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

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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2SC1213A(K)

Silicon NPN Epitaxial

RENESAS

ADE-208-1049 (Z)

1st. Edition

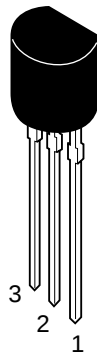
Mar. 2001

Application

- Low frequency amplifier
- Medium speed switching

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

2SC1213A (K)

Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	50	V
Collector to emitter voltage	V_{CEO}	50	V
Emitter to base voltage	V_{EBO}	4	V
Collector current	I_C	500	mA
Collector power dissipation	P_C	400	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

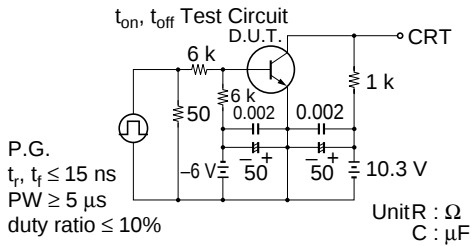
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	50	—	—	V	$I_C = 10\text{ }\mu\text{A}$, $I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	50	—	—	V	$I_C = 1.0\text{ mA}$, $R_{BE} =$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	4	—	—	V	$I_E = 10\text{ }\mu\text{A}$, $I_C = 0$
Collector cutoff current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 20\text{ V}$, $I_E = 0$
DC current transfer ratio	h_{FE}^{*1}	60	—	320		$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$
	h_{FE}	10	—	—		$V_{CE} = 3\text{ V}$, $I_C = 500\text{ mA}^{*2}$
Base to emitter voltage	V_{BE}		0.64	—	V	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	0.12	0.6	V	$I_C = 150\text{ mA}$, $I_B = 15\text{ mA}^{*2}$
Base to emitter saturation voltage	$V_{BE(sat)}$	—	0.83	1.2	V	$I_C = 150\text{ mA}$, $I_B = 15\text{ mA}^{*2}$
Collector output capacitance	C_{ob}	—	7.0	—	pF	$V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$
Gain bandwidth product	f_T	—	120	—	MHz	$V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$
Turn on time	t_{on}	—	0.25	—	μS	$V_{CC} = 10.3\text{ V}$ $I_C = 10\text{ mA}$, $I_{B1} = -10\text{ mA}$, $I_{B2} = 10\text{ mA}$
Turn off time	t_{off}	—	0.85	—	μS	
Storage time	t_{stg}	—	0.4	—	μS	$V_{CC} = 5\text{ V}$ $I_C = I_{B1} = -I_{B2} = 20\text{ mA}$

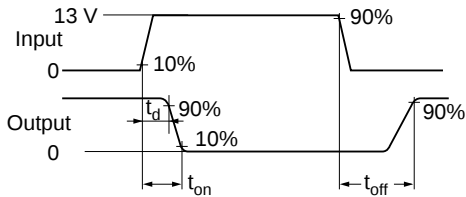
Notes: 1. The 2SC1213A(K) is grouped by h_{FE} as follows.
2. Pulse test

B	C	D
60 to 120	100 to 200	160 to 320

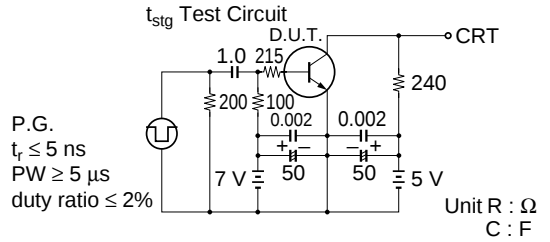
Switching Time Test Circuit



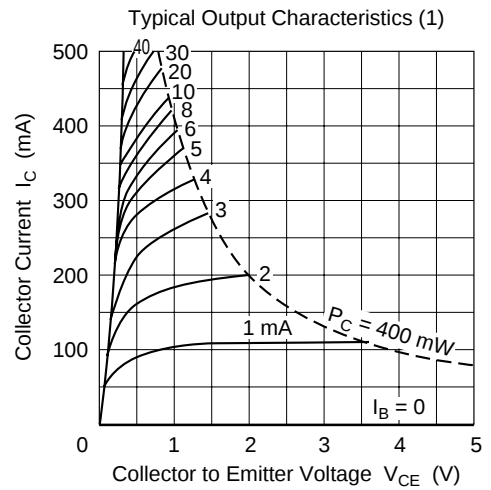
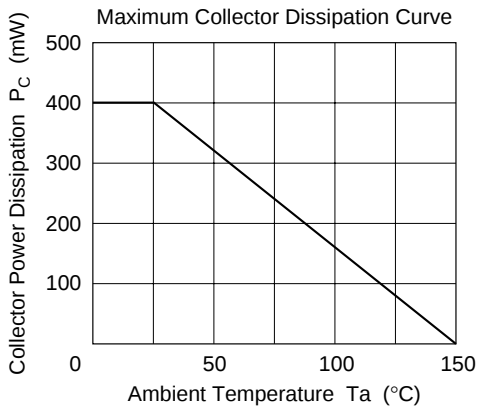
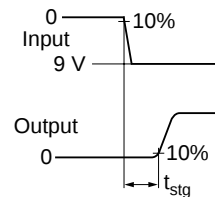
Response Waveform

