2SC2309

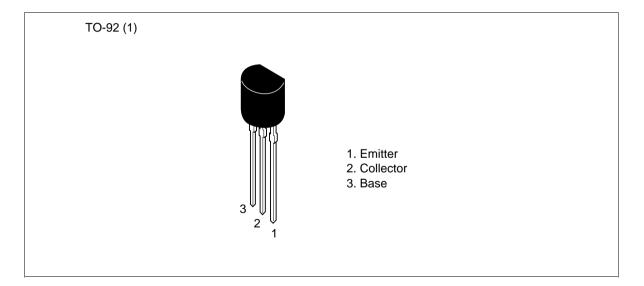
Silicon NPN Epitaxial

HITACHI

Application

Low frequency amplifier

Outline





2SC2309

Absolute Maximum Ratings ($Ta = 25^{\circ}C$)

Item	Symbol		Unit	
Collector to base voltage	V _{CBO}	55	V	
Collector to emitter voltage	V _{CEO}	50	V	
Emitter to base voltage	V _{EBO}	5	V	
Collector current	Ι _c	100	mA	
Collector power dissipation	Pc	200	mW	
Junction temperature	Тј	150	°C	
Storage temperature	Tstg	-55 to +150	°C	

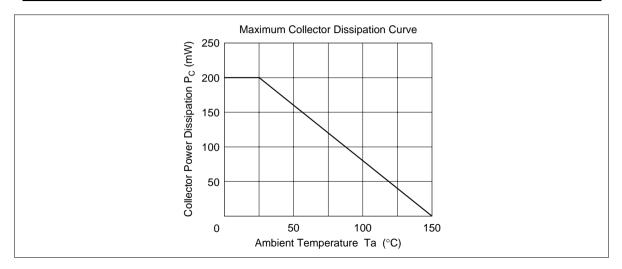
Electrical Characteristics ($Ta = 25^{\circ}C$)

Item	Symbol	Min	Тур	Мах	Unit	Test conditions
Collector to base breakdown voltage	$V_{\rm (BR)CBO}$	55	_	_	V	$I_{c} = 10 \ \mu A, \ I_{E} = 0$
Collector to emitter breakdown voltage	$V_{\rm (BR)CEO}$	50	_	_	V	$I_{\rm C}$ = 1 mA, $R_{\rm BE}$ = ∞
Emitter to base breakdown voltage	$V_{(\text{BR})\text{EBO}}$	5	—	_	V	$I_{\rm E} = 10 \ \mu A, \ I_{\rm C} = 0$
Collector cutoff current	I _{CBO}	—	—	0.5	μΑ	$V_{CB} = 18 \text{ V}, I_{E} = 0$
Emitter cutoff current	I _{EBO}	—	—	0.5	μΑ	$V_{EB} = 2 V, I_{C} = 0$
DC current transfer ratio	$h_{\rm FE}^{*1}$	250	—	1200		$V_{ce} = 12 \text{ V}, \text{ I}_{c} = 2 \text{ mA}$
Base to emitter voltage	V_{BE}	—	—	0.75	V	$V_{ce} = 12 \text{ V}, I_c = 2 \text{ mA}$
Collector to emitter saturation voltage	$V_{\text{CE(sat)}}$	_	_	0.2	V	$I_{c} = 10 \text{ mA}, I_{B} = 1 \text{ mA}$
Gain bandwidth product	f _T	—	230	—	MHz	V_{CE} = 12 V, I_{C} = 2 mA
Collector output capacitance	Cob	—	1.8	3.5	pF	$V_{_{CB}} = 10 \text{ V}, \text{ I}_{_{E}} = 0, \text{ f} = 1 \text{ MHz}$
Note: 1. The 2SC2309 is grouped by h _{FE} as follows.						
D E F						
250 to 500 400 to 800 6	00 to 1200					

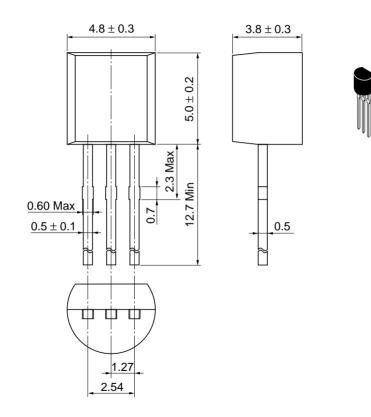
See characteristic curves of 2SC1345.

HITACHI

2SC2309



HITACHI



Hitachi Code	TO-92 (1)
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.25 g

Cautions

- Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
- 2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
- 3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
- 4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
- 5. This product is not designed to be radiation resistant.
- 6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
- 7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.



Semiconductor & Integrated Circuits. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109 NorthAmerica URL http:semiconductor.hitachi.com/ http://www.hitachi-eu.com/hel/ecg Europe http://www.has.hitachi.com.sg/grp3/sicd/index.htm http://www.hitachi.com.tw/E/Product/SICD_Frame.htm Asia (Singapore) Asia (Taiwan) Asia (HongKong) http://www.hitachi.com.hk/eng/bo/grp3/index.htm http://www.hitachi.co.jp/Sicd/indx.htm Japan For further information write to: Hitachi Semiconductor Hitachi Europe GmbH Hitachi Asia Pte. Ltd. (America) Inc. Electronic components Group 16 Collyer Quay #20-00 179 East Tasman Drive, Dornacher Stra§e 3 Hitachi Tower San Jose,CA 95134 D-85622 Feldkirchen, Munich Singapore 049318 Tel: <1> (408) 433-1990 Fax: <1>(408) 433-0223 Germany Tel: 535-2100 Tel: <49> (89) 9 9180-0 Fax: 535-1533 Fax: <49> (89) 9 29 30 00

 Fax: <49> (89) 9 29 30 00
 Hita

 Hitachi Europe Ltd.
 Hita

 Electronic Components Group.
 Taip

 Whitebrook Park
 3F,

 Lower Cookham Road
 Tun

 Maidenhead
 Tel:

 Berkshire SL6 8YA, United Kingdom
 Fax

 Tel: <44> (1628) 585000

 Fax: <44> (1628) 778322

Hitachi Asia Ltd. Taipei Branch Office 3F, Hung Kuo Building. No.167, Tun-Hwa North Road, Taipei (105) Tel: <886> (2) 2718-3666 Fax: <886> (2) 2718-8180

HITACHI

Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong Tel: <852> (2) 735 9218 Fax: <852> (2) 730 0281 Telex: 40815 HITEC HX

Copyright ' Hitachi, Ltd., 1999. All rights reserved. Printed in Japan.