BCP 51/ 52/ 53

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)**

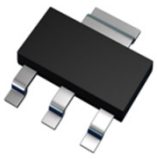
Mechanical Data

- 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 (e3)
- Weight: 0.112 grams (approximate)

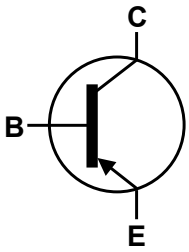
Applications

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

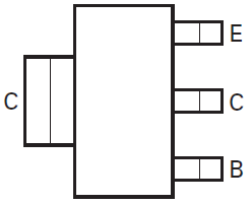
SOT223



Top View



Device Symbol



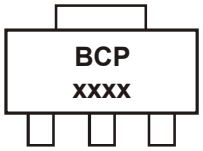
Top View
Pin-Out

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
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

Absolute Maximum Ratings (@T_A = +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			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.)

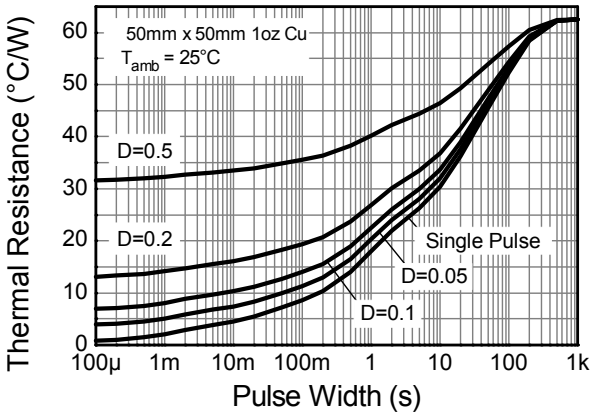
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P_D	2	W
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction to Leads	(Note 7)	$R_{\theta JL}$	19.4	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-65 to +150	°C

ESD Ratings (Note 8)

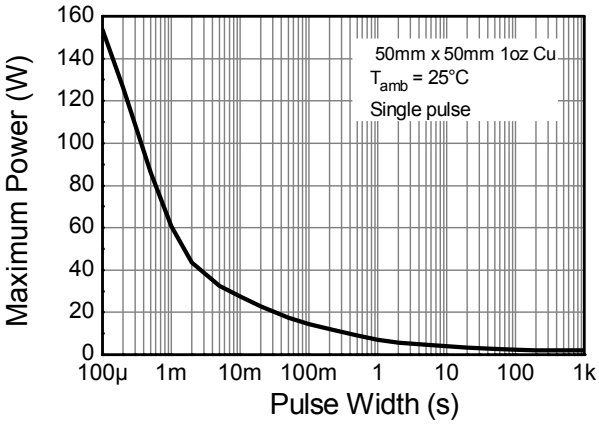
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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.

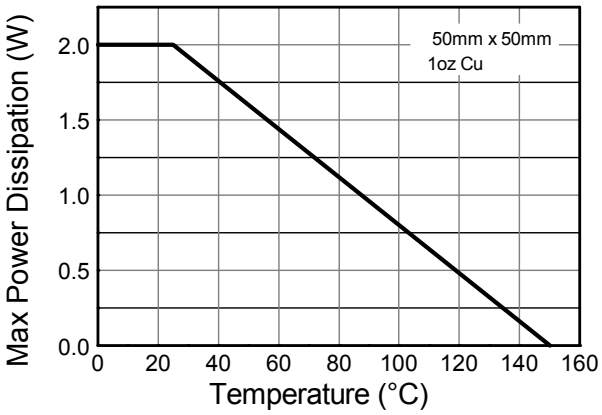
Thermal Characteristics and Derating Information



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	BCP51	BV_{CBO}	-45	—	—	V	I_C = -100µA
	BCP52		-60				
	BCP53		-100				
Collector-Emitter Breakdown Voltage (Note 9)	BCP51	BV_{CEO}	-45	—	—	V	I_C = -10mA
	BCP52		-60				
	BCP53		-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 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 = -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_T	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%.

