

## Features

- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**
- Ultra Small Package

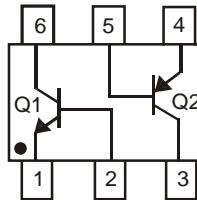
## Mechanical Data

- 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 208
- Weight: 0.0027 grams (approximate)

SOT-963



Top View



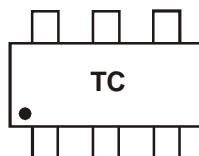
Device Schematic

## Ordering Information

Device	Packaging	Shipping
DST847BPDP6-7	SOT-963	10,000/Tape & Reel

Notes: 1. No purposefully added lead. Halogen and Antimony Free.  
 2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>

## Marking Information



TC = Product Type Marking Code

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{\text{CBO}}$	50(-50)	V
Collector-Emitter Voltage	$V_{\text{CEO}}$	45(-45)	V
Emitter-Base Voltage	$V_{\text{EBO}}$	6.0(-5.0)	V
Collector Current - Continuous (Note 3)	$I_C$	100 (-100)	mA

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	$P_D$	250	mW
Thermal Resistance, Junction to Ambient (Note 3)	$R_{\text{JJA}}$	500	°C/W
Operating and Storage Temperature Range	$T_J, T_{\text{STG}}$	-55 to +150	°C

Notes: 3. Device mounted on FR-4 PCB with minimum recommended pad layout.

