

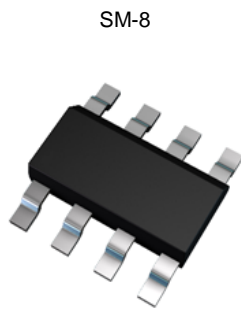
**75V DUAL NPN HIGH GAIN MEDIUM POWER TRANSISTOR IN SM-8**

**Features**

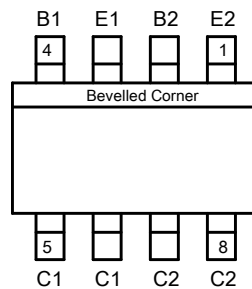
- $BV_{CEO} > 75V$
- $I_C = 5A$  High Collector Current
- $I_{CM} = 20A$  Peak Pulse Current
- High Gain  $h_{FE} > 300 @ 1A$
- Low Saturation Voltage  $V_{CE(SAT)} < 150mV @ 1A$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

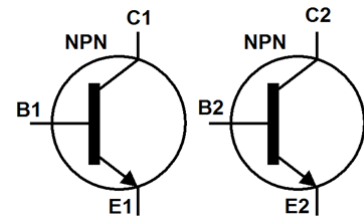
- Case: SM-8 (8 LEAD SOT223)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads; Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.117 grams (Approximate)



Top View



Top View  
Pin Out



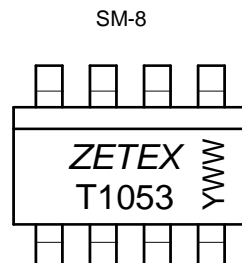
Equivalent Circuit

**Ordering Information** (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZDT1053TA	AEC-Q101	T1053	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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



T1053 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y or  $\bar{Y}$  = Last Digit of Year (ex: 5= 2015)  
 WW or  $\bar{W}W$  = Week Code (01 to 53)

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

Characteristic	Symbol	NPN	Unit
Collector-Base Voltage	V <sub>CBO</sub>	150	V
Collector-Emitter Voltage	V <sub>CEO</sub>	75	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	5	A
Peak Pulse Current	I <sub>CM</sub>	20	A
Base Current	I <sub>B</sub>	500	mA

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

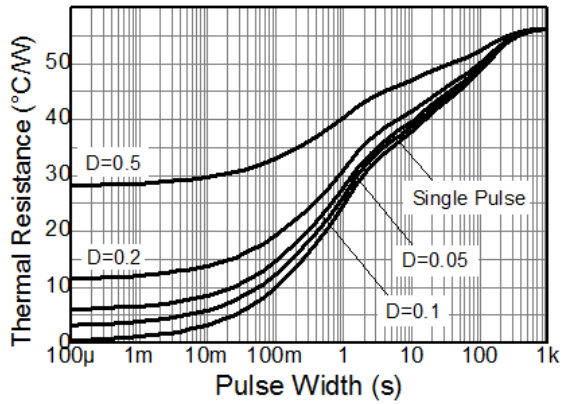
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	(Note 5)	2.25
		(Note 6)	2.75
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5)	55.6
		(Note 6)	45.5
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	30.7	°C/W
Operating and Storage Temperature Range	T 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

**ESD Ratings** (Note 8)

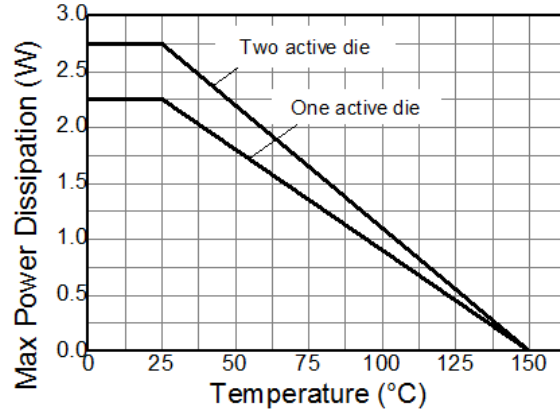
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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 FR-4 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.

