


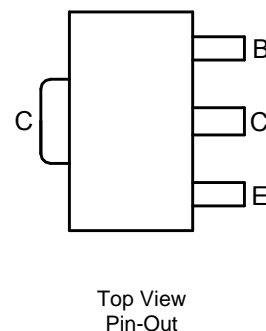
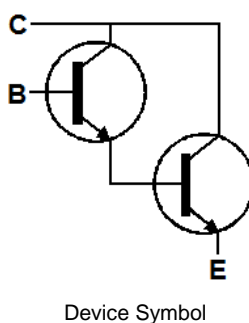
**60V NPN DARLINGTON TRANSISTOR IN SOT89**

**Features**

- $BV_{CEO} > 60V$
- Darlington Transistor  $h_{FE} > 10k$  @ 100mA for High Gain
- $I_C = 500mA$  High Continuous Collector Current
- Complementary Darlington PNP Type: FCX705
- **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: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability 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 0.052 grams (Approximate)

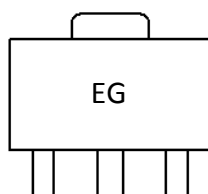


**Ordering Information (Note 4)**

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BCV49TA	AEC-Q101	EG	7	8	3,000

- 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**



EG = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	80	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	10	V
Continuous Collector Current	I <sub>C</sub>	500	mA
Peak Pulse Current	I <sub>CM</sub>	800	mA

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

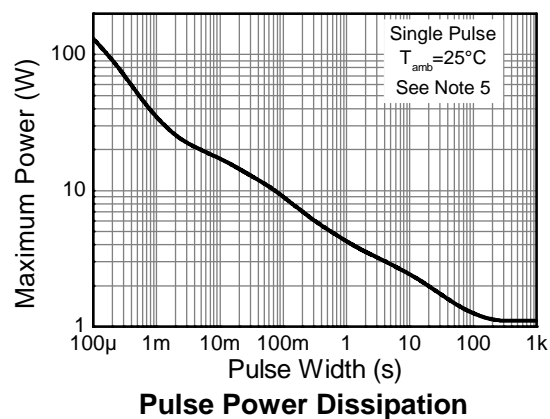
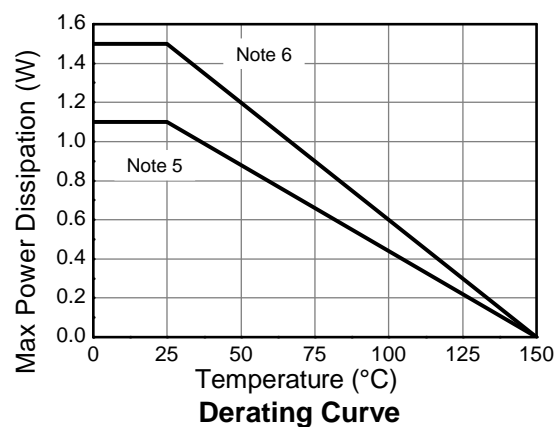
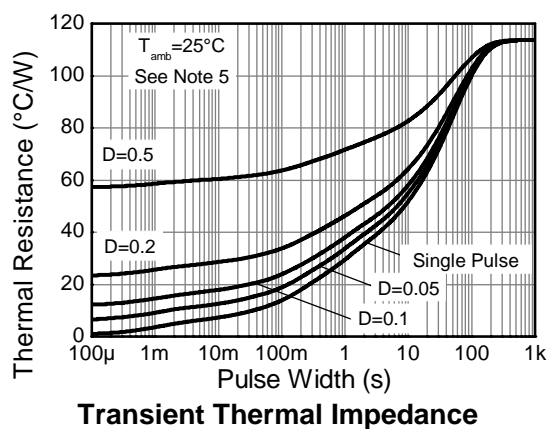
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P <sub>D</sub>	1.1	W
	(Note 6)		1.5	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	113	°C/W
	(Note 6)		83	
Thermal Resistance, Junction to Leads	(Note 7)	R <sub>θJL</sub>	9.9	°C/W
Operating and Storage Temperature Range		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 mounted with the exposed collector pad on 15mm x 15mm 1oz 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 6, except the device is mounted on 25mm x 25mm 1oz copper.
  7. Thermal resistance from junction to solder-point (on the exposed collector pad).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

