

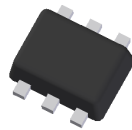
## Features

- NPN & PNP Complementary SS
- $BV_{CE0} > 45V$
- $I_C = 100mA$  High Collector Current
- $P_D = 300mW$  Power Dissipation
- $1mm^2$  Package Footprint, 5 times smaller than SOT23
- 0.5mm Height Package Minimizing Off-Board Profile
- **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**

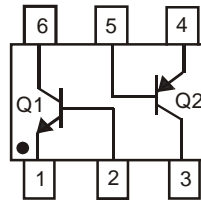
## Mechanical Data

- Case: SOT-963
- 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 Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208②③
- Weight: 0.0027 grams (Approximate)

SOT-963



Top View



Device Schematic

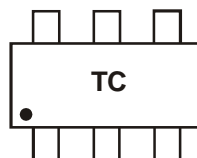
## Ordering Information (Note 4)

Device	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DST847BPDP6-7	AEC-Q101	TC	7	8	10,000

- 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

SOT-963



TC = 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>	50(-50)	V
Collector-Emitter Voltage	V <sub>CEO</sub>	45(-45)	V
Emitter-Base Voltage	V <sub>EBO</sub>	6.0(-5.0)	V
Collector Current	I <sub>C</sub>	100 (-100)	mA

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	417	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**ESD Ratings** (Note 6)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	200	V	B

- Notes:
5. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition.
  6. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics and Derating Information**