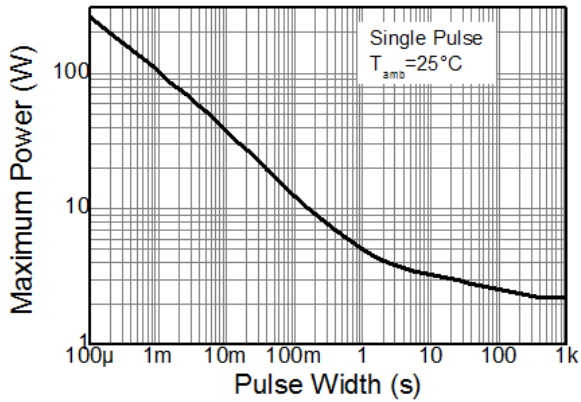
**Thermal Characteristics and Derating Information**



**Transient Thermal Impedance**



**Derating Curve**



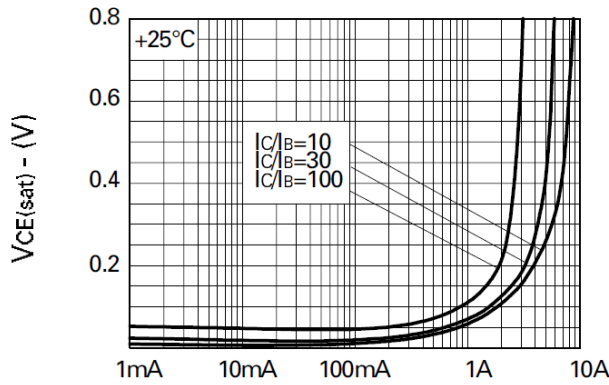
**Pulse Power Dissipation**

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

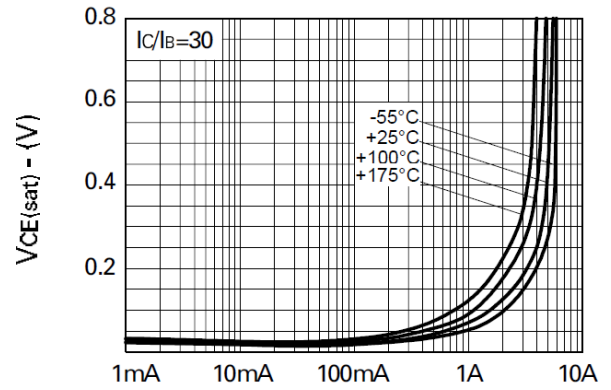
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	150	245	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	75	100	—	V	I <sub>C</sub> = 10mA
Collector-Emitter Breakdown Voltage	BV <sub>CES</sub>	150	245	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage	BV <sub>CEV</sub>	150	245	—	V	I <sub>C</sub> = 100μA, V <sub>EB</sub> = 1V
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	8.8	—	V	I <sub>E</sub> = 100μA
Collector Cut-Off Current	I <sub>CBO</sub>	—	<1	10	nA	V <sub>CB</sub> = 120V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	<1	10	nA	V <sub>EB</sub> = 5.6V
Collector Emitter Cut-Off Current	I <sub>CES</sub>	—	<1	10	nA	V <sub>CES</sub> = 120V
DC Current Transfer Static Ratio (Note 9)	h <sub>FE</sub>	260	420	—	—	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 2V
		300	450	1200		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		150	220	—		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
		30	50	—		I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
		—	15	—		I <sub>C</sub> = 10A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	17	25	mV	I <sub>C</sub> = 0.2A, I <sub>B</sub> = 20mA
		—	70	100		I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA
		—	120	150		I <sub>C</sub> = 1A, I <sub>B</sub> = 10mA
		—	150	200		I <sub>C</sub> = 2A, I <sub>B</sub> = 50mA
		—	300	440		I <sub>C</sub> = 5A, I <sub>B</sub> = 250mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(SAT)</sub>	—	1100	1200	mV	I <sub>C</sub> = 5A, I <sub>B</sub> = 250mA
Base-Emitter Turn-On Voltage (Note 9)	V <sub>BE(ON)</sub>	—	1000	1100	mV	I <sub>C</sub> = 5A, V <sub>CE</sub> = 2V
Transitional Frequency	f <sub>T</sub>	—	140	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 10V, f = 100MHz
Output Capacitance	C <sub>OBO</sub>	—	21	30	pF	V <sub>EB</sub> = 10V, f = 1MHz
Switching Time	t <sub>ON</sub>	—	90	—	ns	V <sub>CC</sub> = 50V, I <sub>C</sub> = 2A, I <sub>B1</sub> = -I <sub>B2</sub> = 20mA
	t <sub>OFF</sub>	—	750	—	ns	

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

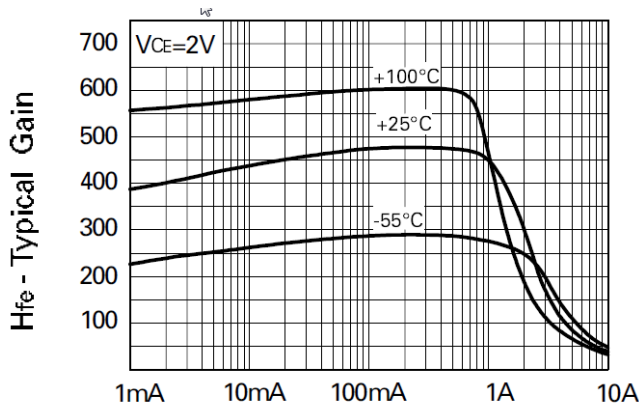
**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)



