

NPN MEDIUM POWER TRANSISTORS IN SOT223
Features

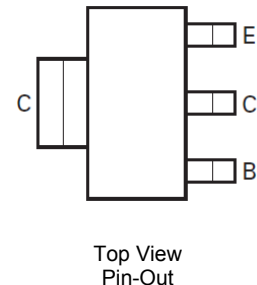
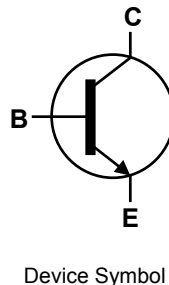
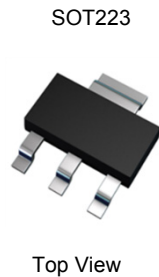
- $BV_{CEO} > 45V, 60V \text{ \& } 80V$
- $I_C = 1A$ High Continuous Collector Current
- $I_{CM} = 2A$ Peak Pulse Current
- 2W Power Dissipation
- Low Saturation Voltage $V_{CE(sat)} < 500mV @ 0.5A$
- Gain Groups 10 and 16
- Complementary PNP Types: BCP51, 52 and 53
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

- Case: SOT223
- 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 208③
- Weight: 0.112 grams (approximate)

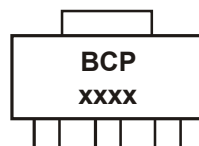
Applications

- Medium Power Switching or Amplification Applications
- AF Driver and Output Stages


Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
BCP54TA	AEC-Q101	BCP 54	7	12	1,000
BCP5410TA	AEC-Q101	BCP 5410	7	12	1,000
BCP5416TA	AEC-Q101	BCP 5416	7	12	1,000
BCP5416QTA	Automotive	BCP 5416	7	12	1,000
BCP55TA	AEC-Q101	BCP 55	7	12	1,000
BCP5510TA	AEC-Q101	BCP 5510	7	12	1,000
BCP5516TA	AEC-Q101	BCP 5516	7	12	1,000
BCP56TA	AEC-Q101	BCP 56	7	12	1,000
BCP5610TA	AEC-Q101	BCP 5610	7	12	1,000
BCP5616TA	AEC-Q101	BCP 5616	7	12	1,000
BCP5616TC	AEC-Q101	BCP 5616	13	12	4,000

- 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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information


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

BCP54 = 54
 BCP5410 = 5410
 BCP5416 = 5416

BCP55 = 55
 BCP5510 = 5510
 BCP5516 = 5516

BCP56 = 56
 BCP5610 = 5610
 BCP5616 = 5616

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

Characteristic	Symbol	BCP54	BCP55	BCP56	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°C, unless otherwise specified.)

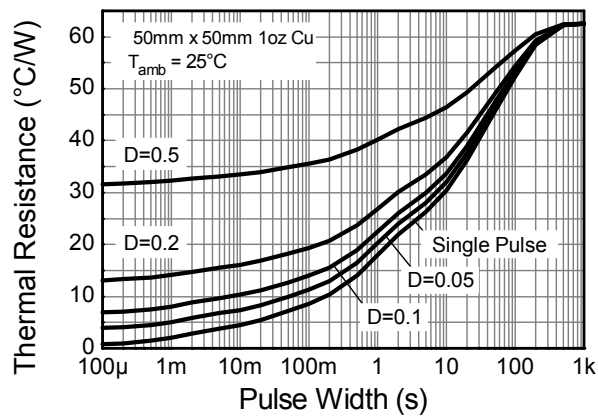
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	2	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	62	°C/W
Thermal Resistance, Junction to Leads (Note 7)	R _{θJL}	19.4	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-65 to +150	°C

ESD Ratings (Note 8)

