

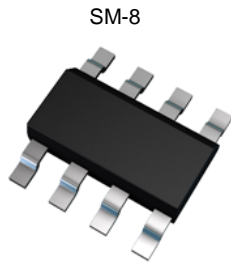
**100V COMPLEMENTARY MEDIUM POWER TRANSISTOR IN SM-8**

**Features**

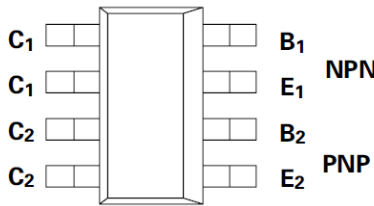
- NPN Transistor
  - $BV_{CEO} > 100$
  - $I_C = 2A$  High Continuous Current
  - Low Saturation Voltage  $V_{CE(sat)} < 300mV @ 1A$
- PNP Transistor
  - $BV_{CEO} > -100V$
  - $I_C = -2A$  High Continuous Current
  - Low Saturation Voltage  $V_{CE(sat)} < -300mV @ -1A$
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

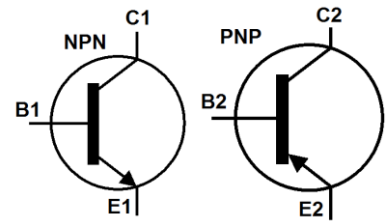
- Case: SM-8 (8 LEAD SOT223)
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads. Solderable per MIL-STD-202, Method 208 (Ⓢ)
- Weight: 0.117 grams (Approximate)



Top View



Top View  
Pin Out



Equivalent Circuit

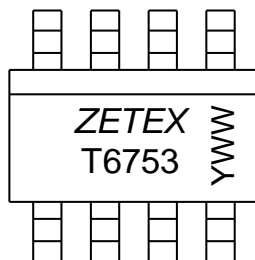
**Ordering Information** (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZDT6753TA	T6753	7	12	1,000
ZDT6753TC	T6753	13	12	4,000

- 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**

SM-8



T6753 = 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 (01~53)

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

Characteristic	Symbol	NPN	PNP	Unit
Collector-Base Voltage	V <sub>CBO</sub>	120	-120	V
Collector-Emitter Voltage	V <sub>CEO</sub>	100	-100	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	-7	V
Continuous Collector Current	I <sub>C</sub>	2	-2	A
Peak Pulse Current (Note 5)	I <sub>CM</sub>	6	-6	A

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

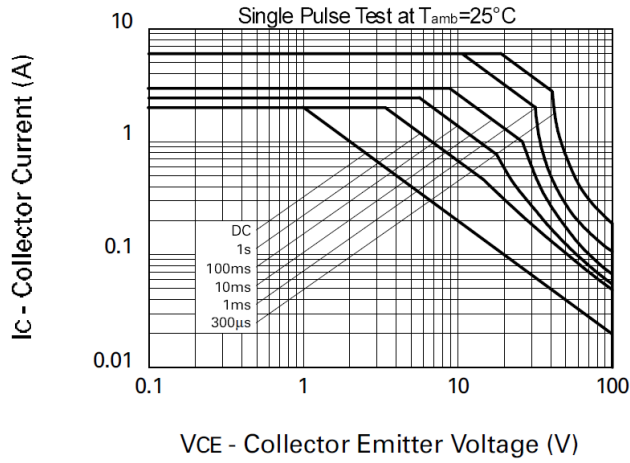
Characteristic	Symbol	Value	Unit
Collector Power Dissipation	P <sub>D</sub>	(Note 5) 2.25	W
		(Note 6) 2.75	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 55.6	°C/W
		(Note 6) 45.5	
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	30.7	°C/W
Operating and Storage Temperature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

### ESD Ratings (Note 8)

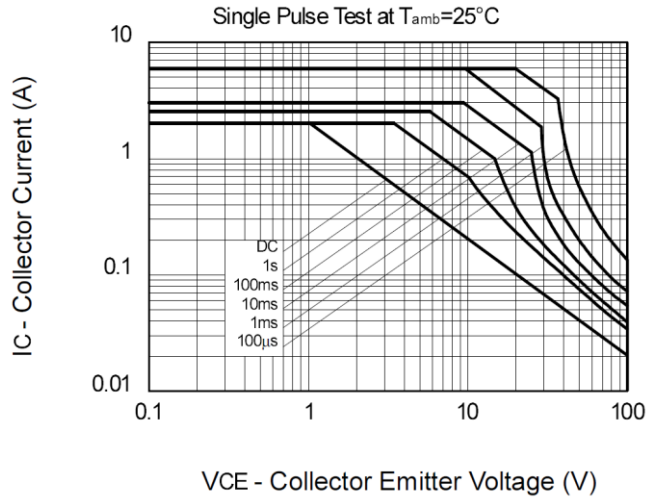
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- 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.

