


**450V NPN HIGH VOLTAGE POWER TRANSISTOR IN TO252**

**Features**

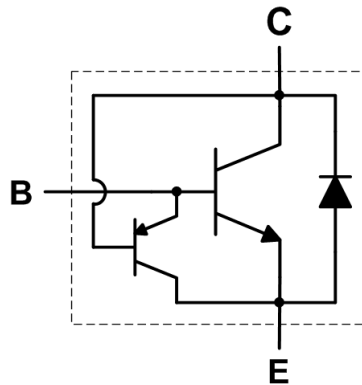
- $BV_{CEO} > 450V$
- $BV_{CES} > 700V$
- $BV_{EBO} > 9V$
- $I_C = 1.5A$  high Continuous Collector Current
- Integrated Anti-Parallel Diode to act as free-wheeling diode
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

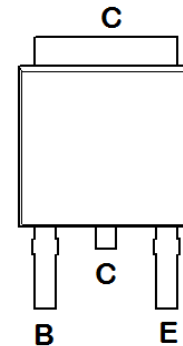
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 
- Weight: 0.34 grams (approximate)



Top View



Device Schematic



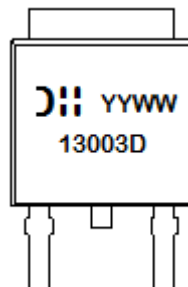
Top View  
Pin-Out


**Ordering Information** (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXT13003DK-13	Standard	13003D	13	16	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
-  = Manufacturer's Code Marking
- YYWW = Date Code Marking
  - YY = Last Digit of Year (ex: 14 = 2014)
  - WW = Week Code (01-53)

**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>	1.5	A
Peak Pulse Collector Current (Note 5)	I <sub>CM</sub>	3	A
Continuous Base Current	I <sub>B</sub>	0.75	A
Peak Pulse Base Current (Note 5)	I <sub>BM</sub>	1.5	A

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

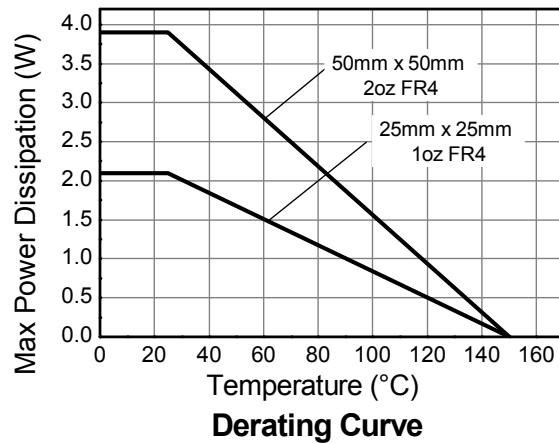
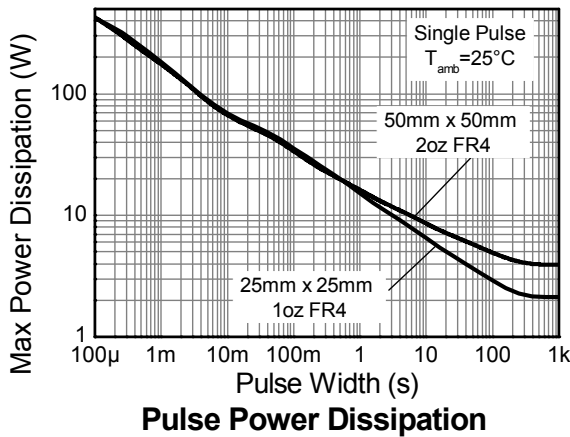
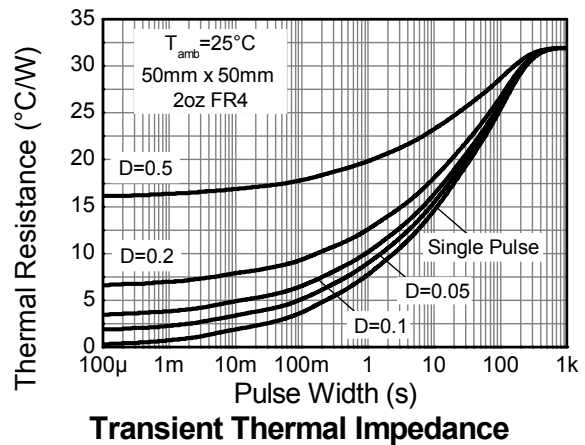
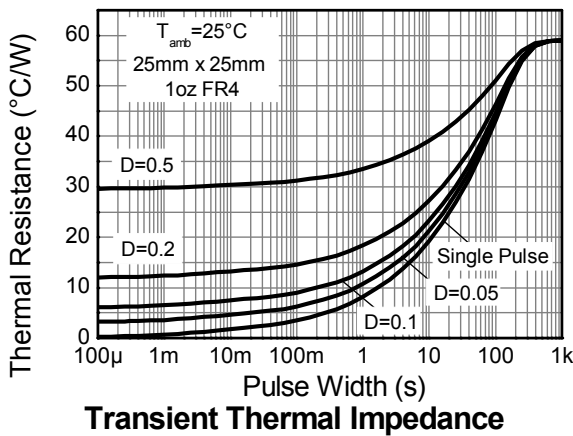
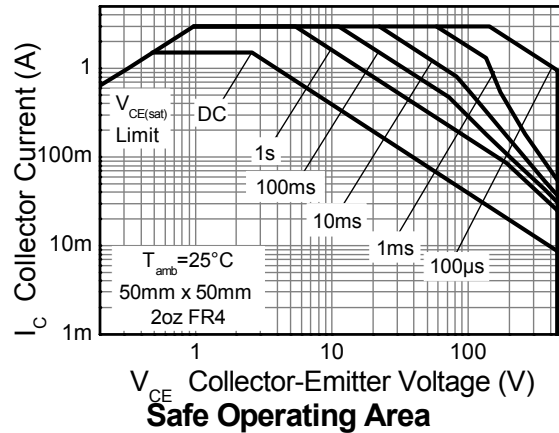
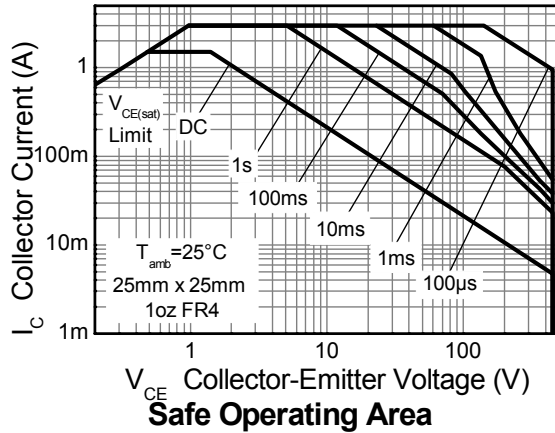
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 6)	3.9
		(Note 7)	2.5
		(Note 8)	2.1
		(Note 9)	1.6
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 6)	32
		(Note 7)	51
		(Note 8)	59
		(Note 9)	80
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	3	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 11)