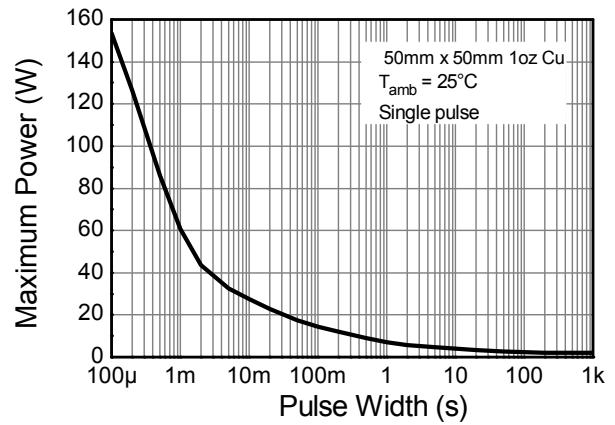
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the collector lead on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

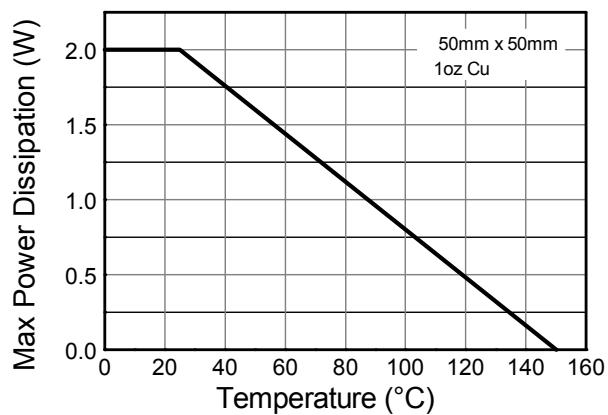
Thermal Characteristics and Derating Information



Transient Thermal Impedance



Pulse Power Dissipation



Derating Curve

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BCP54	BV _{CBO}	45	-	-	V	I _C = 100μA
	BCP55		60				
	BCP56		100				
Collector-Emitter Breakdown Voltage (Note 9)	BCP54	BV _{CEO}	45	-	-	V	I _C = 10mA
	BCP55		60				
	BCP56		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 9)	All versions	h _{FE}	25	-	-	-	I _C = 5mA, V _{CE} = 2V
			40	-	250		I _C = 150mA, V _{CE} = 2V
			25	-	-		I _C = 500mA, V _{CE} = 2V
	10 gain grp		63	-	160		I _C = 150mA, V _{CE} = 2V
	16 gain grp		100	-	250		I _C = 150mA, V _{CE} = 2V
Collector-Emitter Saturation Voltage (Note 9)		V _{CE(sat)}	-	-	0.5	V	I _C = 500mA, I _B = 50mA
Base-Emitter Turn-On Voltage (Note 9)		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: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

