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

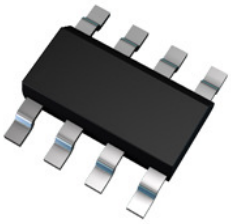
Features

- 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)**

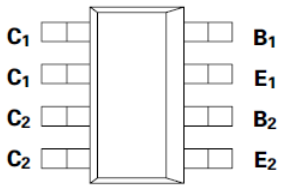
Mechanical Data

- 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 e3
- Weight: 0.117 grams (Approximate)

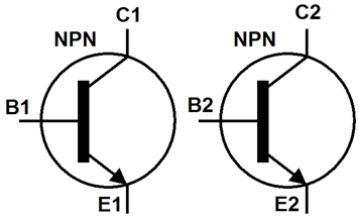
SM-8



Top View



Top View
Pin Out



Equivalent Circuit

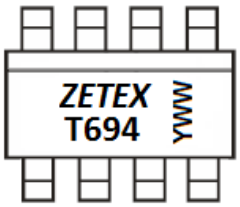
Ordering Information (Notes 4 and 5)

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 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

SM-8



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_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	NPN	Unit
Collector-Base Voltage	V_{CBO}	120	V
Collector-Emitter Voltage	V_{CEO}	120	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	0.5	A
Peak Pulse Current (Note 5)	I_{CM}	1	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

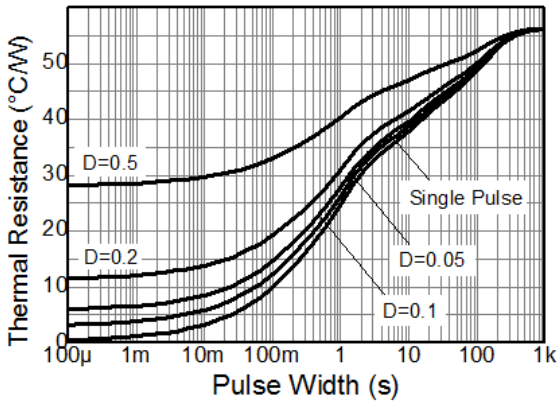
Characteristic		Symbol	Value	Unit
Collector Power Dissipation	(Note 5)	P_D	2.25	W
	(Note 6)		2.75	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	55.6	°C/W
	(Note 6)		45.5	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	30.7	°C/W
Operating and Storage Temperature Range		T_J,T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

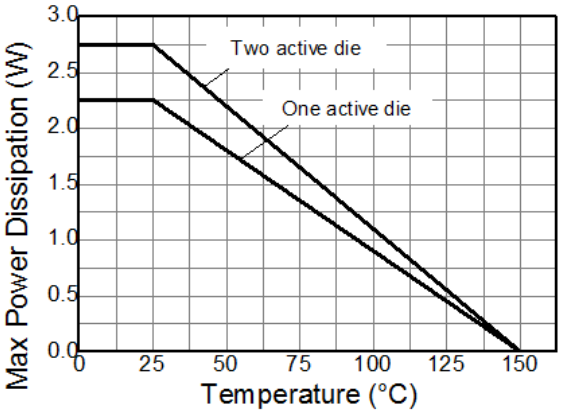
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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.

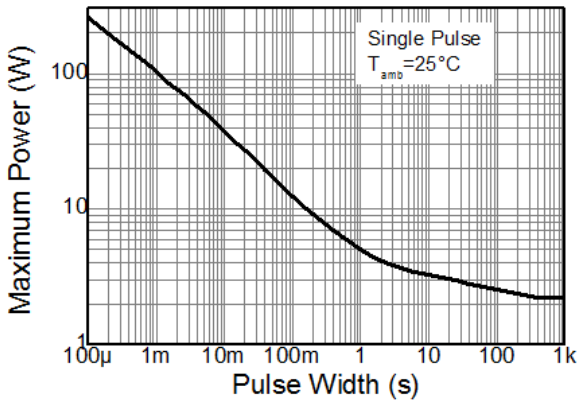
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Derating Curve