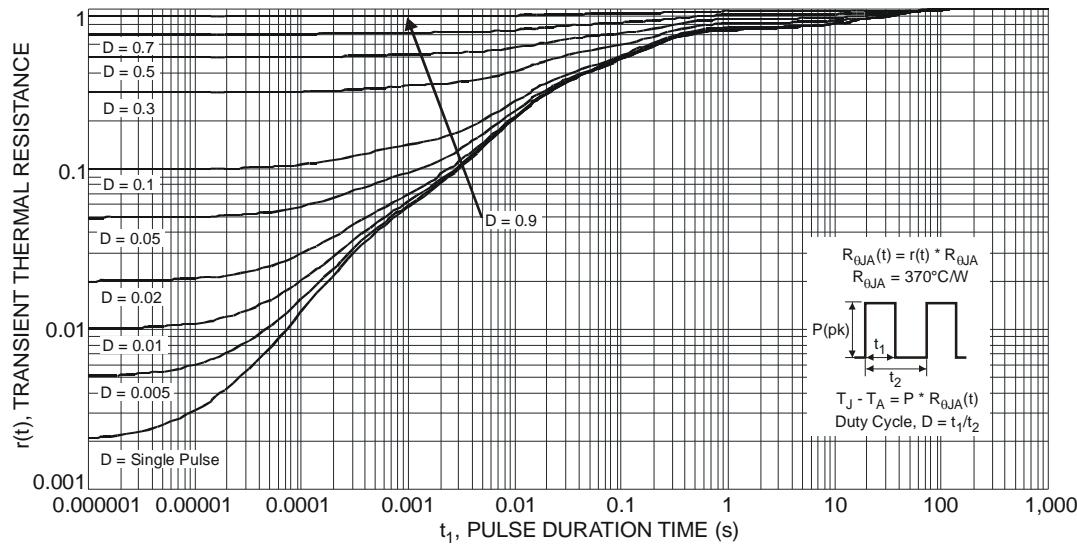


Fig. 1 Transient Thermal Response

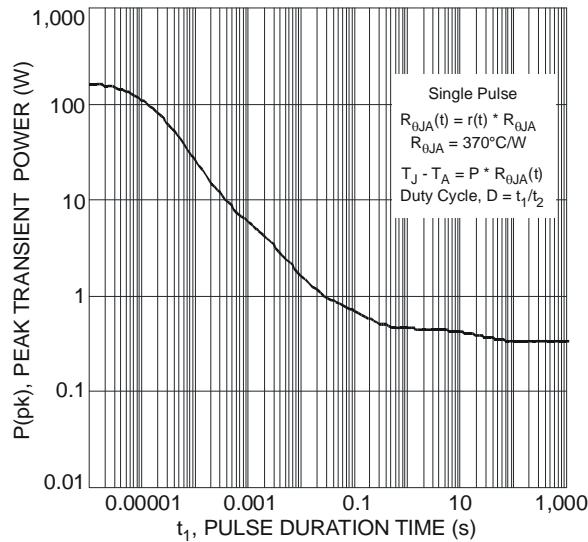


Fig. 2 Single Pulse Maximum Power Dissipation

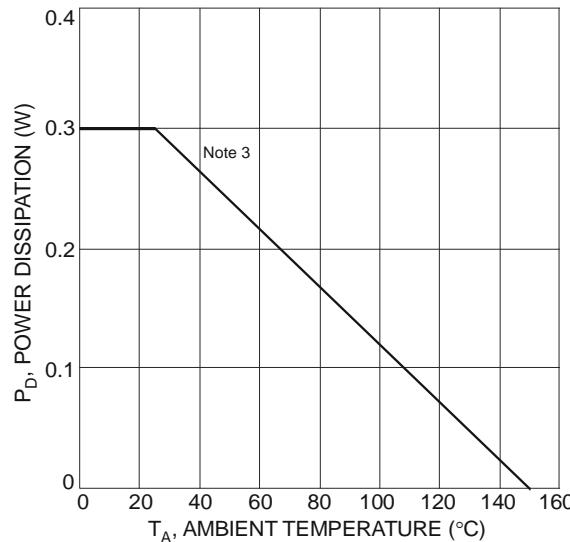


Fig. 3 Power Dissipation vs. Ambient Temperature

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

Characteristic (Note 4)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(\text{BR})\text{CBO}}$	50	150	-	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CES}}$	50	150	-	V	$I_C = 10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CEO}}$	45	65	-	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(\text{BR})\text{EBO}}$	6	8.35	-	V	$I_E = 1\mu\text{A}, I_C = 0$
Collector-Base Cutoff Current	$I_{\text{CBO}}$	-	-	15	nA	$V_{\text{CB}} = 30\text{V}$
DC Current Gain	$\text{h}_{\text{FE}}$	100 200	220 300	470	-	$I_C = 10\mu\text{A}, V_{\text{CE}} = 5\text{V}$ $I_C = 2.0\text{mA}, V_{\text{CE}} = 5\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	- -	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	$V_{\text{BE}(\text{sat})}$	- -	760 880	1000 1100	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	$V_{\text{BE}(\text{on})}$	580	650 725	750 800	mV	$I_C = 2.0\text{mA}, V_{\text{CE}} = 5\text{V}$ $I_C = 10\text{mA}, V_{\text{CE}} = 5\text{V}$
Current Gain-Bandwidth Product	$f_T$	100	175	-	MHz	$V_{\text{CE}} = 5\text{V}, I_C = 10\text{mA},$ $f = 100\text{MHz}$
Collector-Base Capacitance	$C_{\text{cbo}}$	-	1.5	-	pF	$V_{\text{CB}} = 10\text{V}, f = 1.0\text{MHz}$

