

# 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.

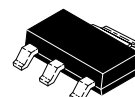
1. Device mounted on a glass epoxy printed circuit board 1.575 in. x 1.575 in. x 0.059 in.; mounting pad for the collector lead min. 0.93 in<sup>2</sup>.



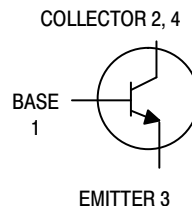
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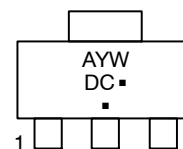
## NPN SILICON TRANSISTOR SURFACE MOUNT



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.

# BF720T1G, SBF720T1G, BF720T3G

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

| Characteristics                                                                                                                                                                                | Symbol        | Min    | Max      | Unit                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|----------|-------------------------|
| <b>OFF CHARACTERISTICS</b>                                                                                                                                                                     |               |        |          |                         |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )                                                                                                                   | $V_{(BR)CEO}$ | 300    | –        | Vdc                     |
| Collector-Base Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $I_E = 0$ )                                                                                                             | $V_{(BR)CBO}$ | 300    | –        | Vdc                     |
| Collector-Emitter Breakdown Voltage<br>( $I_C = 100\text{ }\mu\text{A}$ , $R_{BE} = 2.7\text{ k}\Omega$ )                                                                                      | $V_{(BR)CER}$ | 300    | –        | Vdc                     |
| Emitter-Base Breakdown Voltage<br>( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )                                                                                                                | $V_{(BR)EBO}$ | 5.0    | –        | Vdc                     |
| Collector-Base Cutoff Current<br>( $V_{CB} = 200\text{ Vdc}$ , $I_E = 0$ )                                                                                                                     | $I_{CBO}$     | –      | 10       | nAdc                    |
| Collector-Emitter Cutoff Current<br>( $V_{CE} = 250\text{ Vdc}$ , $R_{BE} = 2.7\text{ k}\Omega$ )<br>( $V_{CE} = 200\text{ Vdc}$ , $R_{BE} = 2.7\text{ k}\Omega$ , $T_J = 150^\circ\text{C}$ ) | $I_{CER}$     | –<br>– | 50<br>10 | nAdc<br>$\mu\text{Adc}$ |
| <b>ON CHARACTERISTICS</b>                                                                                                                                                                      |               |        |          |                         |
| DC Current Gain<br>( $I_C = 25\text{ mA}$ , $V_{CE} = 20\text{ Vdc}$ )                                                                                                                         | $h_{FE}$      | 50     | –        | –                       |
| Collector-Emitter Saturation Voltage<br>( $I_C = 30\text{ mA}$ , $I_B = 5.0\text{ mA}$ )                                                                                                       | $V_{CE(sat)}$ | –      | 0.6      | Vdc                     |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                                                                 |               |        |          |                         |
| Current-Gain – Bandwidth Product<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 35\text{ MHz}$ )                                                                                  | $f_T$         | 60     | –        | MHz                     |
| Feedback Capacitance<br>( $V_{CE} = 30\text{ Vdc}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )                                                                                                        | $C_{re}$      | –      | 1.6      | pF                      |