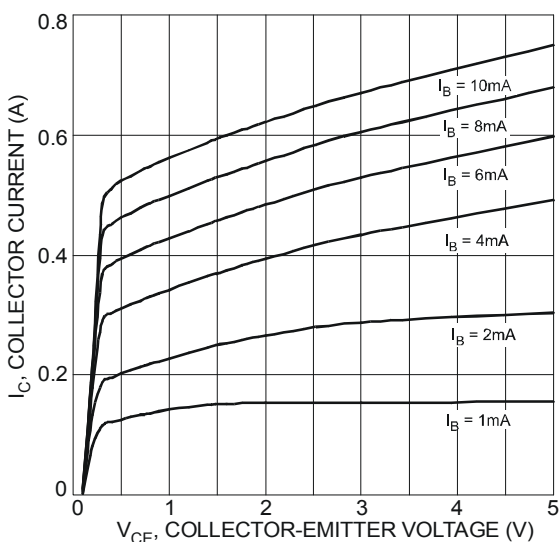


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

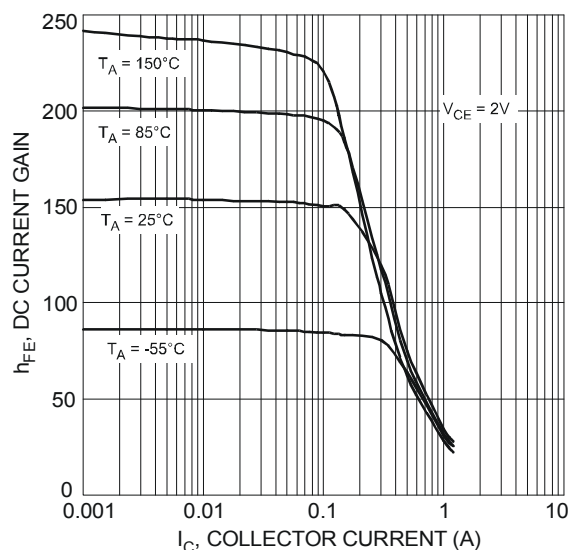


Fig. 2 Typical DC Current Gain vs. Collector Current

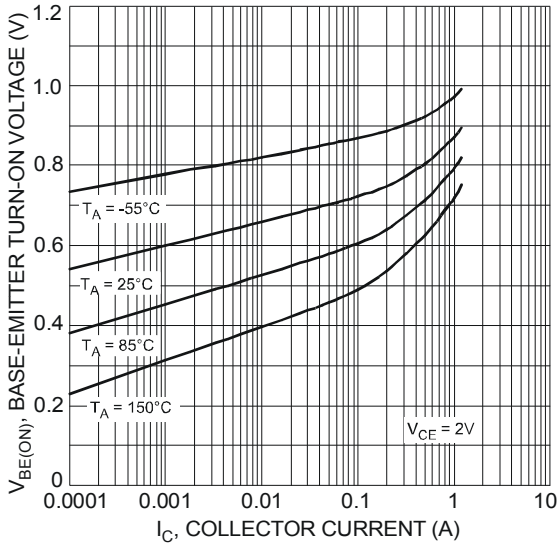


Fig. 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

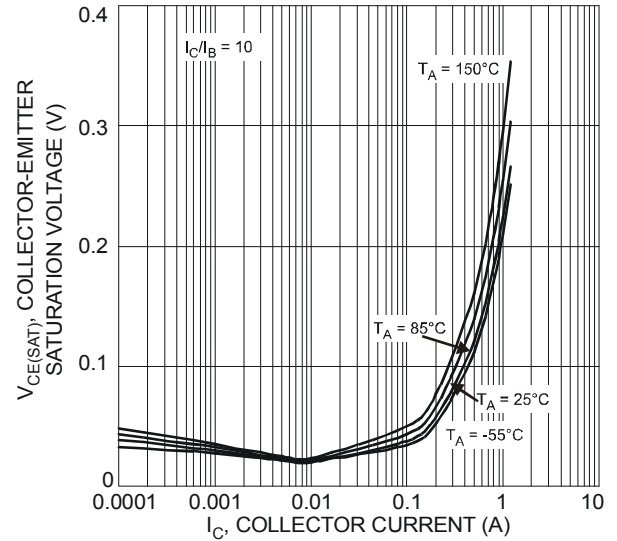


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

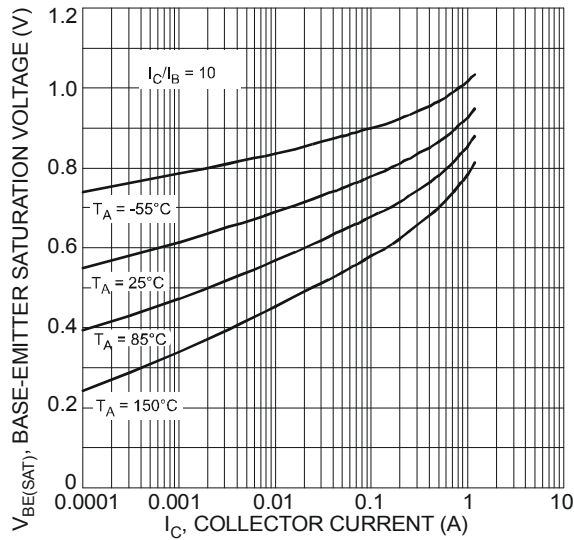


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

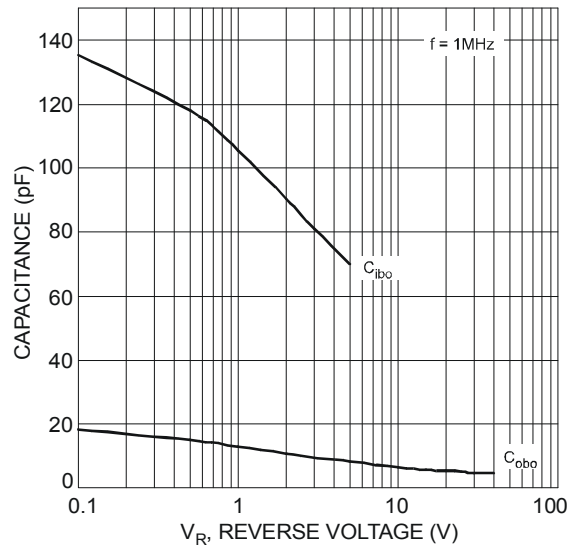


