

# BF720T1G, SBF720T1G, BF720T3G

## NPN Silicon Transistor

### Features

- AEC-Q101 Qualified and PPAP Capable
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating                                                 | Symbol    | Value       | Unit             |
|--------------------------------------------------------|-----------|-------------|------------------|
| Collector – Emitter Voltage                            | $V_{CEO}$ | 300         | Vdc              |
| Collector – Base Voltage                               | $V_{CBO}$ | 300         | Vdc              |
| Collector – Emitter Voltage                            | $V_{CER}$ | 300         | Vdc              |
| Emitter – Base Voltage                                 | $V_{EBO}$ | 5.0         | Vdc              |
| Collector Current                                      | $I_C$     | 100         | mAdc             |
| Total Power Dissipation up to $T_A = 25^\circ\text{C}$ | $P_D$     | 1.5         | W                |
| Storage Temperature Range                              | $T_{stg}$ | -65 to +150 | $^\circ\text{C}$ |
| Junction Temperature                                   | $T_J$     | 150         | $^\circ\text{C}$ |

### THERMAL CHARACTERISTICS

| Characteristic                                      | Symbol          | Max  | Unit               |
|-----------------------------------------------------|-----------------|------|--------------------|
| Thermal Resistance,<br>Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 83.3 | $^\circ\text{C/W}$ |

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.

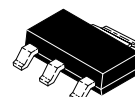
1. Device mounted on a glass epoxy printed circuit board 1.575 in. x 1.575 in. x 0.059 in.; mounting pad for the collector lead min. 0.93 in<sup>2</sup>.



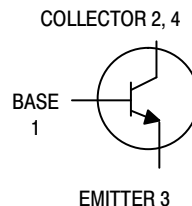
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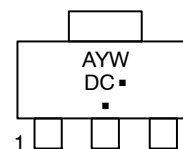
## NPN SILICON TRANSISTOR SURFACE MOUNT



SOT-223 (TO-261)  
CASE 318E  
STYLE 1



### MARKING DIAGRAM



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

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device    | Package           | Shipping <sup>†</sup> |
|-----------|-------------------|-----------------------|
| BF720T1G  | SOT-223 (Pb-Free) | 1,000 / Tape & Reel   |
| SBF720T1G | SOT-223 (Pb-Free) | 1,000 / Tape & Reel   |
| BF720T3G  | SOT-223 (Pb-Free) | 4,000 / Tape & Reel   |

<sup>†</sup>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.

\*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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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

| Characteristics                                                                                                                                                            | Symbol               | Min | Max      | Unit     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|----------|----------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                                                 |                      |     |          |          |
| Collector-Emitter Breakdown Voltage<br>(I <sub>C</sub> = 1.0 mA, I <sub>B</sub> = 0)                                                                                       | V <sub>(BR)CEO</sub> | 300 | –        | Vdc      |
| Collector-Base Breakdown Voltage<br>(I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0)                                                                                          | V <sub>(BR)CBO</sub> | 300 | –        | Vdc      |
| Collector-Emitter Breakdown Voltage<br>(I <sub>C</sub> = 100 μA, R <sub>BE</sub> = 2.7 kΩ)                                                                                 | V <sub>(BR)CER</sub> | 300 | –        | Vdc      |
| Emitter-Base Breakdown Voltage<br>(I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0)                                                                                             | V <sub>(BR)EBO</sub> | 5.0 | –        | Vdc      |
| Collector-Base Cutoff Current<br>(V <sub>CB</sub> = 200 Vdc, I <sub>E</sub> = 0)                                                                                           | I <sub>CBO</sub>     | –   | 10       | nA       |
| Collector-Emitter Cutoff Current<br>(V <sub>CE</sub> = 250 Vdc, R <sub>BE</sub> = 2.7 kΩ)<br>(V <sub>CE</sub> = 200 Vdc, R <sub>BE</sub> = 2.7 kΩ, T <sub>J</sub> = 150°C) | I <sub>CER</sub>     | –   | 50<br>10 | nA<br>μA |
| <b>ON CHARACTERISTICS</b>                                                                                                                                                  |                      |     |          |          |
| DC Current Gain<br>(I <sub>C</sub> = 25 mA, V <sub>CE</sub> = 20 Vdc)                                                                                                      | h <sub>FE</sub>      | 50  | –        | –        |
| Collector-Emitter Saturation Voltage<br>(I <sub>C</sub> = 30 mA, I <sub>B</sub> = 5.0 mA)                                                                                  | V <sub>CE(sat)</sub> | –   | 0.6      | Vdc      |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                                             |                      |     |          |          |
| Current-Gain – Bandwidth Product<br>(I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 10 Vdc, f = 35 MHz)                                                                         | f <sub>T</sub>       | 60  | –        | MHz      |
| Feedback Capacitance<br>(V <sub>CE</sub> = 30 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)                                                                                        | C <sub>re</sub>      | –   | 1.6      | pF       |