# BF720T1G, SBF720T1G, BF720T3G

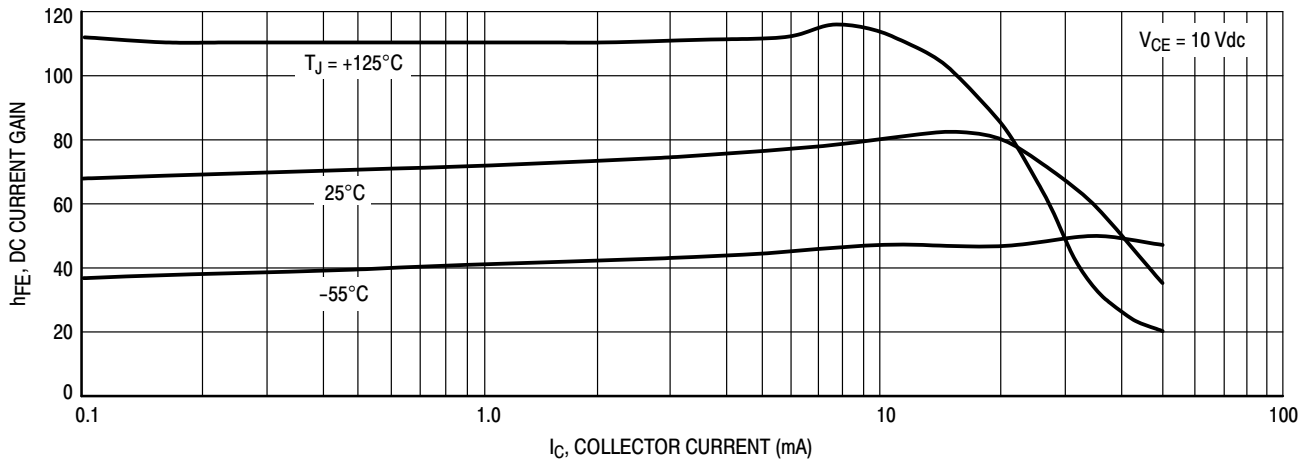


Figure 1. DC Current Gain

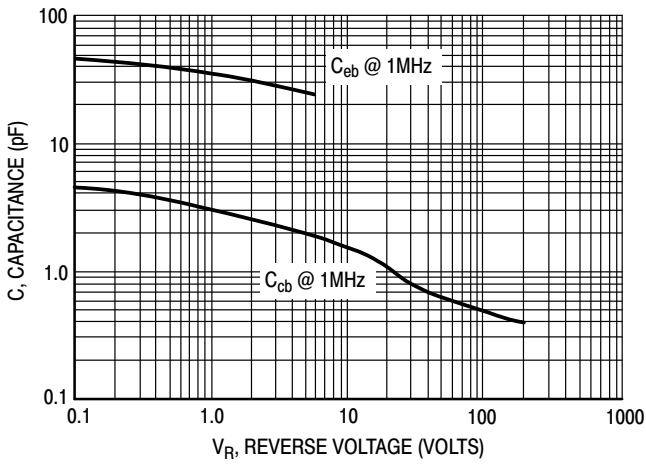


Figure 2. Capacitance

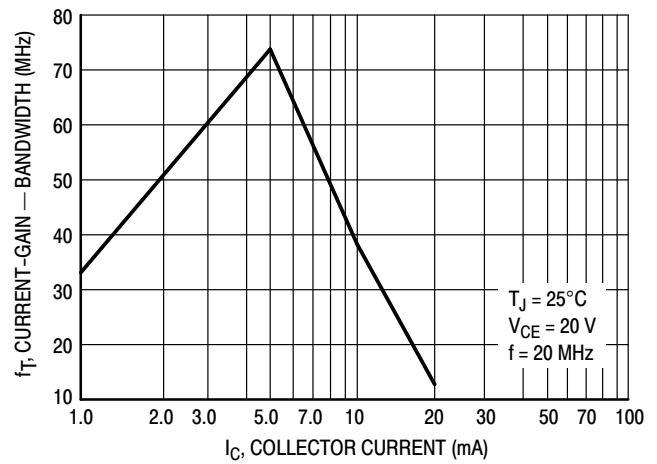


Figure 3. Current-Gain - Bandwidth

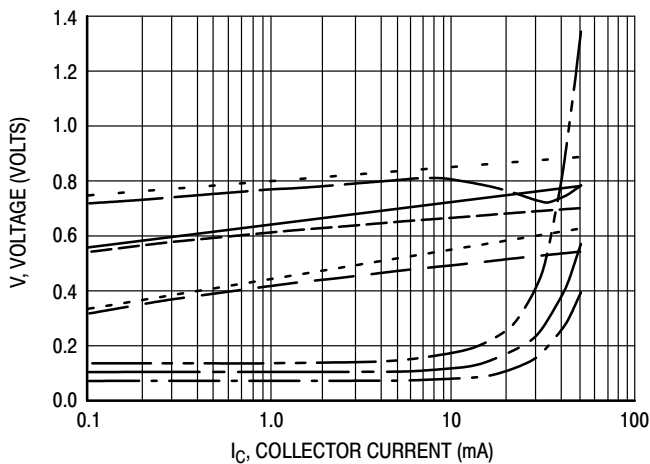


Figure 4. "ON" Voltages

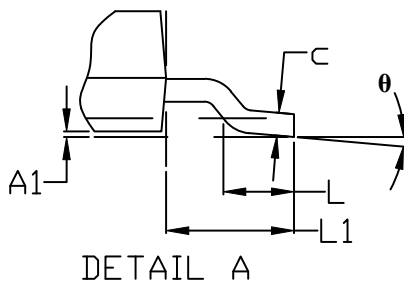
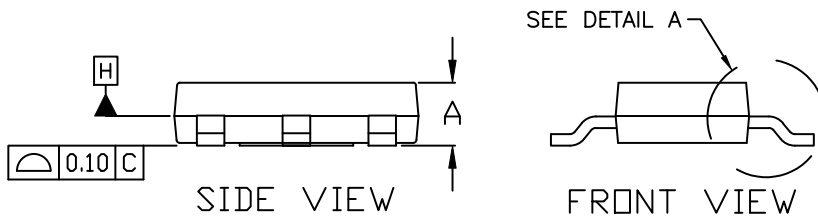
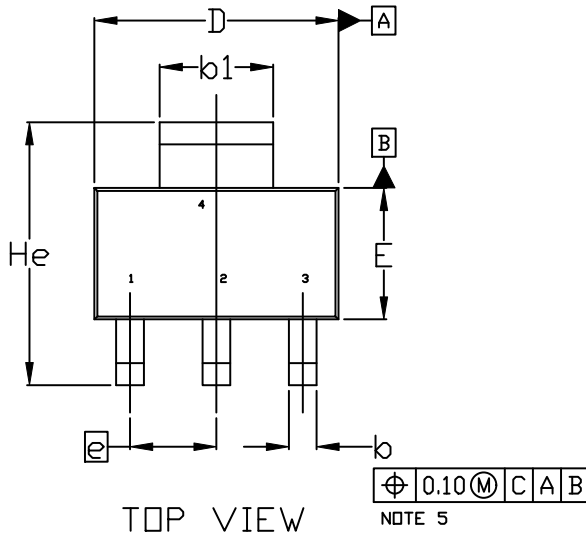
- $V_{CE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$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



SCALE 1:1

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

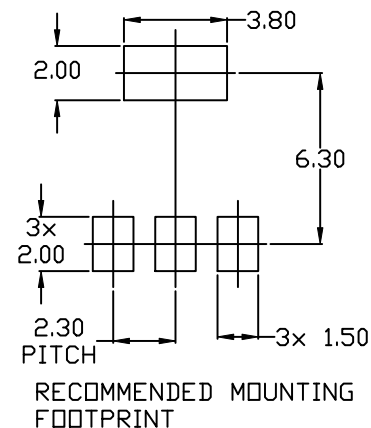
DATE 02 OCT 2018



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D & E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.200MM PER SIDE.
4. DATUMS A AND B ARE DETERMINED AT DATUM H.
5. A1 IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT OF THE PACKAGE BODY.
6. POSITIONAL TOLERANCE APPLIES TO DIMENSIONS b AND b1.

| MILLIMETERS |          |      |      |
|-------------|----------|------|------|
| DIM         | MIN.     | NOM. | MAX. |
| A           | 1.50     | 1.63 | 1.75 |
| A1          | 0.02     | 0.06 | 0.10 |
| b           | 0.60     | 0.75 | 0.89 |
| b1          | 2.90     | 3.06 | 3.20 |
| c           | 0.24     | 0.29 | 0.35 |
| D           | 6.30     | 6.50 | 6.70 |
| E           | 3.30     | 3.50 | 3.70 |
| e           | 2.30 BSC |      |      |
| L           | 0.20     | ---  | ---  |
| L1          | 1.50     | 1.75 | 2.00 |
| He          | 6.70     | 7.00 | 7.30 |
| θ           | 0°       | ---  | 10°  |



|                         |                         |                                                                                                                                                                                  |
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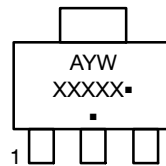
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**SOT-223 (TO-261)**  
**CASE 318E-04**  
**ISSUE R**

DATE 02 OCT 2018