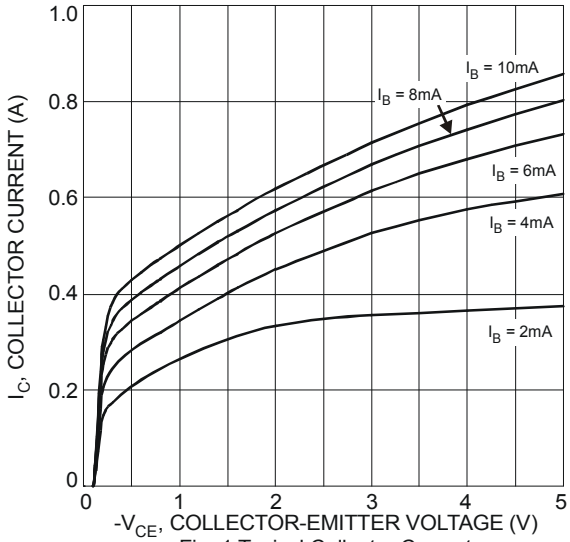


Fig. 1 Typical Collector Current vs. Collector-Emitter Voltage

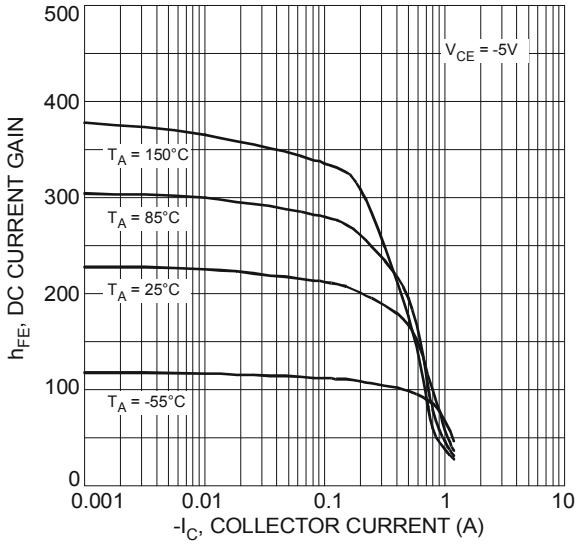


Fig. 2 Typical DC Current Gain vs. Collector Current

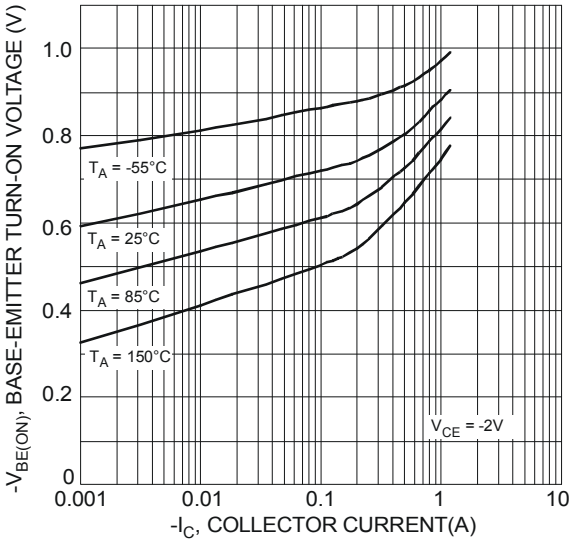


Fig 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

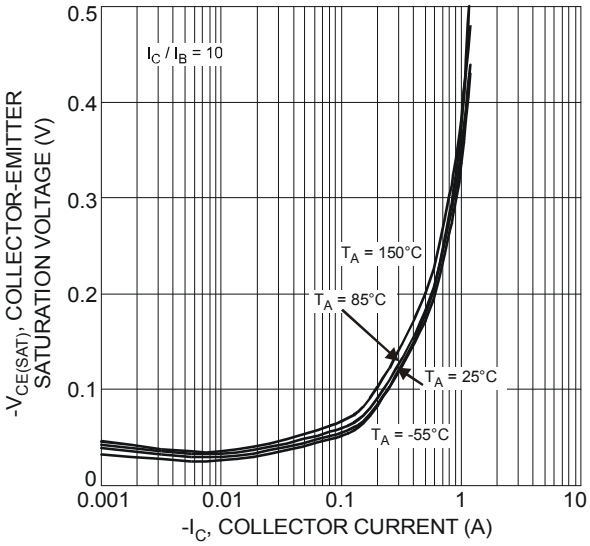


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

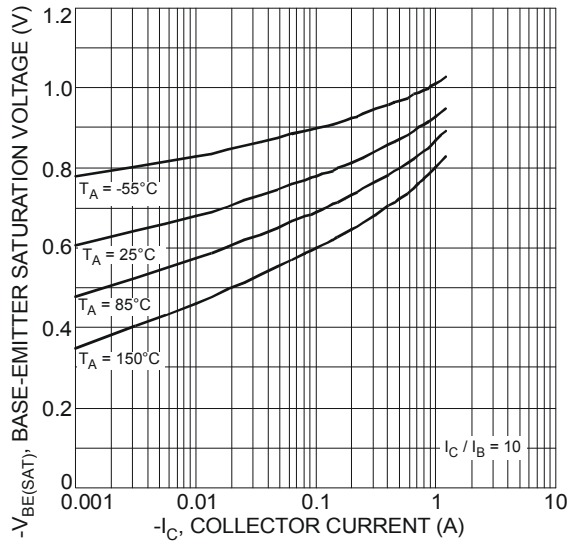


Fig. 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

