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Lead-free Green

BCP5616T

80V NPN MEDIUM POWER TRANSISTOR IN SOT223

Features

- BV_{CEO} > 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (BCP5616TQ)**

Applications

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

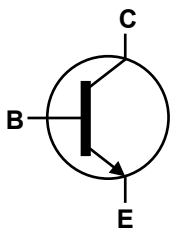
Mechanical Data

- 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)

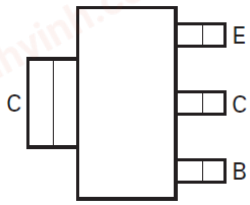
SOT223



Top View



Device Symbol



Top View
Pin-Out

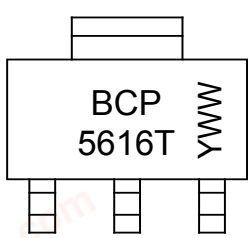
Ordering Information (Note 4)

Product	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
BCP5616TTA	Standard	BCP 5616T	7	12	1,000
BCP5616TTC	Standard	BCP 5616T	13	12	4,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SOT223



BCP 5616T = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 1 = 2021)
WW or $\overline{WW}$ = Week Code (01~53)

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	100	V
Collector-Emitter Voltage	V_{CEO}	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 5)	P_D	2.5	W
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	45.6	°C /W
Thermal Resistance, Junction to Leads	(Note 6)	$R_{\theta JL}$	21.7	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 7)

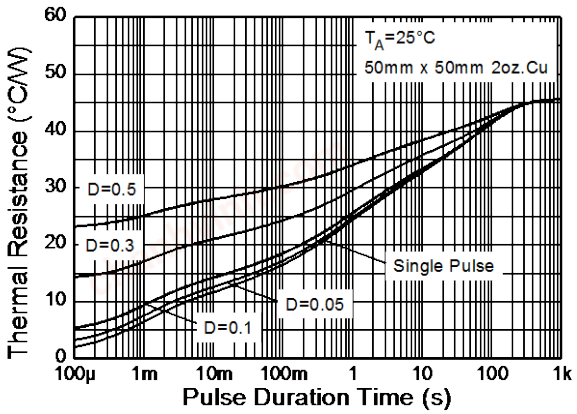
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge – Machine Model	ESD MM	400	V	C

Notes:
5. For a device mounted with the collector lead on 50mm x 50mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady-state.
6. Thermal resistance from junction to solder-point (at the end of the collector lead).
7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

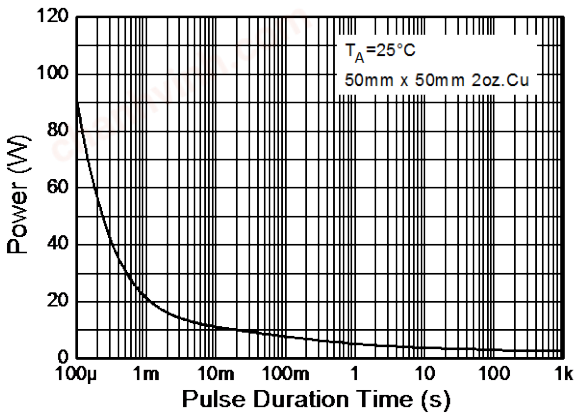
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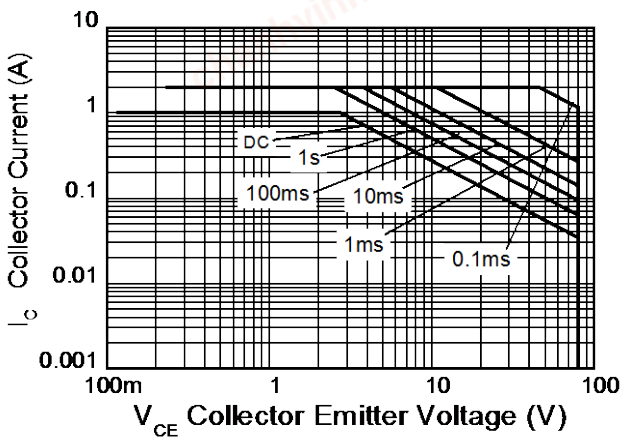
Thermal Characteristics and Derating Information