Notes: 4. Short duration pulse test used to minimize self-heating effect

## Typical Characteristics – Q1 NPN Transistor

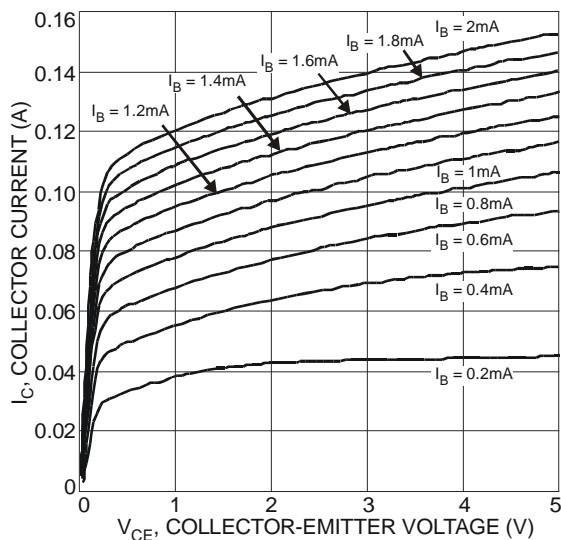


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

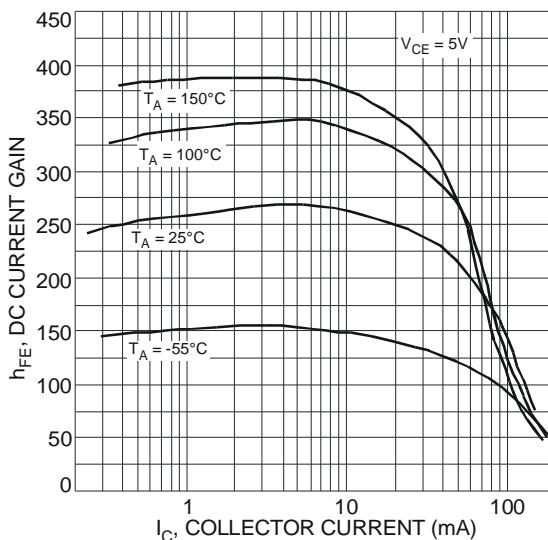


Fig. 5 Typical DC Current Gain vs. Collector Current

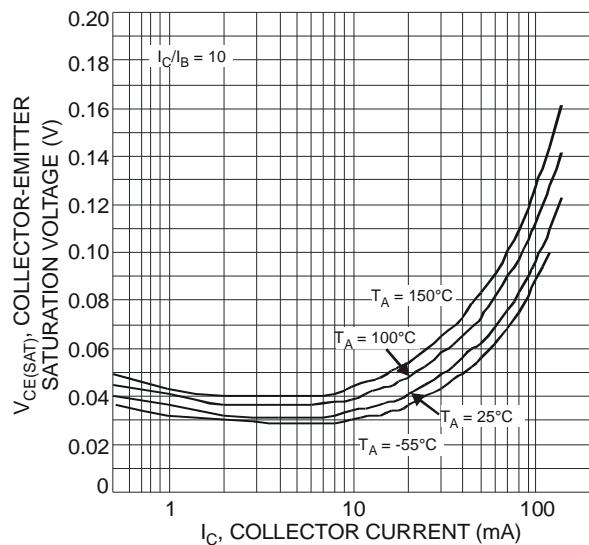


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

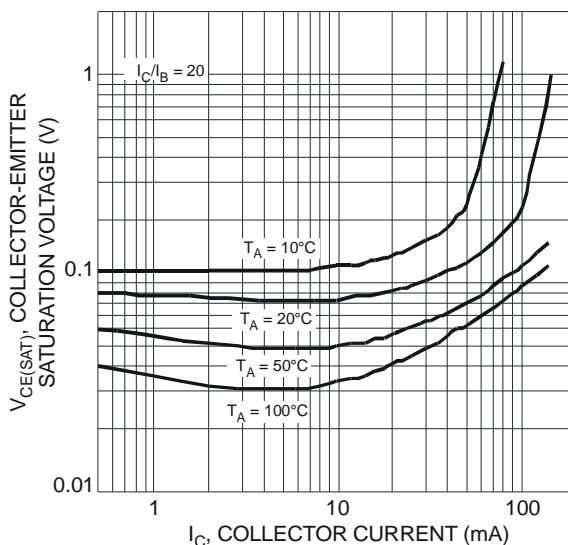


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

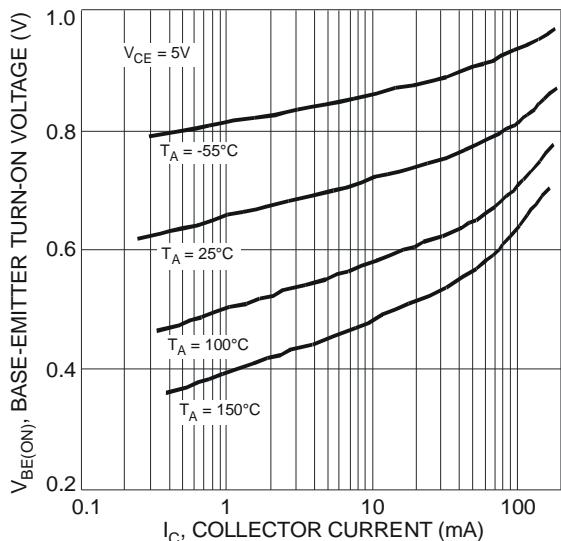


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

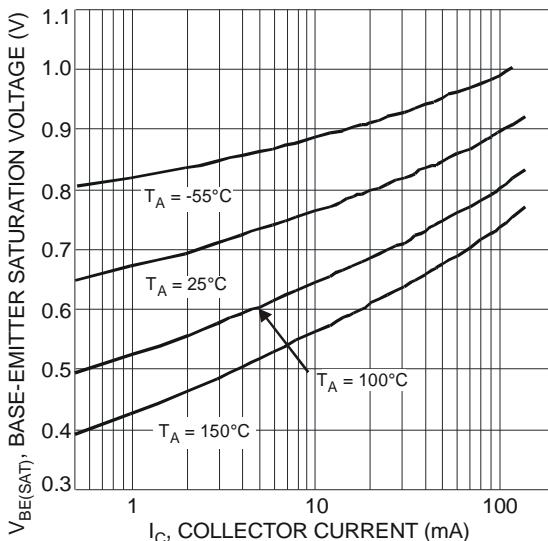


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

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

Characteristic (Note 4)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(\text{BR})\text{CBO}}$	-50	-100	-	V	$I_C = -10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CES}}$	-50	-90	-	V	$I_C = -10\mu\text{A}, I_B = 0$
