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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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2SC458(K)

Silicon NPN Epitaxial

RENESAS

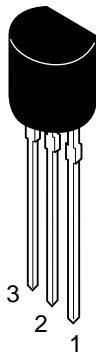
ADE-208-1045 (Z)
1st. Edition
Mar. 2001

Application

- Low frequency amplifier
- Medium speed switching

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

2SC458 (K)

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V _{CBO}	30	V
Collector to emitter voltage	V _{CEO}	30	V
Emitter to base voltage	V _{EBO}	5	V
Collector current	I _C	100	mA
Emitter current	I _E	-100	mA
Collector power dissipation	P _C	200	mW
Junction temperature	T _j	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	V _{(BR)CBO}	30	—	—	V	I _C = 10 μA, I _E = 0
Collector to emitter breakdown voltage	V _{(BR)CEO}	30	—	—	V	I _C = 1 mA, R _{BE} =
Emitter to base breakdown voltage	V _{(BR)EBO}	5	—	—	V	I _E = 10 μA, I _C = 0
Collector cutoff current	I _{CBO}	—	—	0.5	μA	V _{CB} = 18 V, I _E = 0
Emitter cutoff current	I _{EBO}	—	—	1.0	μA	V _{EB} = 4 V, I _C = 0
DC current transfer ratio	h _{FE} ^{*1}	100	—	500		V _{CE} = 1 V, I _C = 10 mA
Collector to emitter saturation voltage	V _{CE(sat)}	—	—	0.4	V	I _C = 10 mA, I _B = 1 mA
Base to emitter voltage	V _{BE(sat)}	—	—	1.0	V	I _C = 10 mA, I _B = 1 mA
Gain bandwidth product	f _T	100	—	—	MHz	V _{CE} = 10 V, I _C = 10 mA
Collector output capacitance	C _{ob}	—	—	4	pF	V _{CB} = 10 V, I _E = 0, f = 1 MHz
Turn on time	t _{on}	—	80	—	ns	I _C = 10 I _{B1} = -10 I _{B2} = 10 mA, V _{CC} = 10 V
Turn off time	t _{off}	—	300	—	ns	
Storage time	t _{stg}	—	260	—	ns	I _C = I _{B1} = -I _{B2} = 20 mA, V _{CC} = 5 V

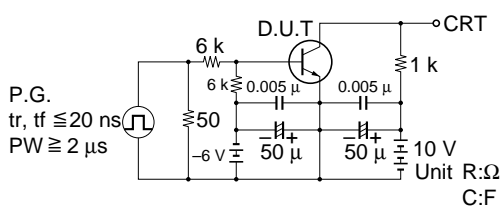
Note: 1. The 2SC458 (K) is grouped by h_{FE} as follows.

B	C	D
100 to 200	160 to 320	250 to 500

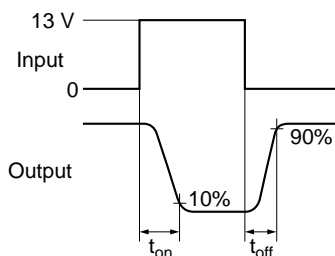
Small Signal h Parameters

Item	Symbol	Typ	Unit	Test conditions
Input impedance	h_{ie}	16.5	$k\Omega$	$V_{CE} = 5\text{ V}$, $I_C = 0.1\text{ mA}$, $f = 270\text{ Hz}$
Voltage feedback ratio	h_{re}	70	$\times 10^{-6}$	
Current transfer ratio	h_{fe}	130		
Output admittance	h_{oe}	11	μS	

