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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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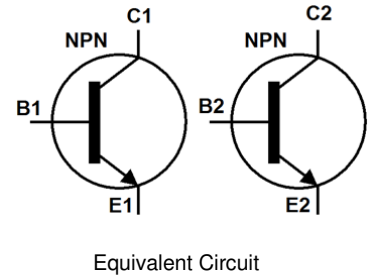
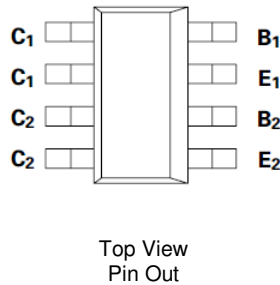
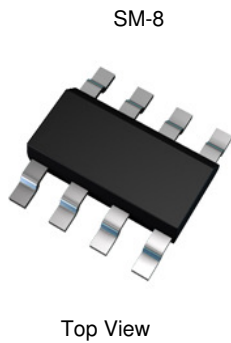
**120V DUAL NPN MEDIUM POWER HIGH GAIN TRANSISTOR IN SM-8**

**Features**

- $BV_{CEO} > 120V$
- $I_C = 0.5A$  High Continuous Current
- High Gain  $> 400 @ 200mA$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Mechanical Data**

- Case: SM-8 (8 LEAD SOT223)
- 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 @3
- Weight: 0.117 grams (Approximate)

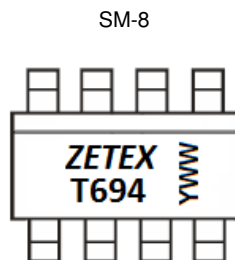


**Ordering Information** (Notes 4 and 5)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZDT694TA	AEC-Q101	T694	7	12	1,000
ZDT694QTA	Automotive	T694	7	12	1,000

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



T694 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 4 = 2014)  
 WW = Week Code 01-52

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	NPN	Unit
Collector-Base Voltage	V <sub>CBO</sub>	120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	120	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	0.5	A
Peak Pulse Current (Note 5)	I <sub>CM</sub>	1	A

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

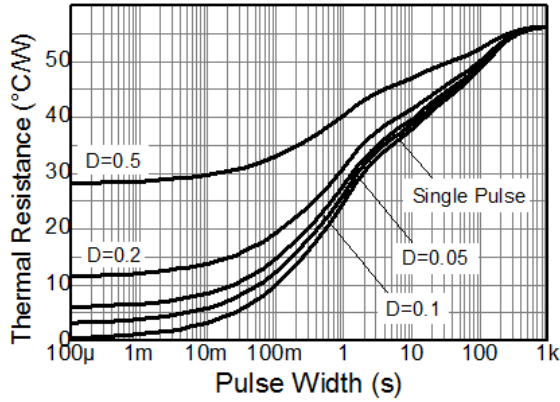
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	(Note 5) 2.25	W
		(Note 6) 2.75	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 55.6	°C/W
		(Note 6) 45.5	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	30.7	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 8)

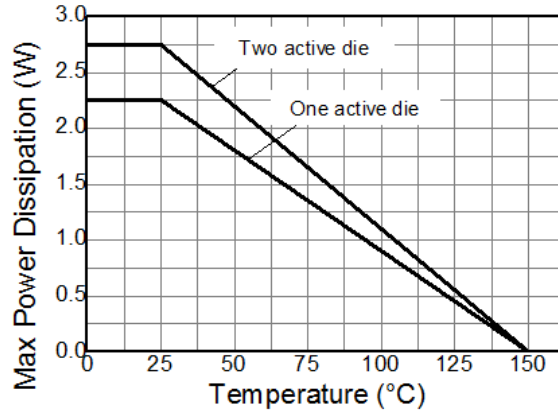
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device with any single die active and mounted with the collector lead on 25mm x 25mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
  6. Same as Note 5, except both die are active and equally sharing power.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

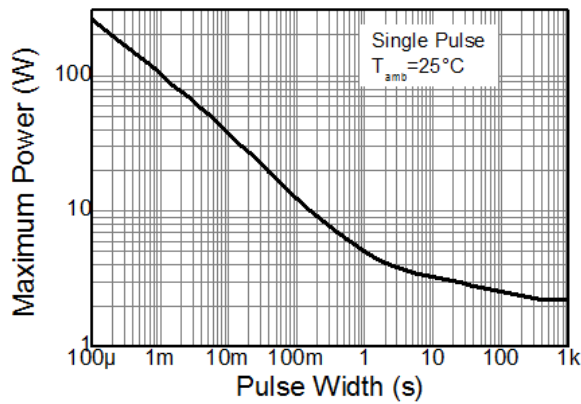
**Thermal Characteristics and Derating Information**



