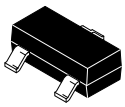
# BCW66GLT1G, SBCW66GLT1G
# General Purpose Transistor

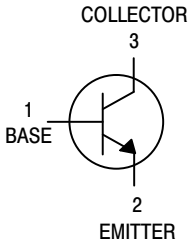
## NPN Silicon



SOT−23
(TO−236)
CASE 318
STYLE 6

### Features

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




### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector−Emitter Voltage | $V_{CEO}$ | 45 | Vdc |
| Collector−Base Voltage | $V_{CBO}$ | 75 | Vdc |
| Emitter−Base Voltage | $V_{EBO}$ | 5.0 | Vdc |
| Collector Current − Continuous | $I_C$ | 800 | mAdc |
| Collector Current − Pulsed | $I_C$ | 1200 | mAdc |

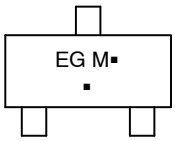
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR−5 Board (Note 1), $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 225<br>1.8 | mW<br>mW/°C |
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 556 | °C/W |
| Total Device Dissipation Alumina Substrate, (Note 2) $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 300<br>2.4 | mW<br>mW/°C |
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 417 | °C/W |
| Junction and Storage Temperature | $T_J$, $T_{stg}$ | −55 to +150 | °C |

1. FR−5 = 1.0 × 0.75 × 0.062 in.
2. Alumina = 0.4 × 0.3 × 0.024 in 99.5% alumina.

### MARKING DIAGRAM




EG = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(*Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| BCW66GLT1G | SOT−23 (Pb−Free) | 3,000/Tape & Reel |
| SBCW66GLT1G | SOT−23 (Pb−Free) | 3,000/Tape & Reel |
| BCW66GLT3G | SOT−23 (Pb−Free) | 10,000/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°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector−Emitter Breakdown Voltage ($I_C$ = 10 mAdc, $I_B$ = 0) | $V_{(BR)CEO}$ | 45 | – | – | Vdc |
| Collector−Emitter Breakdown Voltage ($I_C$ = 10 μAdc, $V_{EB}$ = 0) | $V_{(BR)CES}$ | 75 | – | – | Vdc |
| Emitter−Base Breakdown Voltage ($I_E$ = 10 μAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | 5.0 | – | – | Vdc |
| Collector Cutoff Current<br>($V_{CE}$ = 45 Vdc, $I_E$ = 0)<br>($V_{CE}$ = 45 Vdc, $I_E$ = 0, $T_A$ = 150°C) | $I_{CES}$ | <br>–<br>– | <br>–<br>– | <br>20<br>20 | <br>nAdc<br>μAdc |
| Emitter Cutoff Current ($V_{EB}$ = 4.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | – | – | 20 | nAdc |
| **ON CHARACTERISTICS** | | | | | |
| DC Current Gain<br>($I_C$ = 100 μAdc, $V_{CE}$ = 10 Vdc)<br>($I_C$ = 10 mAdc, $V_{CE}$ = 1.0 Vdc)<br>($I_C$ = 100 mAdc, $V_{CE}$ = 1.0 Vdc)<br>($I_C$ = 500 mAdc, $V_{CE}$ = 2.0 Vdc) | $h_{FE}$ | <br>50<br>110<br>160<br>60 | <br>–<br>–<br>–<br>– | <br>–<br>–<br>400<br>– | – |
| Collector−Emitter Saturation Voltage<br>($I_C$ = 500 mAdc, $I_B$ = 50 mAdc)<br>($I_C$ = 100 mAdc, $I_B$ = 10 mAdc) | $V_{CE(sat)}$ | <br>–<br>– | <br>–<br>– | <br>0.7<br>0.3 | Vdc |
| Base−Emitter Saturation Voltage<br>($I_C$ = 500 mAdc, $I_B$ = 50 mAdc) | $V_{BE(sat)}$ | <br>– | <br>– | <br>2.0 | Vdc |
| **SMALL−SIGNAL CHARACTERISTICS** | | | | | |
| Current−Gain — Bandwidth Product<br>($I_C$ = 20 mAdc, $V_{CE}$ = 10 Vdc, f = 100 MHz) | $f_T$ | 100 | – | – | MHz |
| Output Capacitance<br>($V_{CB}$ = 10 Vdc, $I_E$ = 0, f = 1.0 MHz) | $C_{obo}$ | – | – | 12 | pF |
| Input Capacitance<br>($V_{EB}$ = 0.5 Vdc, $I_C$ = 0, f = 1.0 MHz) | $C_{ibo}$ | – | – | 80 | pF |
| Noise Figure<br>($V_{CE}$ = 5.0 Vdc, $I_C$ = 0.2 mAdc, $R_S$ = 1.0 kΩ, f = 1.0 kHz, BW = 200 Hz) | NF | – | – | 10 | dB |
| **SWITCHING CHARACTERISTICS** | | | | | |
| Turn−On Time ($I_{B1}$ = $I_{B2}$ = 15 mAdc) | $t_{on}$ | – | – | 100 | ns |
| Turn−Off Time ($I_C$ = 150 mAdc, $R_L$ = 150 Ω) | $t_{off}$ | – | – | 400 | ns |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## TYPICAL CHARACTERISTICS