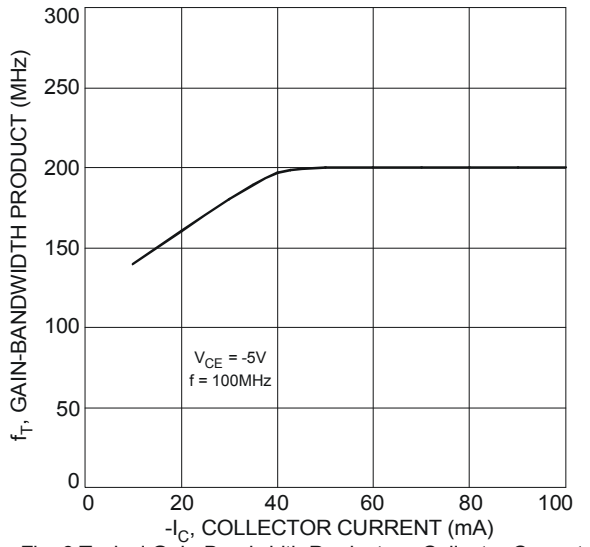


Fig. 6 Typical Gain-Bandwidth Product vs. Collector Current

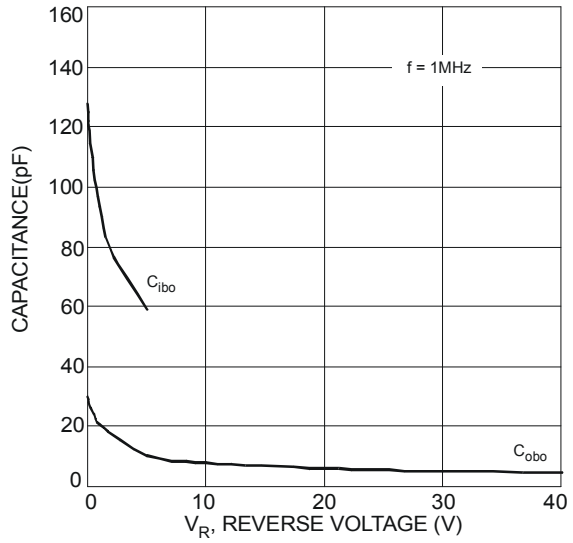
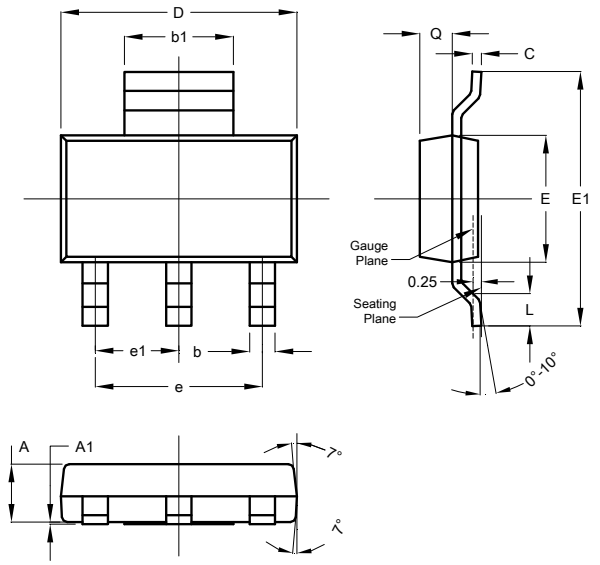


Fig. 7 Typical Capacitance Characteristics

Package Outline Dimensions

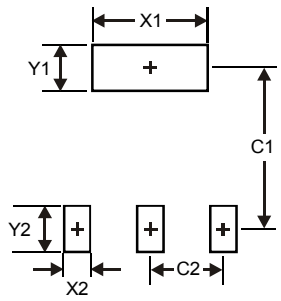
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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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