COMPLEMENTARY DUAL SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Features

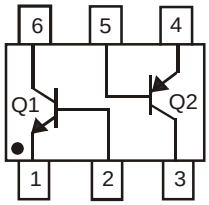
- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Ultra Small Package**

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



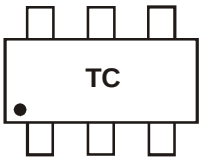
Device Schematic

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°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50(-50)	V
Collector-Emitter Voltage	V_{CEO}	45(-45)	V
Emitter-Base Voltage	V_{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)	$R_{\theta JA}$	500	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

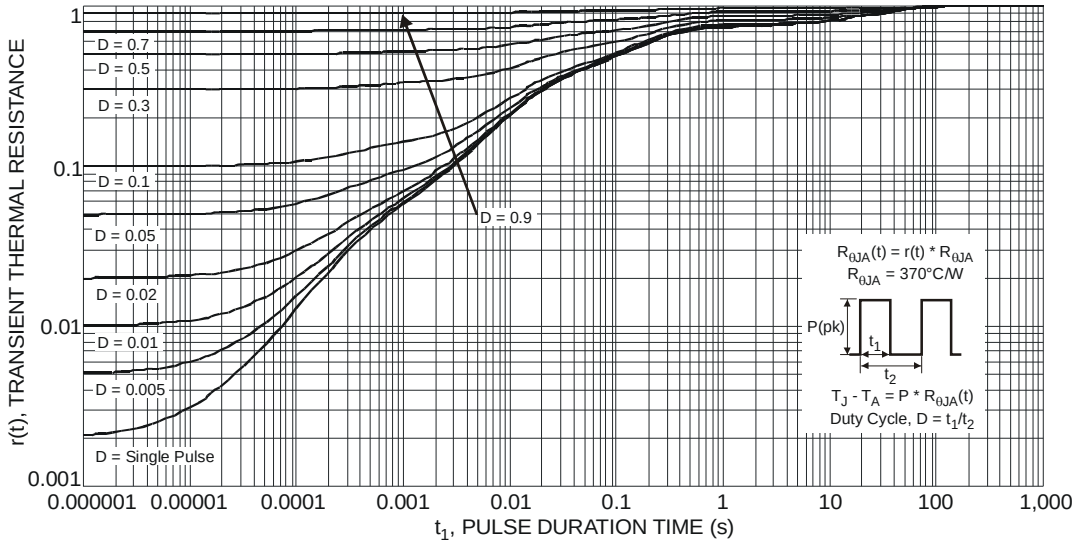


Fig. 1 Transient Thermal Response

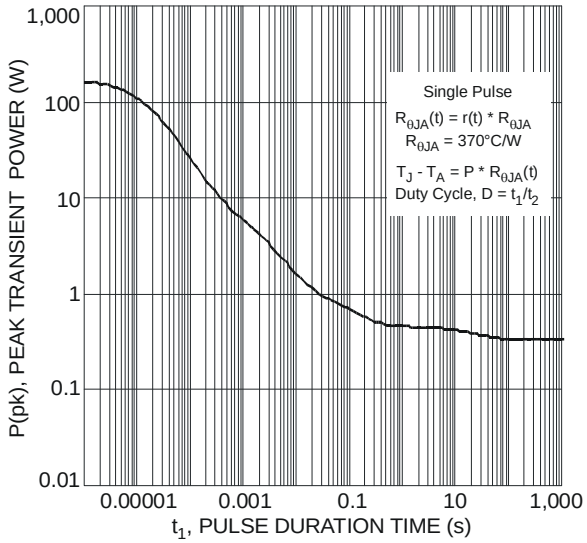


Fig. 2 Single Pulse Maximum Power Dissipation

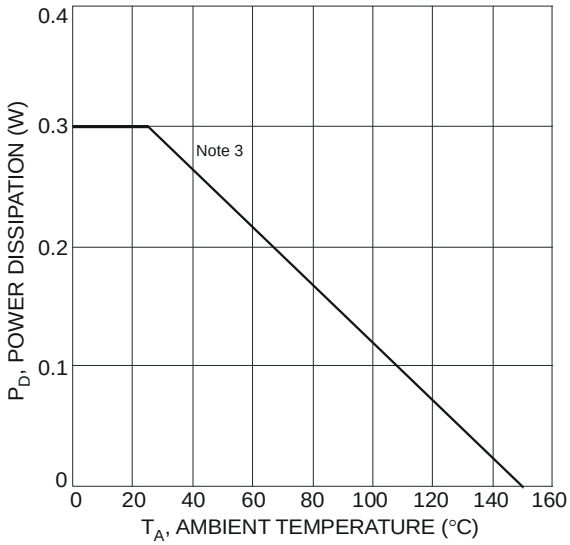


Fig. 3 Power Dissipation vs. Ambient Temperature

Electrical Characteristics – Q1 NPN Transistor @T_A = 25°C unless otherwise specified