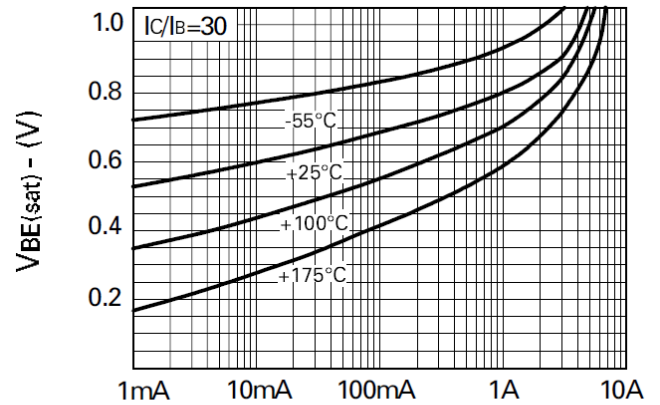
IC-Collector Current  
**V<sub>CE(sat)</sub> v I<sub>C</sub>**



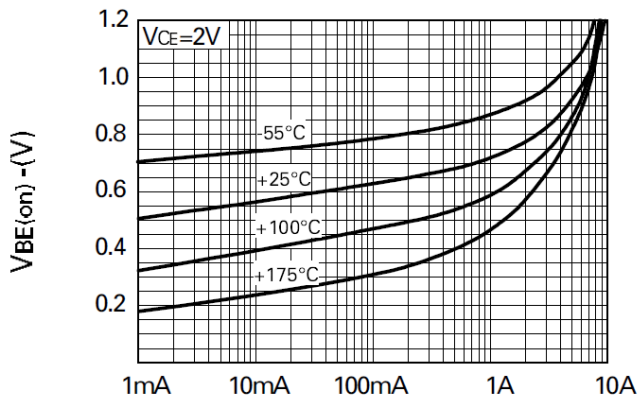
IC-Collector Current  
**V<sub>CE(sat)</sub> v I<sub>C</sub>**



IC-Collector Current  
**h<sub>FE</sub> v I<sub>C</sub>**



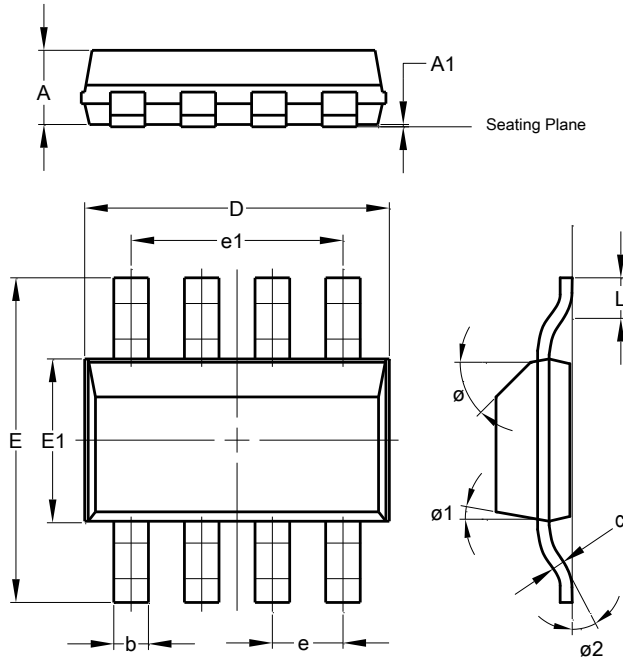
IC-Collector Current  
**V<sub>BE(sat)</sub> v I<sub>C</sub>**



IC-Collector Current  
**V<sub>BE(on)</sub> v I<sub>C</sub>**

## Package Outline Dimensions

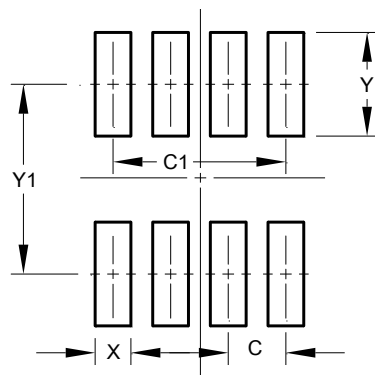
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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	4.60
X	0.95
Y	2.80
Y1	6.80

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