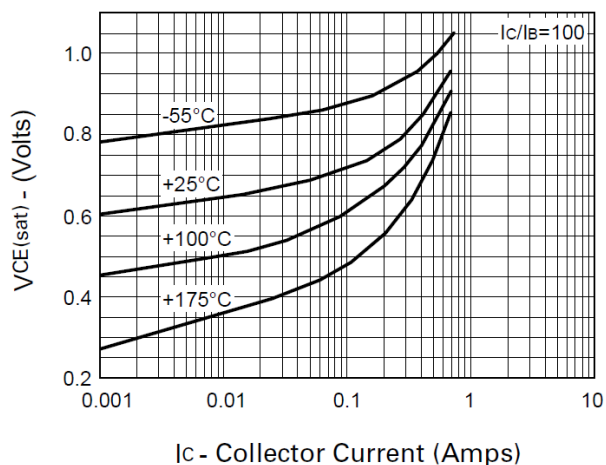


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

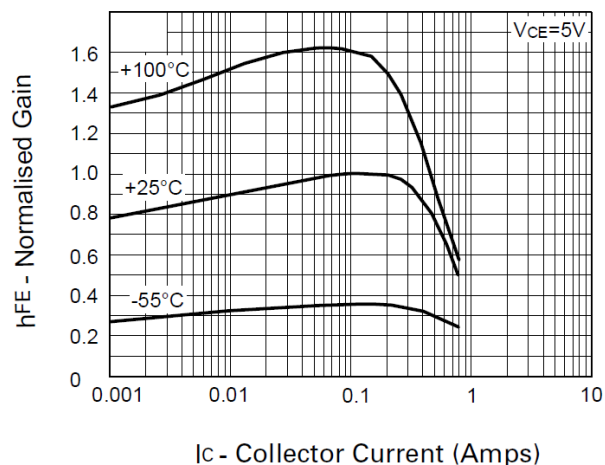
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	80	—	—	V	I <sub>C</sub> = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	60	—	—	V	I <sub>CEO</sub> = 10mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	10	—	—	V	I <sub>EBO</sub> = 10μA
Collector Cut-Off Current	I <sub>CBO</sub>	—	<1	100	nA	V <sub>CB</sub> = 60V
		—	—	10	μA	V <sub>CB</sub> = 60V, T <sub>A</sub> = +150°C
Emitter-Base Cut-Off Current	I <sub>EBO</sub>	—	<1	100	nA	V <sub>EB</sub> = 4V
<b>ON CHARACTERISTICS (Note 9)</b>						
Static Forward Current Transfer Ratio	h <sub>FE</sub>	2,000 4,000 10,000 2,000	—	—	—	I <sub>C</sub> = 100μA, V <sub>CE</sub> = 1V I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 100mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 500mA, V <sub>CE</sub> = 5V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	1.0	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 0.1mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	1.5	V	I <sub>C</sub> = 100mA, I <sub>B</sub> = 0.1mA
<b>SMALL SIGNAL CHARACTERISTICS (Note 9)</b>						
Transition Frequency	f <sub>T</sub>	—	170	—	MHz	I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V, f = 20MHz
Output Capacitance	C <sub>obo</sub>	—	3.5	—	pF	V <sub>CB</sub> = 10V, f = 1MHz

