120V PNP DARLINGTON TRANSISTOR IN SOT89

Features

- BV_{CEO} > -120V
- Darlington Transistor h_{FE} > 3k @ -1A
- Low Saturation Voltage < -1.3V @ -1A
- I_C = -1A Continuous Collector Current
- Specification is also available in Eline and SOT223 package outlines
- **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

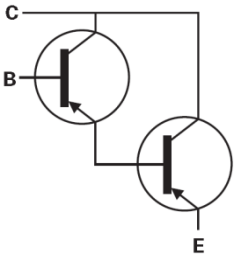
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight 0.052 grams (Approximate)

Applications

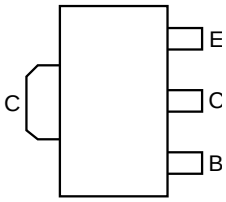
- Various Driving Functions
  - Lamps
  - Motors
  - Relays and Solenoids
- High Output Current Switches

SOT89

Top View



Device Symbol



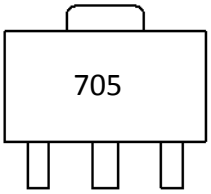
Top View
Pin-Out

Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX705TA	AEC-Q101	705	7	8	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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



705 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-140	V
Collector-Emitter Voltage	V_{CEO}	-120	V
Emitter-Base Voltage	V_{EBO}	-10	V
Continuous Collector Current	I_C	-1	A
Peak Pulse Current	I_{CM}	-4	A

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

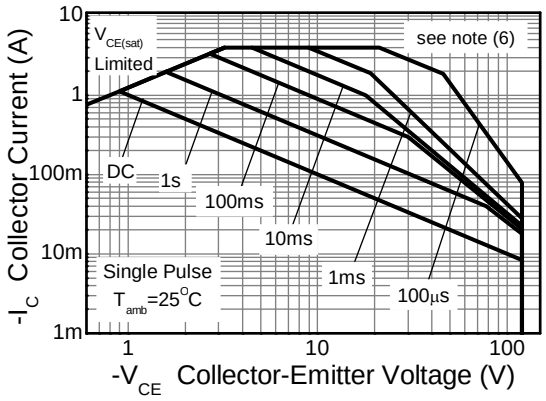
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 5)	P_D	0.9	W
	(Note 6)		1	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	139	°C/W
	(Note 6)		125	
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	5.2	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

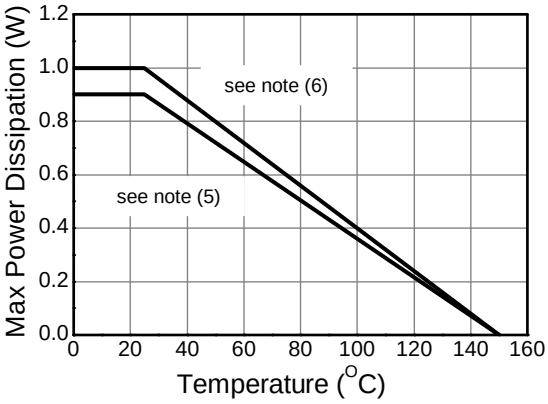
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

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 FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 1oz copper.
7. Thermal resistance from junction to solder-point (at the end of the leads).
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

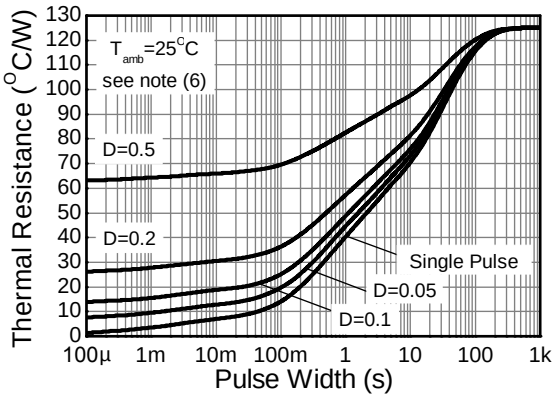
Thermal Characteristics and Derating Information