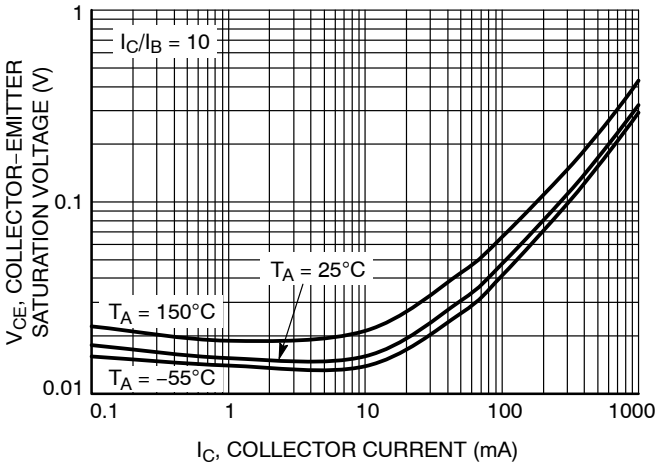


**Figure 1. Collector Emitter Saturation Voltage vs. Collector Current**

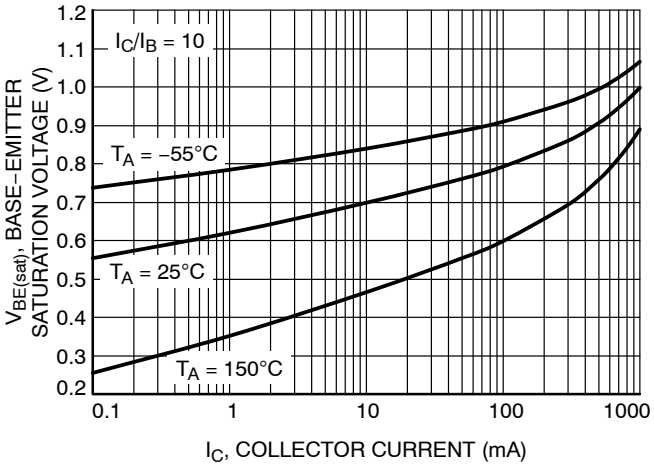


**Figure 2. Base Emitter Saturation Voltage vs. Collector Current**



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## TYPICAL CHARACTERISTICS

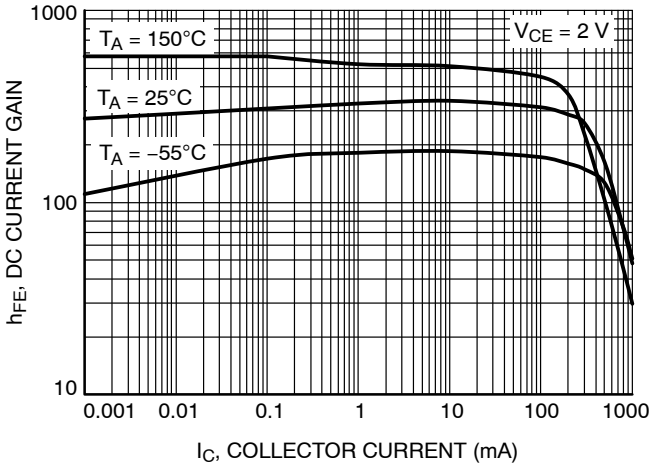


**Figure 3. DC Current Gain vs. Collector Current**

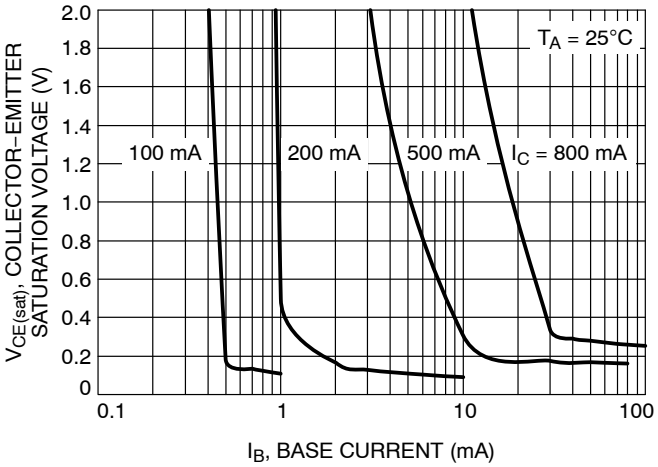


**Figure 4. Saturation Region**

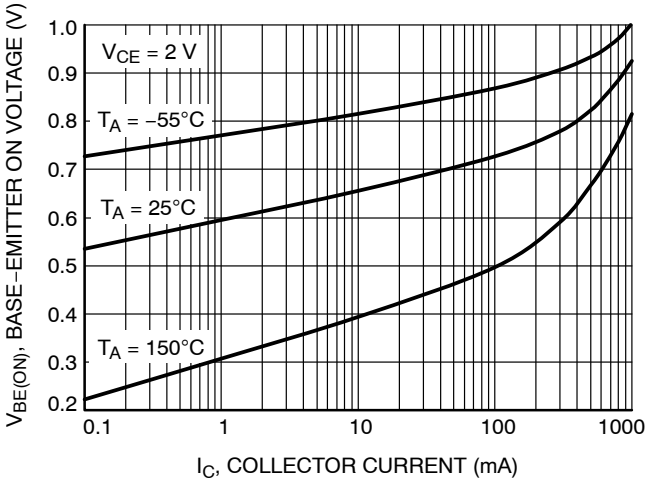


**Figure 5. Base−Emitter Turn−On Voltage vs. Collector Current**

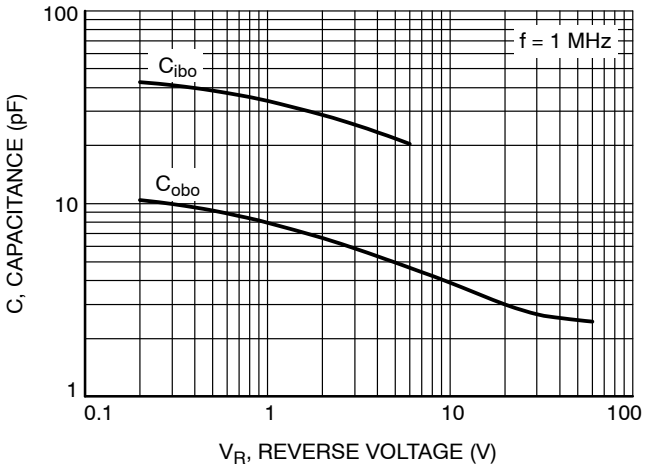


**Figure 6. Capacitance**

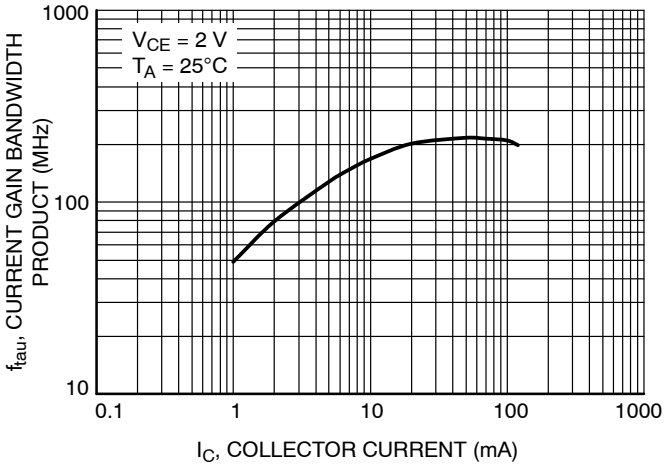


**Figure 7. Current Gain Bandwidth Product vs. Collector Current**

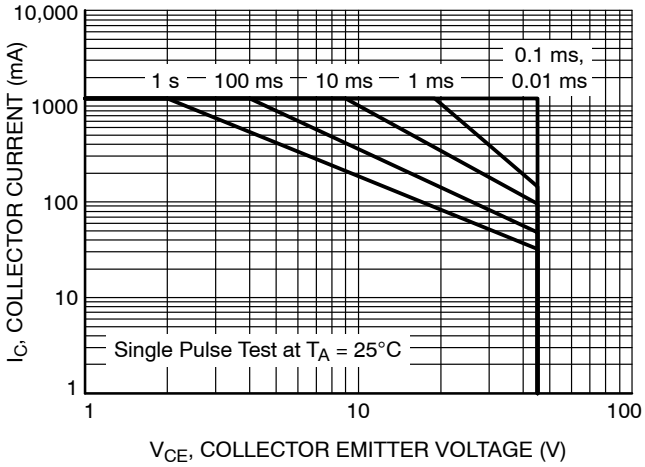