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. Pulse test for pulse width < 5ms, duty cycle ≤ 10%.
  6. For a device mounted with the exposed collector pad 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.
  7. Same as note (6), except the device is surface mounted on 25mm x 25mm 2oz copper.
  8. Same as note (6), except the device is surface mounted on 25mm x 25mm 1oz copper.
  9. Same as note (6), except mounted on minimum recommended pad (MRP) layout.
  10. Thermal resistance from junction to solder-point (on the exposed collector pad).
  11. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

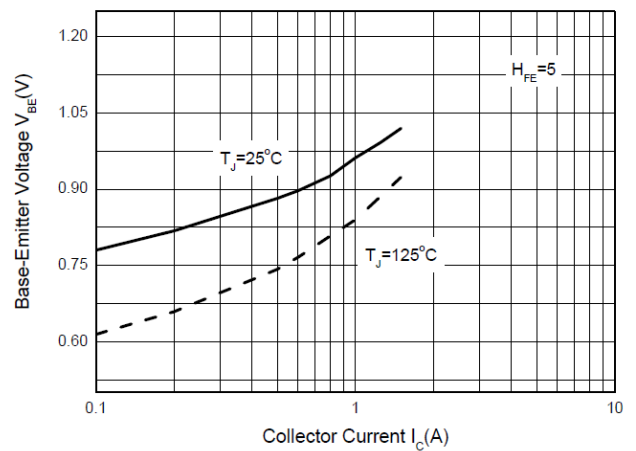
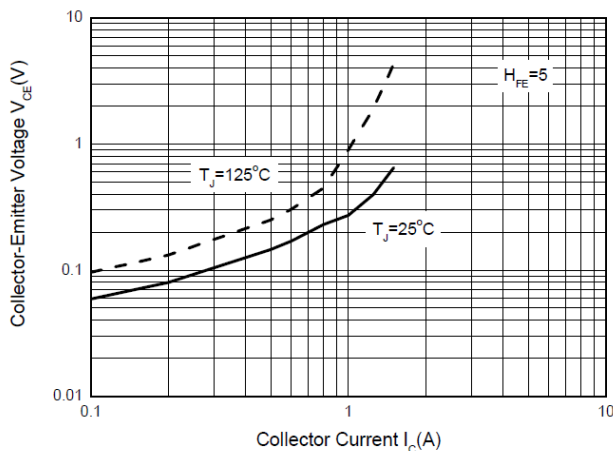
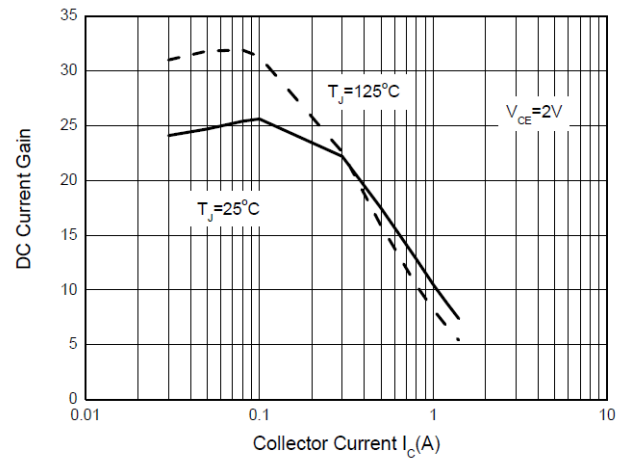
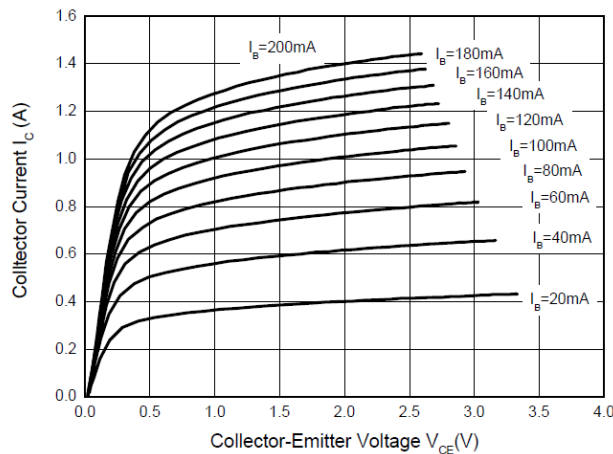


