

# BCW65ALT1G, BCW65CLT1G

## General Purpose Transistor

### NPN Silicon

#### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	$V_{CEO}$	32	Vdc
Collector – Base Voltage	$V_{CBO}$	60	Vdc
Emitter – Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current – Continuous	$I_C$	800	mAdc

#### THERMAL CHARACTERISTICS

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

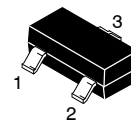
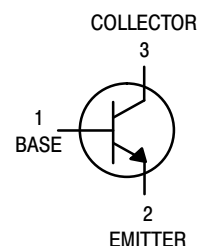
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.
2. Alumina =  $0.4 \times 0.3 \times 0.024$  in 99.5% alumina.



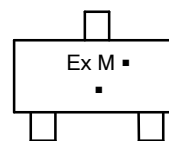
ON Semiconductor®

<http://onsemi.com>



SOT-23  
CASE 318  
STYLE 6

#### MARKING DIAGRAMS



Ex = Device Code  
x = A or C  
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 <sup>†</sup>
BCW65ALT1G	SOT-23 (Pb-Free)	3000/Tape & Reel
BCW65CLT1G	SOT-23 (Pb-Free)	3000/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.

# BCW65ALT1G, BCW65CLT1G

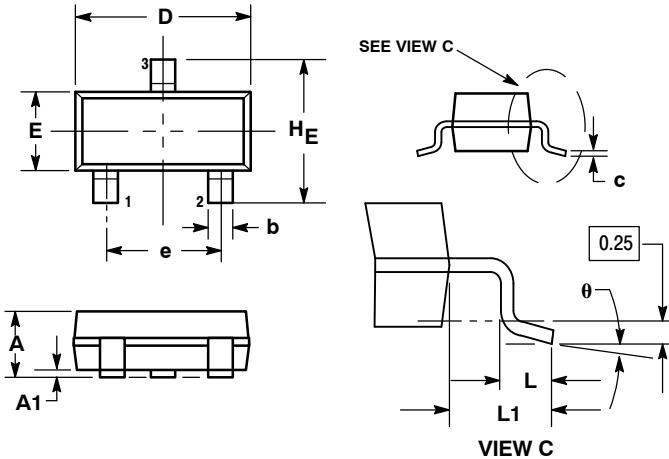
## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	32	–	–	Vdc
Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 10 μA, V <sub>EB</sub> = 0)	V <sub>(BR)CES</sub>	60	–	–	Vdc
Emitter – Base Breakdown Voltage (I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	5.0	–	–	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 32 Vdc, I <sub>E</sub> = 0) (V <sub>CE</sub> = 32 Vdc, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C)	I <sub>CES</sub>	–	–	20	nA μA
Emitter Cutoff Current (V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	–	20	nA
<b>ON CHARACTERISTICS</b>					
DC Current Gain (I <sub>C</sub> = 100 μA, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 2.0 Vdc)	BCW65ALT1 h <sub>FE</sub>	35 75 100 35	– – – –	– – 250 –	–
DC Current Gain (I <sub>C</sub> = 100 μA, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 2.0 Vdc)	BCW65CLT1 h <sub>FE</sub>	80 180 250 100	– – – –	– – 630 –	–
Collector – Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 10 mA)	V <sub>CE(sat)</sub>	– –	0.7 0.3	– –	Vdc
Base – Emitter Saturation Voltage (I <sub>C</sub> = 500 mA, I <sub>B</sub> = 50 mA)	V <sub>BE(sat)</sub>	–	–	2.0	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current – Gain — Bandwidth Product (I <sub>C</sub> = 20 mA, V <sub>CE</sub> = 10 Vdc, f = 100 MHz)	f <sub>T</sub>	100	–	–	MHz
Output Capacitance (V <sub>CB</sub> = 10 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	–	–	12	pF
Input Capacitance (V <sub>EB</sub> = 0.5 Vdc, I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	–	–	80	pF
Noise Figure (V <sub>CE</sub> = 5.0 Vdc, I <sub>C</sub> = 0.2 mA, R <sub>S</sub> = 1.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	–	–	10	dB
<b>SWITCHING CHARACTERISTICS</b>					
Turn-On Time (I <sub>B1</sub> = I <sub>B2</sub> = 15 mA)	t <sub>on</sub>	–	–	100	ns
Turn-Off Time (I <sub>C</sub> = 150 mA, R <sub>L</sub> = 150 Ω)	t <sub>off</sub>	–	–	400	ns

# BCW65ALT1G, BCW65CLT1G

## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AN



NOTES:

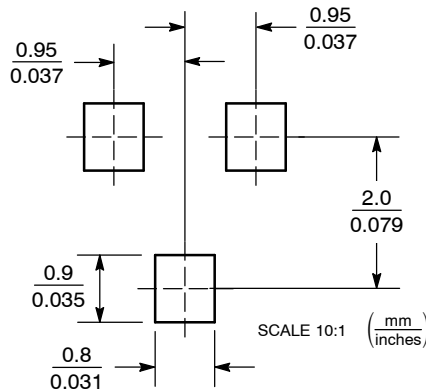
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104

STYLE 6:

1. BASE
2. EMITTER
3. 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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