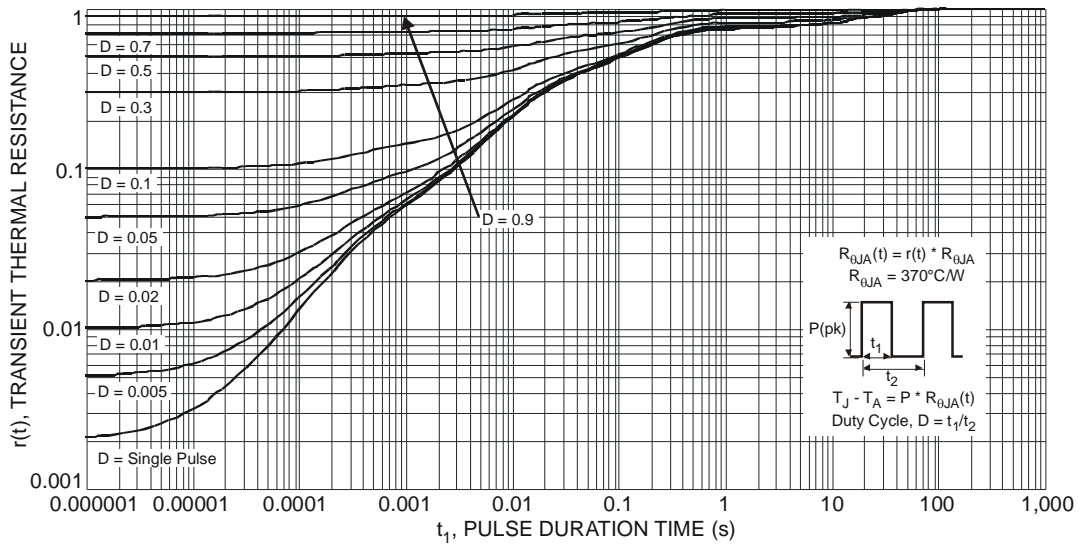


Fig. 1 Transient Thermal Response

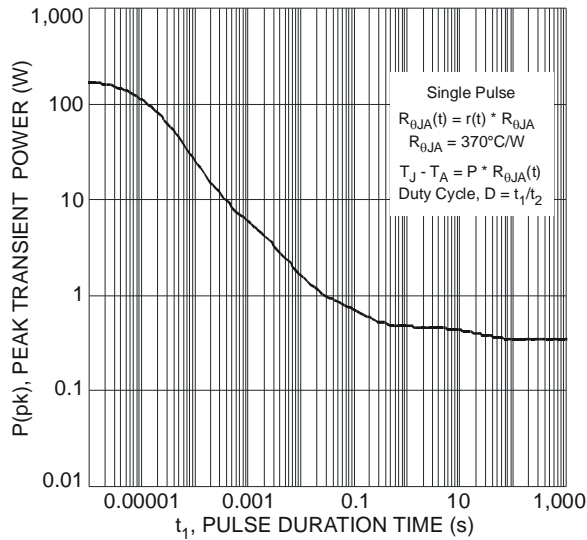


Fig. 2 Single Pulse Maximum Power Dissipation

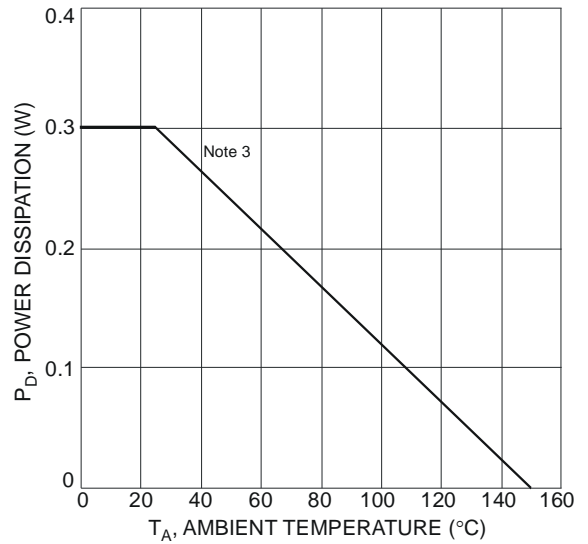


Fig. 3 Power Dissipation vs. Ambient Temperature

**Electrical Characteristics – Q1 NPN Transistor** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic (Note 7)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	50	150	-	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$BV_{CES}$	50	150	-	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	45	65	-	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	8.35	-	V	$I_E = 1\mu\text{A}, I_C = 0$
Collector-Base Cut-Off Current	$I_{CBO}$	-	-	15	nA	$V_{CB} = 30\text{V}$
DC Current Gain	$h_{FE}$	- 200	220 300	- 470	-	$I_C = 10\mu\text{A}, V_{CE} = 5\text{V}$ $I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	- -	50 122	125 300	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	- -	760 880	1,000 1,100	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5.0\text{mA}$
Base-Emitter Voltage	$V_{BE(on)}$	580	650 725	750 800	mV	$I_C = 2.0\text{mA}, V_{CE} = 5\text{V}$ $I_C = 10\text{mA}, V_{CE} = 5\text{V}$
Current Gain-Bandwidth Product	$f_T$	100	175	-	MHz	$V_{CE} = 5\text{V}, I_C = 10\text{mA},$ $f = 100\text{MHz}$
Collector-Base Capacitance	$C_{cbo}$	-	1.5	-	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$

Note: 7. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Characteristics – Q1 NPN Transistor** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

