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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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for new design

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2SC458(K)

Silicon NPN Epitaxial

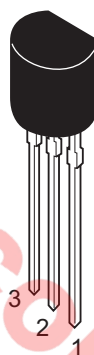
REJ03G0680-0200
 (Previous ADE-208-1045)
 Rev.2.00
 Aug.10.2005

Application

- Low frequency amplifier
- Medium speed switching

Outline

RENESAS Package code: PRSS0003DA-A
 (Package name: TO-92 (1))



1. Emitter
2. Collector
3. Base

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	$I_C = 10 \mu A, I_E = 0$
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	30	—	—	V	$I_C = 1 \text{ mA}, R_{BE} = \infty$
Emitter to base breakdown voltage	$V_{(BR)EBO}$	5	—	—	V	$I_E = 10 \mu A, I_C = 0$
Collector cutoff current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 18 \text{ V}, I_E = 0$
Emitter cutoff current	I_{EBO}	—	—	1.0	μA	$V_{EB} = 4 \text{ V}, I_C = 0$
DC current transfer ratio	h_{FE}^{*1}	100	—	320		$V_{CE} = 1 \text{ V}, I_C = 10 \text{ mA}$
Collector to emitter saturation voltage	$V_{CE(sat)}$	—	—	0.4	V	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$
Base to emitter voltage	$V_{BE(sat)}$	—	—	1.0	V	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$
Gain bandwidth product	f_T	100	—	—	MHz	$V_{CE} = 10 \text{ V}, I_C = 10 \text{ mA}$
Collector output capacitance	C_{ob}	—	—	4	pF	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$
Turn on time	t_{on}	—	80	—	ns	$I_C = 10 \text{ mA}, I_{B1} = -10 \text{ mA}, I_{B2} = 10 \text{ mA}, V_{CC} = 10 \text{ V}$
Turn off time	t_{off}	—	300	—	ns	
Storage time	t_{stg}	—	260	—	ns	$I_C = I_{B1} = -I_{B2} = 20 \text{ mA}, V_{CC} = 5 \text{ V}$

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

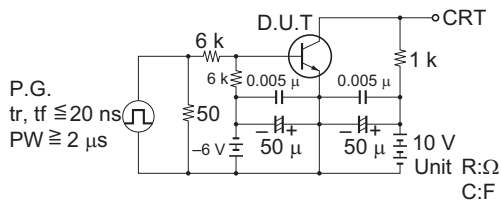
B	C
100 to 200	160 to 320

Small Signal h Parameters

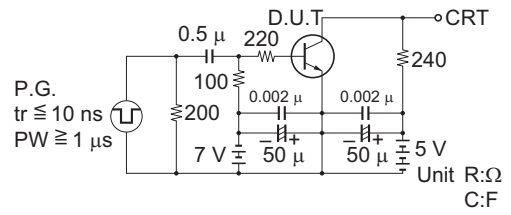
Item	Symbol	Typ	Unit	Test conditions
Input impedance	h_{ie}	16.5	$k\Omega$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}, f = 270 \text{ Hz}$
Voltage feedback ratio	h_{re}	70	$\times 10^{-6}$	
Current transfer ratio	h_{fe}	130		
Output admittance	h_{oe}	11	μS	

Main Characteristics

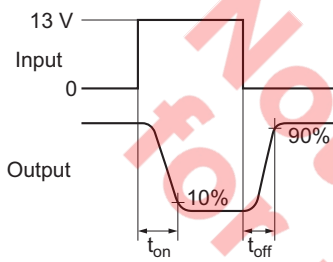
Switching Time Test Circuit
 t_{on} , t_{off} Test Circuit



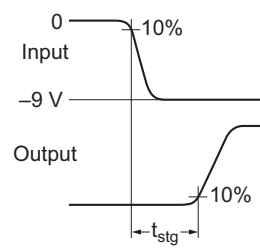
Switching Time Test Circuit
 t_{stg} Test Circuit