Characteristic (Note 4)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	150	-	V	I_C = 10μA, I_B = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	50	150	-	V	I_C = 10μA, I_B = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	45	65	-	V	I_C = 1mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	8.35	-	V	I_E = 1μA, I_C = 0
Collector-Base Cutoff Current	I_{CBO}	-	-	15	nA	V_{CB} = 30V
DC Current Gain	h_{FE}	100 200	220 300	- 470	-	I_C = 10μA, V_{CE} = 5V I_C = 2.0mA, V_{CE} = 5V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	- -	50 122	125 300	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	- -	760 880	1000 1100	mV	I_C = 10mA, I_B = 0.5mA I_C = 100mA, I_B = 5.0mA
Base-Emitter Voltage	$V_{BE(on)}$	580	650 725	750 800	mV	I_C = 2.0mA, V_{CE} = 5V I_C = 10mA, V_{CE} = 5V
Current Gain-Bandwidth Product	f_T	100	175	-	MHz	V_{CE} = 5V, I_C = 10mA, f = 100MHz
Collector-Base Capacitance	C_{cbo}	-	1.5	-	pF	V_{CB} = 10V, f = 1.0MHz

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

Typical Characteristics – Q1 NPN Transistor

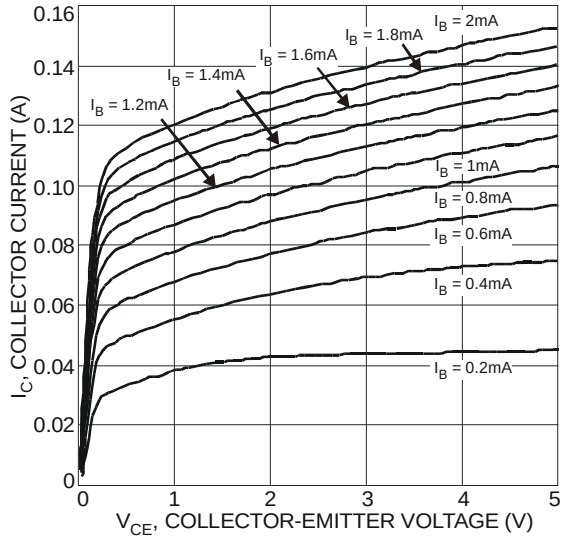


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

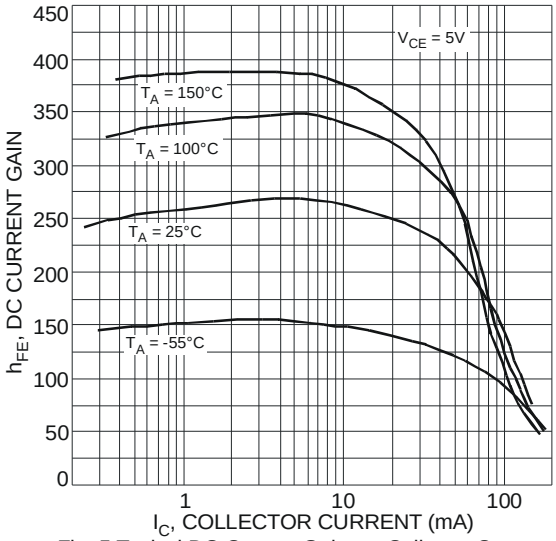


Fig. 5 Typical DC Current Gain vs. Collector Current

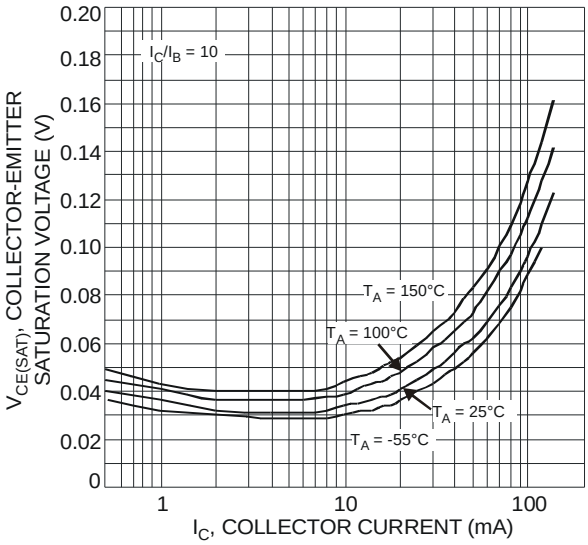


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

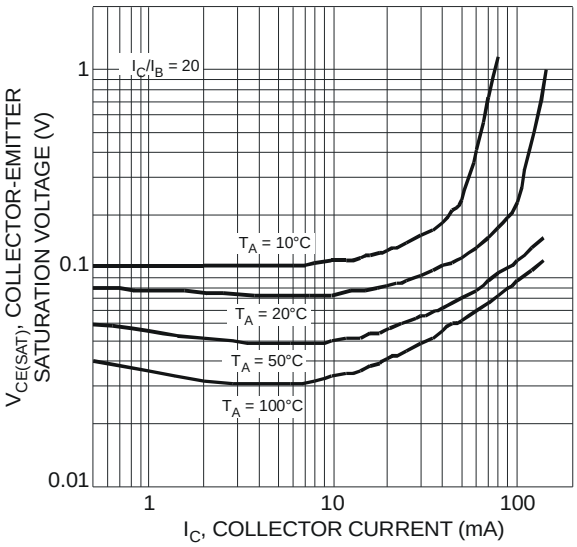


Fig. 7 Typical Collector-Emitter Saturation Voltage vs. Collector Current

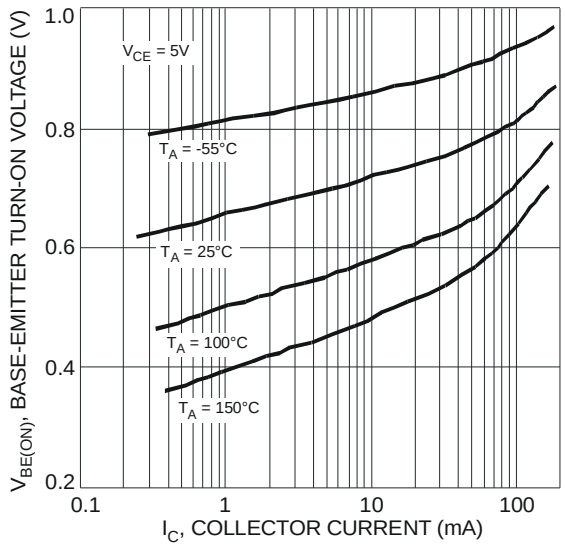


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

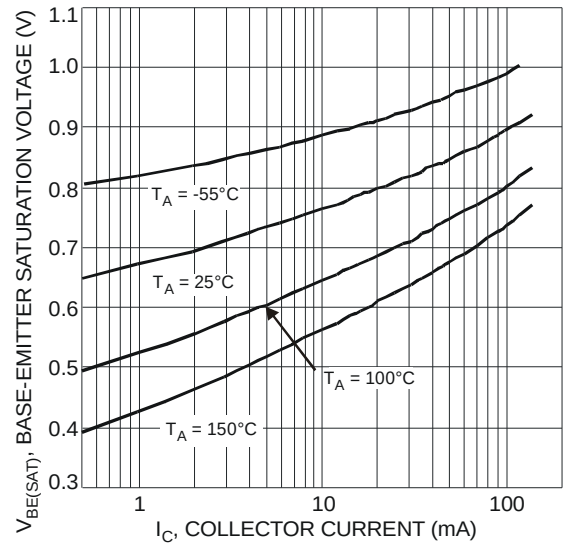


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

Electrical Characteristics – Q2 PNP Transistor @T_A = 25°C unless otherwise specified

