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## Features

- $BV_{CEO} > 180V$
- $I_C = 0.5A$  high Continuous Collector Current
- $I_{CM} = 1A$  Peak Pulse Current
- High gain device  $> 500$  at  $I_C = 100mA$
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

## 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 (e3)
- Weight: 0.34 grams (approximate)

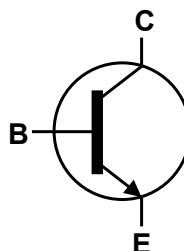
## Applications

- Voltage Regulator Transistors
- Startup Switches
- Darlington Replacement
- DC Fans
- Relays and Solenoid Driving

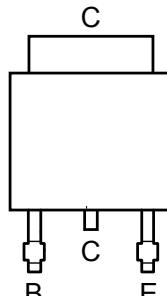
TO252 (DPAK)



Top View



Equivalent Circuit



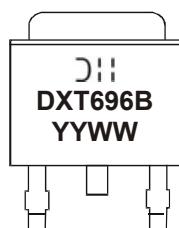
Top View  
Pin-Out

## Ordering Information (Note 4)

Product	Package	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DXT696BK-13	TO252 (DPAK)	DXT696B	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



DII = Manufacturers' code marking  
DXT 696B = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Digit of Year, (ex: 13 = 2013)  
WW = Week Code 01 - 52

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	180	V
Collector-Emitter Voltage	$V_{CEO}$	180	V
Emitter-Base Voltage	$V_{EBO}$	7	V
Continuous Collector Current	$I_C$	0.5	A
Peak Pulse Current	$I_{CM}$	1	A
Peak Base Current	$I_{BM}$	0.5	A