**Transient Thermal Impedance**



**Derating Curve**



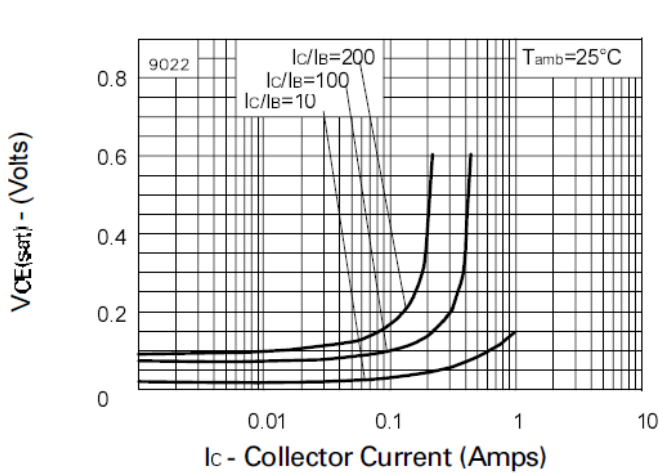
**Pulse Power Dissipation**

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

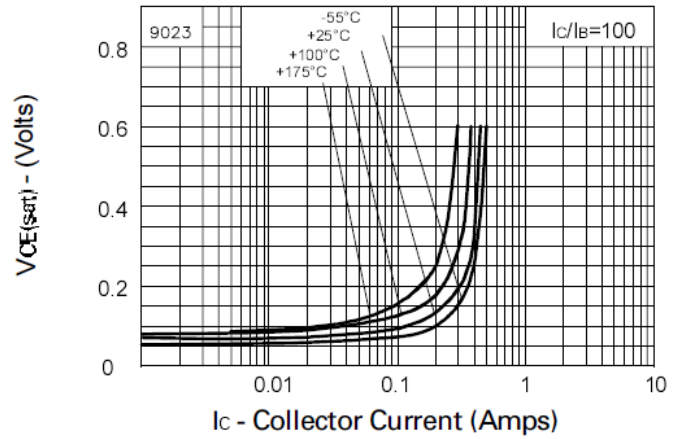
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	120	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	120	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	0.1	μA	V <sub>CB</sub> = 100V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	0.1	μA	V <sub>EB</sub> = 5.6V
DC current transfer Static ratio (Note 8)	h <sub>FE</sub>	500	—	—	—	I <sub>C</sub> = 150mA, V <sub>CE</sub> = 2V
		400	—	—		I <sub>C</sub> = 200mA, V <sub>CE</sub> = 2V
		150	—	—		I <sub>C</sub> = 400mA, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	—	0.25	V	I <sub>C</sub> = 0.1A, I <sub>B</sub> = 0.5mA
		—	—	0.50		I <sub>C</sub> = 0.4A, I <sub>B</sub> = 5mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	—	—	0.9	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
Base-Emitter Turn-on Voltage (Note 9)	V <sub>BE(on)</sub>	—	—	0.9	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
Transitional Frequency	f <sub>T</sub>	130	—	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V, f = 50MHz
Input Capacitance	C <sub>ibo</sub>	—	200	—	pF	V <sub>EB</sub> = 0.5V, f = 1MHz,
Output Capacitance	C <sub>obo</sub>	—	9	—	pF	V <sub>EB</sub> = 10V, f = 1MHz,
Switching Time	t <sub>on</sub>	—	80	—	ns	V <sub>CC</sub> = 50V, I <sub>C</sub> = 100mA, I <sub>B1</sub> = -I <sub>B2</sub> = 10mA
	t <sub>off</sub>		2900		ns	

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

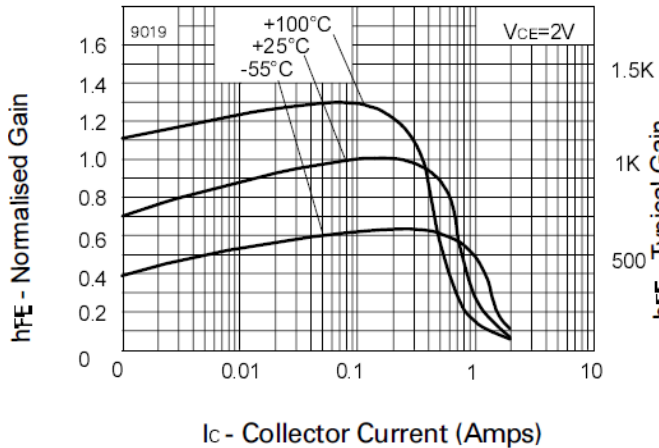
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