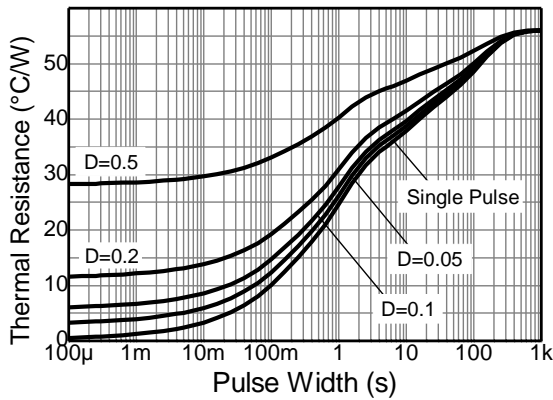
**Thermal Characteristics and Derating Information**



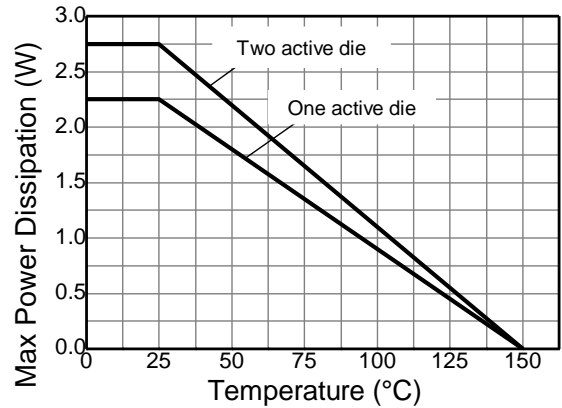
**Safe Operating Area**



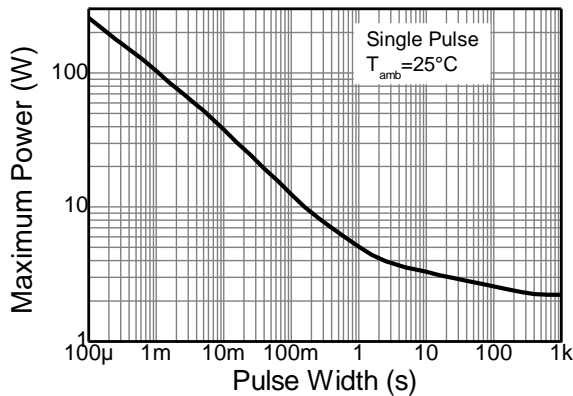
**Safe Operating Area**



**Transient Thermal Impedance**



**Derating Curve**



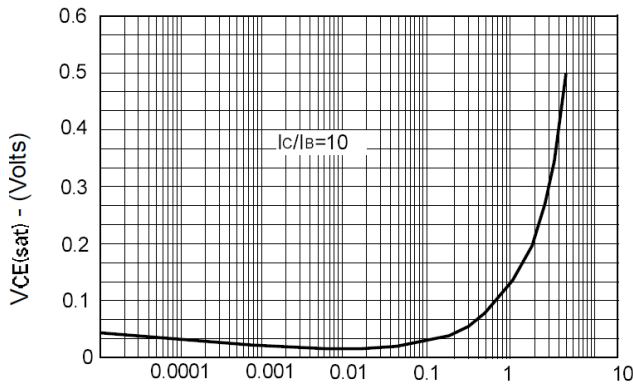
**Pulse Power Dissipation**

**NPN - 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>	100	—	—	V	I <sub>C</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	7	—	—	V	I <sub>E</sub> = 100μA
Collector Cut-Off Current	I <sub>CBO</sub>	—	< 1	0.1	μA	V <sub>CB</sub> = 100V
		—	—	10	μA	V <sub>CB</sub> = 100V, T <sub>A</sub> = +125°C
Emitter Cut-Off Current	I <sub>EBO</sub>	—	< 1	0.1	μA	V <sub>EB</sub> = 5.6V
DC Current Transfer Static Ratio (Note 9)	h <sub>FE</sub>	70	200	—	—	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 2V
		100	200	300		I <sub>C</sub> = 500mA, V <sub>CE</sub> = 2V
		55	110	—		I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
		25	55	—		I <sub>C</sub> = 2A, V <sub>CE</sub> = 2V