Switching Time Test Circuit
 t_{on} , t_{off} Test Circuit

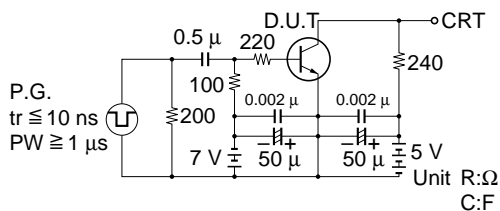


Response Waveform

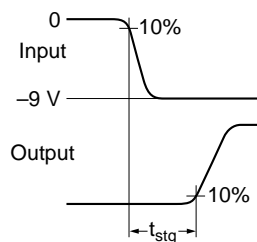


I_C	I_{B1}	I_{B2}	V_{CC}	V_{BB}	V_{in}
10 mA	1 mA	-1 mA	10 V	-6 V	13 V

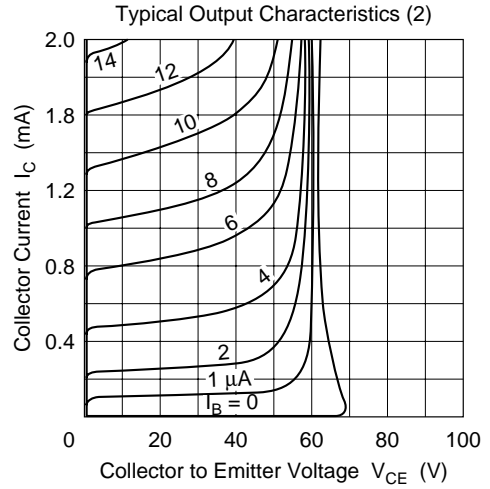
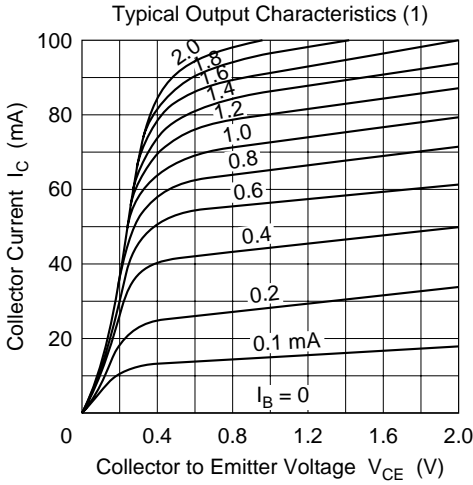
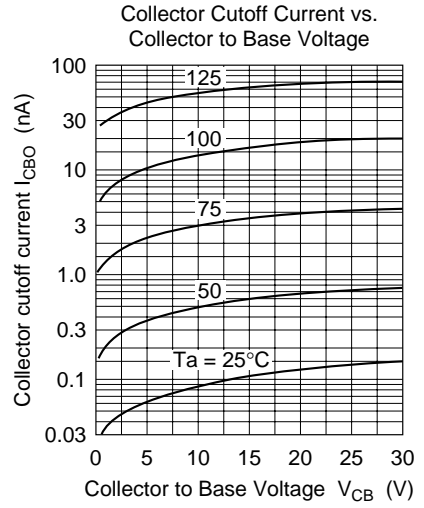
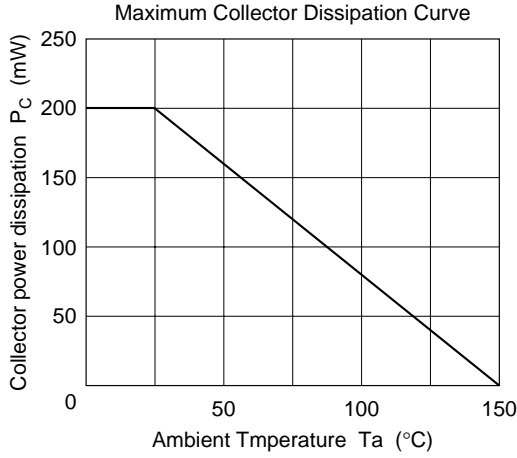
Switching Time Test Circuit
 t_{stg} Test Circuit