**Figure 8. Safe Operating Area**



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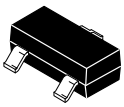
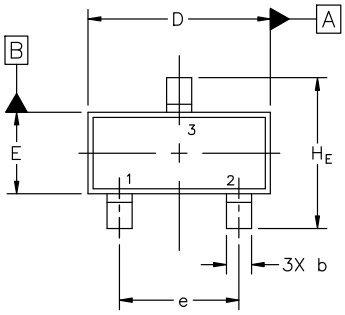


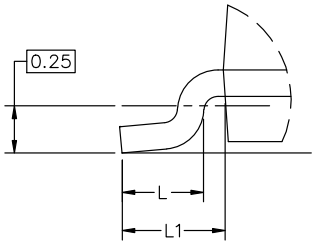
SCALE 4:1

**SOT−23 (TO−236) 2.90x1.30x1.00 1.90P**
CASE 318
ISSUE AU

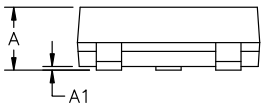
DATE 14 AUG 2024



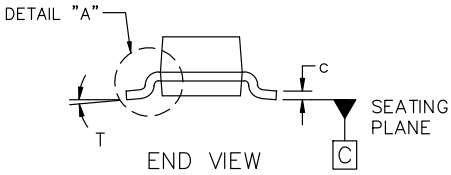

TOP VIEW




DETAIL "A"
Scale 3:1




SIDE VIEW

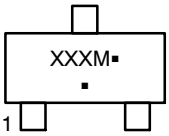



END VIEW

| MILLIMETERS | | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.08 | 0.14 | 0.20 |
| D | 2.80 | 2.90 | 3.04 |
| E | 1.20 | 1.30 | 1.40 |
| e | 1.78 | 1.90 | 2.04 |
| L | 0.30 | 0.43 | 0.55 |
| L1 | 0.35 | 0.54 | 0.69 |
| $H_E$ | 2.10 | 2.40 | 2.64 |
| T | 0° | −−− | 10° |

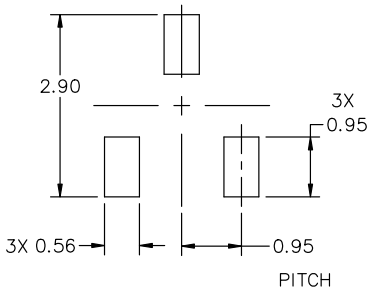
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

**GENERIC MARKING DIAGRAM***




XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*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.




RECOMMENDED
MOUNTING FOOTPRINT

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

**STYLES ON PAGE 2**

| | | |
|---|---|---|
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| **DESCRIPTION:** | **SOT−23 (TO−236) 2.90x1.30x1.00 1.90P** | **PAGE 1 OF 2** |

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CASE 318
ISSUE AU

DATE 14 AUG 2024

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE−ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE−ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE




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