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

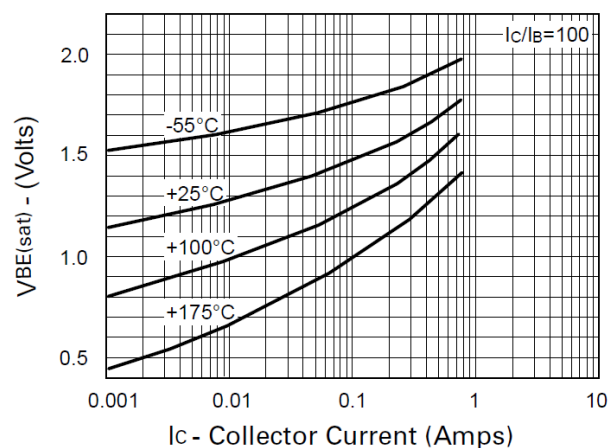
## Typical Electrical Characteristics



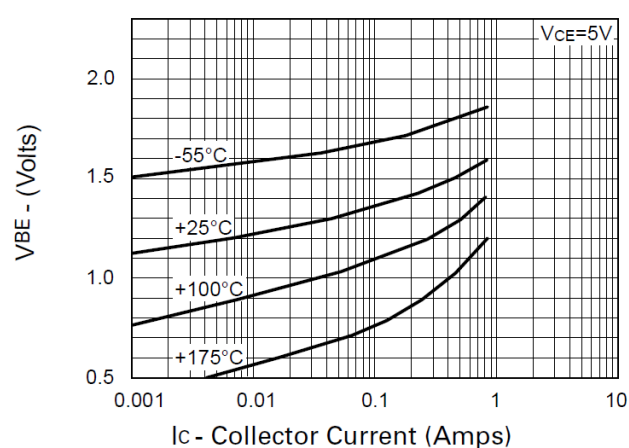
**$V_{CE(sat)}$  v  $I_C$**



**$h_{FE}$  v  $I_C$**



**$V_{BE(sat)}$  v  $I_C$**

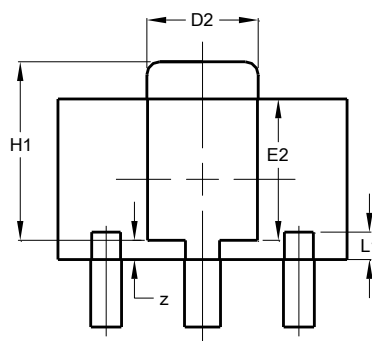
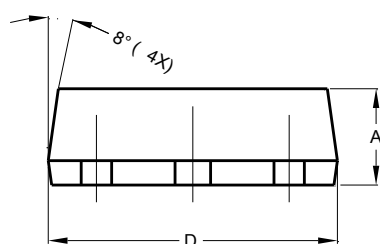
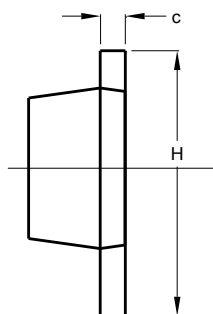
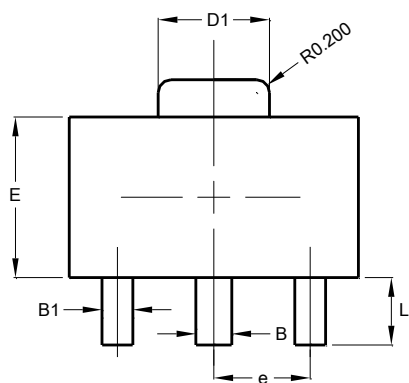


**$V_{BE(on)}$  v  $I_C$**

## Package Outline Dimensions

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

**SOT89**

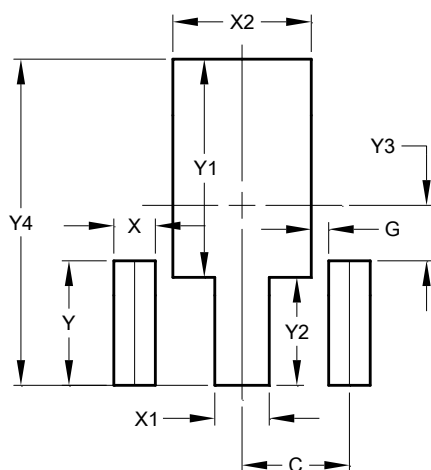


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.427 REF		
Z	0.30 REF		
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

**SOT89**



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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