Characteristic (Note 4)	Symbol	Min	Typical	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	-100	-	V	I_C = -10μA, I_B = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	-50	-90	-	V	I_C = -10μA, I_B = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-45	-65	-	V	I_C = -1mA, I_B = 0
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-6	-8.5	-	V	I_E = -1μA, I_C = 0
Collector Cutoff Current	I_{CBO}	-	-	-15	nA	V_{CB} = -30V
DC Current Gain	h_{FE}	100 200	340 330	- 470	-	I_C = -10μA, V_{CE} = -5V I_C = -2.0mA, V_{CE} = -5V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	- -	-70 -300	-175 -500	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5.0mA
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	- -	-760 -885	-1000 -1100	mV	I_C = -10mA, I_B = -0.5mA I_C = -100mA, I_B = -5.0mA
Base-Emitter Voltage	$V_{BE(on)}$	-600 -	-670 -715	-780 -850	mV	I_C = -2.0mA, V_{CE} = -5V I_C = -10mA, V_{CE} = -5V
Current Gain-Bandwidth Product	f_T	100	340	-	MHz	V_{CE} = -5V, I_C = -10mA, f = 100MHz
Output Capacitance	C_{obo}	-	2.0	-	pF	V_{CB} = -10V, f = 1.0MHz

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

Typical Characteristics – Q2 PNP Transistor

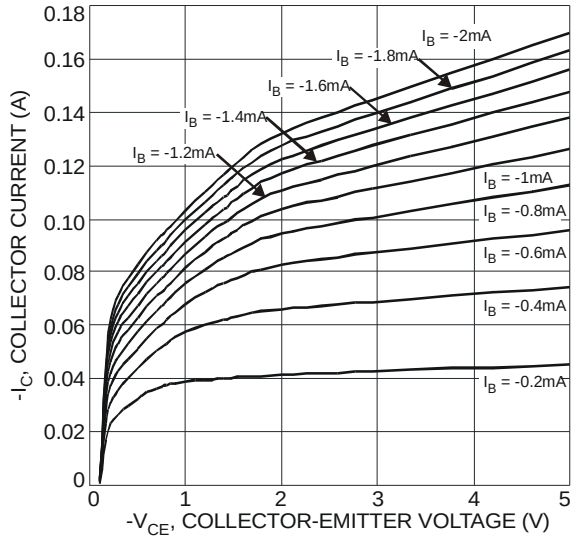


Fig. 10 Typical Collector Current vs. Collector-Emitter Voltage

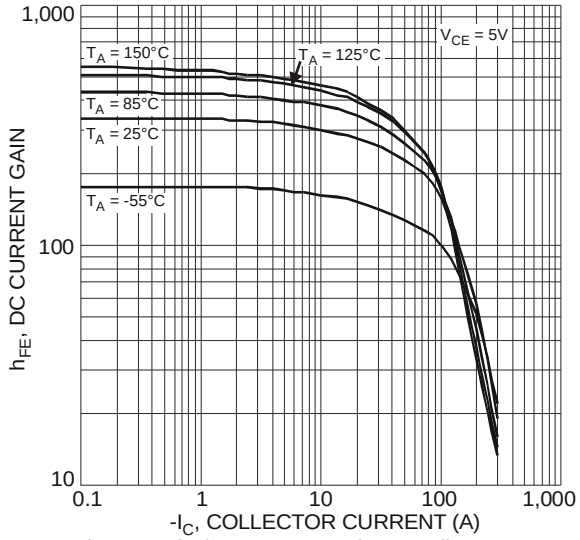


Fig. 11 Typical DC Current Gain vs. Collector Current

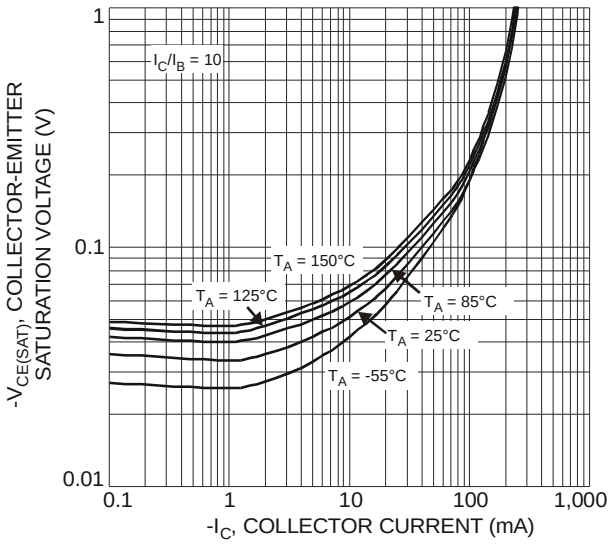


Fig. 12 Typical Collector-Emitter Saturation Voltage vs. Collector Current

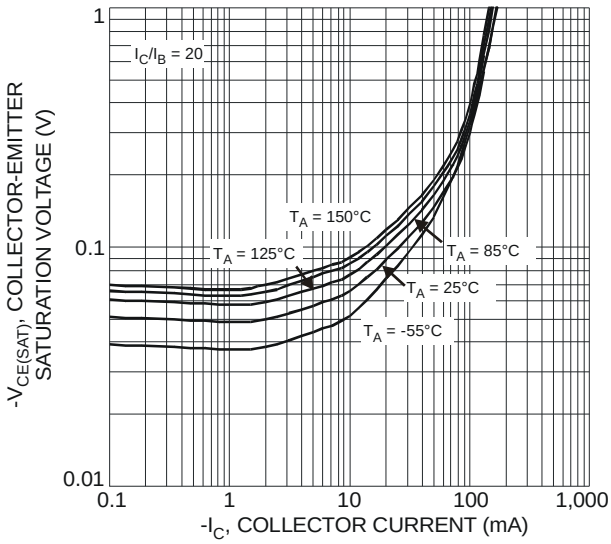


Fig. 13 Typical Collector-Emitter Saturation Voltage vs. Collector Current

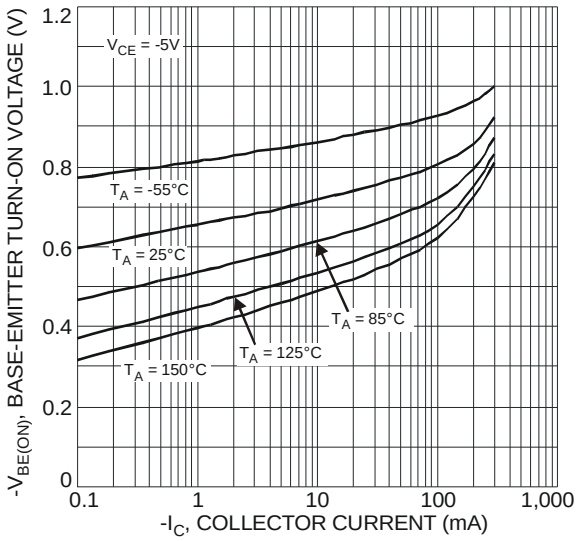


Fig. 14 Typical Base-Emitter Turn-On Voltage vs. Collector Current

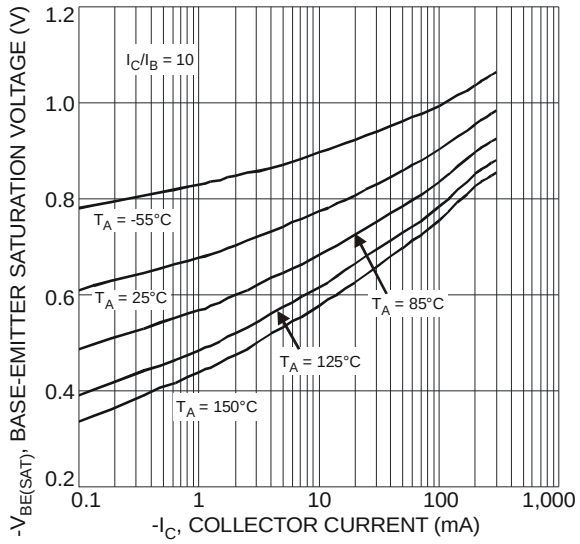
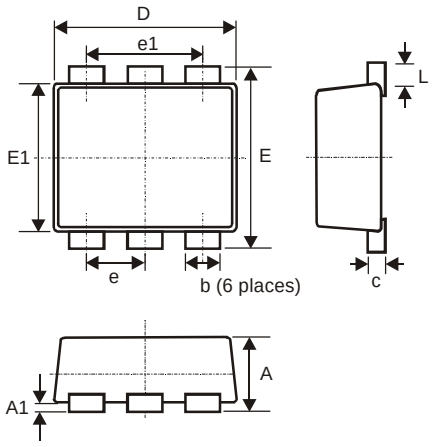


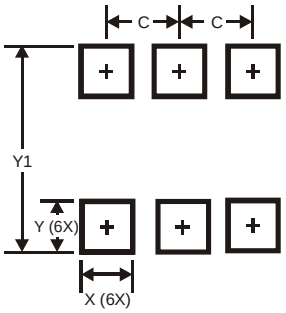
Fig. 15 Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions



SOT-963			
Dim	**Min**	**Max**	**Typ**
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



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

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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331