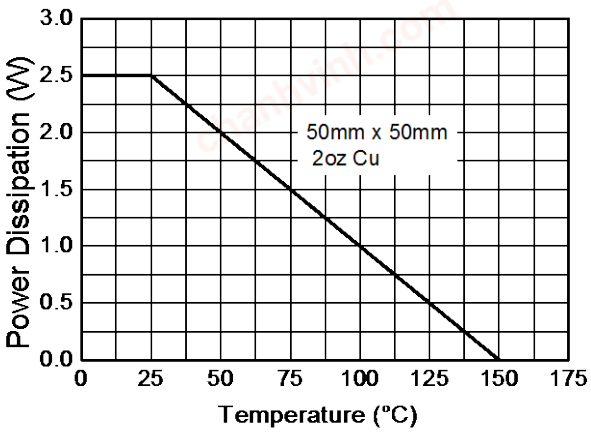
Transient Thermal Impedance



Pulse Power Dissipation



SOA, Safe Operating Area



Derrating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	100	—	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV_{CEO}	80	—	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	—	—	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} = 6V
Static Forward Current Transfer Ratio (Note 8)	h_{FE}	63 100 40	—	250	—	I_C = 5mA, V_{CE} = 2V I_C = 150mA, V_{CE} = 2V I_C = 500mA, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 8)	$V_{CE(sat)}$	—	—	0.5	V	I_C = 500mA, I_B = 50mA
Base-Emitter Turn-On Voltage (Note 8)	$V_{BE(on)}$	—	—	1.0	V	I_C = 500mA, V_{CE} = 2V
Transition Frequency	f_T	100	150	—	MHz	I_C = 50mA, V_{CE} = 10V f = 100MHz
Output Capacitance	C_{obo}	—	—	25	pF	V_{CB} = 10V, f = 1MHz