# BF720T1G, SBF720T1G, BF720T3G

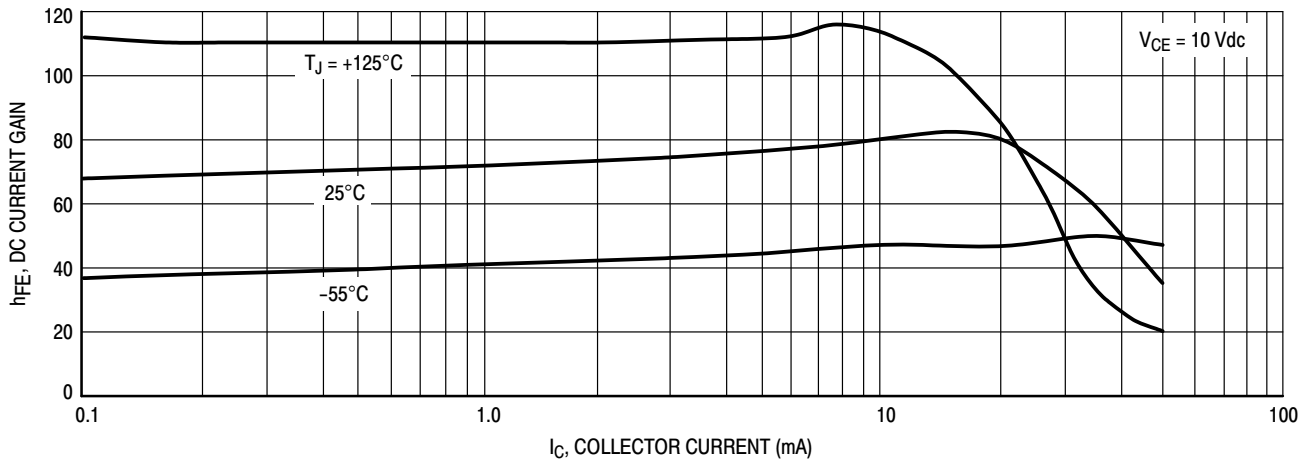


Figure 1. DC Current Gain

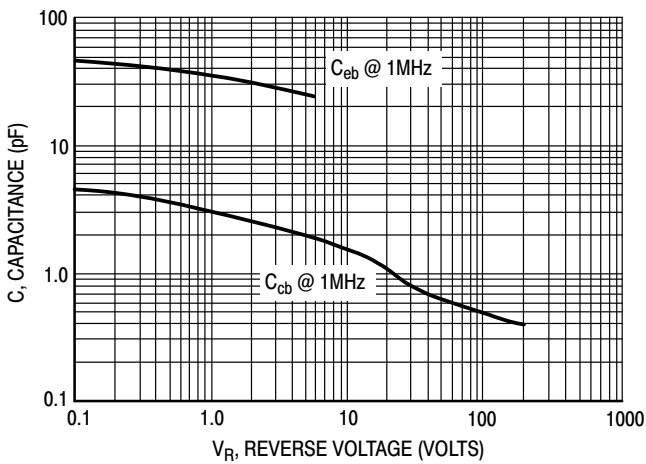


Figure 2. Capacitance

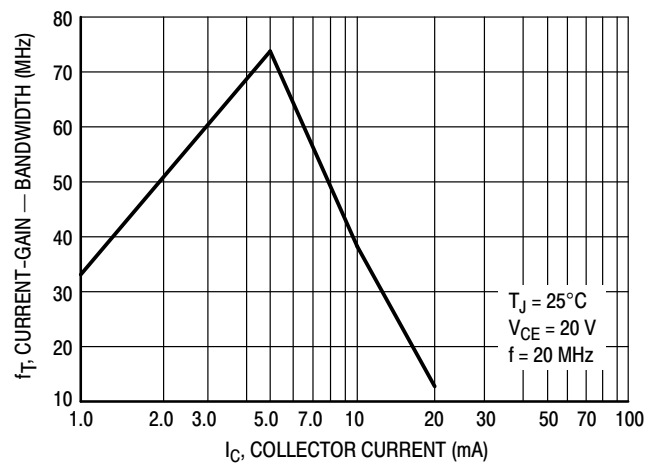


Figure 3. Current-Gain - Bandwidth

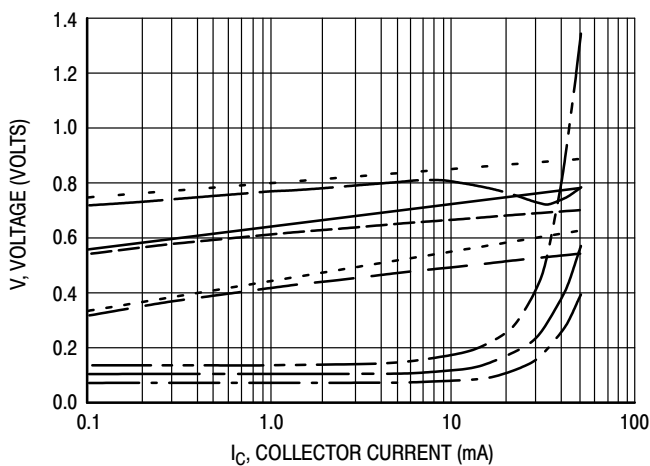


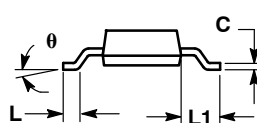
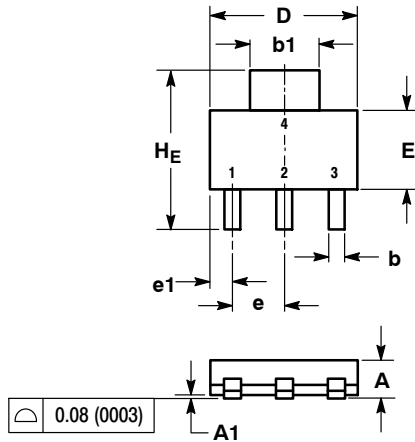
Figure 4. "ON" Voltages

- $V_{CE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $25^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$
- $V_{BE(on)}$  @  $125^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$
- $V_{BE(on)}$  @  $-55^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$

# BF720T1G, SBF720T1G, BF720T3G

## PACKAGE DIMENSIONS

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

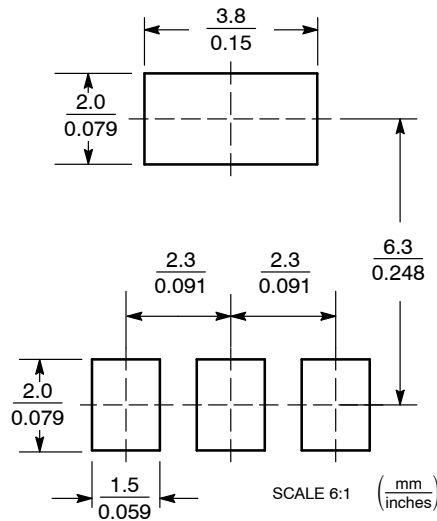


NOTES:  
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.  
2. CONTROLLING DIMENSION: INCH.

| 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 |
| H_E | 6.70        | 7.00 | 7.30 | 0.264  | 0.276 | 0.287 |
| θ   | 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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