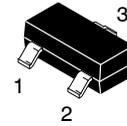


General Purpose Transistors

NPN Silicon

BCW32LT1G



SOT-23 (TO-236)
CASE 318
STYLE 6

Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS

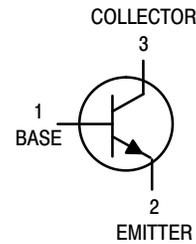
Symbol	Rating	Value	Unit
V_{CEO}	Collector-Emitter Voltage	32	Vdc
V_{CBO}	Collector-Base Voltage	32	Vdc
V_{EBO}	Emitter-Base Voltage	5.0	Vdc
I_C	Collector Current - Continuous	100	mAdc

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

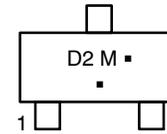
THERMAL CHARACTERISTICS

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



MARKING DIAGRAM



- D2 = Device Code
- 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 [†]
BCW32LT1G	SOT-23 (Pb-Free)	3000 / Tape & Reel
NSVBCW32LT1G	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](#).

BCW32LT1G

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Symbol	Characteristic	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
V _{(BR)CEO}	Collector – Emitter Breakdown Voltage (I _C = 2.0 mA _{dc} , V _{EB} = 0)	32	–	–	V _{dc}
V _{(BR)CBO}	Collector – Base Breakdown Voltage (I _C = 10 μA _{dc} , I _E = 0)	32	–	–	V _{dc}
V _{(BR)EBO}	Emitter – Base Breakdown Voltage (I _E = 10 μA _{dc} , I _C = 0)	5.0	–	–	V _{dc}
I _{CBO}	Collector Cutoff Current (V _{CB} = 32 V _{dc} , I _E = 0) (V _{CB} = 32 V _{dc} , I _E = 0, T _A = 100°C)	– –	– –	100 10	nA _{dc} μA _{dc}

ON CHARACTERISTICS

h _{FE}	DC Current Gain (I _C = 2.0 mA _{dc} , V _{CE} = 5.0 V _{dc})	200	–	450	–
V _{CE(sat)}	Collector – Emitter Saturation Voltage (I _C = 10 mA _{dc} , I _B = 0.5 mA _{dc})	–	–	0.25	V _{dc}
V _{BE(on)}	Base – Emitter On Voltage (I _C = 2.0 mA _{dc} , V _{CE} = 5.0 V _{dc})	0.55	–	0.70	V _{dc}

SMALL-SIGNAL CHARACTERISTICS

C _{obo}	Output Capacitance (I _E = 0, V _{CB} = 10 V _{dc} , f = 1.0 MHz)	–	–	4.0	pF
NF	Noise Figure (I _C = 0.2 mA _{dc} , V _{CE} = 5.0 V _{dc} , R _S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	–	–	10	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL NOISE CHARACTERISTICS

(V_{CE} = 5.0 V_{dc}, T_A = 25°C)