Note: 8. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

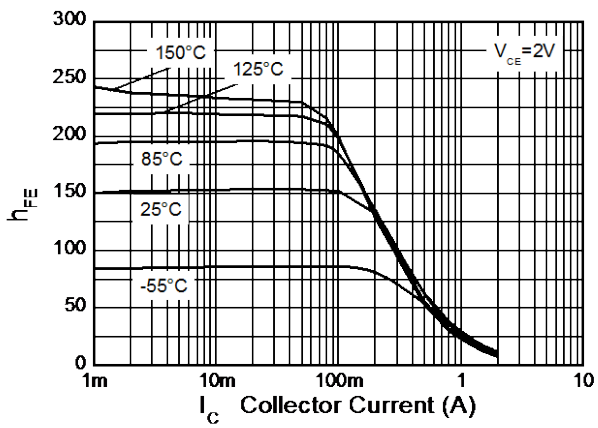


Fig.1 : Typical DC Current Gain vs Collector Current

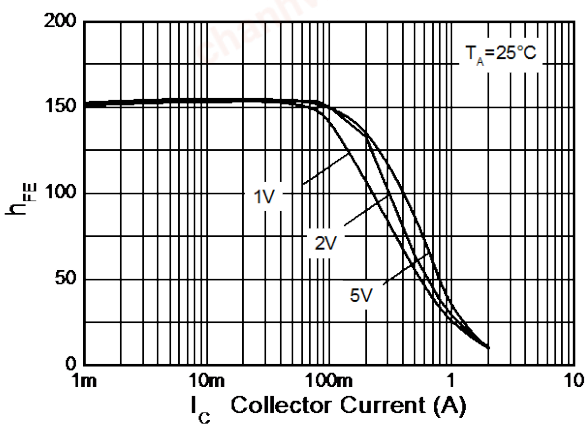


Fig.2 : Typical DC Current Gain vs Collector Current

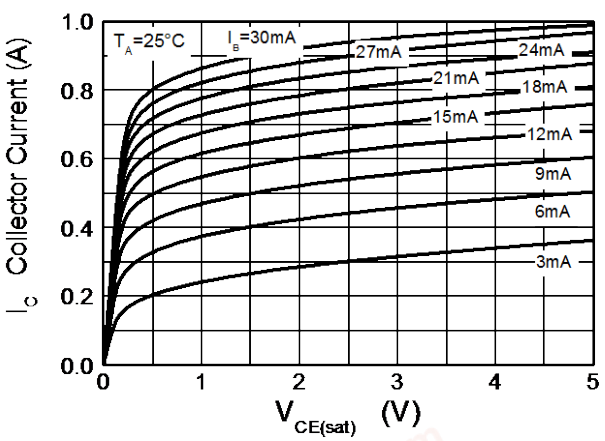


Fig.3 : Typical Collector Current vs Collector-Emitter Saturation Voltage

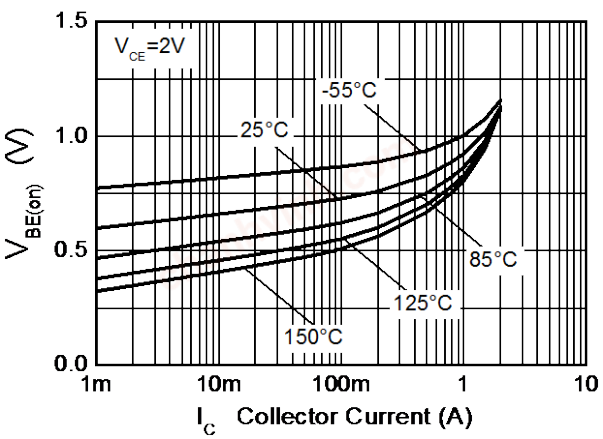


Fig.4 : Typical Base-Emitter Turn-On Voltage vs Collector Current

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

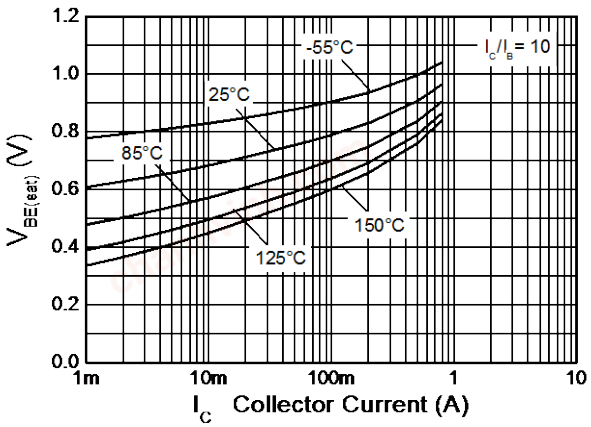


Fig 5: Typical Base-Emitter Saturation Voltage vs Collector Current