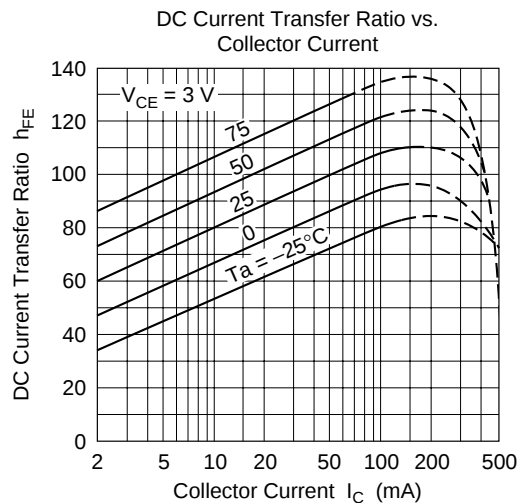
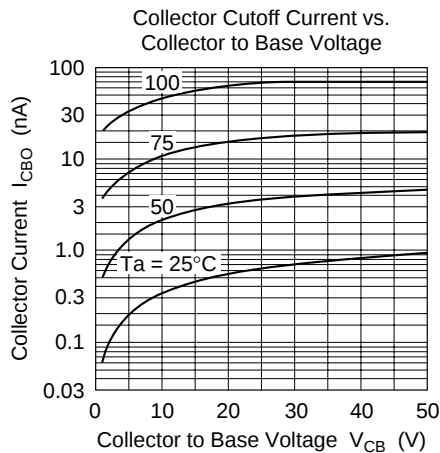
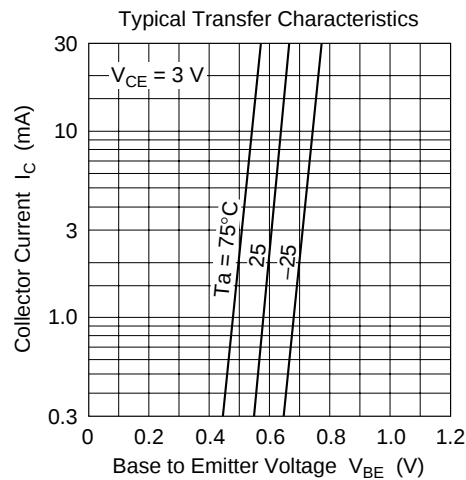
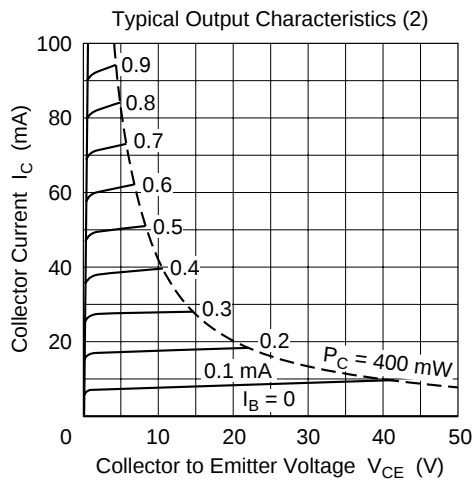


