

BCW32LT1

General Purpose Transistors

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}	32	Vdc
Emitter-Base Voltage	V_{EBO}	5.0	Vdc
Collector Current – Continuous	I_C	100	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

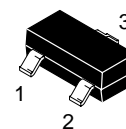
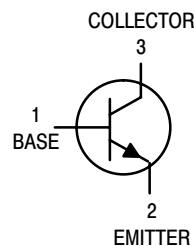
Characteristic	Symbol	Value	Unit
Total Device Dissipation FR-5 Board ⁽¹⁾ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225	mW
		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, ⁽²⁾ $T_A = 25^\circ\text{C}$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



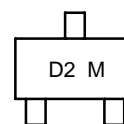
ON Semiconductor®

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

MARKING DIAGRAM



M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
BCW32LT1	SOT-23	3000 Units / Reel
BCW32LT1G	SOT-23 (Pb-Free)	3000 Units / 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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (I _C = 2.0 mA, V _{EB} = 0)	V _{(BR)CEO}	32	–	–	Vdc
Collector–Base Breakdown Voltage (I _C = 10 μA, I _E = 0)	V _{(BR)CBO}	32	–	–	Vdc
Emitter–Base Breakdown Voltage (I _E = 10 μA, I _C = 0)	V _{(BR)EBO}	5.0	–	–	Vdc
Collector Cutoff Current (V _{CB} = 32 Vdc, I _E = 0) (V _{CB} = 32 Vdc, I _E = 0, T _A = 100°C)	I _{CBO}	–	–	100 10	nA μA
ON CHARACTERISTICS					
DC Current Gain (I _C = 2.0 mA, V _{CE} = 5.0 Vdc)	h _{FE}	200	–	450	–
Collector–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA)	V _{CE(sat)}	–	–	0.25	Vdc
Base–Emitter On Voltage (I _C = 2.0 mA, V _{CE} = 5.0 Vdc)	V _{BE(on)}	0.55	–	0.70	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Output Capacitance (I _E = 0, V _{CB} = 10 Vdc, f = 1.0 MHz)	C _{obo}	–	–	4.0	pF
Noise Figure (I _C = 0.2 mA, V _{CE} = 5.0 Vdc, R _S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	–	–	10	dB

