

# BCP68T1G

## NPN Silicon Epitaxial Transistor

This NPN Silicon Epitaxial Transistor is designed for use in low voltage, high current applications. The device is housed in the SOT-223 package, which is designed for medium power surface mount applications.

### Features

- High Current:  $I_C = 1.0\text{ A}$
- The SOT-223 Package Can Be Soldered Using Wave or Reflow
- SOT-223 package ensures level mounting, resulting in improved thermal conduction, and allows visual inspection of soldered joints. The formed leads absorb thermal stress during soldering, eliminating the possibility of damage to the die
- The PNP Complement is BCP69T1
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	20	Vdc
Collector-Base Voltage	$V_{CBO}$	25	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	1.0	Adc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 1) Derate above $25^\circ\text{C}$	$P_D$	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Temperature Range	$T_J, T_{stg}$	-65 to 150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient (Surface Mounted)	$R_{\theta JA}$	83.3	$^\circ\text{C}/\text{W}$
Lead Temperature for Soldering, 0.0625 in from case Time in Solder Bath	$T_L$	260 10	$^\circ\text{C}$ Sec

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

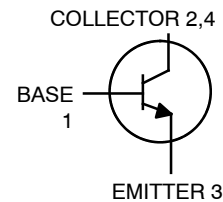
1. Device mounted on a glass epoxy printed circuit board 1.575 in. x 1.575 in. x 0.059 in.; mounting pad for the collector lead min. 0.93 sq. in.



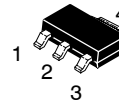
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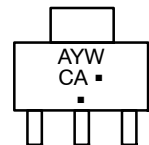
## MEDIUM POWER NPN SILICON HIGH CURRENT TRANSISTOR SURFACE MOUNT



### MARKING DIAGRAM



SOT-223  
CASE 318E  
STYLE 1



CA = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
BCP68T1G	SOT-223 (Pb-Free)	1000/Tape & Reel
BCP68T3G	SOT-223 (Pb-Free)	4000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage ( $I_C = 100\ \mu\text{Adc}$ , $I_E = 0$ )	$V_{(BR)CES}$	25	-	-	Vdc
Collector-Emitter Breakdown Voltage ( $I_C = 1.0\ \text{mAdc}$ , $I_B = 0$ )	$V_{(BR)CEO}$	20	-	-	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10\ \mu\text{Adc}$ , $I_C = 0$ )	$V_{(BR)EBO}$	5.0	-	-	Vdc
Collector-Base Cutoff Current ( $V_{CB} = 25\ \text{Vdc}$ , $I_E = 0$ )	$I_{CBO}$	-	-	10	$\mu\text{Adc}$
Emitter-Base Cutoff Current ( $V_{EB} = 5.0\ \text{Vdc}$ , $I_C = 0$ )	$I_{EBO}$	-	-	10	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 5.0\ \text{mAdc}$ , $V_{CE} = 10\ \text{Vdc}$ ) ( $I_C = 500\ \text{mAdc}$ , $V_{CE} = 1.0\ \text{Vdc}$ ) ( $I_C = 1.0\ \text{Adc}$ , $V_{CE} = 1.0\ \text{Vdc}$ )	$h_{FE}$	50 85 60	- - -	- 375 -	-
Collector-Emitter Saturation Voltage ( $I_C = 1.0\ \text{Adc}$ , $I_B = 100\ \text{mAdc}$ )	$V_{CE(sat)}$	-	-	0.5	Vdc
Base-Emitter On Voltage ( $I_C = 1.0\ \text{Adc}$ , $V_{CE} = 1.0\ \text{Vdc}$ )	$V_{BE(on)}$	-	-	1.0	Vdc
<b>DYNAMIC CHARACTERISTICS</b>					
Current-Gain - Bandwidth Product ( $I_C = 10\ \text{mAdc}$ , $V_{CE} = 5.0\ \text{Vdc}$ )	$f_T$	-	60	-	MHz