Collector-Emitter Saturation Voltage (Note 9)	V <sub>CE(sat)</sub>	—	0.13	0.30	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
		—	0.23	0.50		I <sub>C</sub> = 2A, I <sub>B</sub> = 200mA
Base-Emitter Saturation Voltage (Note 9)	V <sub>BE(sat)</sub>	—	0.9	1.25	V	I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA
Base-Emitter Turn-on Voltage (Note 9)	V <sub>BE(on)</sub>	—	0.8	1.0	V	I <sub>C</sub> = 1A, V <sub>CE</sub> = 2V
Transitional Frequency	f <sub>T</sub>	140	175	—	MHz	I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5V, f = 100MHz
Output Capacitance	C <sub>obo</sub>	—	—	30	pF	V <sub>CB</sub> = 10V, f = 1MHz
Switching Time	t <sub>on</sub>	—	80	—	Ns	V <sub>CC</sub> = 10V, I <sub>C</sub> = 500mA, I <sub>B1</sub> = -I <sub>B2</sub> = 50mA
	t <sub>off</sub>	—	1200	—	ns	

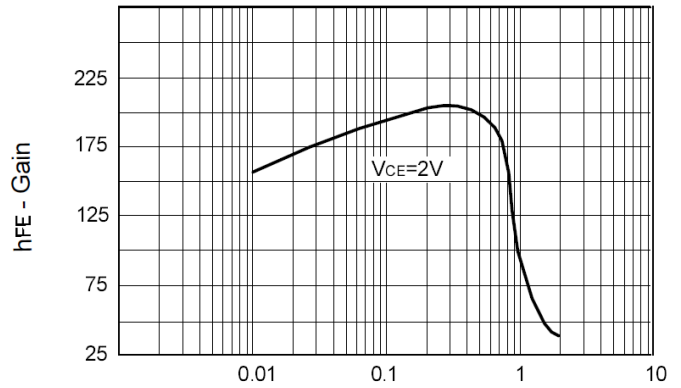
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



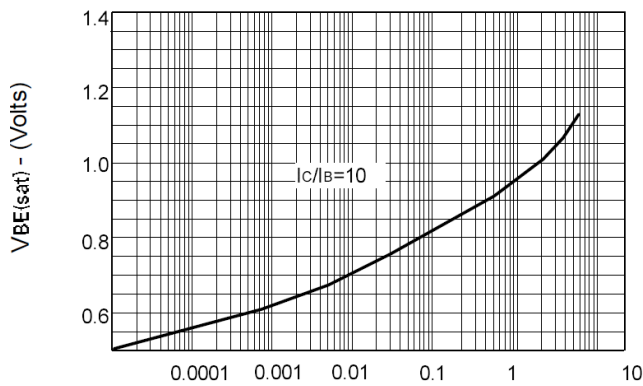
IC - Collector Current (Amps)

**VCE(sat) v IC**



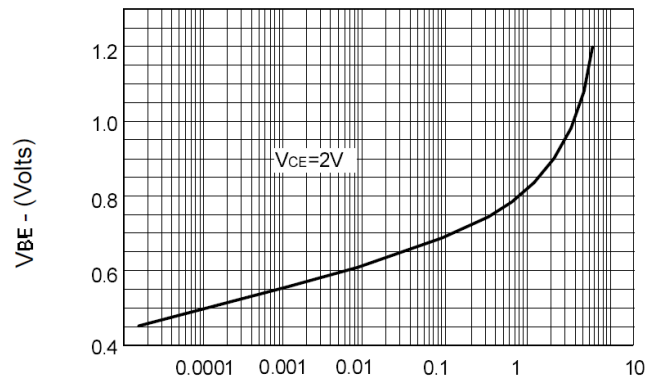
IC - Collector Current (Amps)

