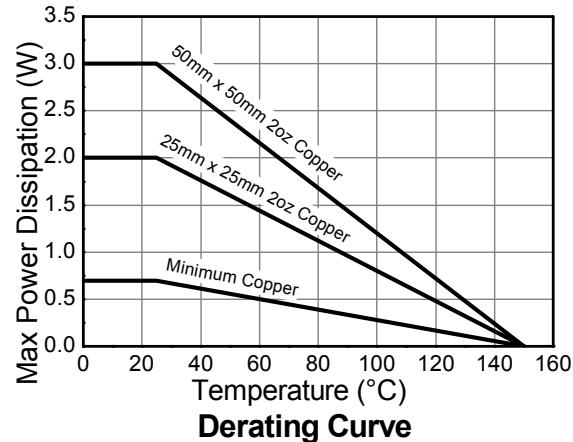
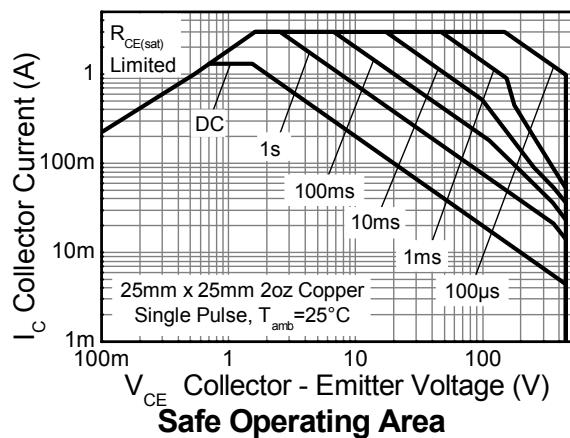
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	3	W
		2	
		0.7	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	42	°C/W
		62.5	
		178	
Thermal Resistance Junction to Lead	$R_{\theta JL}$	17	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**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:
- 5. 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.
  - 6. Same as note (5), except the device is mounted on 25mm x 25mm 2oz copper.
  - 7. Same as note (5), except the device is mounted on minimum recommended pad layout.
  - 8. Thermal resistance from junction to solder-point (at the end of the collector lead).
  - 9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

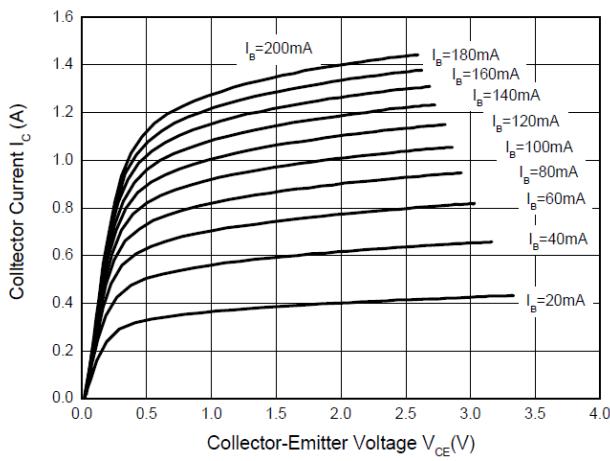
**Safe Operating Areas and Derating Information** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



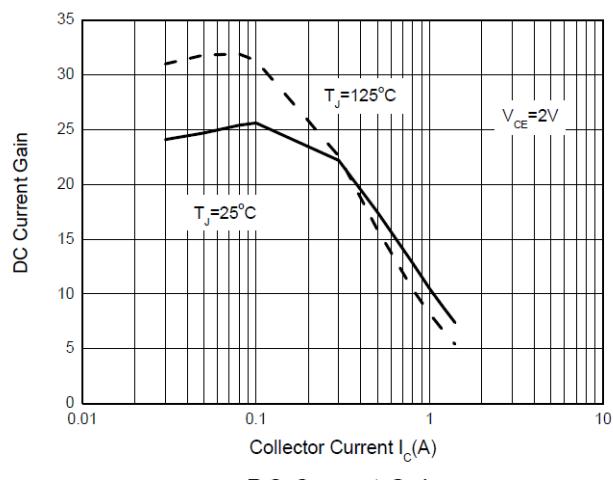
**Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	$\text{BV}_{\text{CES}}$	700	—	—	V	$I_C = 100\mu\text{A}, V_{BE} = 0\text{V}$
Collector-Emitter Breakdown Voltage	$\text{BV}_{\text{CEO}}$	450	—	—	V	$I_C = 100\mu\text{A}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	9	—	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	$I_{\text{CEV}}$	—	—	10	$\mu\text{A}$	$V_{CE} = 700\text{V}, V_{BE} = -1.5\text{V}$
DC current transfer Static ratio (Note 10)	$\text{h}_{\text{FE}}$	20 16 5.0	— — —	40 30 25	—	$I_C = 20\text{mA}, V_{CE} = 10\text{V}$ $I_C = 0.5\text{A}, V_{CE} = 2\text{V}$ $I_C = 1.0\text{A}, V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{\text{CE(sat)}}$	— —	— —	0.3 0.4	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 10)	$V_{\text{BE(sat)}}$	— —	— —	1.0 1.2	V	$I_C = 0.5\text{A}, I_B = 0.1\text{A}$ $I_C = 1\text{A}, I_B = 0.25\text{A}$
Output Capacitance	$C_{\text{ob}}$	—	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	$t_{\text{on}}$	—	—	0.7	—	
Storage Time with Resistive Load	$t_s$	—	—	3.0	μs	$I_C = 1\text{A}, V_{CC} = 125\text{V}, I_{B1} = 0.2\text{A}, I_{B2} = -0.2\text{A}$
Fall Time with Resistive Load	$t_f$	—	—	0.35	—	