TYPICAL NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

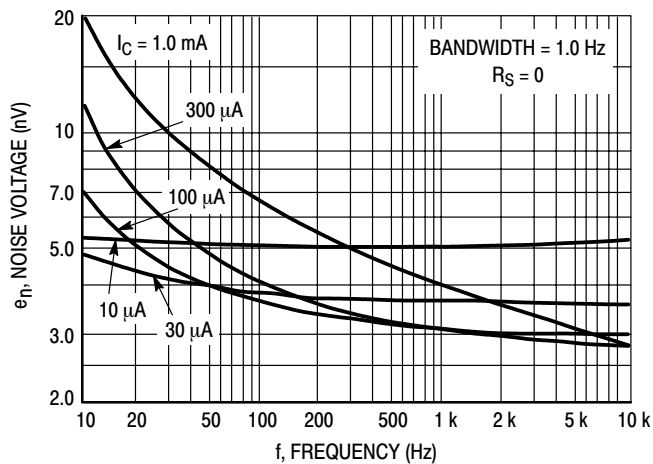


Figure 1. Noise Voltage

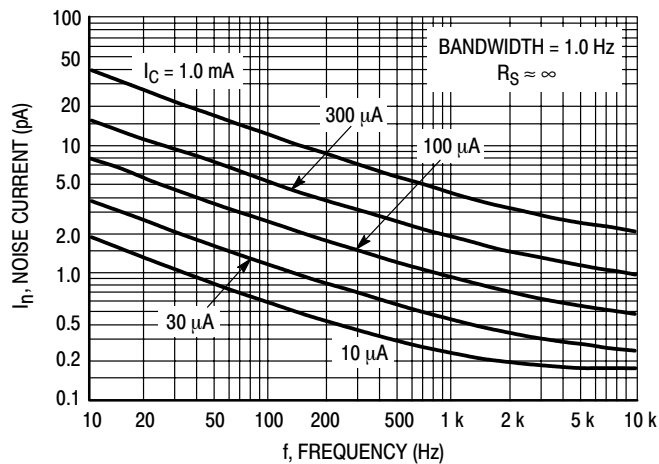


Figure 2. Noise Current

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NOISE FIGURE CONTOURS

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

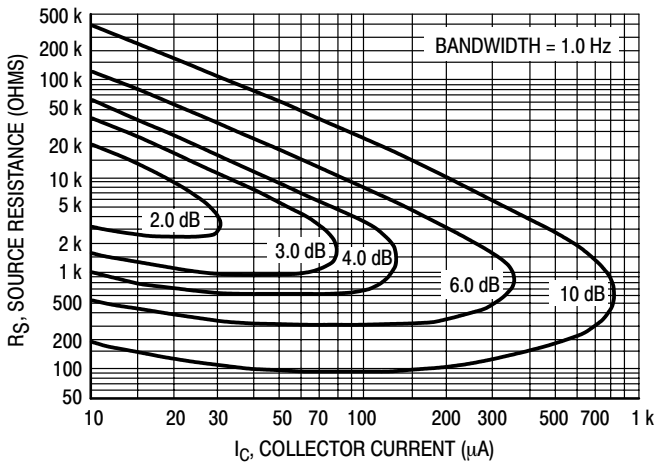


Figure 3. Narrow Band, 100 Hz

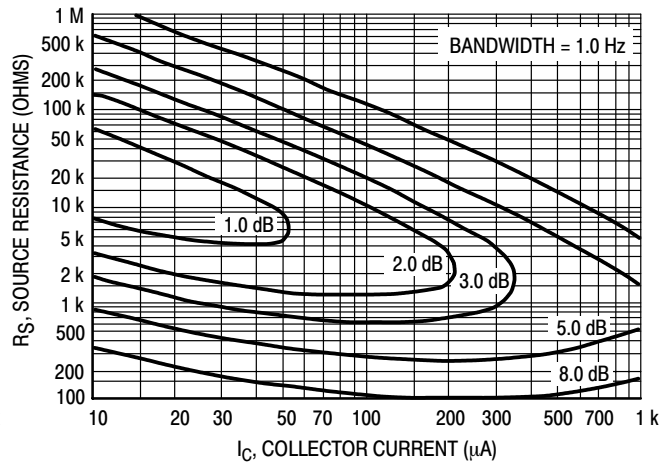


Figure 4. Narrow Band, 1.0 kHz

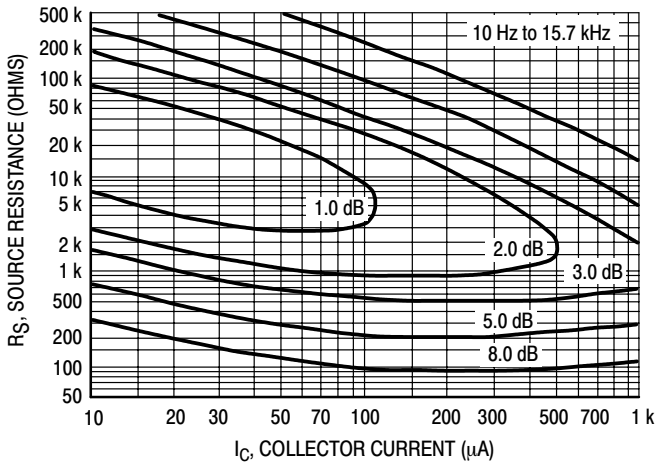


Figure 5. Wideband

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.

n (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

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TYPICAL STATIC CHARACTERISTICS

