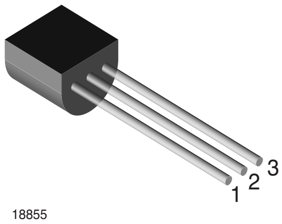
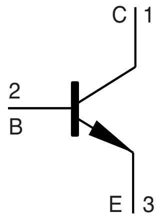
Small Signal Transistors (NPN)

Features

- NPN Silicon Epitaxial Planar Transistors
- These transistors are subdivided into three groups A, B, and C according to their current gain. The type BC546 is available in groups A and B, however, the types BC547 and BC548 can be supplied in all three groups. As complementary types the PNP transistors BC556...BC558 are recommended.
- On special request, these transistors are also manufactured in the pin configuration TO-18.





Mechanical Data

Case: TO-92 Plastic Package
Weight: approx. 180 mg
Packaging Codes/Options:
BULK / 5 k per container 20 k/box
TAP / 4 k per Ammopack 20 k/box

Parts Table

Part	Ordering code	Remarks
BC546A	BC546A-BULK or BC546A-TAP	Bulk / Ammopack
BC546B	BC546B-BULK or BC546B-TAP	Bulk / Ammopack
BC547A	BC547A-BULK or BC547A-TAP	Bulk / Ammopack
BC547B	BC547B-BULK or BC547B-TAP	Bulk / Ammopack
BC547C	BC547C-BULK or BC547C-TAP	Bulk / Ammopack
BC548A	BC548A-BULK or BC548A-TAP	Bulk / Ammopack
BC548B	BC548B-BULK or BC548B-TAP	Bulk / Ammopack
BC548C	BC548C-BULK or BC548C-TAP	Bulk / Ammopack

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Part	Symbol	Value	Unit
Collector - base voltage		BC546	V_{CBO}	80	V
		BC547	V_{CBO}	50	V
		BC548	V_{CBO}	30	V
Collector - emitter voltage		BC546	V_{CES}	80	V
		BC547	V_{CES}	50	V
		BC548	V_{CES}	30	V
		BC546	V_{CEO}	65	V
		BC547	V_{CEO}	45	V
		BC548	V_{CEO}	30	V
Emitter - base voltage		BC546	V_{EBO}	6	V
		BC547	V_{EBO}	6	V
		BC548	V_{EBO}	5	V
Collector current			I_C	100	mA
Collector peak current			I_{CM}	200	mA
Peak base current			I_{BM}	200	mA
Peak emitter current			$-I_{EM}$	200	mA
Power dissipation	T_{amb} = 25 °C		P_{tot}	500[1)]	mW

[1)] Valid provided that leads are kept at ambient temperature at distance of 2 mm from case.

Maximum Thermal Resistance

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{\theta JA}$	250[1)]	°C/W
Junction temperature		T_j	150	°C
Storage temperature range		T_S	- 65 to + 150	°C

[1)] Valid provided that leads are kept at ambient temperature at distance of 2 mm from case.

Electrical DC Characteristics

Parameter	Test condition	Part	Symbol	Min	Typ	Max	Unit
Small signal current gain (current gain group A)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{fe}		220		
Small signal current gain (current gain group B)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{fe}		330		
Small signal current gain (current gain group C)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{fe}		600		
Input impedance (current gain group A)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{ie}	1.6	2.7	4.5	kΩ
Input impedance (current gain group B)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{ie}	3.2	4.5	8.5	kΩ
Input impedance (current gain group C)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{ie}	6	8.7	15	kΩ
Output admittance (current gain group A)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{oe}		18	30	µS
Output admittance (current gain group B)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{oe}		30	60	µS
Output admittance (current gain group C)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{oe}		60	110	µS