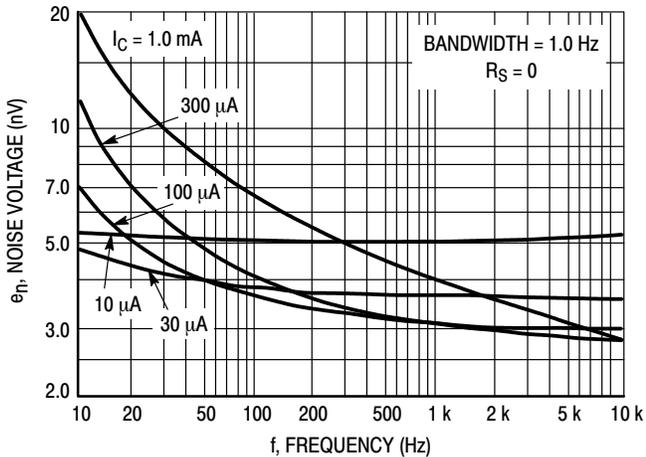


Figure 1. Noise Voltage

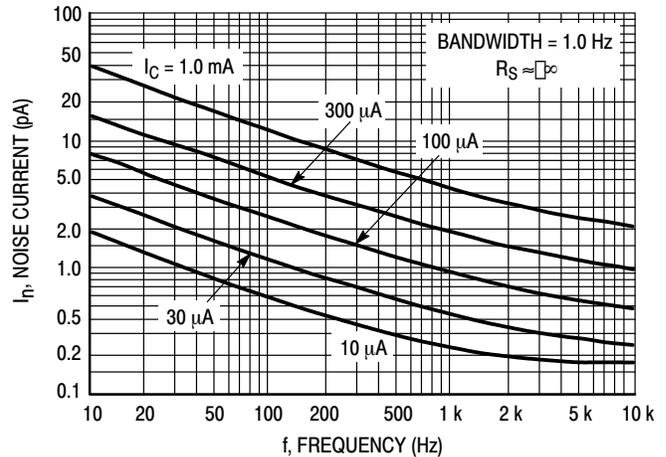


Figure 2. Noise Current

BCW32LT1G

NOISE FIGURE CONTOURS

($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

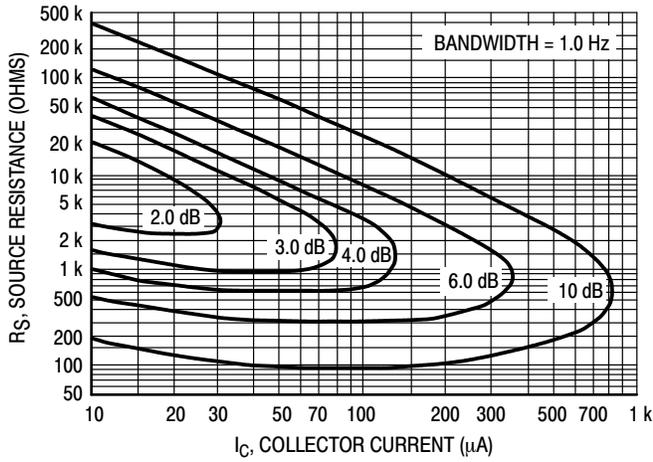


Figure 3. Narrow Band, 100 Hz

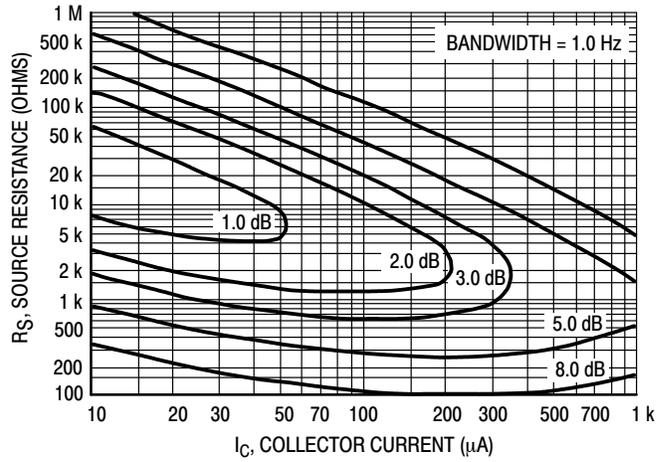


Figure 4. Narrow Band, 1.0 kHz

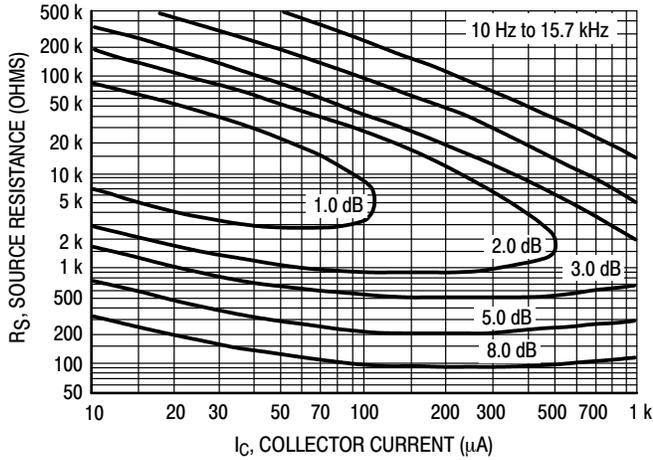


Figure 5. Wideband

Noise Figure is defined as:

$$NF = 20 \log_{10} \left(\frac{e_n^2 + 4KTR_S + I_n^2 R_S^2}{4KTR_S} \right)^{1/2}$$

e_n = Noise Voltage of the Transistor referred to the input. (Figure 3)

I_n = Noise Current of the Transistor referred to the input. (Figure 4)

K = Boltzman's Constant ($1.38 \times 10^{-23} \text{ J}^\circ\text{K}$)

T = Temperature of the Source Resistance ($^\circ\text{K}$)

R = Source Resistance (Ω)

S

BCW32LT1G

TYPICAL STATIC CHARACTERISTICS

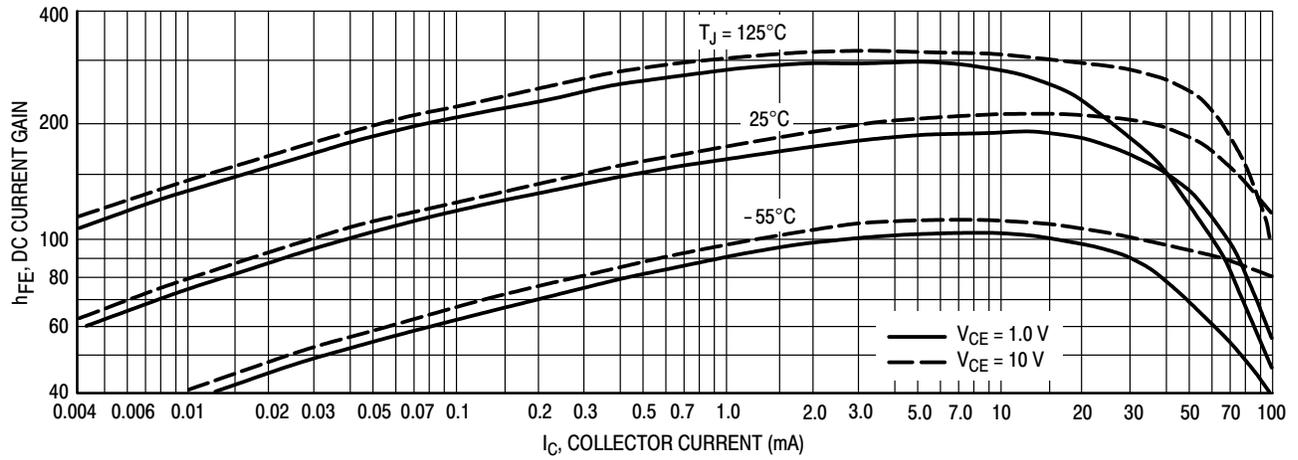


Figure 6. DC Current Gain

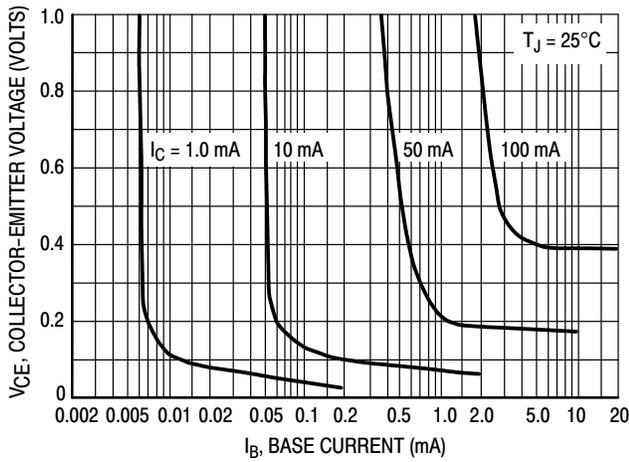


Figure 7. Collector Saturation Region

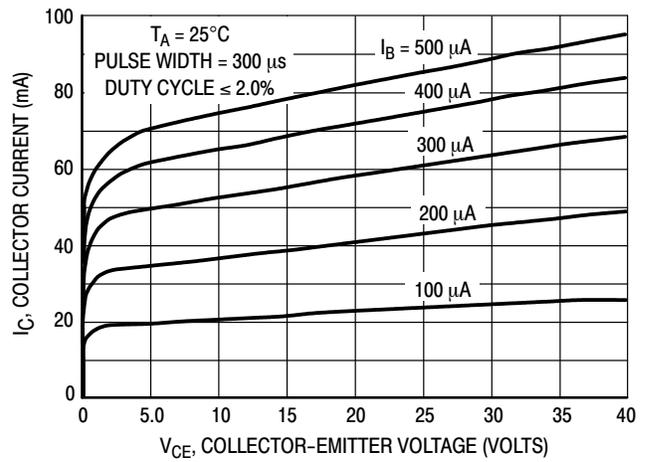


Figure 8. Collector Characteristics

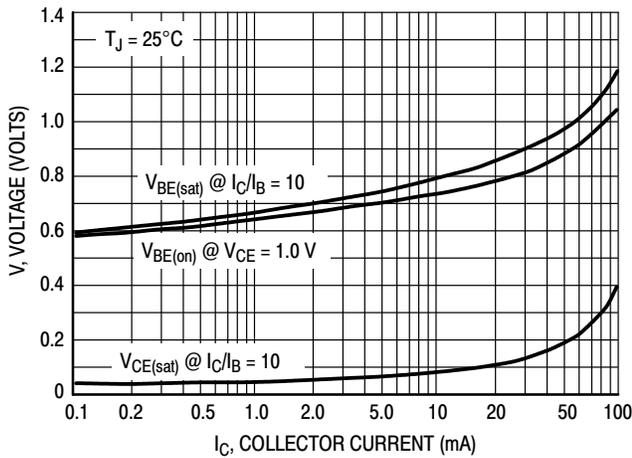


Figure 9. "On" Voltages

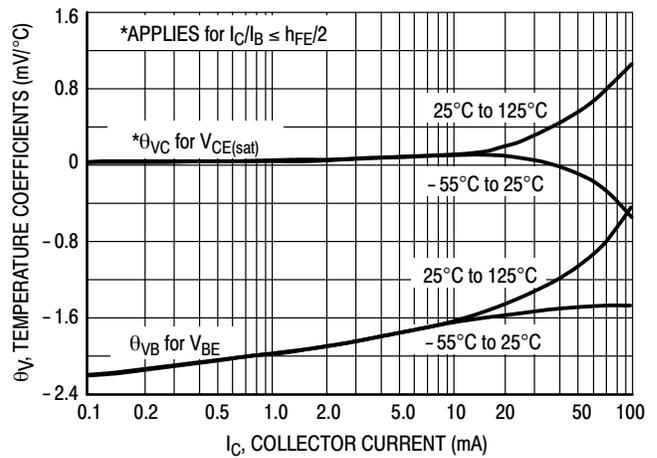


Figure 10. Temperature Coefficients

BCW32LT1G

TYPICAL DYNAMIC CHARACTERISTICS

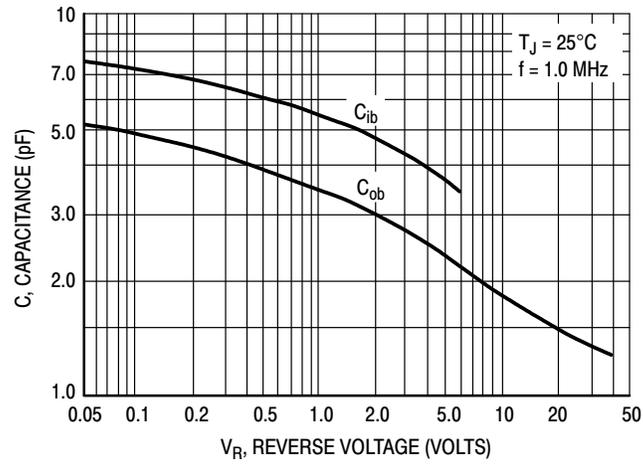
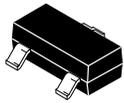