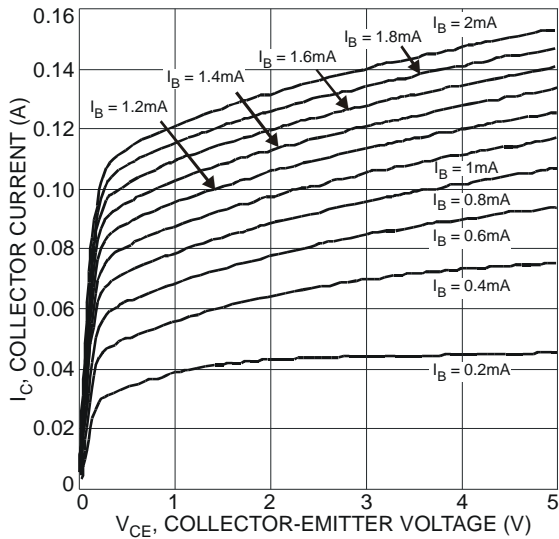


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

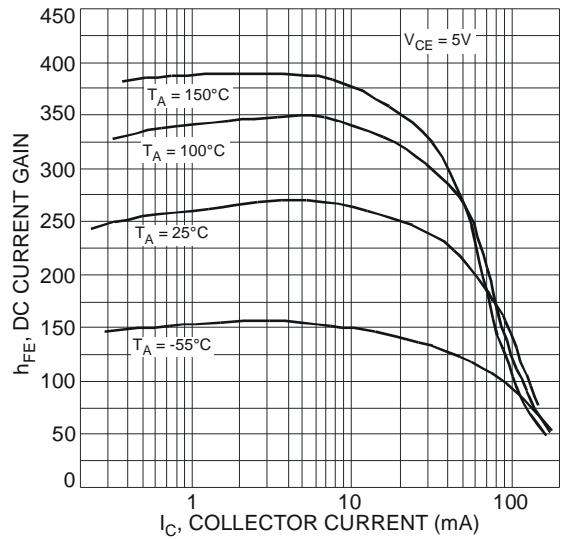


Fig. 5 Typical DC Current Gain vs. Collector Current

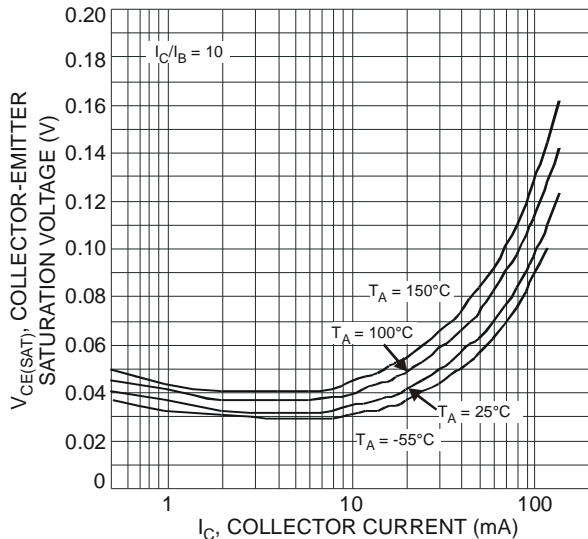


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

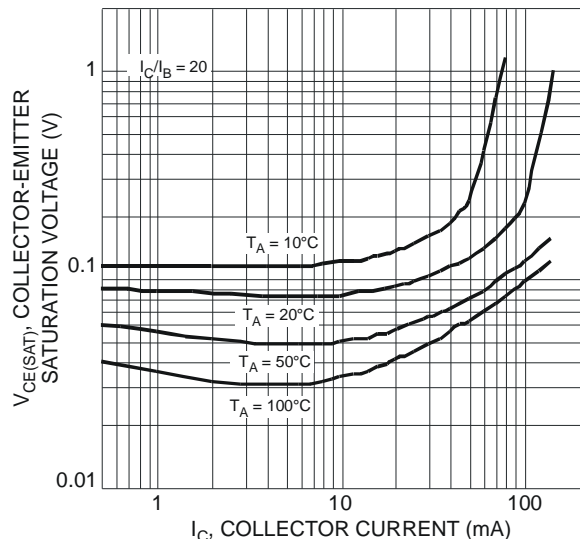


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

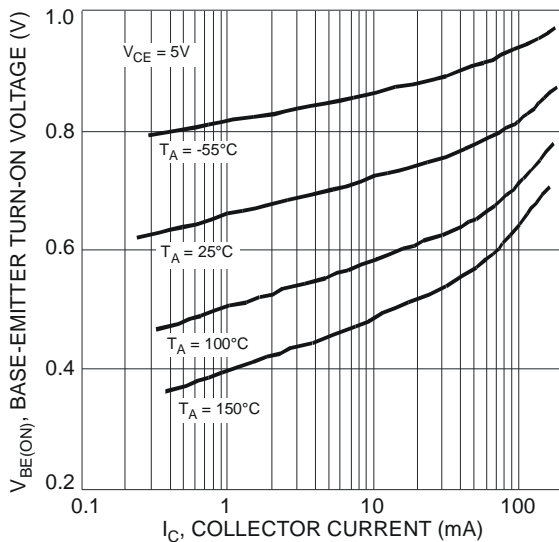


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

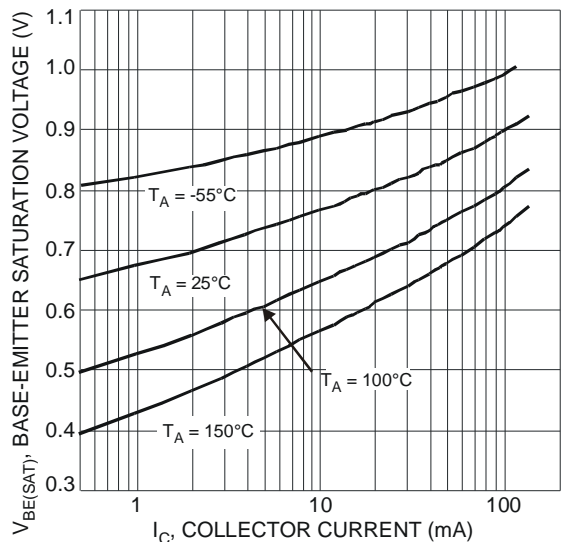


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

**Electrical Characteristics – Q2 PNP Transistor** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic (Note 7)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-50	-100	-	V	$I_C = -10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$BV_{CES}$	-50	-90	-	V	$I_C = -10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	-45	-65	-	V	$I_C = -1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-6	-8.5	-	V	$I_E = -1\mu\text{A}, I_C = 0$
Collector Cut-Off Current	$I_{CBO}$	-	-	-15	nA	$V_{CB} = -30\text{V}$
DC Current Gain	$h_{FE}$	- 200	340 330	- 470	-	$I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$ $I_C = -2.0\text{mA}, V_{CE} = -5\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	- -	-70 -300	-175 -500	mV	$I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	- -	-760 -885	-1,000 -1,100	mV	$I_C = -10\text{mA}, I_B = -0.5\text{mA}$ $I_C = -100\text{mA}, I_B = -5.0\text{mA}$
Base-Emitter Voltage	$V_{BE(on)}$	-600 -	-670 -715	-780 -850	mV	$I_C = -2.0\text{mA}, V_{CE} = -5\text{V}$ $I_C = -10\text{mA}, V_{CE} = -5\text{V}$
Current Gain-Bandwidth Product	$f_T$	100	340	-	MHz	$V_{CE} = -5\text{V}, I_C = -10\text{mA},$ $f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	-	2.0	-	pF	$V_{CB} = -10\text{V}, f = 1.0\text{MHz}$

Note: 7. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Characteristics – Q2 PNP Transistor (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)**