Parameter	Test condition	Part	Symbol	Min	Typ	Max	Unit
Reverse voltage transfer ratio (current gain group A)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{re}		1.5 x 10^{-4}		
Reverse voltage transfer ratio (current gain group B)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{re}		2 x 10^{-4}		
Reverse voltage transfer ratio (current gain group C)	V_{CE} = 5 V, I_C = 2 mA, f = 1 kHz		h_{re}		3 x 10^{-4}		
DC current gain (current gain group A)	V_{CE} = 5 V, I_C = 10 µA		h_{FE}		90		
DC current gain (current gain group B)	V_{CE} = 5 V, I_C = 10 µA		h_{FE}		150		
DC current gain (current gain group C)	V_{CE} = 5 V, I_C = 10 µA		h_{FE}		270		
DC current gain (current gain group A)	V_{CE} = 5 V, I_C = 2 mA		h_{FE}	110	180	220	
DC current gain (current gain group B)	V_{CE} = 5 V, I_C = 2 mA		h_{FE}	200	290	450	
DC current gain (current gain group C)	V_{CE} = 5 V, I_C = 2 mA		h_{FE}	420	500	800	
DC current gain (current gain group A)	V_{CE} = 5 V, I_C = 100 mA		h_{FE}		120		
DC current gain (current gain group B)	V_{CE} = 5 V, I_C = 100 mA		h_{FE}		200		
DC current gain (current gain group C)	V_{CE} = 5 V, I_C = 100 mA		h_{FE}		400		
Collector saturation voltage	I_C = 10 mA, I_B = 0.5 mA		V_{CEsat}		80	200	mV
	I_C = 100 mA, I_B = 5 mA		V_{CEsat}		200	600	mV
Base saturation voltage	I_C = 10 mA, I_B = 0.5 mA		V_{BEsat}		700		mV
	I_C = 100 mA, I_B = 5 mA		V_{BEsat}		900		mV
Base - emitter voltage	V_{CE} = 5 V, I_C = 2 mA		V_{BE}	580	660	700	mV
	V_{CE} = 5 V, I_C = 10 mA		V_{BE}			720	mV
Collector-emitter cut-off current	V_{CE} = 80 V	BC546	I_{CES}		0.2	15	nA
	V_{CE} = 50 V	BC547	I_{CES}		0.2	15	nA
	V_{CE} = 30 V	BC548	I_{CES}		0.2	15	nA
	V_{CE} = 80 V, T_j = 125 °C	BC546	I_{CES}			4	µA
	V_{CE} = 50 V, T_j = 125 °C	BC547	I_{CES}			4	µA
	V_{CE} = 30 V, T_j = 125 °C	BC548	I_{CES}			4	µA

Electrical AC Characteristics

Parameter	Test condition	Part	Symbol	Min	Typ	Max	Unit
Gain - bandwidth product	V_{CE} = 5 V, I_C = 10 mA, f = 100 MHz		f_T		300		MHz
Collector - base capacitance	V_{CB} = 10 V, f = 1 MHz		C_{CBO}		3.5	6	pF
Emitter - base capacitance	V_{EB} = 0.5 V, f = 1 MHz		C_{EBO}		9		pF
Noise figure	V_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 1 kHz, Δf = 200 Hz	BC546	F		2	10	dB
		BC547	F		2	10	dB
		BC548	F		2	10	dB

Typical Characteristics (T_{amb} = 25 °C unless otherwise specified)