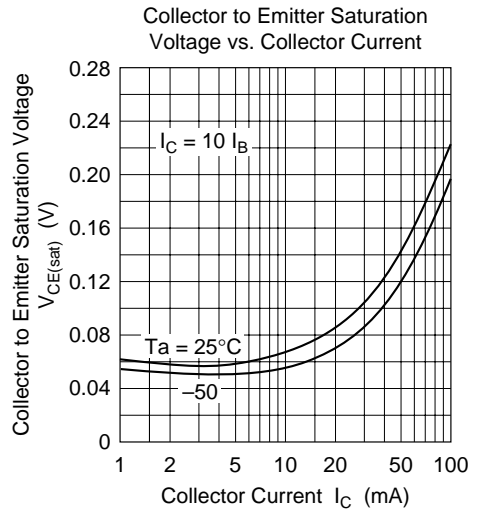
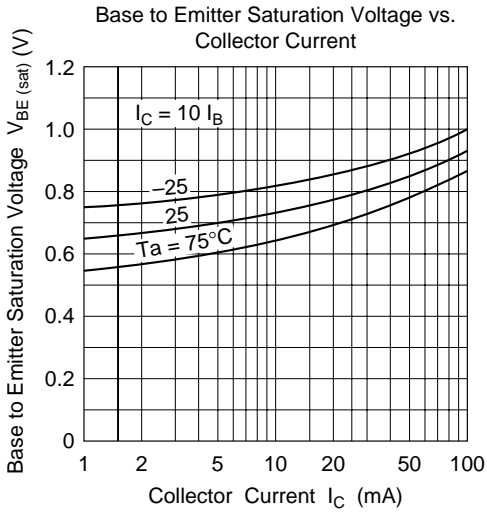
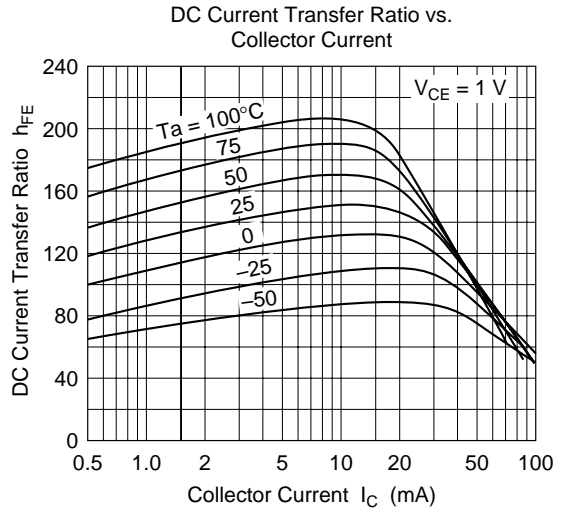
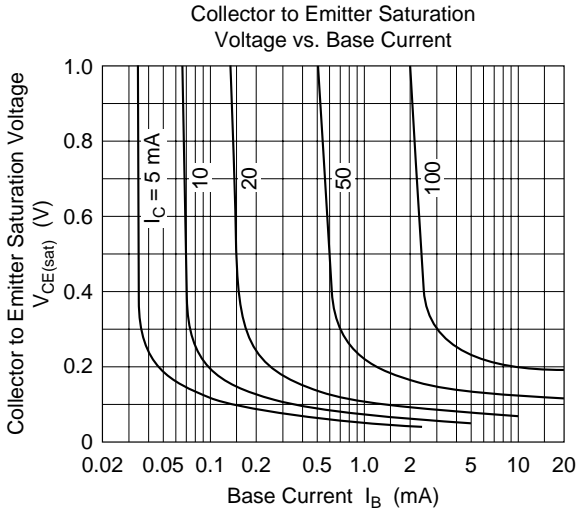


Response Waveform

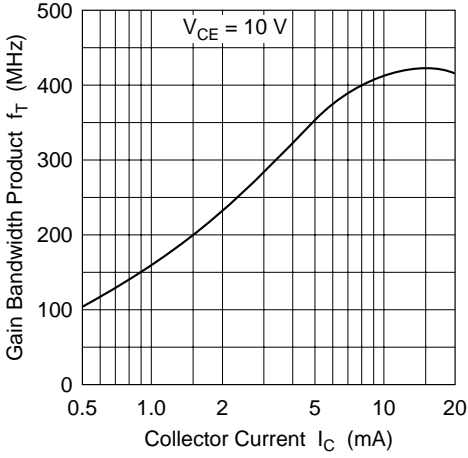


I_C	I_{B1}	I_{B2}	V_{CC}	V_{BB}	V_{in}
20 mA	20 mA	-20 mA	5 V	7 V	-9 V

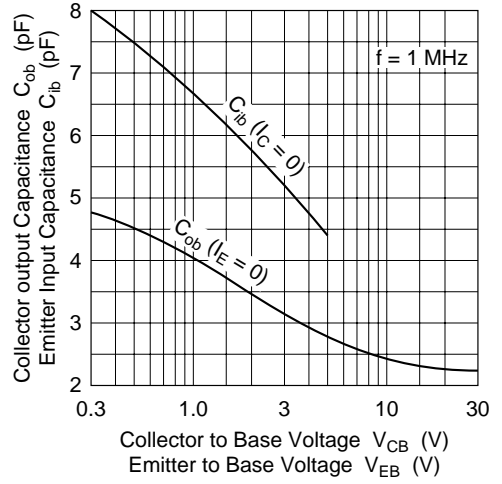




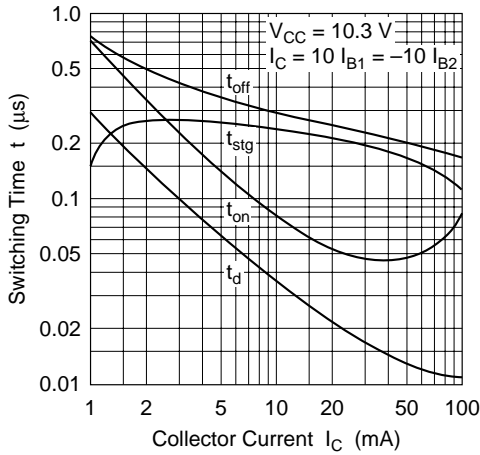
Gain Bandwidth Product vs. Collector Current