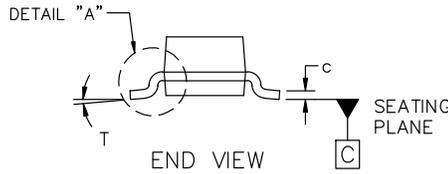
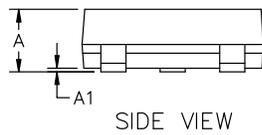
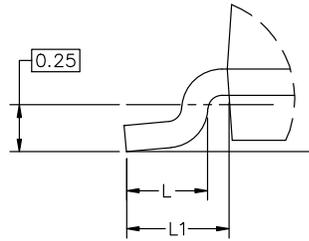
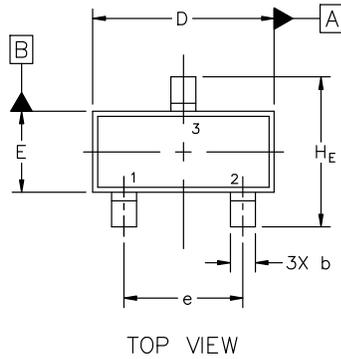
Figure 11. Capacitance



SCALE 4:1

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CASE 318
ISSUE AU

DATE 14 AUG 2024

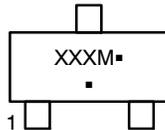


MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
HE	2.10	2.40	2.64
T	0°	---	10°

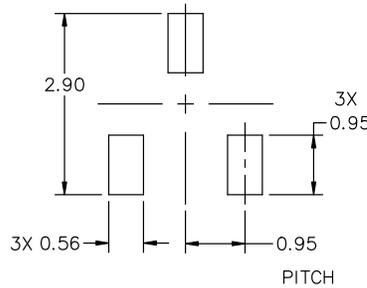
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

GENERIC MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb-Free Package



* For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

STYLES ON PAGE 2

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CASE 318
ISSUE AU

DATE 14 AUG 2024

STYLE 1 THRU 5:
CANCELLED

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR

STYLE 7:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

STYLE 8:
PIN 1. ANODE
2. NO CONNECTION
3. CATHODE

STYLE 9:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 10:
PIN 1. DRAIN
2. SOURCE
3. GATE

STYLE 11:
PIN 1. ANODE
2. CATHODE
3. CATHODE-ANODE

STYLE 12:
PIN 1. CATHODE
2. CATHODE
3. ANODE

STYLE 13:
PIN 1. SOURCE
2. DRAIN
3. GATE

STYLE 14:
PIN 1. CATHODE
2. GATE
3. ANODE

STYLE 15:
PIN 1. GATE
2. CATHODE
3. ANODE

STYLE 16:
PIN 1. ANODE
2. CATHODE
3. CATHODE

STYLE 17:
PIN 1. NO CONNECTION
2. ANODE
3. CATHODE

STYLE 18:
PIN 1. NO CONNECTION
2. CATHODE
3. ANODE

STYLE 19:
PIN 1. CATHODE
2. ANODE
3. CATHODE-ANODE

STYLE 20:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

STYLE 22:
PIN 1. RETURN
2. OUTPUT
3. INPUT

STYLE 23:
PIN 1. ANODE
2. ANODE
3. CATHODE

STYLE 24:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 25:
PIN 1. ANODE
2. CATHODE
3. GATE

STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

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