Collector-Emitter Breakdown Voltage	$V_{(\text{BR})\text{CEO}}$	-45	-65	-	V	$I_C = -1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(\text{BR})\text{EBO}}$	-6	-8.5	-	V	$I_E = -1\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{\text{CBO}}$	-	-	-15	nA	$V_{\text{CB}} = -30\text{V}$
DC Current Gain	$\text{h}_{\text{FE}}$	100 200	340 330	470	-	$I_C = -10\mu\text{A}, V_{\text{CE}} = -5\text{V}$ $I_C = -2.0\text{mA}, V_{\text{CE}} = -5\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{sat})}$	- -	-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	$V_{\text{BE}(\text{sat})}$	- -	-760 -885	-1000 -1100	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	$V_{\text{BE}(\text{on})}$	-600 -	-670 -715	-780 -850	mV	$I_C = -2.0\text{mA}, V_{\text{CE}} = -5\text{V}$ $I_C = -10\text{mA}, V_{\text{CE}} = -5\text{V}$
Current Gain-Bandwidth Product	$f_T$	100	340	-	MHz	$V_{\text{CE}} = -5\text{V}, I_C = -10\text{mA},$ $f = 100\text{MHz}$
Output Capacitance	$C_{\text{obo}}$	-	2.0	-	pF	$V_{\text{CB}} = -10\text{V}, f = 1.0\text{MHz}$

Notes: 4. Short duration pulse test used to minimize self-heating effect.