**hFE v IC**



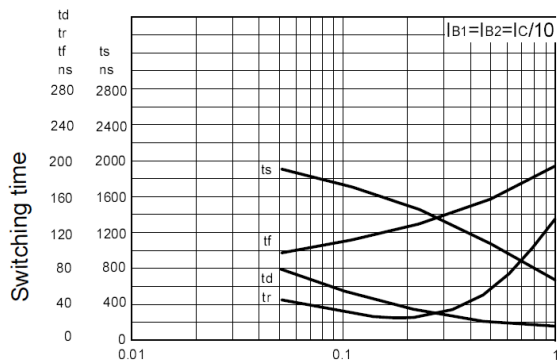
IC - Collector Current (Amps)

**VBE(sat) v IC**



IC - Collector Current (Amps)

**VBE(on) v IC**



IC - Collector Current (Amps)

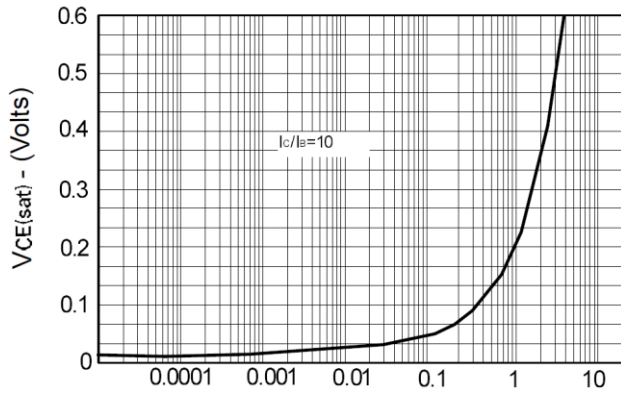
**Switching Speeds**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-120	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	-100	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	—	—	V	$I_E = -100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$	—	< 1	-0.1	$\mu\text{A}$	$V_{CB} = -100\text{V}$
		—	—	-10	$\mu\text{A}$	$V_{CB} = -100\text{V}, T_A = +125^\circ\text{C}$
Emitter Cut-Off Current	$I_{EBO}$	—	< 1	-0.1	$\mu\text{A}$	$V_{EB} = -5.6\text{V}$
DC Current Transfer Static Ratio (Note 8)	$h_{FE}$	70	200	—	—	$I_C = -50\text{mA}, V_{CE} = -2\text{V}$
		100	200	300		$I_C = -500\text{mA}, V_{CE} = -2\text{V}$
		55	170	—		$I_C = -1\text{A}, V_{CE} = -2\text{V}$
		25	55	—		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-0.17	-0.30	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
		—	-0.30	-0.50		$I_C = -2\text{A}, I_B = -200\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-0.90	-1.25	V	$I_C = -1\text{A}, I_B = -100\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	-0.80	-1.0	V	$I_C = -1\text{A}, V_{CE} = -2\text{V}$
Transitional Frequency	$f_T$	100	140	—	MHz	$I_C = -100\text{mA}, V_{CE} = -5\text{V}, f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	—	30	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Switching Time	$t_{on}$	—	35	—	ns	$V_{CC} = -10\text{V}, I_C = -500\text{mA}$
	$t_{off}$	—	600	—	ns	$I_{B1} = -I_{B2} = -50\text{mA}$

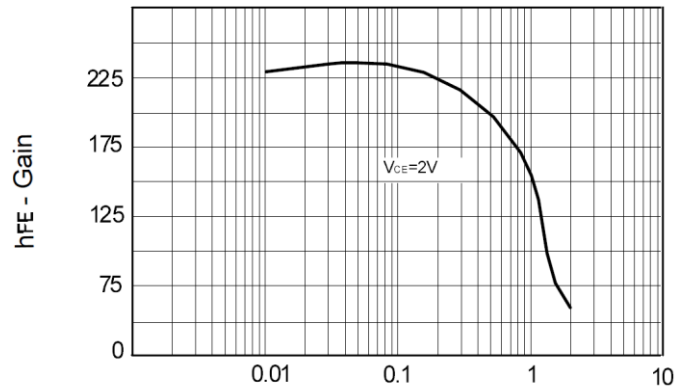
Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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



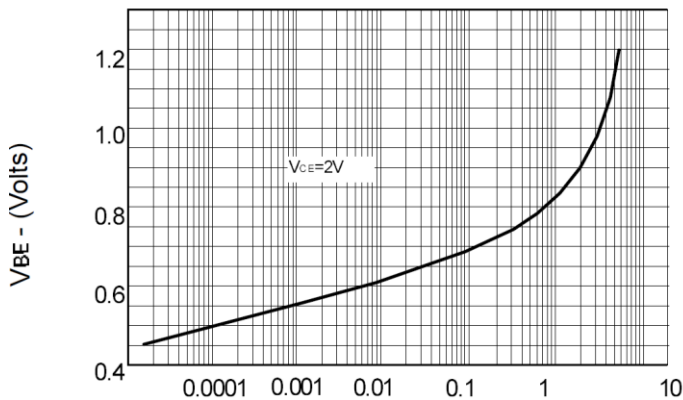
IC - Collector Current (Amps)

