



PNP MEDIUM POWER TRANSISTORS IN SOT223

Features

- BV_{CEO} > -45V, -60V & -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 NPN Types: BCP54, 55 and 56
- 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 208 (23)
- Weight: 0.112 grams (Approximate)

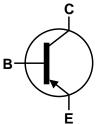
Applications

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

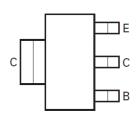








Device Symbol



Top View Pin-Out

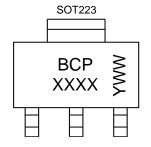
Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel	
BCP51TA	AEC-Q101	BCP 51	7	12	1,000	
BCP5110TA	AEC-Q101	BCP 5110	7	12	1,000	
BCP5116TA	AEC-Q101	BCP 5116	7	12	1,000	
BCP5116TC	AEC-Q101	BCP 5116	13	12	4,000	
BCP52TA	AEC-Q101	BCP 52	7	12	1,000	
BCP5210TA	AEC-Q101	BCP 5210	7	12	1,000	
BCP5216TA	AEC-Q101	BCP 5216	7	12	1,000	
BCP53TA	AEC-Q101	BCP 53	7	12	1,000	
BCP53QTA	Automotive	BCP 53	7	12	1,000	
BCP5310TA	AEC-Q101	BCP 5310	7	12	1,000	
BCP5316TA	AEC-Q101	BCP 5316	7	12	1,000	
BCP5316QTA	Automotive	Refer to http://diodes.com/datasheets/BCP5316Q.pdf				
BCP5316TC	AEC-Q101	BCP 5316	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:

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

YWW = Date Code Marking Y or \overline{Y} = Last Digit of Year (ex: 5= 2015) WW or $\overline{W}W$ = Week Code (01~53)

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Absolute Maximum Ratings (@TA = +25°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		
Continuous Collector Current	Ic	-1			A mA
Peak Pulse Collector Current	I _{CM}	-2			
Continuous Base Current	I _B	-100			
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)	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction to Leads (Note 7)		R ₀ JL	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	С

Notes:

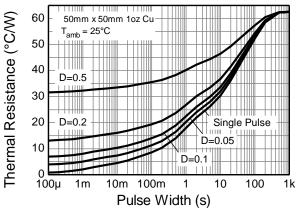
^{6.} For a device mounted with the collector lead on 50mm x 50mm 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.

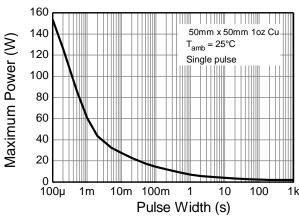
^{7.} Thermal resistance from junction to solder-point (at the end of the collector lead).

8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.



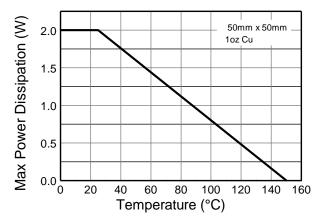
Thermal Characteristics and Derating Information





Transient Thermal Impedance

Pulse Power Dissipation



Derating Curve

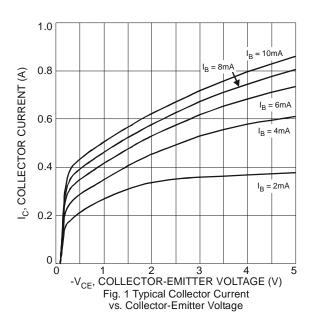


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic			Min	Тур	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BCP51 BCP52 BCP53	BV _{CBO}	-45 -60 -100			>	I _C = -100μA
Collector-Emitter Breakdown Voltage (Note 9)	BCP51 BCP52 BCP53	BV _{CEO}	-45 -60 -80	_	_	>	I _C = -10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-5	_	_	V	$I_E = -10\mu A$	
Collector Cut-Off Current		I _{CBO}	_	_	-0.1 -20	μΑ	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 40 25	_ _ _	_ 250 _		$I_C = -5mA$, $V_{CE} = -2V$ $I_C = -150mA$, $V_{CE} = -2V$ $I_C = -500mA$, $V_{CE} = -2V$
,	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	$I_C = -500 \text{mA}, I_B = -50 \text{mA}$
Base-Emitter Turn-On Voltage (Note 9)		V _{BE(on)}	_	_	-1.0	V	$I_C = -500 \text{mA}, V_{CE} = -2 \text{V}$
Transition Frequency		f⊤	150	_	_	MHz	$I_C = -50 \text{mA}, V_{CE} = -10 \text{V}$ f = 100MHz
Output Capacitance		Cobo	_	_	25	pF	$V_{CB} = -10V$, $f = 1MHz$

Note:

9. Measured under pulsed conditions. Pulse width \leq 300 μ s. Duty cycle \leq 2%.



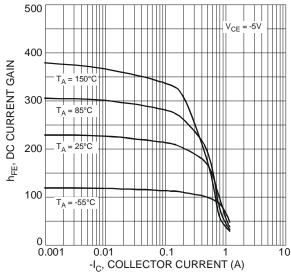


Fig. 2 Typical DC Current Gain vs. Collector Current



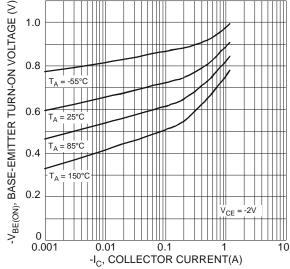


Fig 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

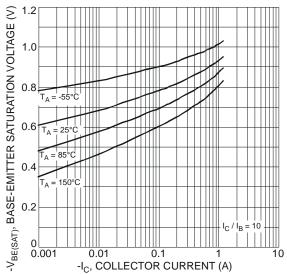
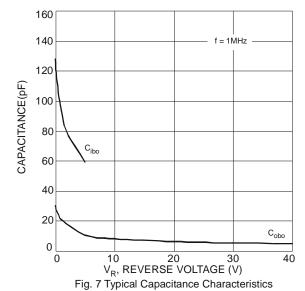


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current



-I_C, COLLECTOR CURRENT (A)
Fig. 4 Typical Collector-Emitter Saturation Voltage
vs. Collector Current

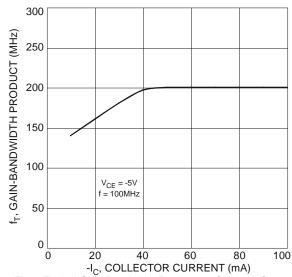
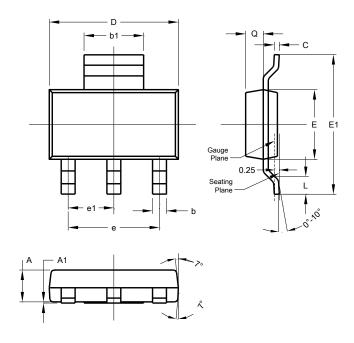


Fig. 6 Typical Gain-Bandwidth Product vs. Collector Current



Package Outline Dimensions

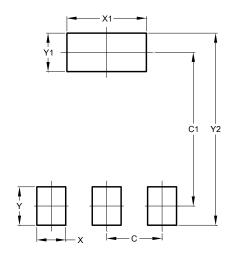
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223						
Dim	Min	Max	Тур			
Α	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			
С	0.20	0.30	0.25			
D	6.45	6.55	6.50			
Е	3.45	3.55	3.50			
E1	6.90	7.10	7.00			
е	-	-	4.60			
e1	-	-	2.30			
L	0.85	1.05	0.95			
ø	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)
С	2.30
C1	6.40
Х	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00



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