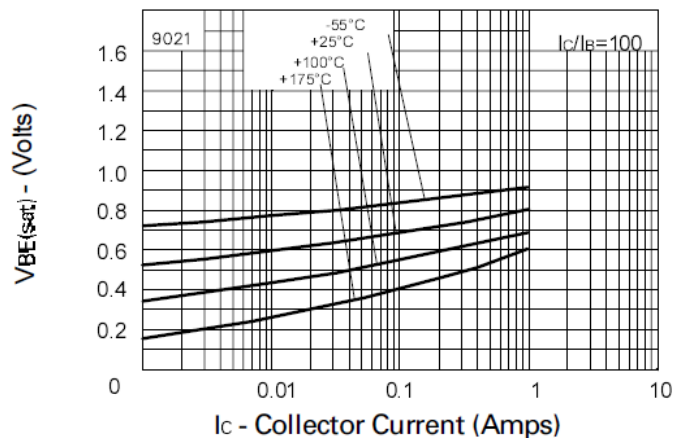
**VCE(sat) v IC**



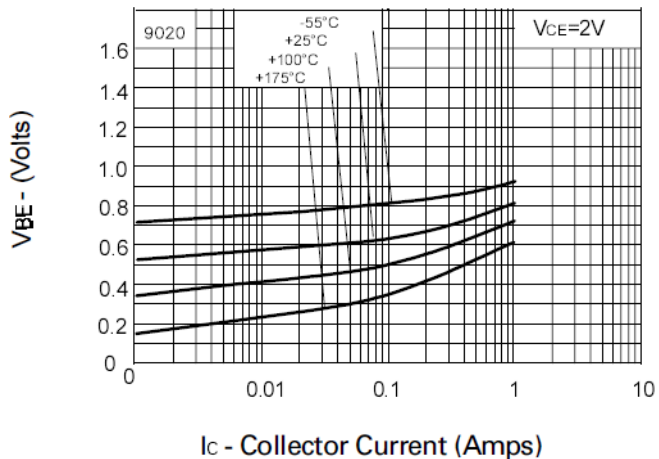
**VCE(sat) v IC**



**hFE v IC**



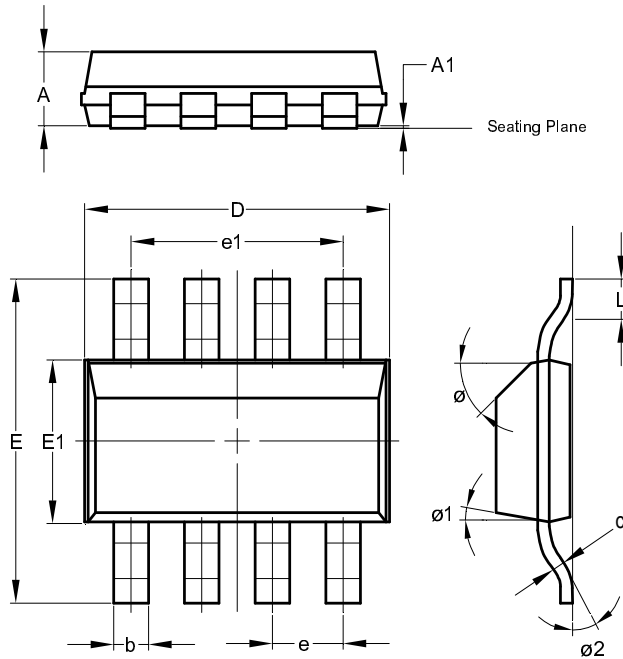
**VBE(sat) v IC**



**VBE(on) v IC**

## Package Outline Dimensions

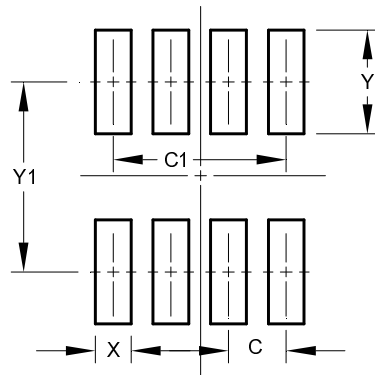
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SM-8			
Dim	Min	Max	Typ
A	--	1.70	1.60
A1	0.02	0.10	0.04
b	0.70	0.90	0.80
c	0.24	0.32	0.28
D	6.30	6.70	6.60
e	1.53 REF		
e1	4.59 REF		
E	6.70	7.30	7.00
E1	3.30	3.70	3.50
L	0.75	1.00	0.90
Ø	--	--	45°
Ø1	--	15°	--
Ø2	--	--	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)
C	1.52
C1	4.6
X	0.95
Y	2.80
Y1	6.80

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