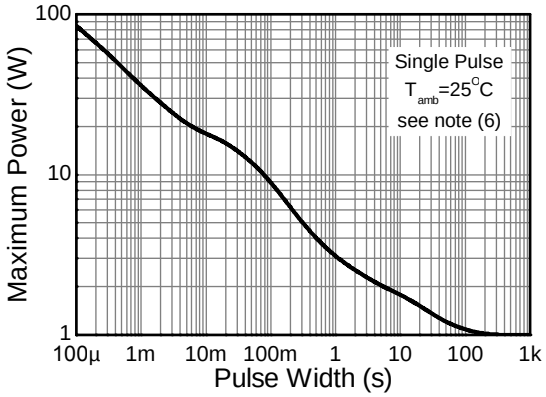
Safe Operating Area



Derating Curve



Transient Thermal Impedance



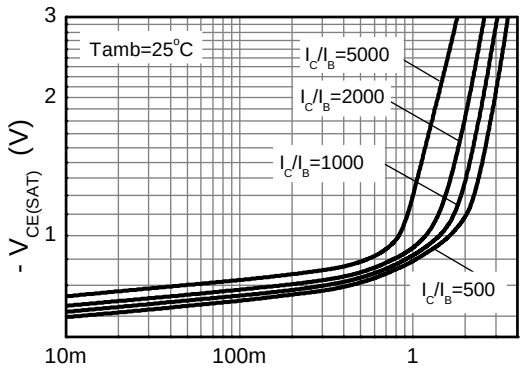
Pulse Power Dissipation

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

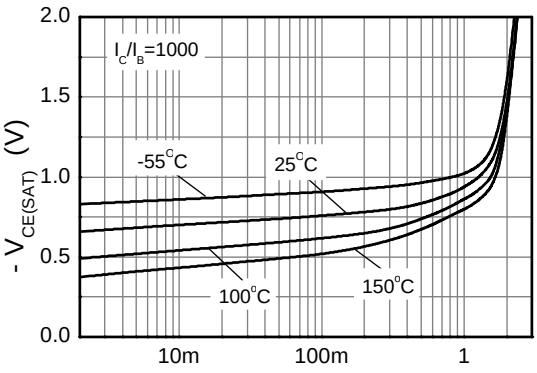
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-140	—	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-120	—	—	V	I_{CEO} = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-10	—	—	V	I_{EBO} = -100µA
Collector Cut-off Current	I_{CBO}	— —	— —	-100 -10	nA µA	V_{CB} = -120V V_{CB} = -120V, T_A = +150°C
Emitter-base Cut-off Current	I_{EBO}	—	—	-100	nA	V_{EB} = -8V
ON CHARACTERISTICS (Note 9)						
Static Forward Current Transfer Ratio	h_{FE}	3k 3k 3k 2k	— — — —	— — 30k —	—	I_C = -10mA, V_{CE} = -5V I_C = -100mA, V_{CE} = -5V I_C = -1A, V_{CE} = -5V I_C = -2A, V_{CE} = -5V
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	-1.3 -2.5	V	I_C = -1A, I_B = -1mA I_C = -2A, I_B = -2mA
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	—	—	-1.8	V	I_C = -1A, I_B = -1mA
Base-Emitter Turn-On Voltage	$V_{BE(ON)}$	—	—	-1.7	V	I_C = -1A, V_{CE} = -5V
SMALL SIGNAL CHARACTERISTICS (Note 9)						
Transition Frequency	f_T	—	160	—	MHz	I_C = -100mA, V_{CE} = -10V f = 20MHz
Input Capacitance	C_{ibo}	—	90	—	pF	V_{CB} = -500mV, f = 1MHz
Output Capacitance	C_{obo}	—	15	—	pF	V_{CB} = -10V, f = 1MHz
Turn-On Time	t_{ON}	—	0.6	—	µs	I_C = -500mA, V_{CE} = -10V I_{B1} = -I_{B2} = 0.5mA
Turn-Off Time	t_{OFF}	—	0.8	—	µs	I_C = -500mA, V_{CE} = -10V I_{B1} = -I_{B2} = 0.5mA