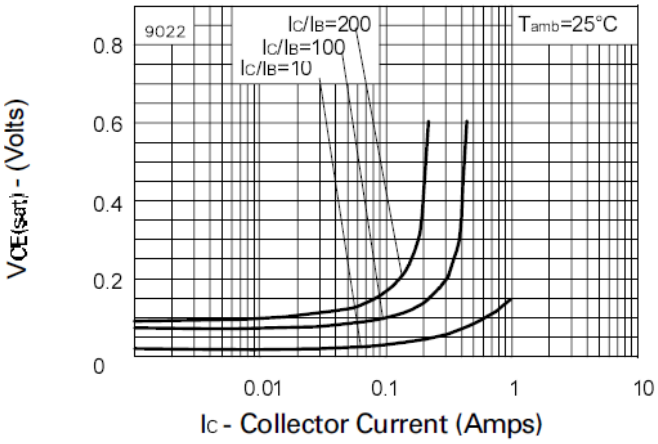
Pulse Power Dissipation

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

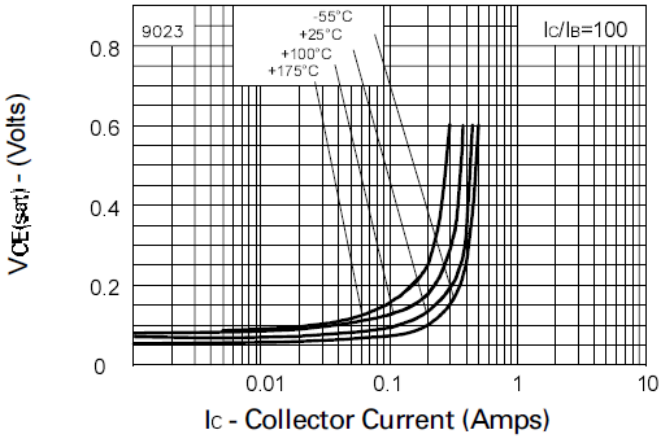
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	120	—	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	120	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	—	—	0.1	µA	V_{CB} = 100V
Emitter Cutoff Current	I_{EBO}	—	—	0.1	µA	V_{EB} = 5.6V
DC current transfer Static ratio (Note 8)	h_{FE}	500	—	—	—	I_C = 150mA, V_{CE} = 2V
		400	—	—		I_C = 200mA, V_{CE} = 2V
		150	—	—		I_C = 400mA, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	—	0.25	V	I_C = 0.1A, I_B = 0.5mA
		—	—	0.50		I_C = 0.4A, I_B = 5mA
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	—	0.9	V	I_C = 1A, I_B = 10mA
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	—	0.9	V	I_C = 1A, V_{CE} = 2V
Transitional Frequency	f_T	130	—	—	MHz	I_C = 50mA, V_{CE} = 5V, f = 50MHz
Input Capacitance	C_{ibo}	—	200	—	pF	V_{EB} = 0.5V, f = 1MHz,
Output Capacitance	C_{obo}	—	9	—	pF	V_{EB} = 10V, f = 1MHz,
Switching Time	t_{on}	—	80	—	ns	V_{CC} = 50V, I_C = 100mA,
	t_{off}		2900		ns	I_{B1} = -I_{B2} = 10mA

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

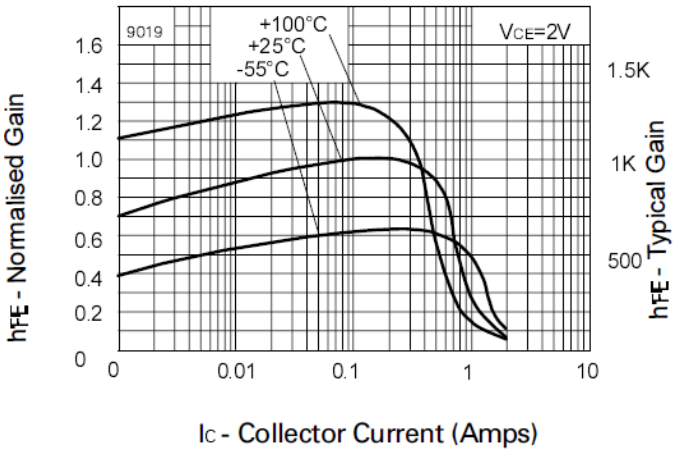
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