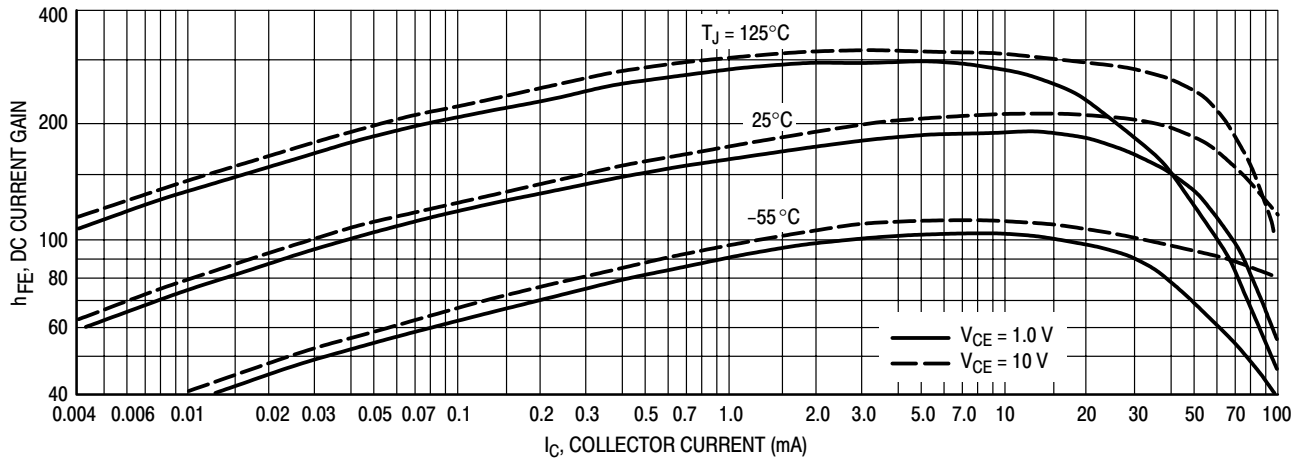


Figure 6. DC Current Gain

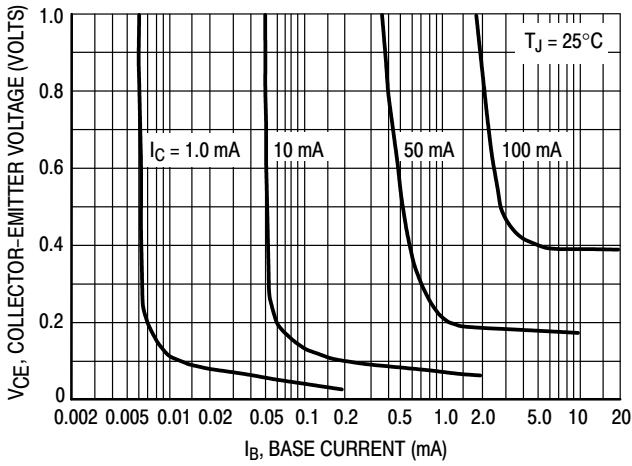


Figure 7. Collector Saturation Region

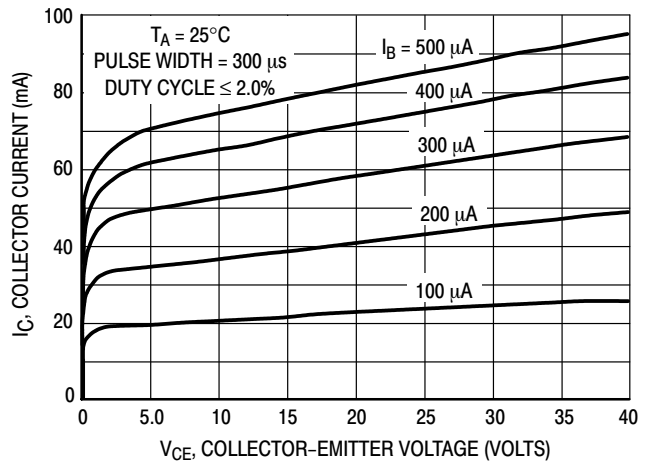


Figure 8. Collector Characteristics

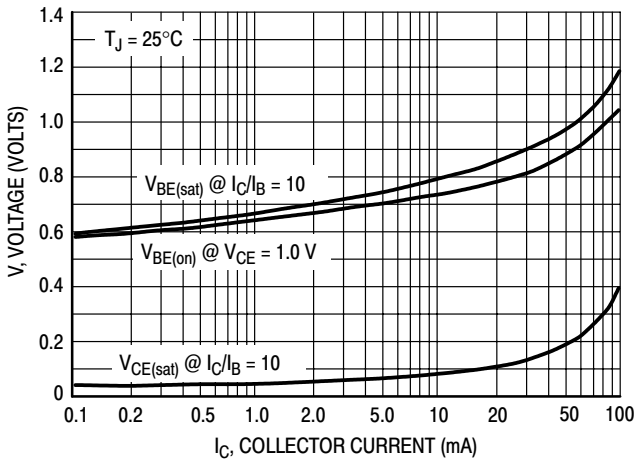


Figure 9. "On" Voltages

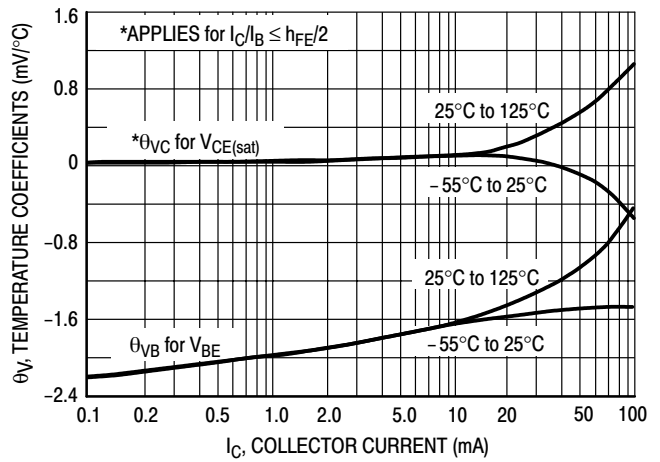


Figure 10. Temperature Coefficients

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TYPICAL DYNAMIC CHARACTERISTICS

