

PNP SILICON PLANAR MEDIUM POWER TRANSISTORS IN SOT223

Features

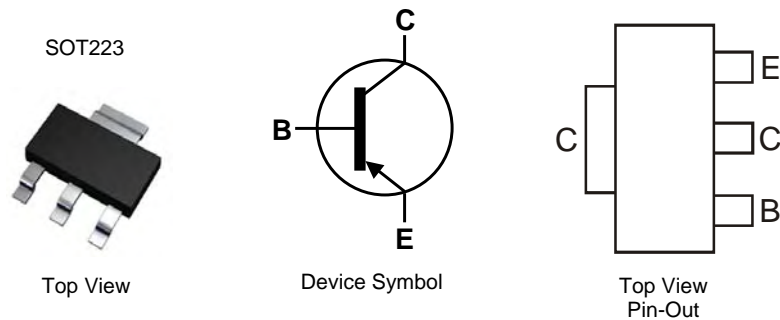
- $I_C = -1A$ Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)} < -500mV @ -0.5A$
- Gain groups 10 and 16
- Epitaxial Planar Die Construction
- Complementary NPN types: BCP54, 55 and 56
- **Lead-Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Devices (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound (Note 2)
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.112 grams (Approximate)

Applications

- Medium Power Switching or Amplification Applications
- AF driver and output stages

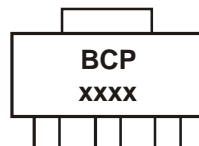


Ordering Information (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BCP51TA	BCP 51	7	12	1,000
BCP5110TA	BCP 5110	7	12	1,000
BCP5116TA	BCP 5116	7	12	1,000
BCP5116TC	BCP 5116	13	12	4,000
BCP52TA	BCP 52	7	12	1,000
BCP5210TA	BCP 5210	7	12	1,000
BCP5216TA	BCP 5216	7	12	1,000
BCP53TA	BCP 53	7	12	1,000
BCP5310TA	BCP 5310	7	12	1,000
BCP5316TA	BCP 5316	7	12	1,000
BCP5316TC	BCP 5316	13	12	4,000

- Notes:
1. No purposefully added lead.
 2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
 3. For packaging details, go to our website <http://www.diodes.com>

Marking Information



BCP = Product Type Marking Code, Line 1.
 xxxx = Product Type Marking Code, Line 2 as follows:

- | | | |
|----------------|----------------|----------------|
| BCP51 = 51 | BCP52 = 52 | BCP53 = 53 |
| BCP5110 = 5110 | BCP5210 = 5210 | BCP5310 = 5310 |
| BCP5116 = 5116 | BCP5216 = 5216 | BCP5316 = 5316 |

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

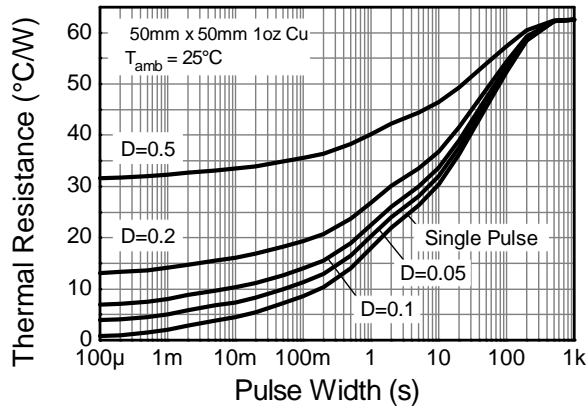
Characteristic	Symbol	BCP51	BCP52	BCP53	Unit
Collector-Base Voltage	V_{CBO}	-45	-60	-100	V
Collector-Emitter Voltage	V_{CEO}	-45	-60	-80	V
Emitter-Base Voltage	V_{EBO}		-5		V
Continuous Collector Current	I_C		-1		A
Peak Pulse Collector Current	I_{CM}		-2		
Continuous Base Current	I_B		-100		mA
Peak Pulse Base Current	I_{BM}		-200		