Fig. 6 Typical Capacitance Characteristics

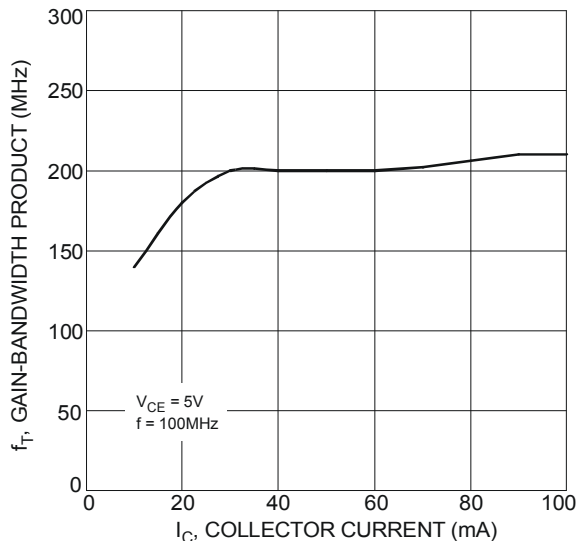
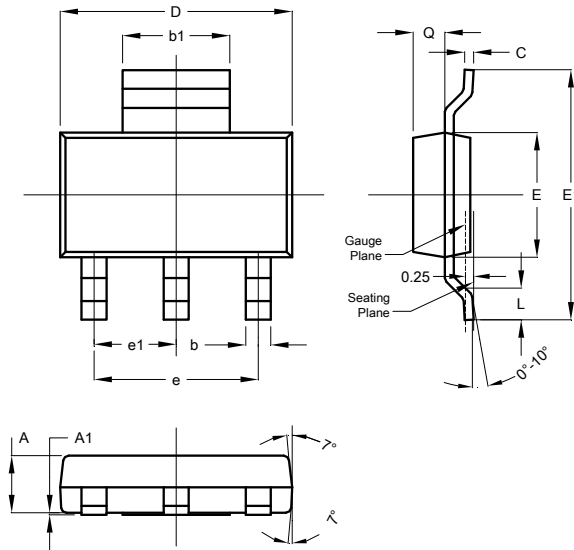


Fig. 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

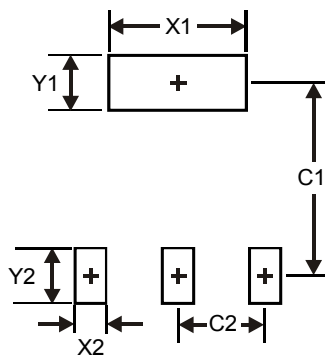
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
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

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



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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