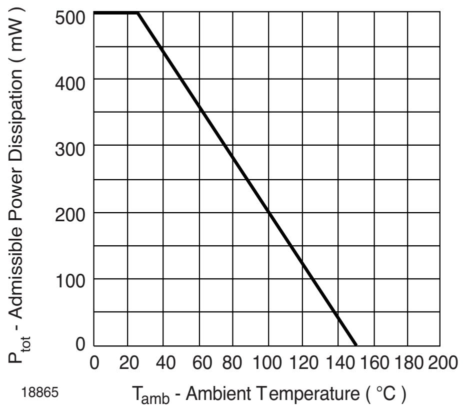


Fig. 1 Admissible Power Dissipation vs. Ambient Temperature

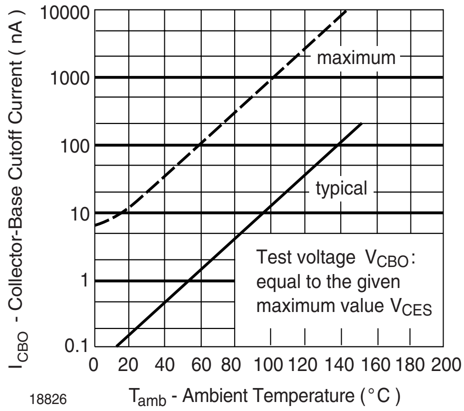


Fig. 4 Collector-Base Cutoff Curent vs. Ambient Temperature

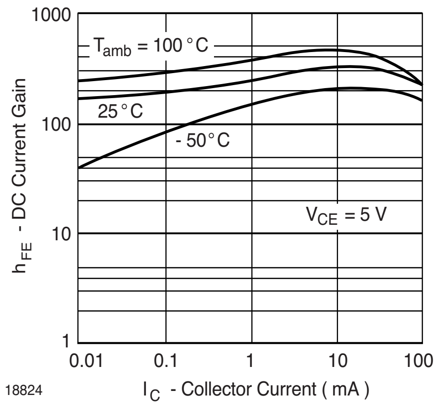


Fig. 2 DC Current Gain vs. Collector Current

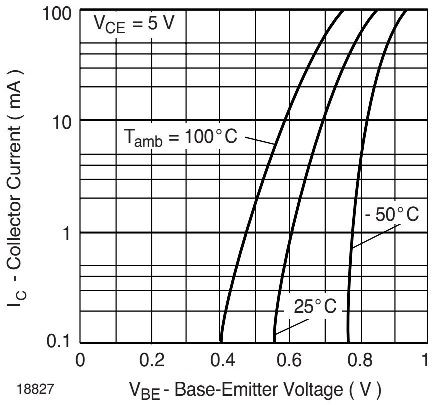


Fig. 5 Collector Current vs. Base-Emitter Voltage

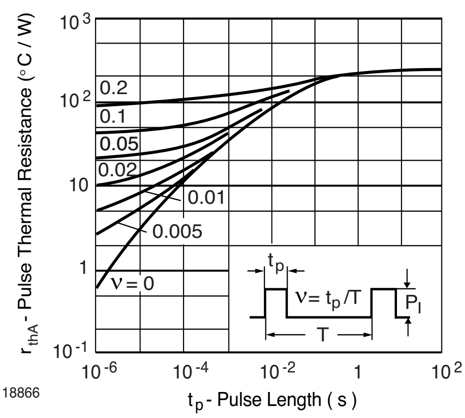


Fig. 3 Pulse Thermal Resistance vs. Pulse Duration

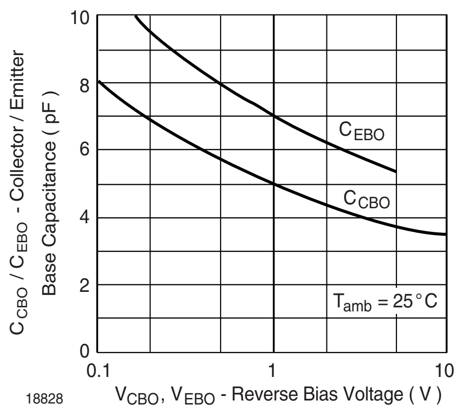


Fig. 6 Collector Base Capacitance, Emitter base Capacitance vs. Bias Voltage

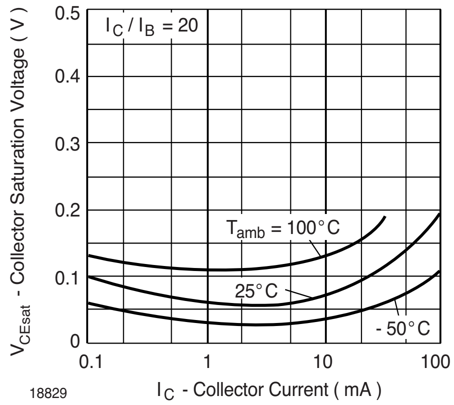