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

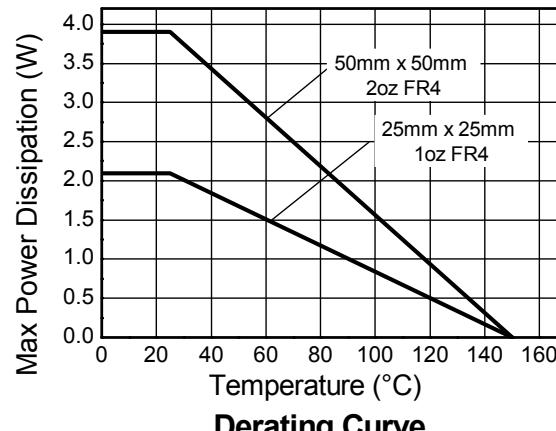
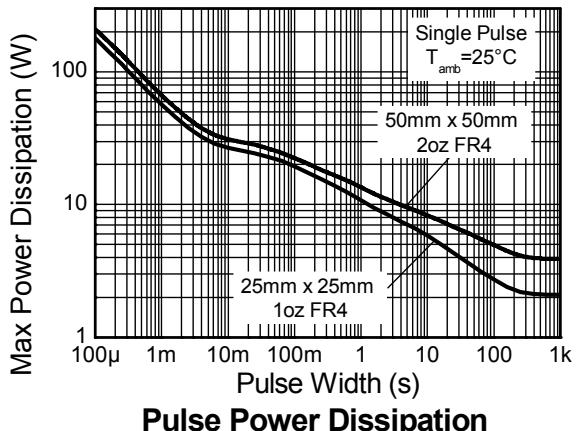
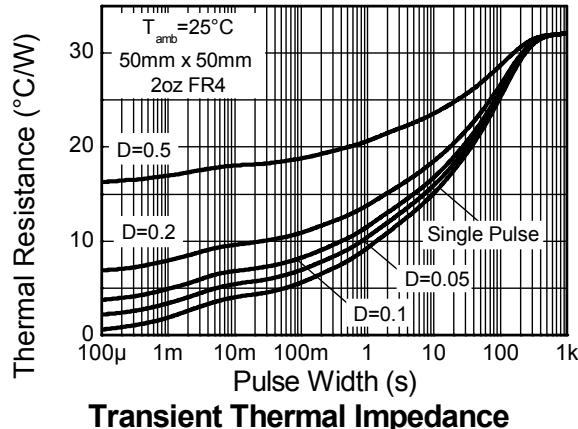
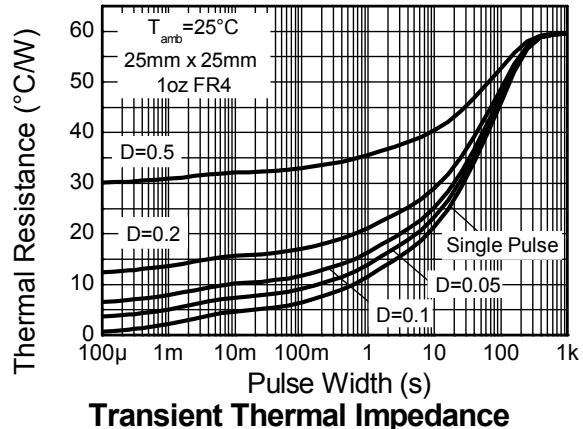
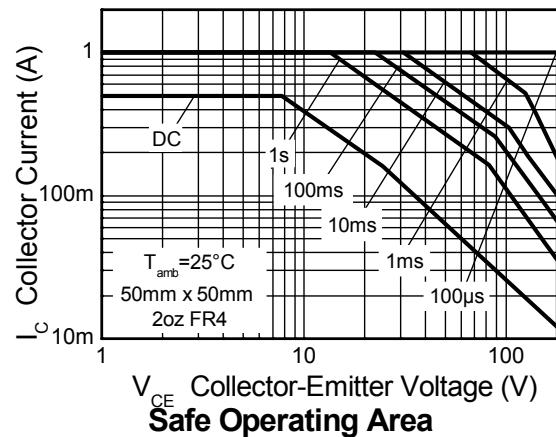
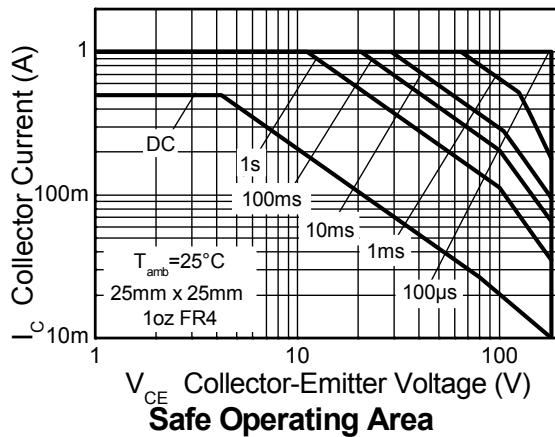
Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	3.9	W
		2.1	
		1.6	
Thermal Resistance, Junction to Ambient Air	$R_{\theta JA}$	32	°C/W
		59	
		80	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	8.4	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	14.6	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**ESD Ratings** (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. 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.
  6. Same as note (5), except mounted on 25mm x 25mm 1oz copper.
  7. Same as note (5), except mounted on minimum recommended pad (MRP) layout.
  8. Thermal resistance from junction to solder-point (on the exposed collector pad).
  9. Thermal resistance from junction to the top of the case.
  10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