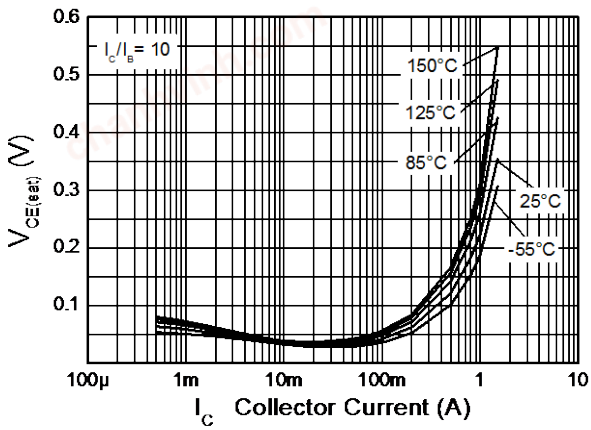


Fig 6: Typical Collector-Emitter Saturation Voltage vs Collector Current

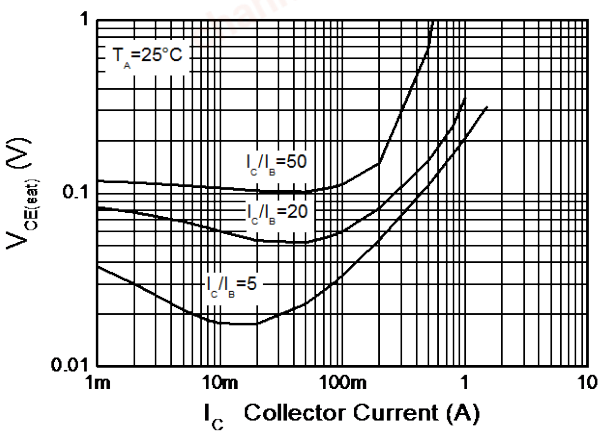


Fig 7: Typical Collector-Emitter Saturation Voltage vs Collector Current

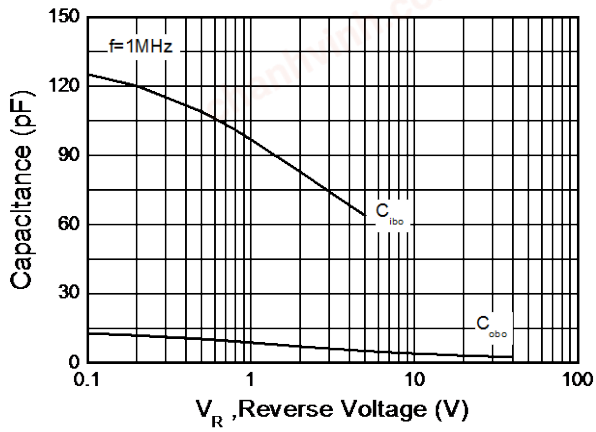


Fig 8: Typical Capacitance Characteristics

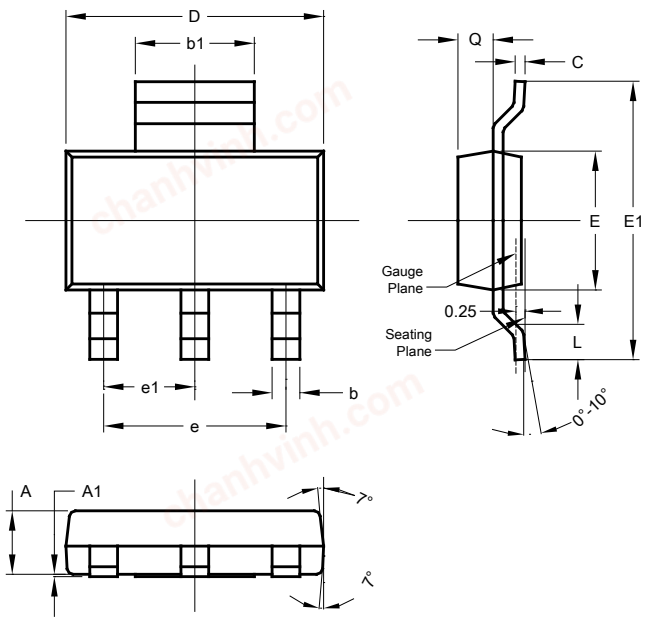
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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223

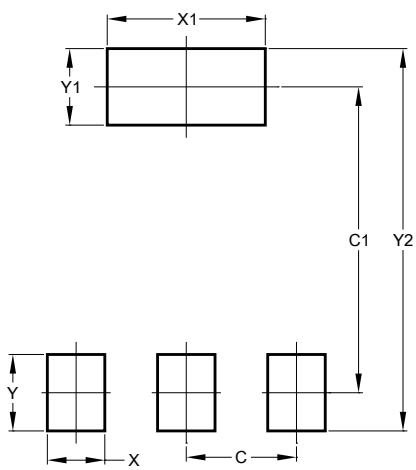


SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	–	–	4.60
e1	–	–	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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