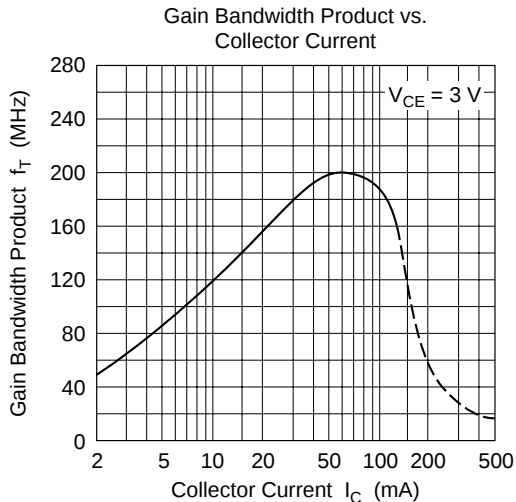
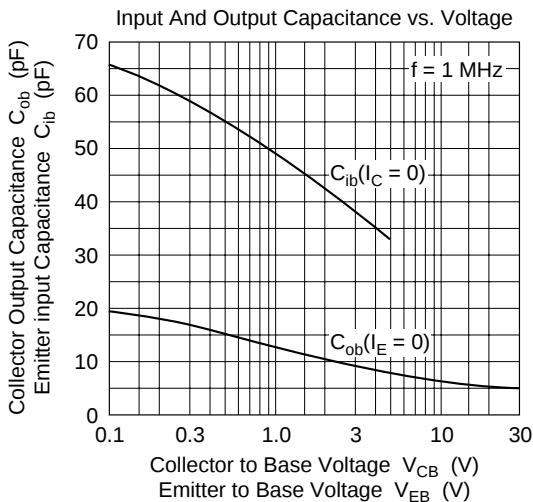
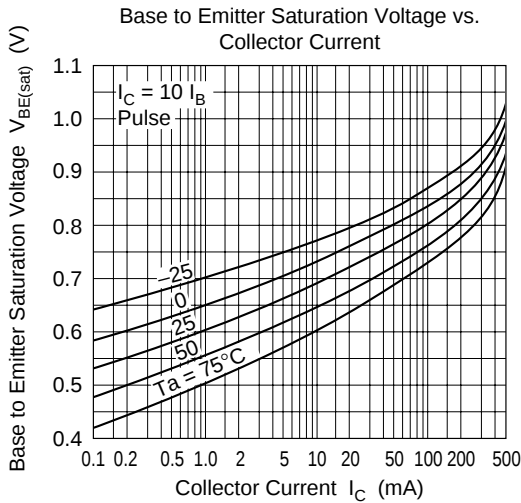
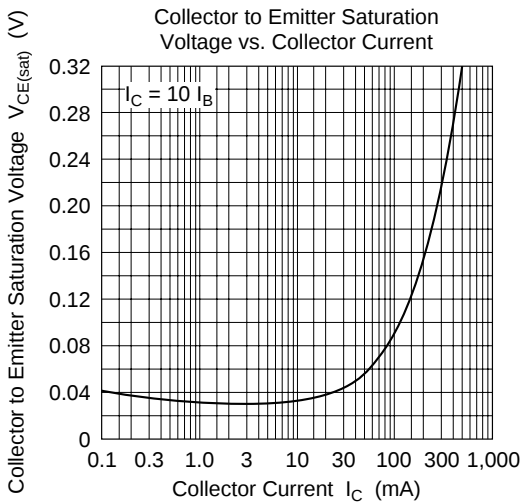
Switching Time Test Circuit

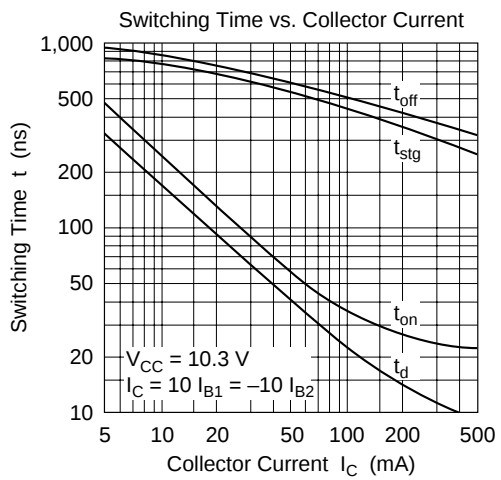


Response Waveform



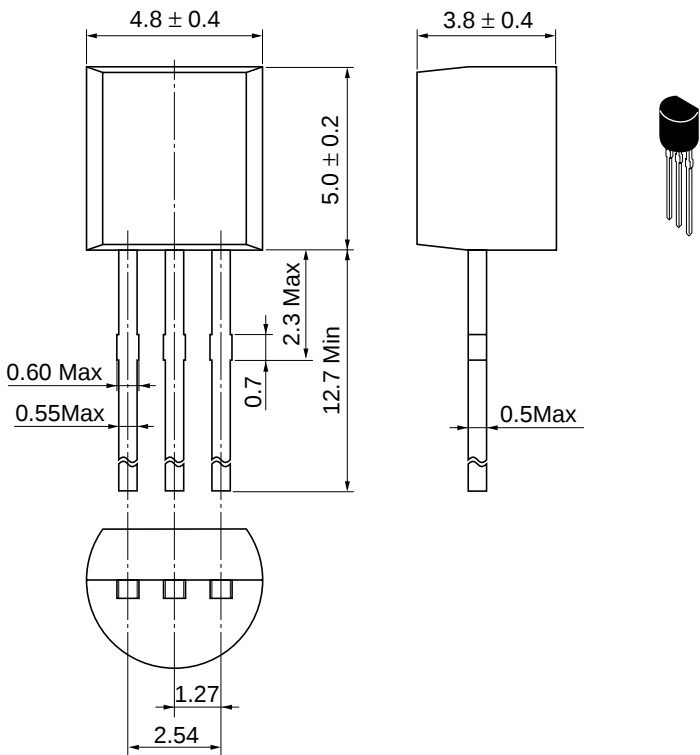






Package Dimensions

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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