

**45V NPN SMALL SIGNAL TRANSISTOR IN SOT23**
**Features**

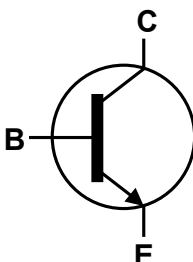
- $BV_{CEO} > 45V$
- $I_C = 800mA$  High Continuous Collector Current
- Low Saturation Voltage  $V_{CE(sat)} < 300mV @ 100mA$
- Complementary PNP Type: BCW68H
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

**Mechanical Data**

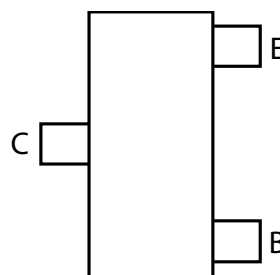
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ③
- Weight 0.008 grams (approximate)



Top View



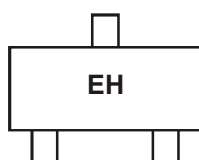
Device Symbol


 Top View  
 Pin-Out

**Ordering Information (Notes 4 & 5)**

| Part Number | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|------------|---------|--------------------|-----------------|-------------------|
| BCW66HTA    | AEC-Q101   | EH      | 7                  | 8               | 3,000             |
| BCW66HQT A  | Automotive | EH      | 7                  | 8               | 3,000             |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


EH = Product Type Marking Code

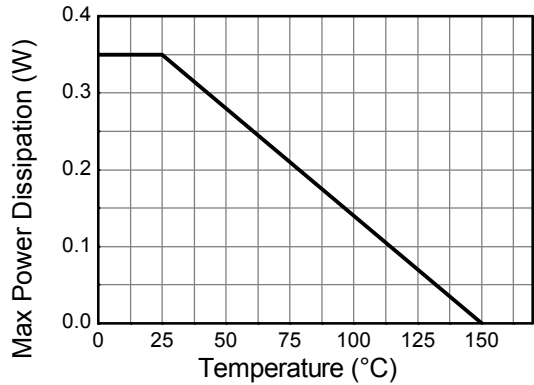
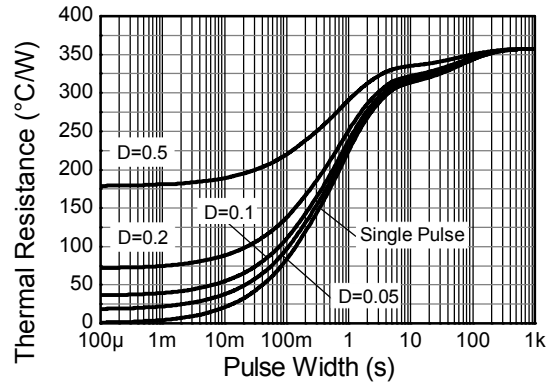
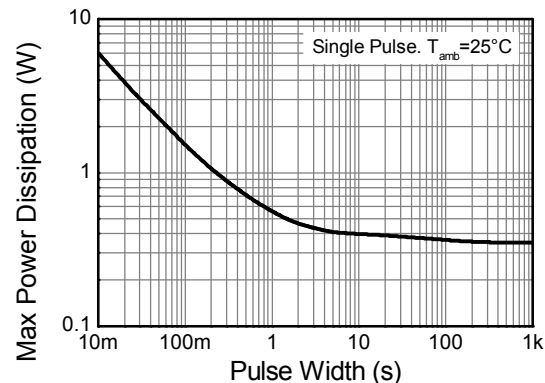
**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$ | 75    | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 45    | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 7     | V    |
| Continuous Collector Current | $I_C$     | 800   | mA   |
| Peak Pulse Current           | $I_{CM}$  | 1000  | mA   |
| Base Current                 | $I_B$     | 100   | mA   |

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                          | Symbol          | Value       | Unit               |
|-----------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation                       | $P_D$           | 310         | mW                 |
| (Note 6)                                |                 | 350         |                    |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 403         | $^\circ\text{C/W}$ |
| (Note 7)                                |                 | 357         |                    |
| Thermal Resistance, Junction to Leads   | $R_{\theta JL}$ | 350         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

- Notes:
- For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  - Same as Note 6, except the device is mounted on 15mm X 15mm 1oz copper.
  - Thermal resistance from junction to solder-point (at the end of the leads).