Thermal Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

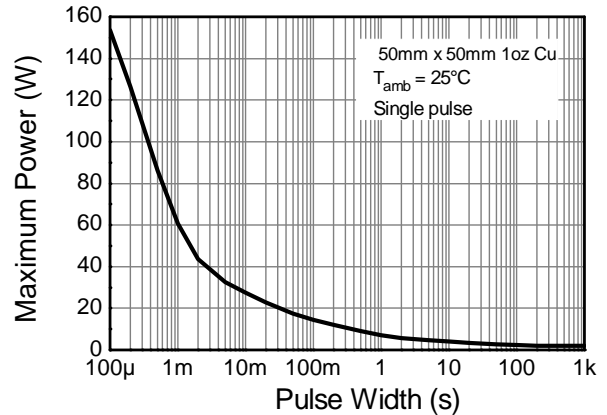
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P_D	2	W
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	62	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 5)	$R_{\theta JL}$	19.4	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ\text{C}$

- Notes:
4. For a device surface mounted on 50mm X 50mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 5. Thermal resistance from junction to solder-point (at the end of the collector lead).

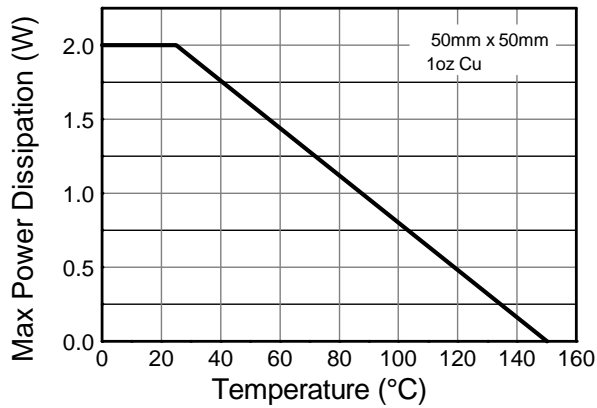
Thermal Characteristics



Transient Thermal Impedance



Pulse Power Dissipation

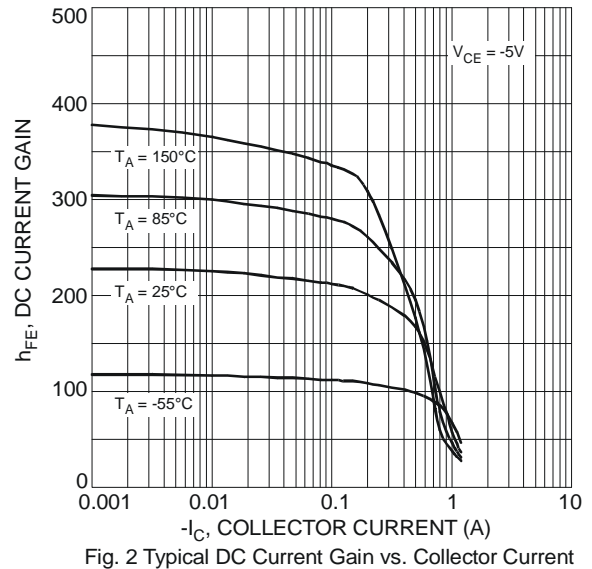
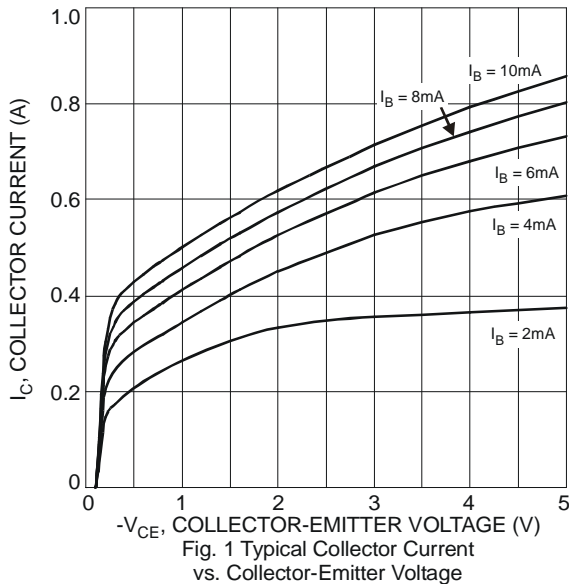