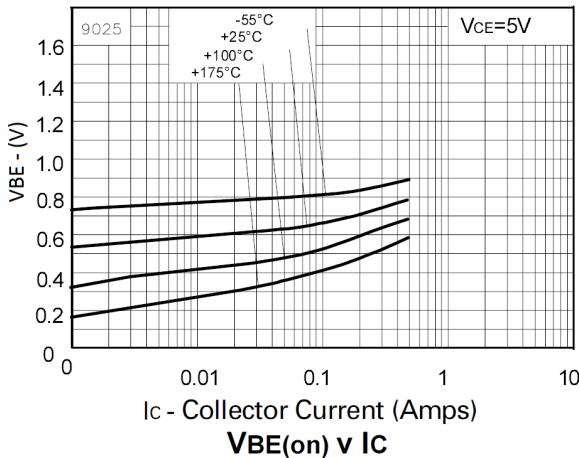
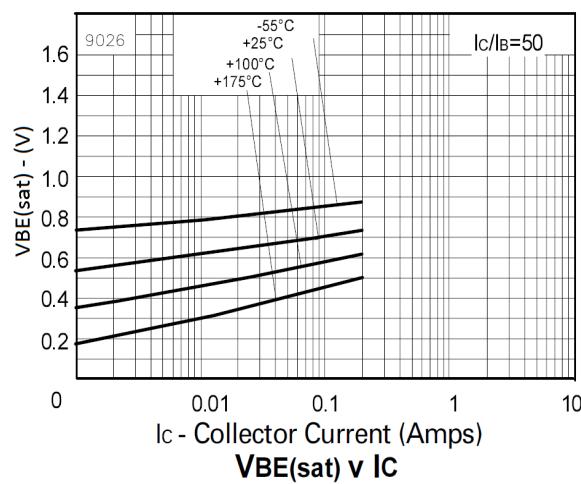
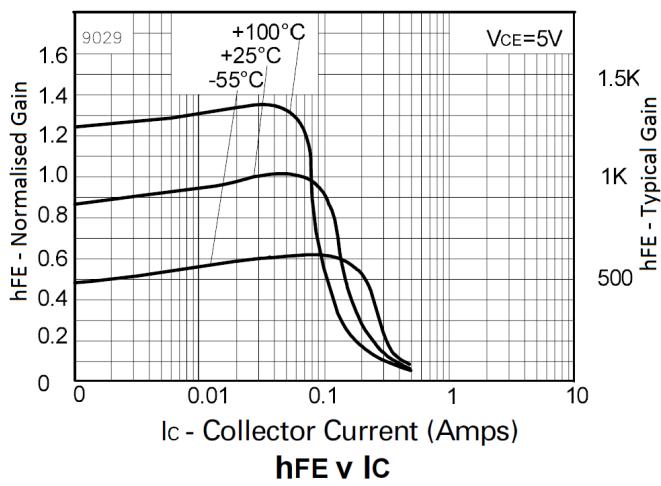
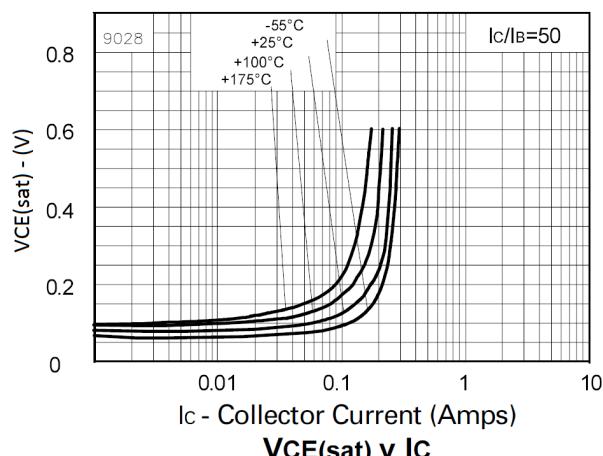
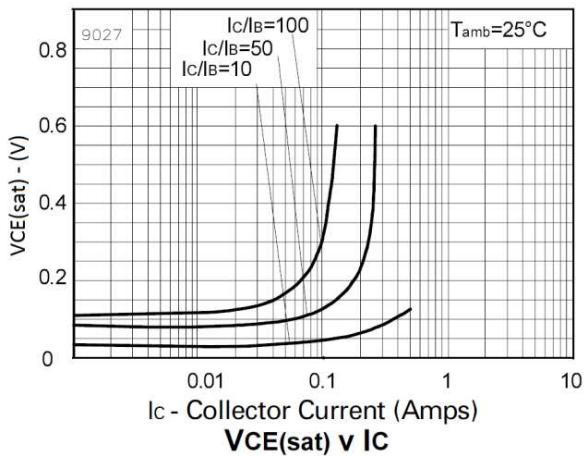