## Typical Characteristics – Q2 PNP Transistor

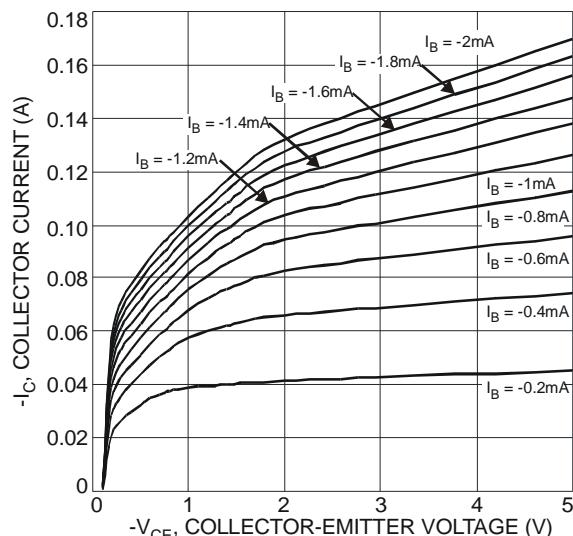


Fig. 10 Typical Collector Current vs. Collector-Emitter Voltage

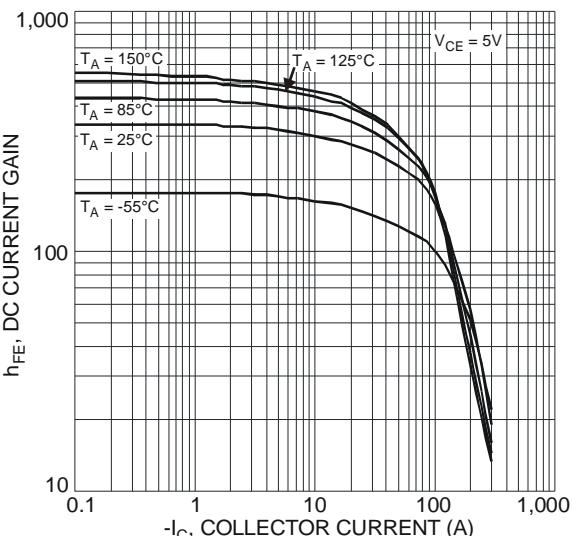


Fig. 11 Typical DC Current Gain vs. Collector Current

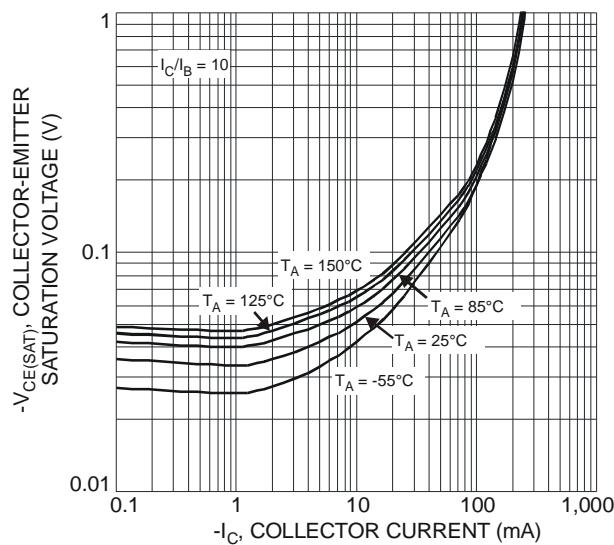


Fig. 12 Typical Collector-Emitter Saturation Voltage vs. Collector Current

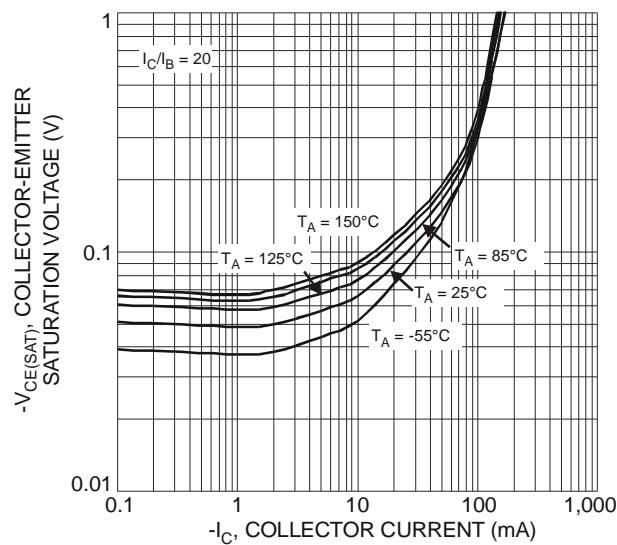


Fig. 13 Typical Collector-Emitter Saturation Voltage vs. Collector Current

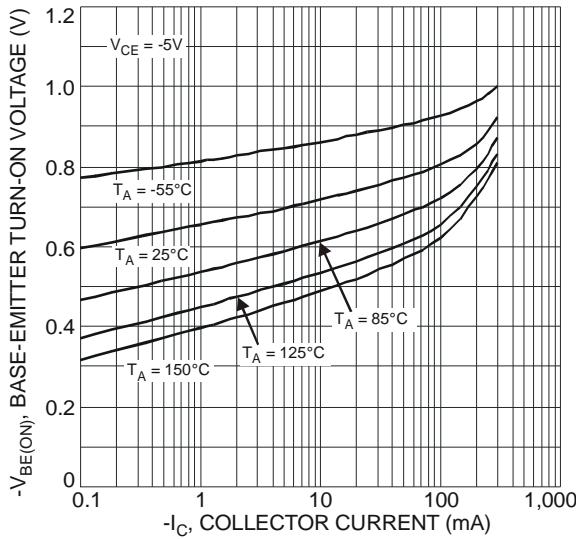