Derating Curve

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-45	-	-	V	I _C = -100μA
		-60				
		-100				
Collector-Emitter Breakdown Voltage (Note 6)	BV _{CEO}	-45	-	-	V	I _C = -10mA
		-60				
		-80				
Emitter-Base Breakdown Voltage	BV _{EBO}	-5	-	-	V	I _E = -10μA
Collector Cut-off Current	I _{CBO}	-	-	-0.1 -20	μA	V _{CB} = -30V V _{CB} = -30V, T _A = 150°C
Emitter Cut-off Current	I _{EBO}	-	-	-20	nA	V _{EB} = -4V
Static Forward Current Transfer Ratio (Note 6)	h _{FE}	25	-	-	-	I _C = -5mA, V _{CE} = -2V I _C = -150mA, V _{CE} = -2V I _C = -500mA, V _{CE} = -2V I _C = -150mA, V _{CE} = -2V I _C = -150mA, V _{CE} = -2V
		40	-	250		
		25	-	-		
		10 gain grp	63	-		
16 gain grp	100	-	250			
Collector-Emitter Saturation Voltage (Note 6)	V _{CE(sat)}	-	-	-0.5	V	I _C = -500mA, I _B = -50mA
Base-Emitter Turn-On Voltage (Note 6)	V _{BE(on)}	-	-	-1.0	V	I _C = -500mA, V _{CE} = -2V
Transition Frequency	f _r	150	-	-	MHz	I _C = -50mA, V _{CE} = -10V f = 100MHz
Output Capacitance	C _{obo}	-	-	25	pF	V _{CB} = -10V, f = 1MHz

Notes: 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.