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>	700	—	—	V	I <sub>C</sub> = 100μA, V <sub>BE</sub> = 0V
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	450	—	—	V	I <sub>C</sub> = 100μA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	9	—	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CEV</sub>	—	—	10	μA	V <sub>CE</sub> = 700V, V <sub>BE</sub> = -1.5V
DC current transfer Static ratio (Note 12)	h <sub>FE</sub>	20	—	40	—	I <sub>C</sub> = 20mA, V <sub>CE</sub> = 10V
		16	—	30	—	I <sub>C</sub> = 0.5A, V <sub>CE</sub> = 2V
		5	—	25	—	I <sub>C</sub> = 1.0A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 12)	V <sub>CE(sat)</sub>	—	—	0.3	V	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 0.1A
		—	—	0.4	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 0.25A
Base-Emitter Saturation Voltage (Note 12)	V <sub>BE(sat)</sub>	—	—	1.0	V	I <sub>C</sub> = 0.5A, I <sub>B</sub> = 0.1A
		—	—	1.2	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 0.25A
Output Capacitance	C <sub>ob</sub>	—	18	—	pF	V <sub>CB</sub> = 10V, f = 0.1MHz
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>	—	0.35	—	μs	I <sub>C</sub> = 1A, V <sub>CC</sub> = 125V, I <sub>B1</sub> = 0.2A, I <sub>B2</sub> = -0.2A
Storage Time with Resistive Load	t <sub>s</sub>	—	2.31	—		
Fall Time with Resistive Load	t <sub>f</sub>	—	0.21	—		

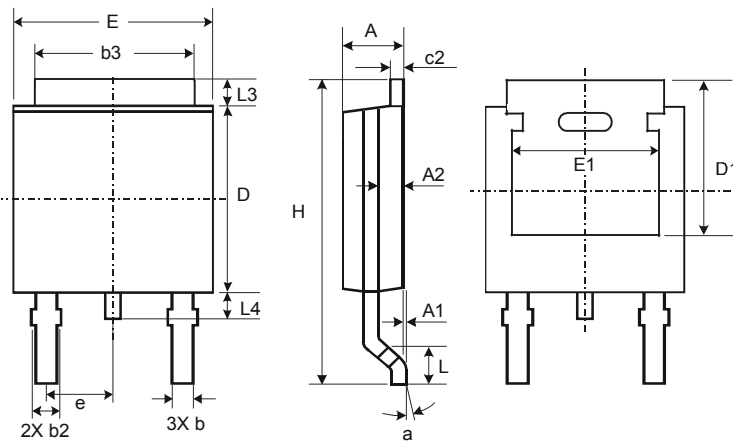
Note: 12. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



## Package Outline Dimensions

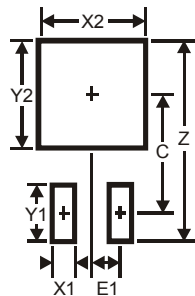
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



TO252			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c2	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
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)
Z	11.6
X1	1.5
X2	7.0
Y1	2.5
Y2	7.0
C	6.9
E1	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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