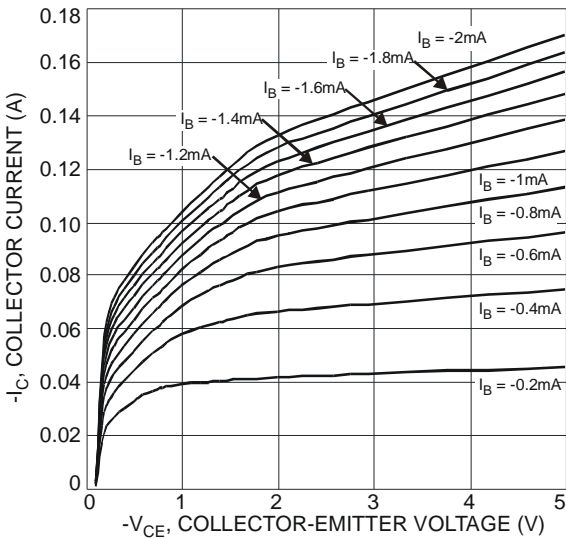


Fig. 10 Typical Collector Current vs. Collector-Emitter Voltage

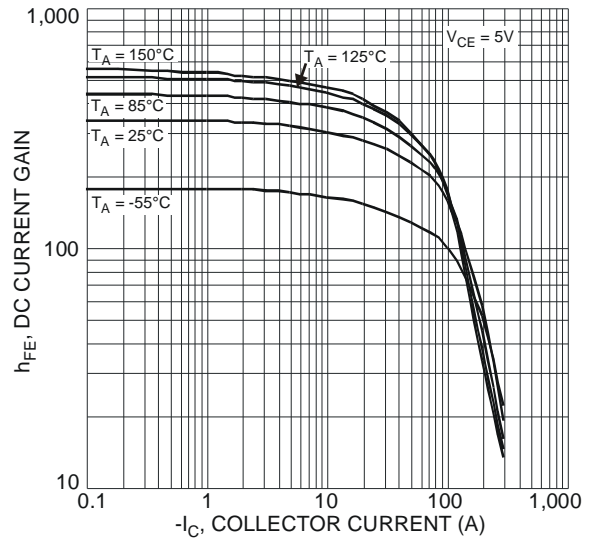


Fig. 11 Typical DC Current Gain vs. Collector Current

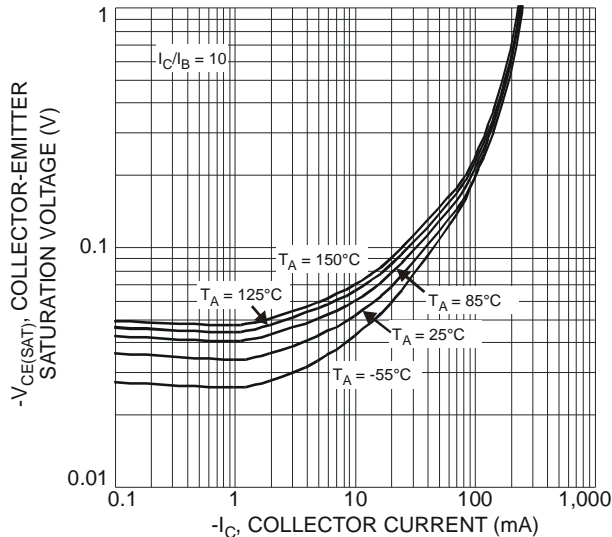


Fig. 12 Typical Collector-Emitter Saturation Voltage vs. Collector Current

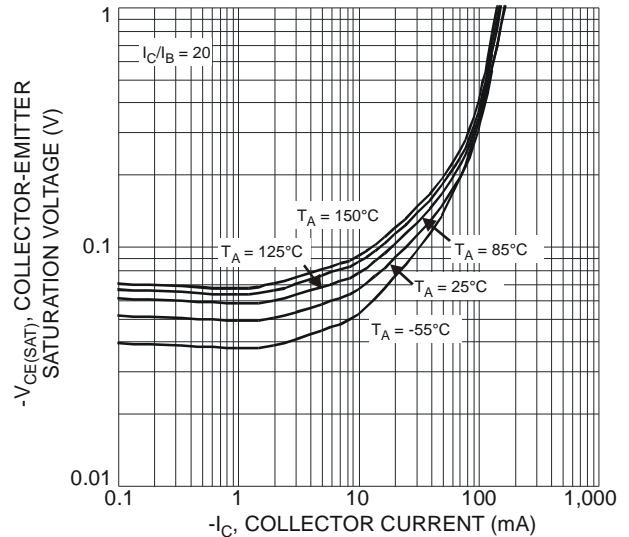


Fig. 13 Typical Collector-Emitter Saturation Voltage vs. Collector Current

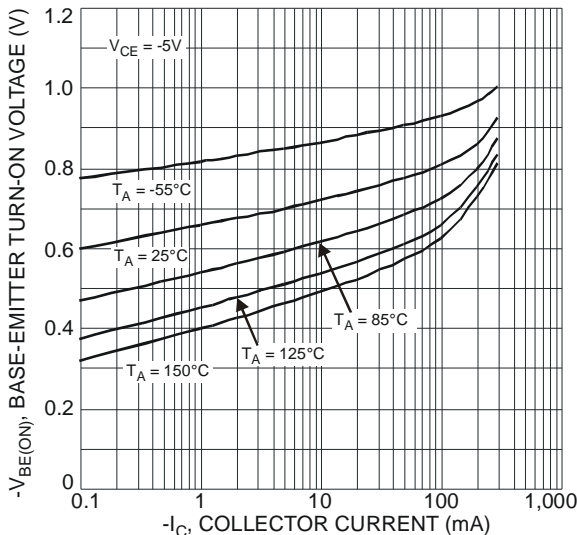


Fig. 14 Typical Base-Emitter Turn-On Voltage vs. Collector Current

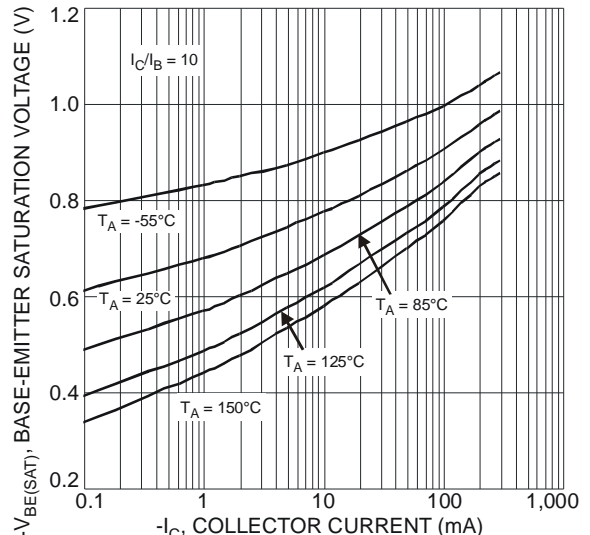
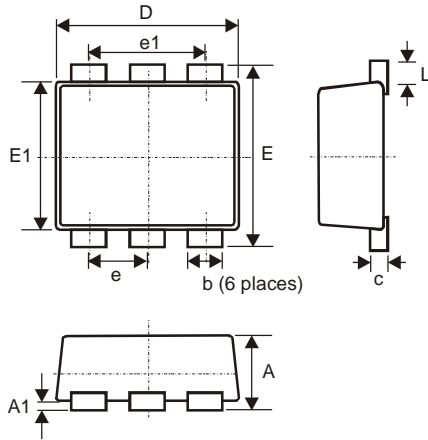


Fig. 15 Typical Base-Emitter Saturation Voltage vs. Collector Current

**Package Outline Dimensions**

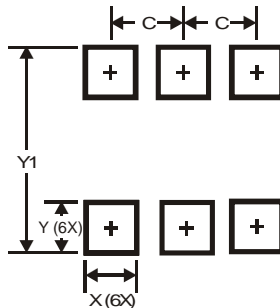
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT-963			
Dim	Min	Max	Typ
A	0.40	0.50	0.45
A1	0	0.05	-
C	0.120	0.180	0.150
D	0.95	1.05	1.00
E	0.95	1.05	1.00
E1	0.75	0.85	0.80
L	0.05	0.15	0.10
b	0.10	0.20	0.15
e	0.35 Typ		
e1	0.70 Typ		
All Dimensions in mm			

**Suggest Pad Layout**

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



Dimensions	Value (in mm)
C	0.350
X	0.200
Y	0.200
Y1	1.100



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