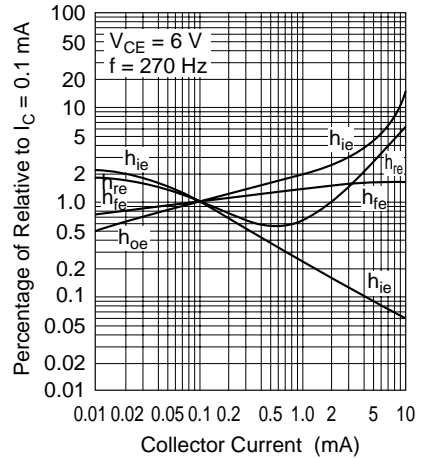
Input and Output Capacitance vs. Voltage



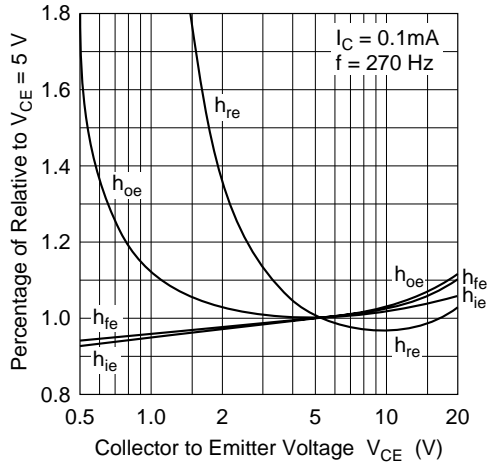
Switching Time vs. Collector Current



h Parameter vs. Collector Current

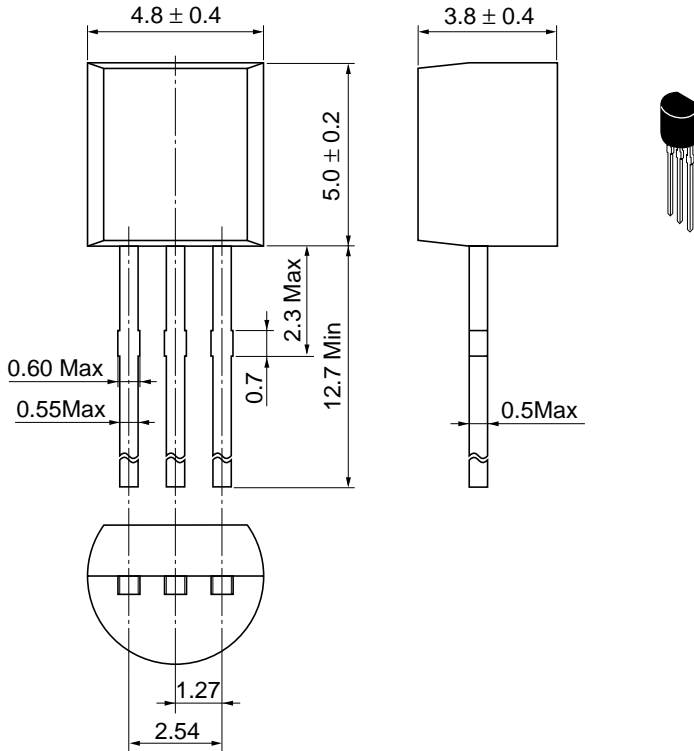


h Parameter vs. Collector to Emitter Voltage



Package Dimensions

As of January, 2001
Unit: mm



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

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HITACHI

Hitachi, Ltd.

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

URL	NorthAmerica	: http://semiconductor.hitachi.com/
	Europe	: http://www.hitachi-eu.com/hel/ecg
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For further information write to:

Hitachi Semiconductor
(America) Inc.
179 East Tasman Drive,
San Jose, CA 95134
Tel: <1> (408) 433-1990
Fax: <1> (408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel : <65>-538-6533/538-8577
Fax : <65>-538-6933/538-3877
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel : <886>-(2)-2718-3666
Fax : <886>-(2)-2718-8180
Telex : 23222 HAS-TP
URL : <http://www.hitachi.com.tw>

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
URL : <http://www.hitachi.com.hk>