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

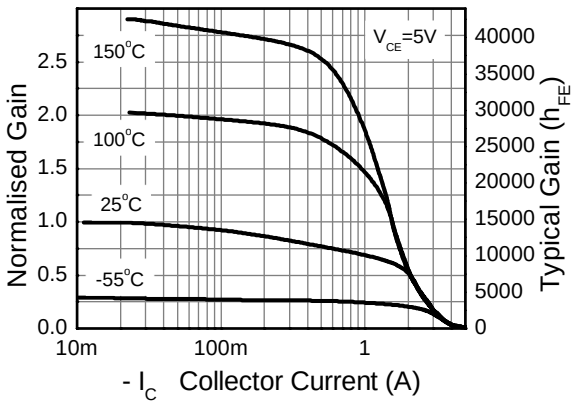
Typical Electrical Characteristics



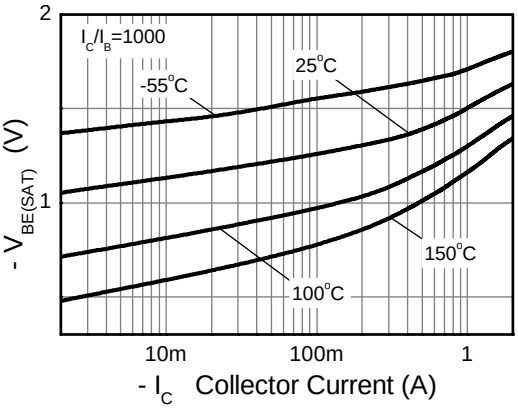
$V_{CE(SAT)}$ v I_C



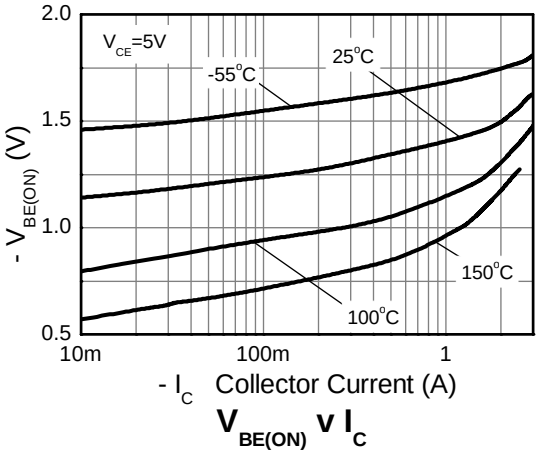
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C

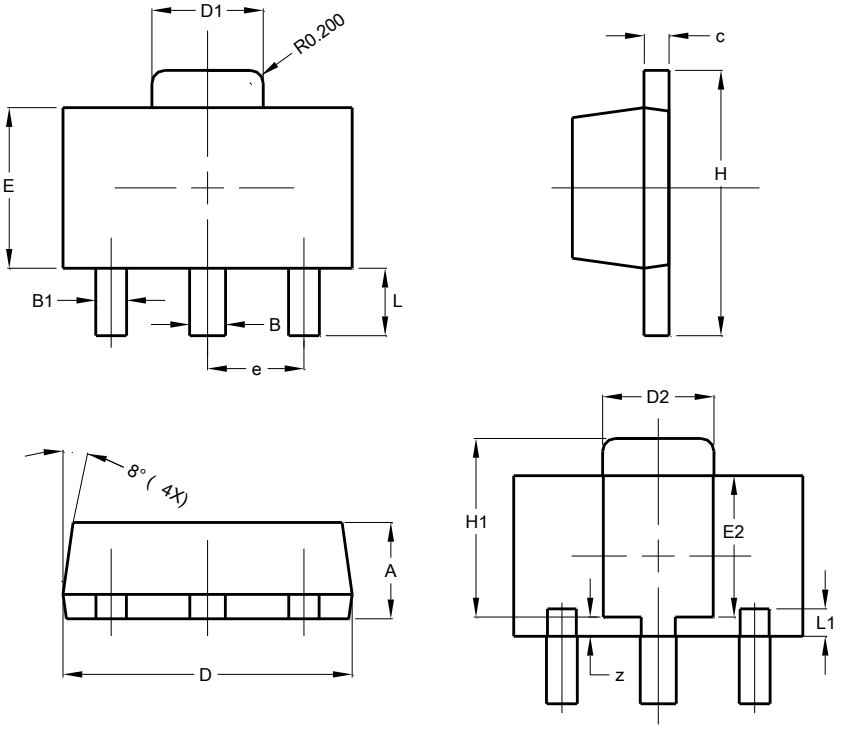


$V_{BE(ON)}$ v I_C

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the 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	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

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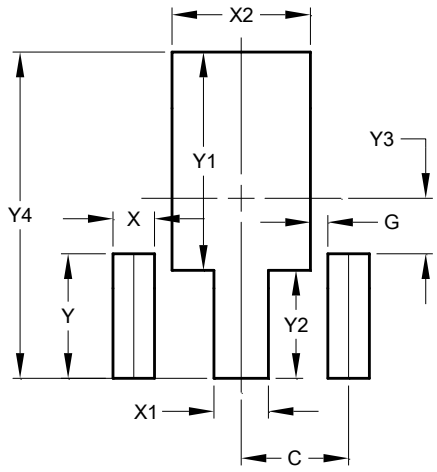

Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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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