|                                                                              |                                                                             |                                                                               |                                                                       |                                                                       |
|------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>STYLE 1:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 2:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. NC<br>4. CATHODE        | <b>STYLE 3:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE<br>4. DRAIN           | <b>STYLE 4:</b><br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE<br>4. DRAIN   | <b>STYLE 5:</b><br>PIN 1. DRAIN<br>2. GATE<br>3. SOURCE<br>4. GATE    |
| <b>STYLE 6:</b><br>PIN 1. RETURN<br>2. INPUT<br>3. OUTPUT<br>4. INPUT        | <b>STYLE 7:</b><br>PIN 1. ANODE 1<br>2. CATHODE<br>3. ANODE 2<br>4. CATHODE | <b>STYLE 8:</b><br>CANCELLED                                                  | <b>STYLE 9:</b><br>PIN 1. INPUT<br>2. GROUND<br>3. LOGIC<br>4. GROUND | <b>STYLE 10:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE<br>4. ANODE |
| <b>STYLE 11:</b><br>PIN 1. MT 1<br>2. MT 2<br>3. GATE<br>4. MT 2             | <b>STYLE 12:</b><br>PIN 1. INPUT<br>2. OUTPUT<br>3. NC<br>4. OUTPUT         | <b>STYLE 13:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR |                                                                       |                                                                       |

**GENERIC  
MARKING DIAGRAM\***



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

(Note: Microdot may be in either location)  
 \*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

|                         |                         |                                                                                                                                                                                  |
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