## TYPICAL ELECTRICAL CHARACTERISTICS

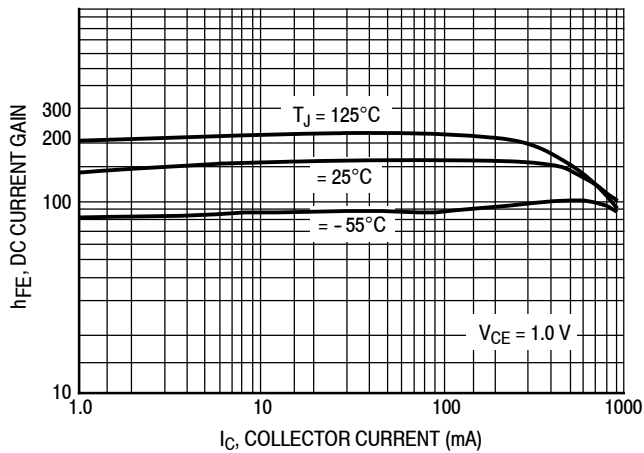


Figure 1. DC Current Gain

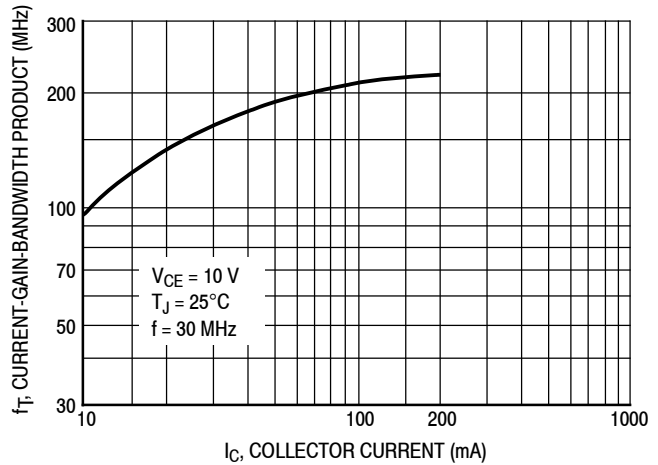


Figure 2. Current-Gain-Bandwidth Product

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## TYPICAL ELECTRICAL CHARACTERISTICS