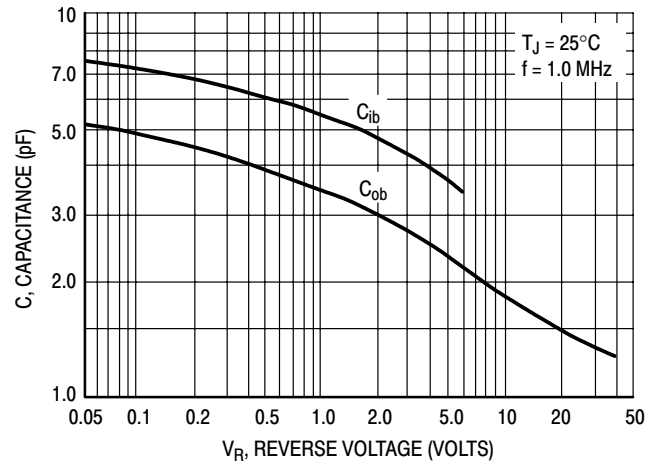


Figure 11. Capacitance

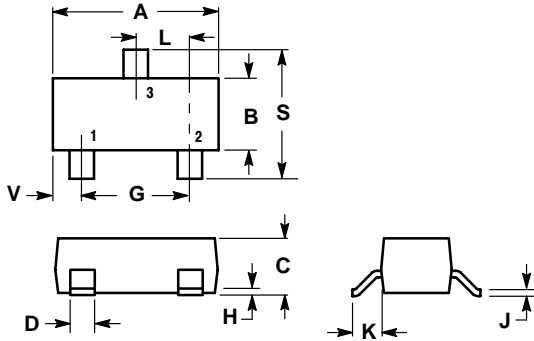
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PACKAGE DIMENSIONS

SOT-23 (TO-236AB)

CASE 318-08

ISSUE AK



NOTES:

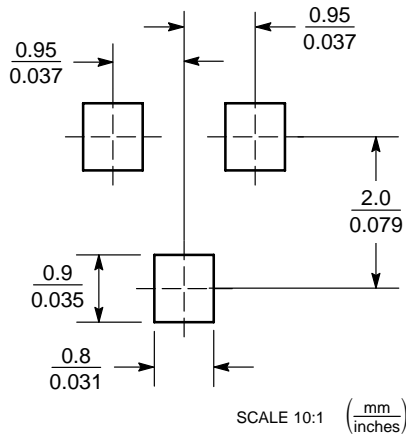
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

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.

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