**VCE(sat) v IC**



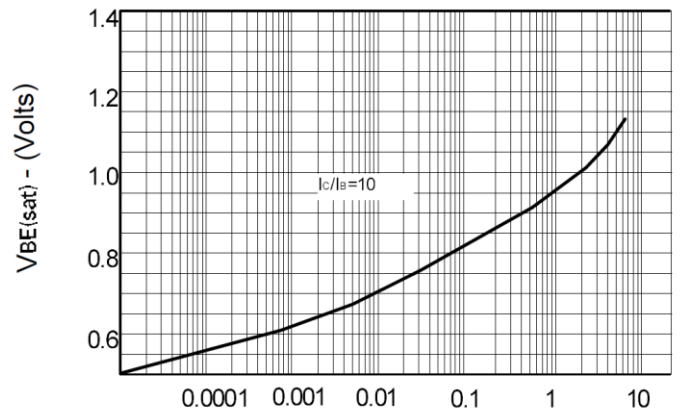
IC - Collector Current (Amps)

**hFE v IC**



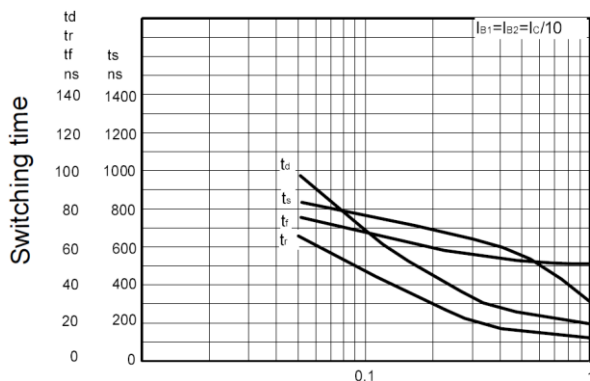
IC - Collector Current (Amps)

**VBE(on) v IC**



IC - Collector Current (Amps)

**VBE(sat) v IC**

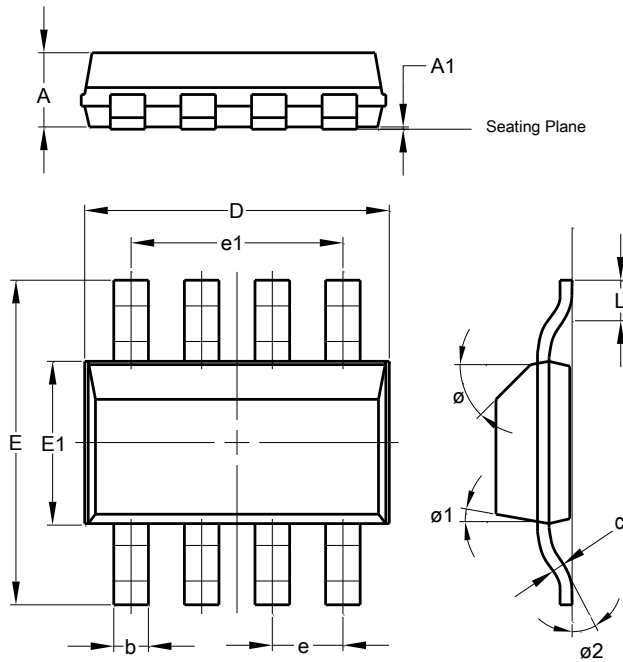


IC - Collector Current (Amps)

**Switching Speeds**

## Package Outline Dimensions

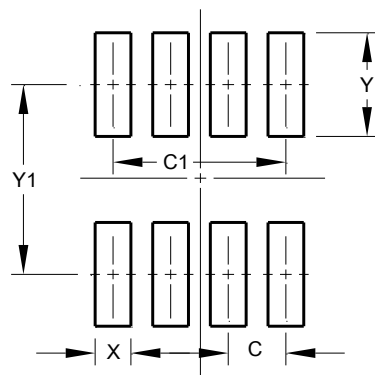
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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

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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