

BCW65ALT1, BCW65CLT1

General Purpose Transistor NPN Silicon

Features

- Pb-Free Packages are 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 |

THERMAL CHARACTERISTICS

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

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.

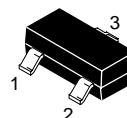
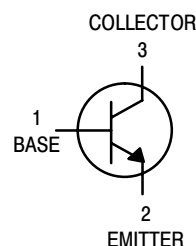
1. FR–5 = $1.0 \times 0.75 \times 0.062$ in.

2. Alumina = $0.4 \times 0.3 \times 0.024$ in 99.5% alumina.



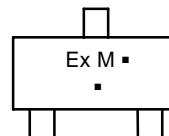
ON Semiconductor®

<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 [†] |
|------------|---------------------|-----------------------|
| BCW65ALT1 | SOT–23 | 3000/Tape & Reel |
| BCW65ALT1G | SOT–23 (Pb-Free) | 3000/Tape & Reel |
| BCW65CLT1 | SOT–23 | 3000/Tape & Reel |
| BCW65CLT1G | SOT–23 (Pb-Free) | 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|--|---------------|--------|--------|----------|-------------------------|
| Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mAdc}$, $I_B = 0$) | $V_{(BR)CEO}$ | 32 | – | – | Vdc |
| Collector–Emitter Breakdown Voltage ($I_C = 10\text{ }\mu\text{Adc}$, $V_{EB} = 0$) | $V_{(BR)CES}$ | 60 | – | – | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 10\text{ }\mu\text{Adc}$, $I_C = 0$) | $V_{(BR)EBO}$ | 5.0 | – | – | Vdc |
| Collector Cutoff Current ($V_{CE} = 32\text{ Vdc}$, $I_E = 0$) ($V_{CE} = 32\text{ Vdc}$, $I_E = 0$, $T_A = 150^\circ\text{C}$) | I_{CES} | – – | – – | 20 20 | nAdc μAdc |
| Emitter Cutoff Current ($V_{EB} = 4.0\text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | – | 20 | nAdc |

ON CHARACTERISTICS

| | | | | | | |
|--|-----------|---------------|-------------------------|------------------|--------------------|-----|
| DC Current Gain ($I_C = 100\text{ }\mu\text{Adc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 2.0\text{ Vdc}$) | BCW65ALT1 | h_{FE} | 35 75 100 35 | – – – – | – – 250 – | – |
| DC Current Gain ($I_C = 100\text{ }\mu\text{Adc}$, $V_{CE} = 10\text{ Vdc}$) ($I_C = 10\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 100\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$) ($I_C = 500\text{ mAdc}$, $V_{CE} = 2.0\text{ Vdc}$) | BCW65CLT1 | h_{FE} | 80 180 250 100 | – – – – | – – 630 – | – |
| Collector–Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$) ($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$) | | $V_{CE(sat)}$ | – – | 0.7 0.3 | – – | Vdc |
| Base–Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$) | | $V_{BE(sat)}$ | – | – | 2.0 | Vdc |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|--|-----------|-----|---|----|-----|
| Current–Gain — Bandwidth Product ($I_C = 20\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | 100 | – | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$) | C_{obo} | – | – | 12 | pF |
| Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$) | C_{ibo} | – | – | 80 | pF |
| Noise Figure ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 0.2\text{ mAdc}$, $R_S = 1.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$) | NF | – | – | 10 | dB |

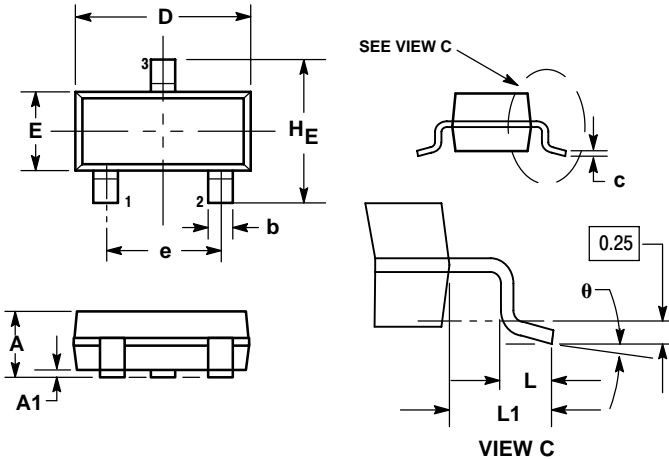
SWITCHING CHARACTERISTICS

| | | | | | |
|--|-----------|---|---|-----|----|
| Turn–On Time ($I_{B1} = I_{B2} = 15\text{ mAdc}$) | t_{on} | – | – | 100 | ns |
| Turn–Off Time ($I_C = 150\text{ mAdc}$, $R_L = 150\text{ }\Omega$) | t_{off} | – | – | 400 | ns |

BCW65ALT1, BCW65CLT1

PACKAGE DIMENSIONS

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



NOTES:

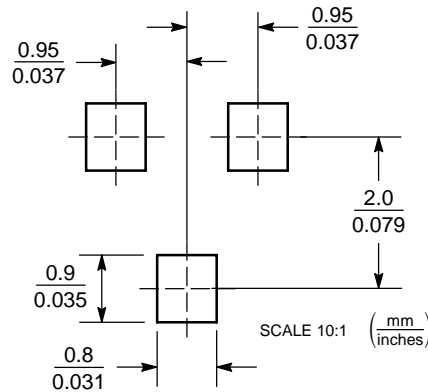
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| 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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BCW65ALT1/D