Response Waveform



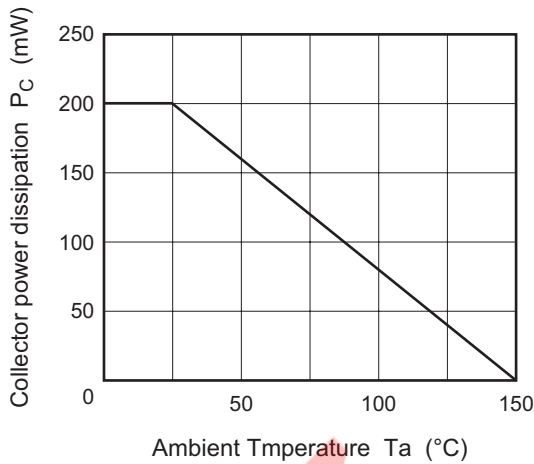
Response Waveform



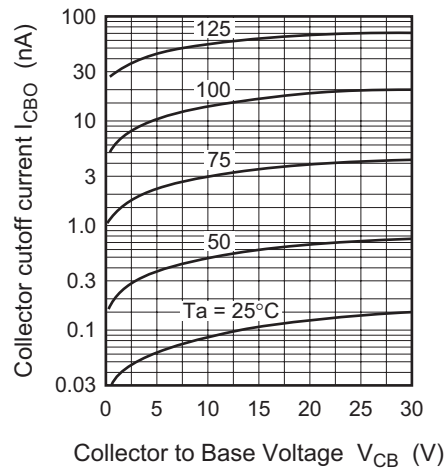
I_C	I_{B1}	I_{B2}	V_{CC}	V_{BB}	V_{in}
10 mA	1 mA	-1 mA	10 V	-6 V	13 V

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

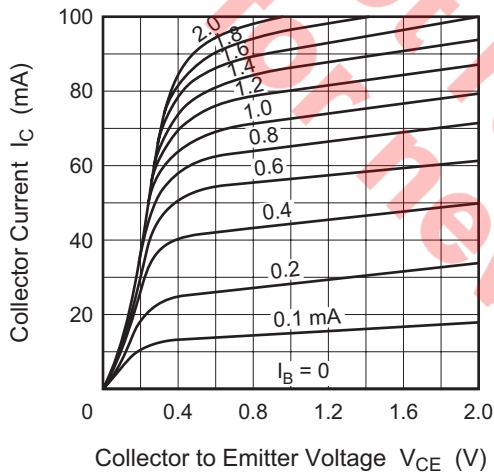
Maximum Collector Dissipation Curve



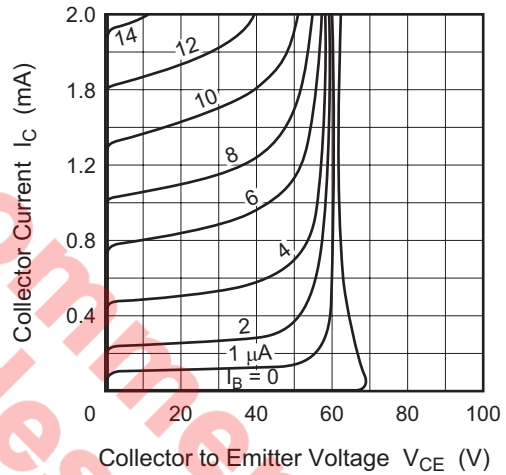
Collector Cutoff Current vs. Collector to Base Voltage



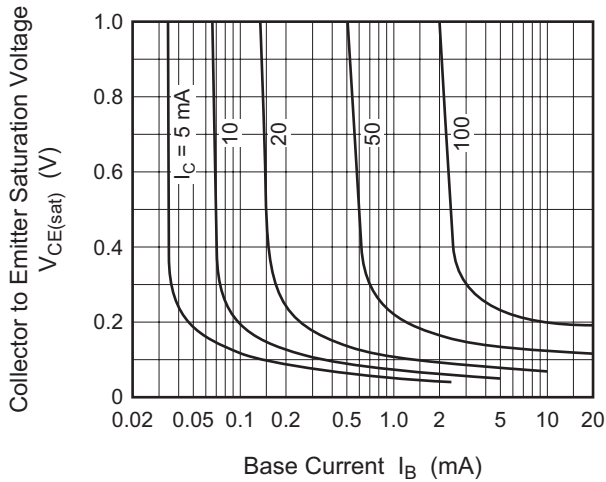
Typical Output Characteristics (1)



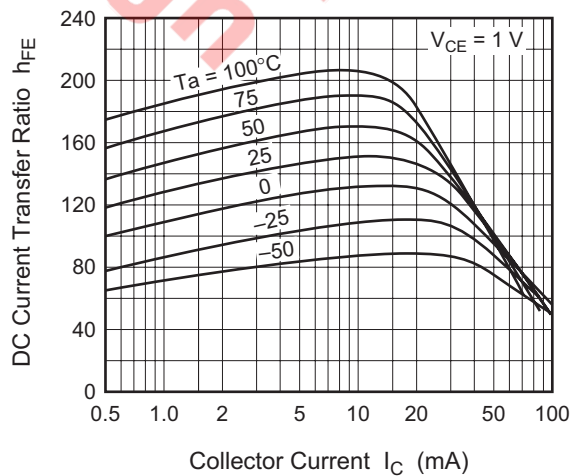
Typical Output Characteristics (2)