Fig. 14 Typical Base-Emitter Turn-On Voltage vs. Collector Current

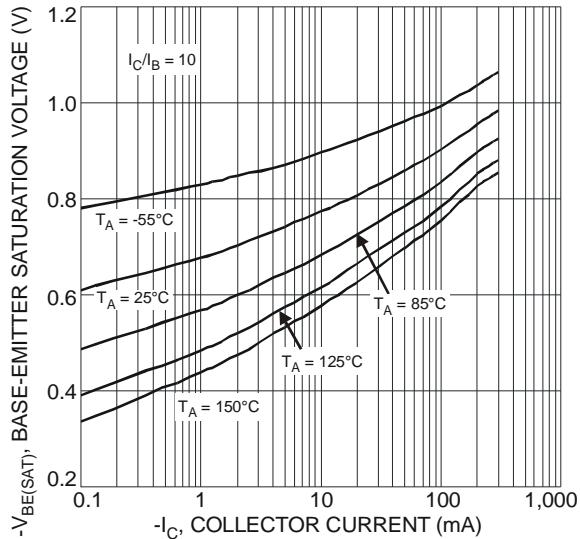
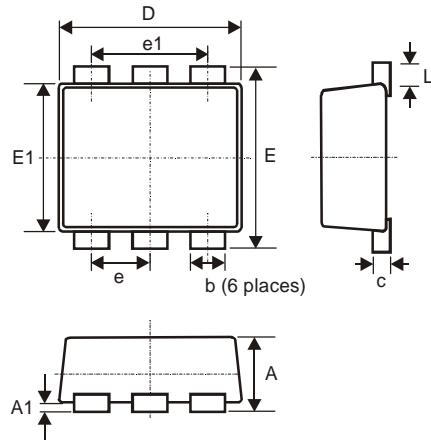


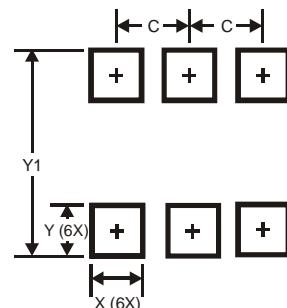
Fig. 15 Typical Base-Emitter Saturation Voltage vs. Collector Current

## Package Outline Dimensions



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

## Suggest Pad Layout



Dimensions	Value (in mm)
<b>C</b>	0.350
<b>X</b>	0.200
<b>Y</b>	0.200
<b>Y1</b>	1.100

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