Fig. 7 Collector Saturation Voltage vs. Collector Current

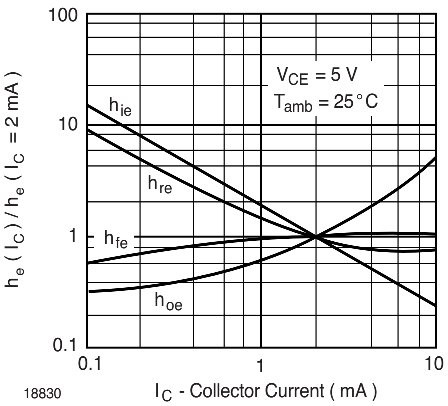


Fig. 8 Relative h-Parameters vs. Collector Current

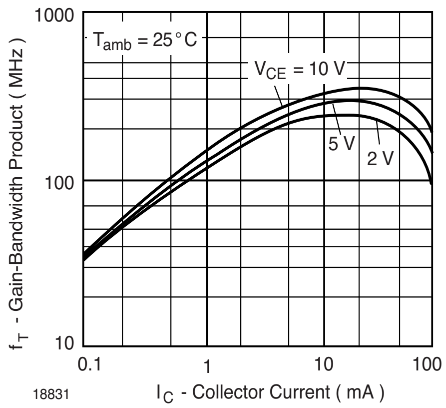
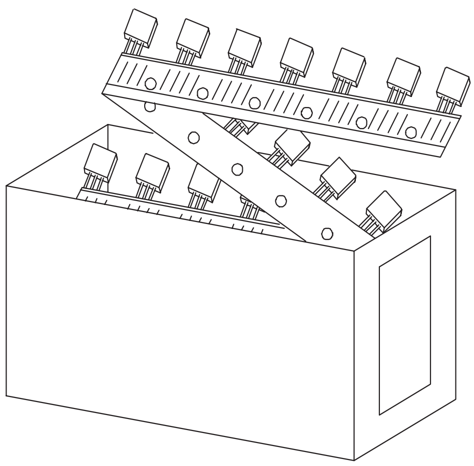
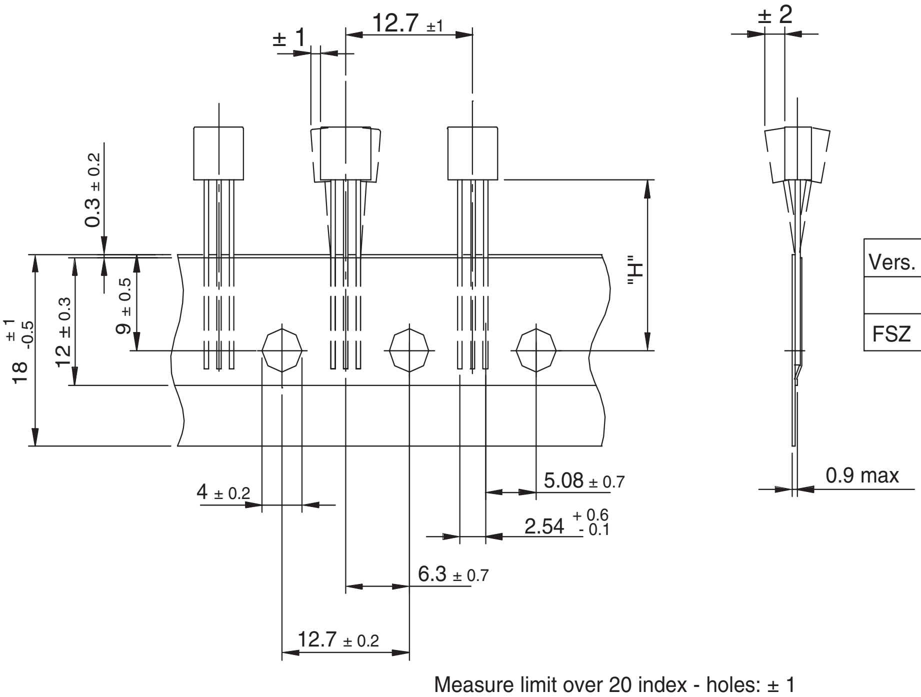


Fig. 9 Gain-Bandwidth Product vs. Collector Current

Packaging for Radial Taping



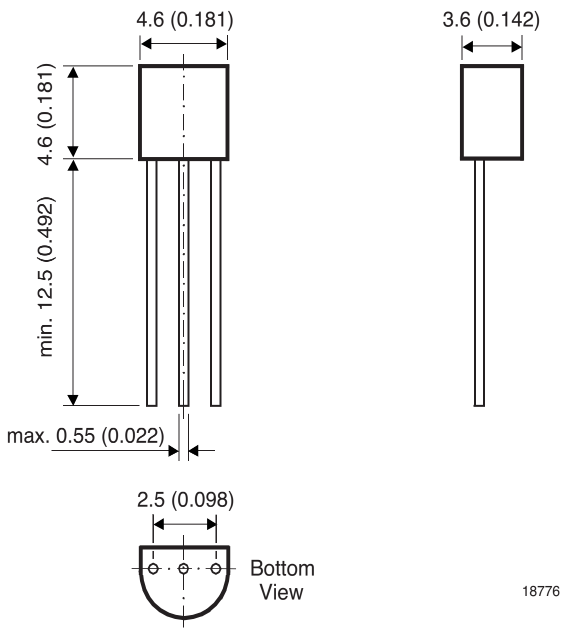


Vers.	Dim. "H"
FSZ	27 ± 0.5

Measure limit over 20 index - holes: ± 1

18787

Package Dimensions in mm (Inches)



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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