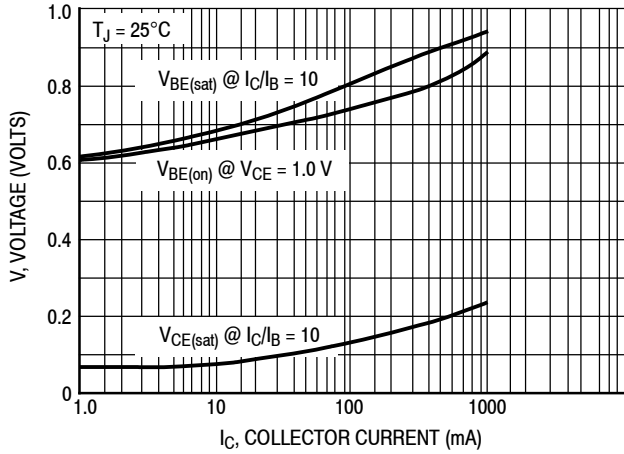


Figure 3. "On" Voltage

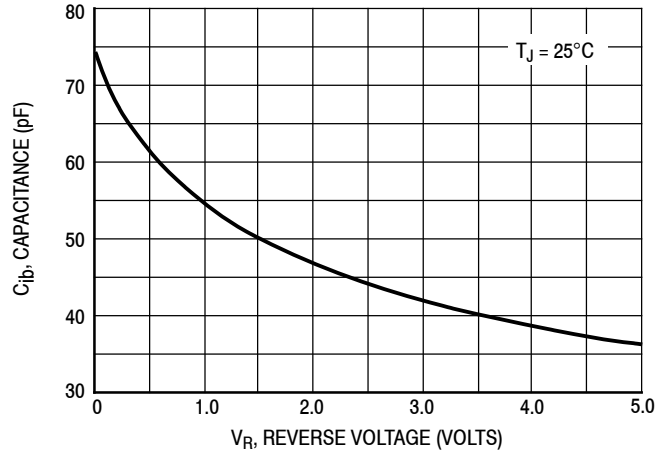


Figure 4. Capacitance

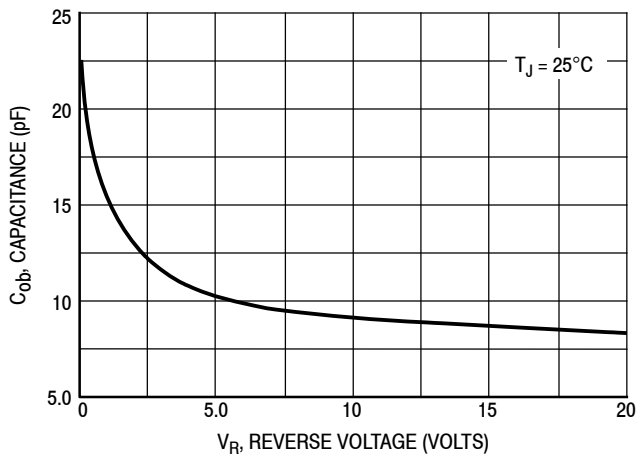


Figure 5. Capacitance

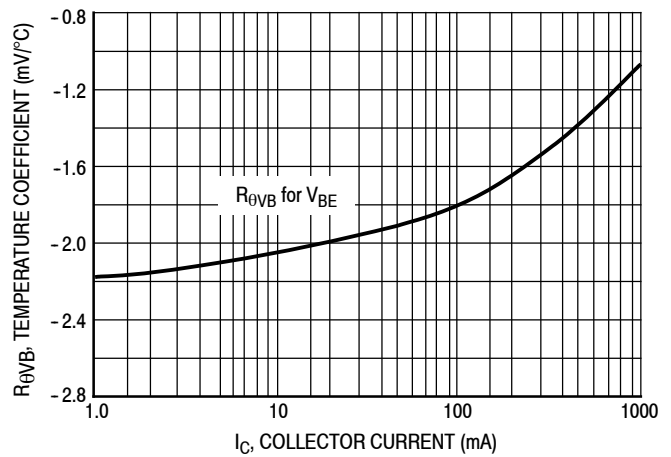


Figure 6. Base-Emitter Temperature Coefficient

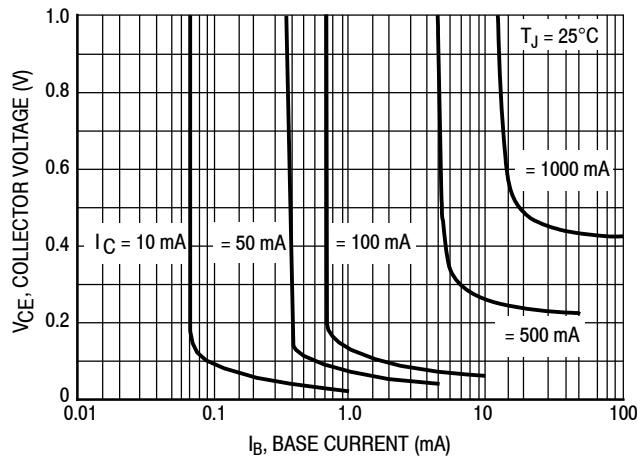
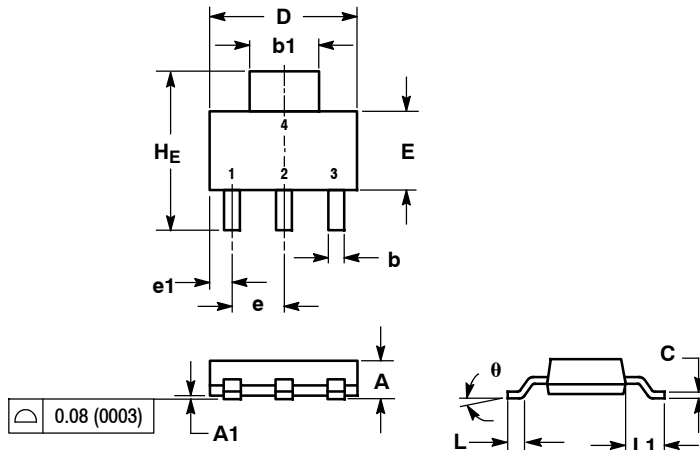


Figure 7. Saturation Region

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## PACKAGE DIMENSIONS

SOT-223 (TO-261)  
CASE 318E-04  
ISSUE N

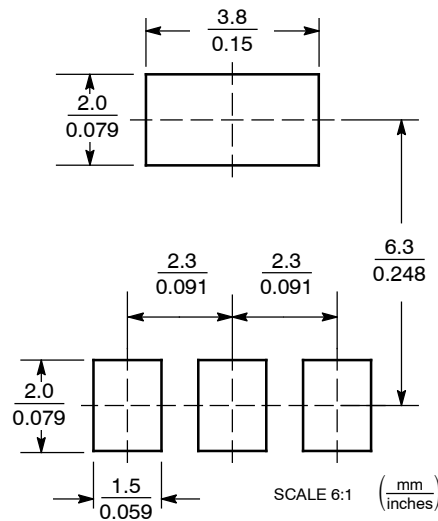


NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.  
2. CONTROLLING DIMENSION: INCH

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L	0.20	---	---	0.008	---	---
L1	1.50	1.75	2.00	0.060	0.069	0.078
HE	6.70	7.00	7.30	0.264	0.276	0.287
$\theta$	0°	-	10°	0°	-	10°

STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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