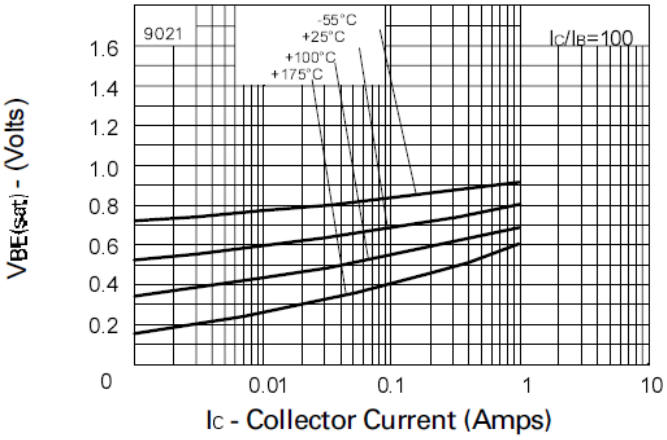
VCE(sat) v IC



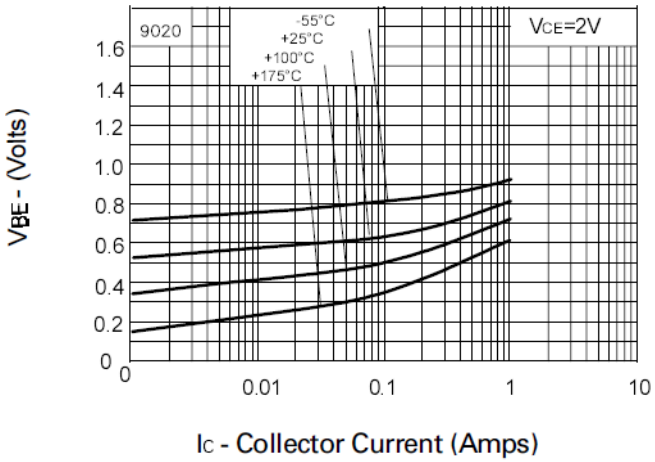
VCE(sat) v IC



hFE v IC



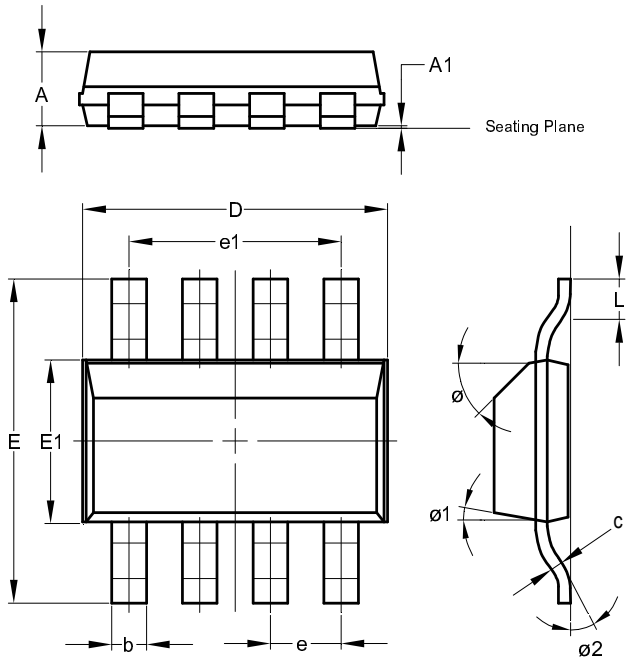
VBE(sat) v IC



VBE(on) v IC

Package Outline Dimensions

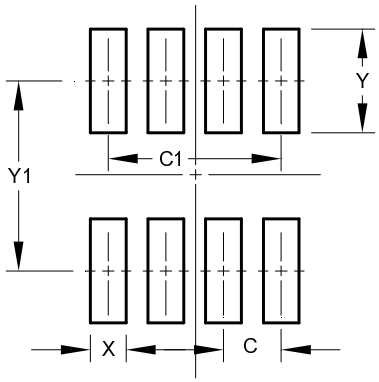
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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