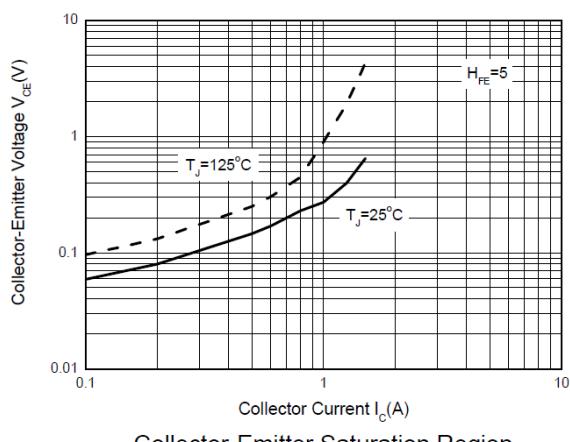
Note: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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


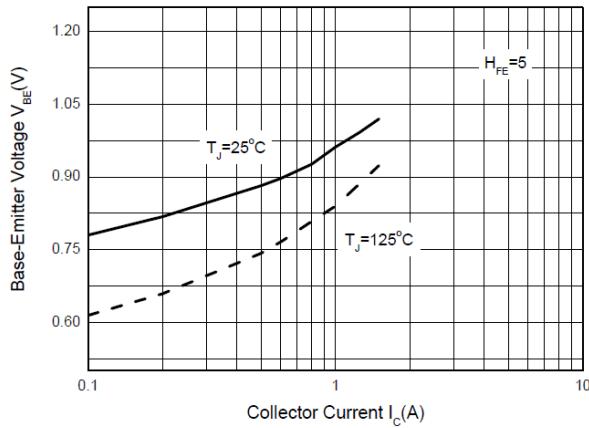
Static Characteristics



DC Current Gain



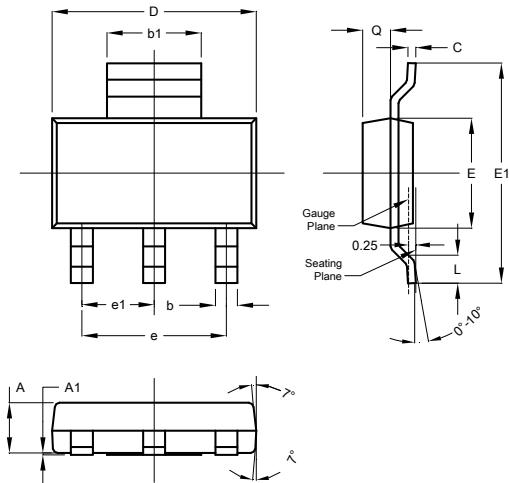
Collector-Emitter Saturation Region



Base-Emitter Saturation Voltage

## Package Outline Dimensions

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

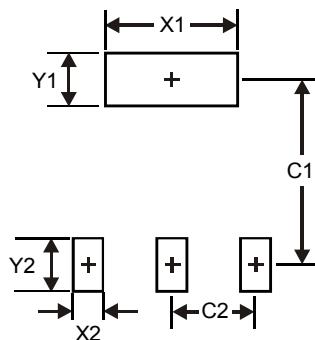


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89

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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