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	180	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 11)	$\text{BV}_{\text{CEO}}$	180	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	7	—	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cutoff Current	$I_{\text{CBO}}$	—	—	100	nA	$V_{\text{CB}} = 140\text{V}$
Emitter Cutoff Current	$I_{\text{EBO}}$	—	—	100	nA	$V_{\text{EB}} = 5\text{V}$
DC Current Gain (Note 11)	$h_{\text{FE}}$	500 150	— —	—		$I_C = 100\text{mA}, V_{\text{CE}} = 5\text{V}$ $I_C = 200\text{mA}, V_{\text{CE}} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 11)	$V_{\text{CE}(\text{sat})}$	— — —	— — —	200 200 250	mV	$I_C = 50\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 2.0\text{mA}$ $I_C = 200\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage (Note 11)	$V_{\text{BE}(\text{sat})}$	—	—	900	mV	$I_C = 200\text{mA}, I_B = 5\text{mA}$
Base-Emitter Turn-On Voltage (Note 11)	$V_{\text{BE}(\text{on})}$	—	—	900	mV	$I_C = 200\text{mA}, V_{\text{CE}} = 5\text{V}$
Input Capacitance	$C_{\text{ib}}$	—	200	—	pF	$V_{\text{EB}} = 0.5\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{\text{ob}}$	—	6	—	pF	$V_{\text{CE}} = 10\text{V}, f = 1\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	70	—	—	MHz	$V_{\text{CE}} = 5\text{V}, I_C = 50\text{mA}, f = 50\text{MHz}$
Turn-On Time	$t_{\text{on}}$	—	80	—	ns	$V_{\text{CC}} = 50\text{V}, I_C = 100\text{mA}$
Turn-Off Time	$t_{\text{off}}$	—	4,400	—	ns	$I_{B1} = -I_{B2} = 10\text{mA}$

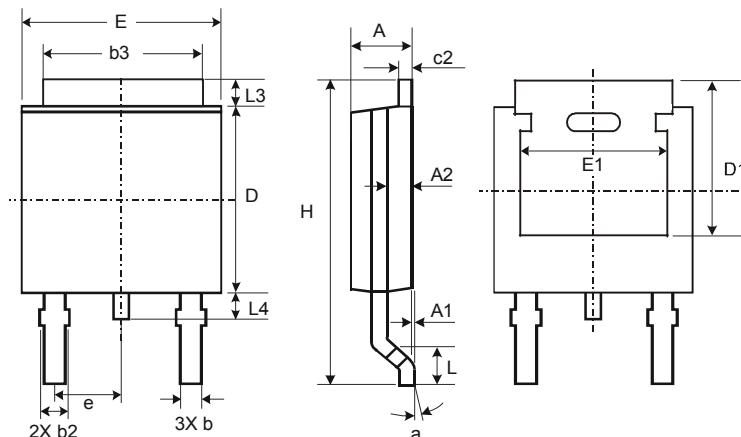
Note: 11. Measured under pulsed conditions. Pulse width  $\leq 300\ \mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**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.

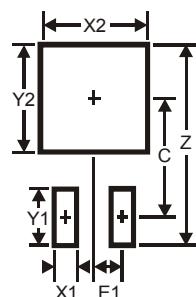


TO252			
Dim	Min	Max	Typ
<b>A</b>	2.19	2.39	2.29
<b>A1</b>	0.00	0.13	0.08
<b>A2</b>	0.97	1.17	1.07
<b>b</b>	0.64	0.88	0.783
<b>b2</b>	0.76	1.14	0.95
<b>b3</b>	5.21	5.46	5.33
<b>c2</b>	0.45	0.58	0.531
<b>D</b>	6.00	6.20	6.10
<b>D1</b>	5.21	—	—
<b>e</b>	—	—	2.286
<b>E</b>	6.45	6.70	6.58
<b>E1</b>	4.32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