

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

**Features**

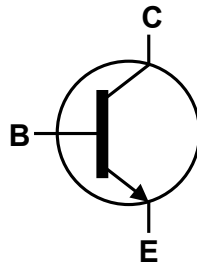
- $BV_{CEO} > 45V$
- $I_C = 800mA$  High Continuous Collector Current
- Low Saturation Voltage  $V_{CE(sat)} < 300mV @ 100mA$
- Complementary PNP Type: BCW68H
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101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

**Mechanical Data**

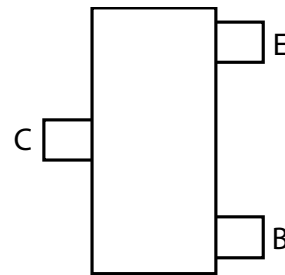
- Case: SOT23
- Case Material: molded plastic, "Green" molding compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight 0.008 grams (approximate)



Top View



Device Symbol



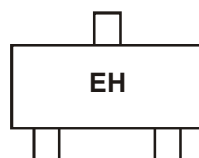
Top View  
Pin-Out

**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
BCW66HQTA	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

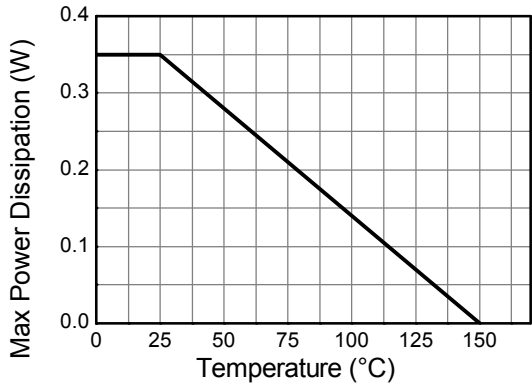
**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	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

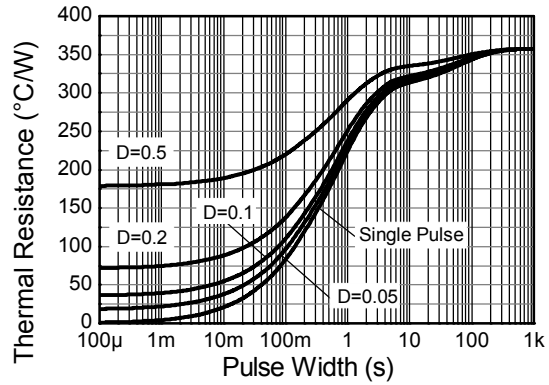
**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation	$P_D$	(Note 6)	310
		(Note 7)	350
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 6)	403
		(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	$^\circ\text{C}$

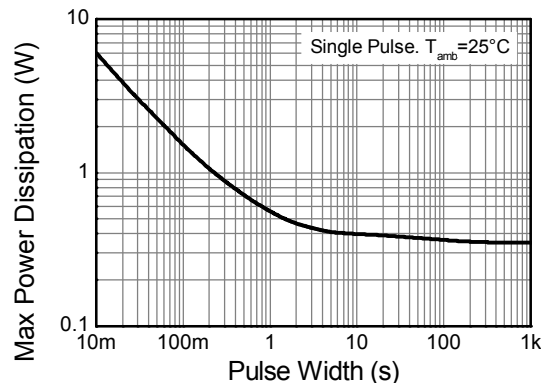
- Notes:
6. For a device mounted on minimum recommended pad layout 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  7. Same as Note 6, except the device is mounted on 15mm X 15mm 1oz copper.
  8. Thermal resistance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



**Derating Curve**



**Transient Thermal Impedance**



**Pulse Power Dissipation**

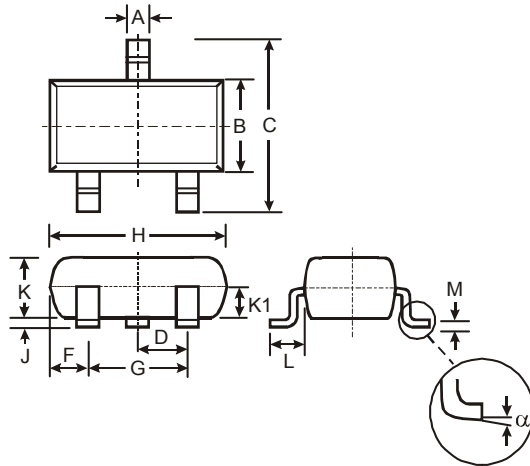
**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CES}$	75	—	—	V	$I_C = 10\mu\text{A}$
Collector-Emitter Breakdown Voltage (base open) (Note 9)	$BV_{CEO}$	45	—	—	V	$I_{CEO} = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	7	—	—	V	$I_{EBO} = 10\mu\text{A}$
Collector-Emitter Cut-Off Current	$I_{CES}$	—	<1	20	nA	$V_{CES} = 45\text{V}$
		—	—	20	$\mu\text{A}$	$V_{CES} = 45\text{V}, T_A = +150^\circ\text{C}$
Emitter-Base Cut-Off Current	$I_{EBO}$	—	<1	20	nA	$V_{EBO} = 5.6\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Static Forward Current Transfer Ratio	$h_{FE}$	80 180 250 100	— — 350 —	— — 630 —	—	$I_C = 100\mu\text{A}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 1\text{V}$ $I_C = 100\text{mA}, V_{CE} = 1\text{V}$ $I_C = 500\text{mA}, V_{CE} = 2\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3 0.7	mV	$I_C = 100\text{mA}, I_B = 10\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	2	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS (Note 9)</b>						
Transition Frequency	$f_T$	100	—	—	MHz	$I_C = 20\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$
Output Capacitance	$C_{obo}$	—	8	12	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Input Capacitance	$C_{ibo}$	—	—	80	pF	$V_{CB} = -0.5\text{V}, f = 1\text{MHz}$
Noise Figure	N	—	2	10	dB	$I_C = 0.2\text{mA}, V_{CE} = 5\text{V}, R_G = 1\text{K}\Omega$
Turn-On Time	$t_{on}$	—	—	100	ns	$I_C = 150\text{mA}$
Turn-Off Time	$t_{off}$	—	—	400	ns	$I_{B1} = -I_{B2} = 15\text{mA}$ $R_L = 150\Omega$

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$

## Package Outline Dimensions

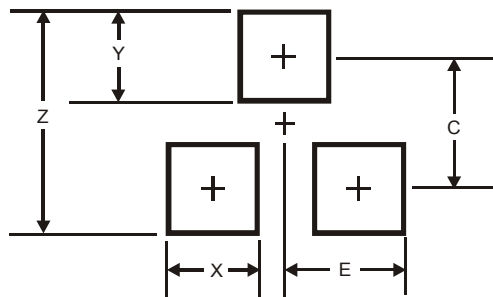
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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
α	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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