

# BCW65ALT1, BCW65CLT1

## General Purpose Transistor

### NPN Silicon

#### Features

- Pb-Free Package is Available

#### 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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

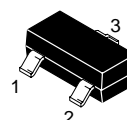
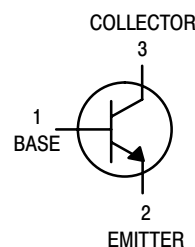
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR–5 Board (Note 1), $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction–to–Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (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	$^\circ\text{C}$

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



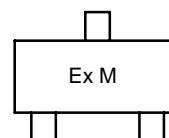
ON Semiconductor®

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SOT-23  
CASE 318  
STYLE 6

#### MARKING DIAGRAM



EA = Specific Device Code (BCW65ALT1)  
EC = Specific Device Code (BCW65CLT1)  
M = Date Code

#### ORDERING INFORMATION

Device	Package	Shipping†
BCW65ALT1	SOT–23	3000 / Tape & Reel
BCW65ALT1G	SOT–23 (Pb–Free)	3000 / Tape & Reel
BCW65CLT1	SOT–23	3000 / 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.

# BCW65ALT1, BCW65CLT1

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 10 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	32	–	–	Vdc
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 10 μAdc, V <sub>EB</sub> = 0)	V <sub>(BR)CES</sub>	60	–	–	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μAdc, 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 20	nAdc μAdc
Emitter Cutoff Current (V <sub>EB</sub> = 4.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	–	20	nAdc

### ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 100 μAdc, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 500 mAdc, 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 μAdc, V <sub>CE</sub> = 10 Vdc) (I <sub>C</sub> = 10 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 100 mAdc, V <sub>CE</sub> = 1.0 Vdc) (I <sub>C</sub> = 500 mAdc, 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 mAdc, I <sub>B</sub> = 50 mAdc) (I <sub>C</sub> = 100 mAdc, I <sub>B</sub> = 10 mAdc)		V <sub>CE(sat)</sub>	– –	0.7 0.3	– –	Vdc
Base–Emitter Saturation Voltage (I <sub>C</sub> = 500 mAdc, I <sub>B</sub> = 50 mAdc)		V <sub>BE(sat)</sub>	–	–	2.0	Vdc

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product (I <sub>C</sub> = 20 mAdc, 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 mAdc, R <sub>S</sub> = 1.0 kΩ, f = 1.0 kHz, BW = 200 Hz)		NF	–	–	10	dB

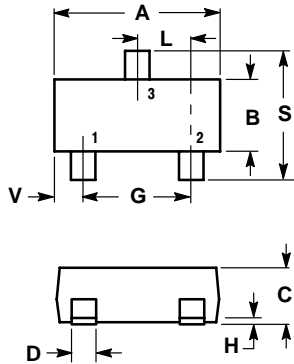
### SWITCHING CHARACTERISTICS

Turn–On Time (I <sub>B1</sub> = I <sub>B2</sub> = 15 mAdc)		t <sub>on</sub>	–	–	100	ns
Turn–Off Time (I <sub>C</sub> = 150 mAdc, R <sub>L</sub> = 150 Ω)		t <sub>off</sub>	–	–	400	ns

# BCW65ALT1, BCW65CLT1

## PACKAGE DIMENSIONS

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



### NOTES:

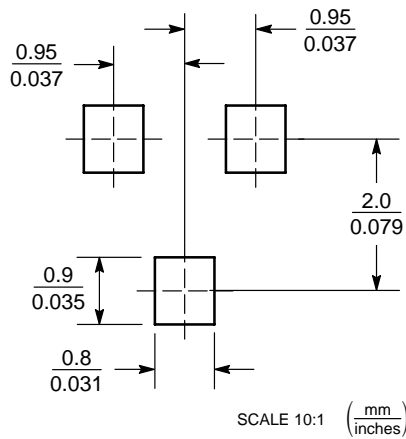
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-03 AND -07 OBSOLETE, NEW STANDARD 318-08.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

### 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.

# BCW65ALT1, BCW65CLT1

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