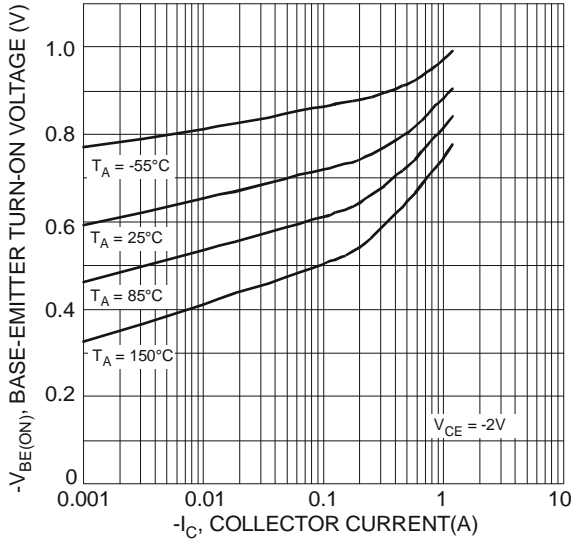


Fig 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

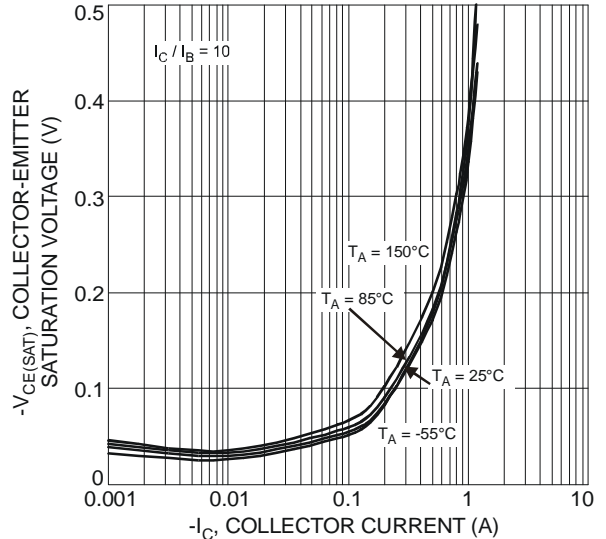


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

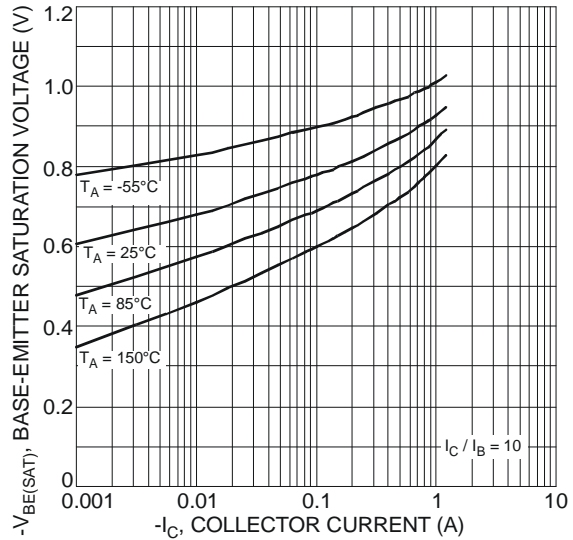


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

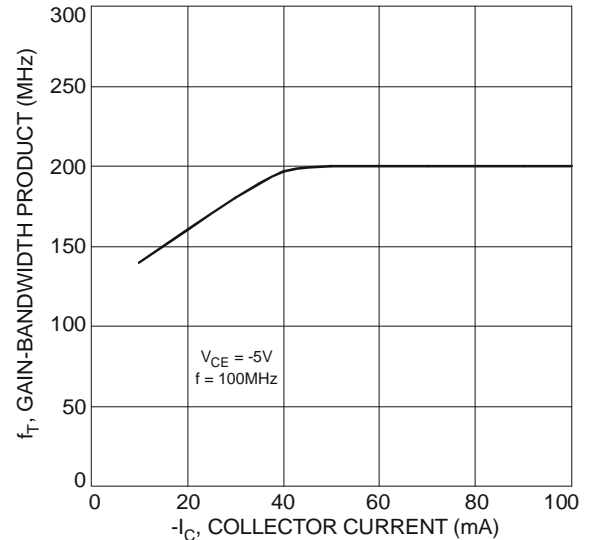


Fig. 6 Typical Gain-Bandwidth Product vs. Collector Current

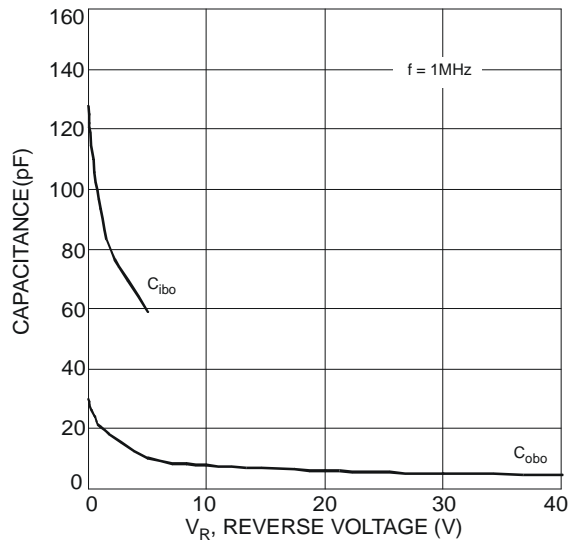
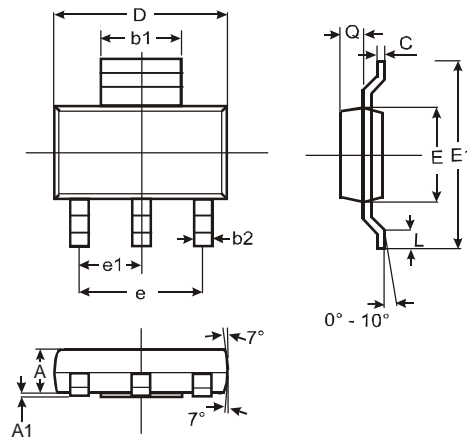


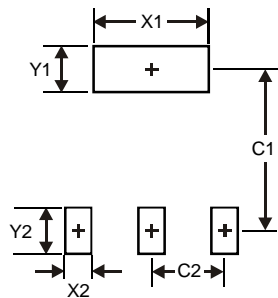
Fig. 7 Typical Capacitance Characteristics

Package Outline Dimensions



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b1	2.90	3.10	3.00
b2	0.60	0.80	0.70
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	—	—	4.60
e1	—	—	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
X1	3.3
X2	1.2
Y1	1.6
Y2	1.6
C1	6.4
C2	2.3

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