**Derating Curve**

**Transient Thermal Impedance**

**Pulse Power Dissipation**

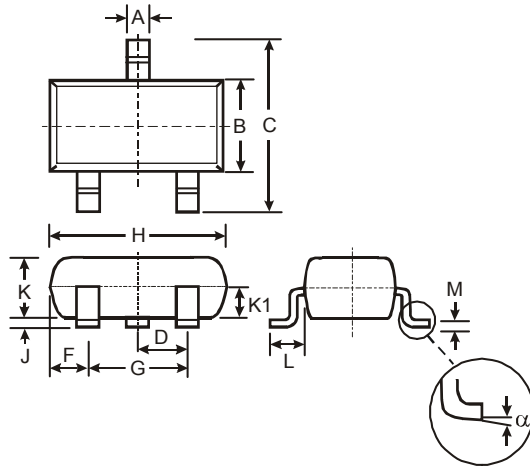
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                           | Symbol               | Min                     | Typ                | Max                | Unit | Test Condition                                                                                                                                                                               |
|----------------------------------------------------------|----------------------|-------------------------|--------------------|--------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                               |                      |                         |                    |                    |      |                                                                                                                                                                                              |
| Collector-Base Breakdown Voltage                         | BV <sub>CES</sub>    | 75                      | —                  | —                  | V    | I <sub>C</sub> = 10μA                                                                                                                                                                        |
| Collector-Emitter Breakdown Voltage (base open) (Note 9) | BV <sub>CEO</sub>    | 45                      | —                  | —                  | V    | I <sub>CEO</sub> = 10mA                                                                                                                                                                      |
| Emitter-Base Breakdown Voltage                           | BV <sub>EBO</sub>    | 7                       | —                  | —                  | V    | I <sub>EBO</sub> = 10μA                                                                                                                                                                      |
| Collector-Emitter Cut-Off Current                        | I <sub>CES</sub>     | —                       | <1                 | 20                 | nA   | V <sub>CES</sub> = 45V                                                                                                                                                                       |
|                                                          |                      | —                       | —                  | 20                 | μA   | V <sub>CES</sub> = 45V, T <sub>A</sub> = +150°C                                                                                                                                              |
| Emitter-Base Cut-Off Current                             | I <sub>EBO</sub>     | —                       | <1                 | 20                 | nA   | V <sub>EBO</sub> = 5.6V                                                                                                                                                                      |
| <b>ON CHARACTERISTICS (Note 9)</b>                       |                      |                         |                    |                    |      |                                                                                                                                                                                              |
| Static Forward Current Transfer Ratio                    | h <sub>FE</sub>      | 80<br>180<br>250<br>100 | —<br>—<br>350<br>— | —<br>—<br>630<br>— | —    | I <sub>C</sub> = 100μA, V <sub>CE</sub> = 10V<br>I <sub>C</sub> = 10mA, V <sub>CE</sub> = 1V<br>I <sub>C</sub> = 100mA, V <sub>CE</sub> = 1V<br>I <sub>C</sub> = 500mA, V <sub>CE</sub> = 2V |
| Collector-Emitter Saturation Voltage                     | V <sub>CE(sat)</sub> | —<br>—                  | —<br>—             | 0.3<br>0.7         | mV   | I <sub>C</sub> = 100mA, I <sub>B</sub> = 10mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA                                                                                               |
| Base-Emitter Saturation Voltage                          | V <sub>BE(sat)</sub> | —                       | —                  | 2                  | V    | I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA                                                                                                                                                |
| <b>SMALL SIGNAL CHARACTERISTICS (Note 9)</b>             |                      |                         |                    |                    |      |                                                                                                                                                                                              |
| Transition Frequency                                     | f <sub>T</sub>       | 100                     | —                  | —                  | MHz  | I <sub>C</sub> = 20mA, V <sub>CE</sub> = 10V, f = 100MHz                                                                                                                                     |
| Output Capacitance                                       | C <sub>obo</sub>     | —                       | 8                  | 12                 | pF   | V <sub>CB</sub> = 10V, f = 1MHz                                                                                                                                                              |
| Input Capacitance                                        | C <sub>ibo</sub>     | —                       | —                  | 80                 | pF   | V <sub>CB</sub> = -0.5V, f = 1MHz                                                                                                                                                            |
| Noise Figure                                             | N                    | —                       | 2                  | 10                 | dB   | I <sub>C</sub> = 0.2mA, V <sub>CE</sub> = 5V, R <sub>G</sub> = 1KΩ                                                                                                                           |
| Turn-On Time                                             | t <sub>on</sub>      | —                       | —                  | 100                | ns   | I <sub>C</sub> = 150mA, I <sub>B1</sub> = -I <sub>B2</sub> = 15mA                                                                                                                            |
| Turn-Off Time                                            | t <sub>off</sub>     | —                       | —                  | 400                | ns   | R <sub>L</sub> = 150Ω                                                                                                                                                                        |

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%

## Package Outline Dimensions

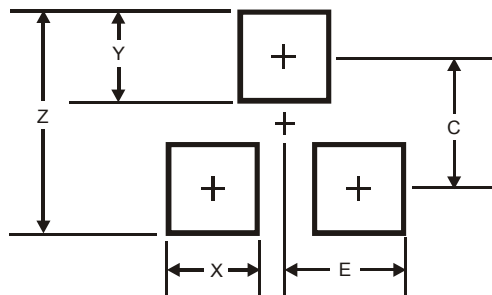
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| $\alpha$             | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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