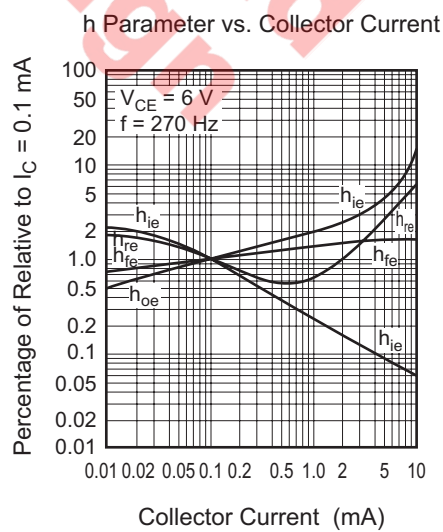
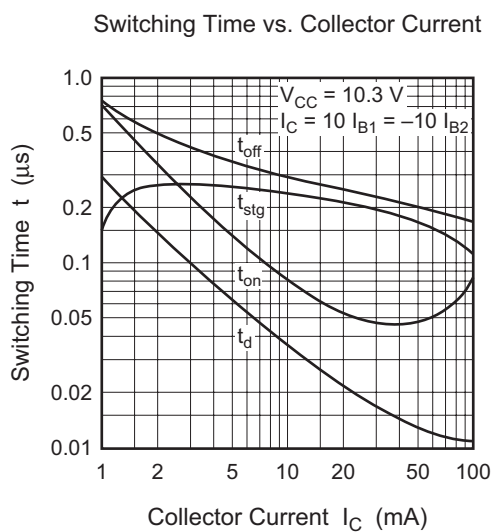
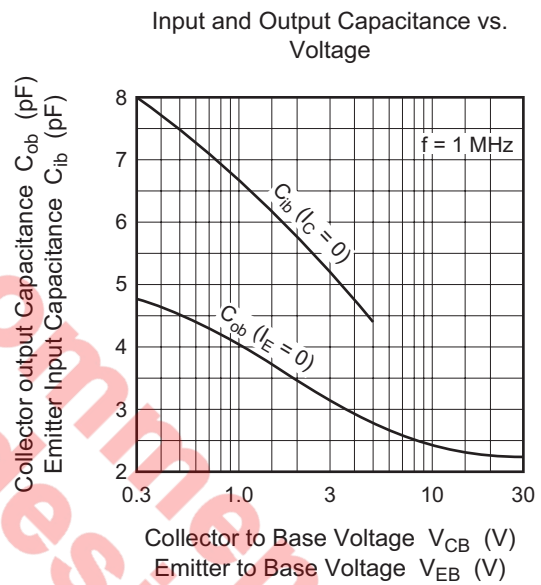
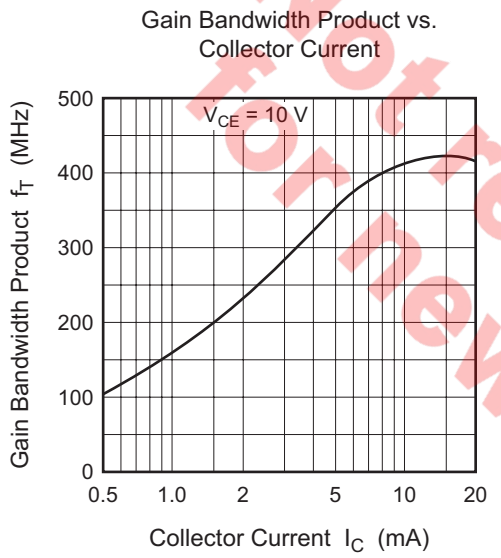
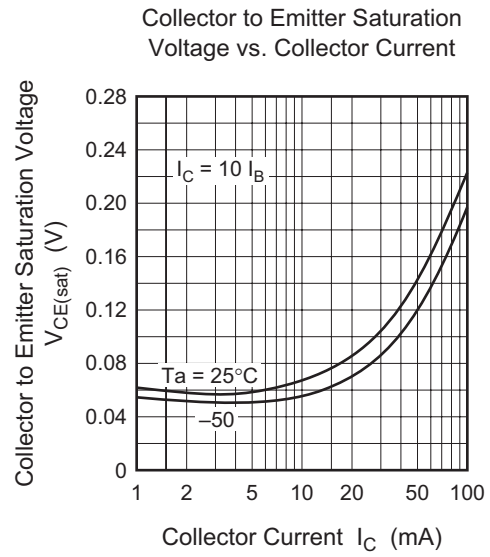
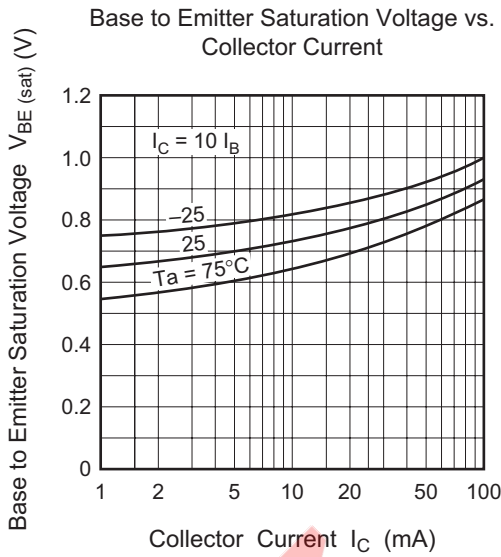


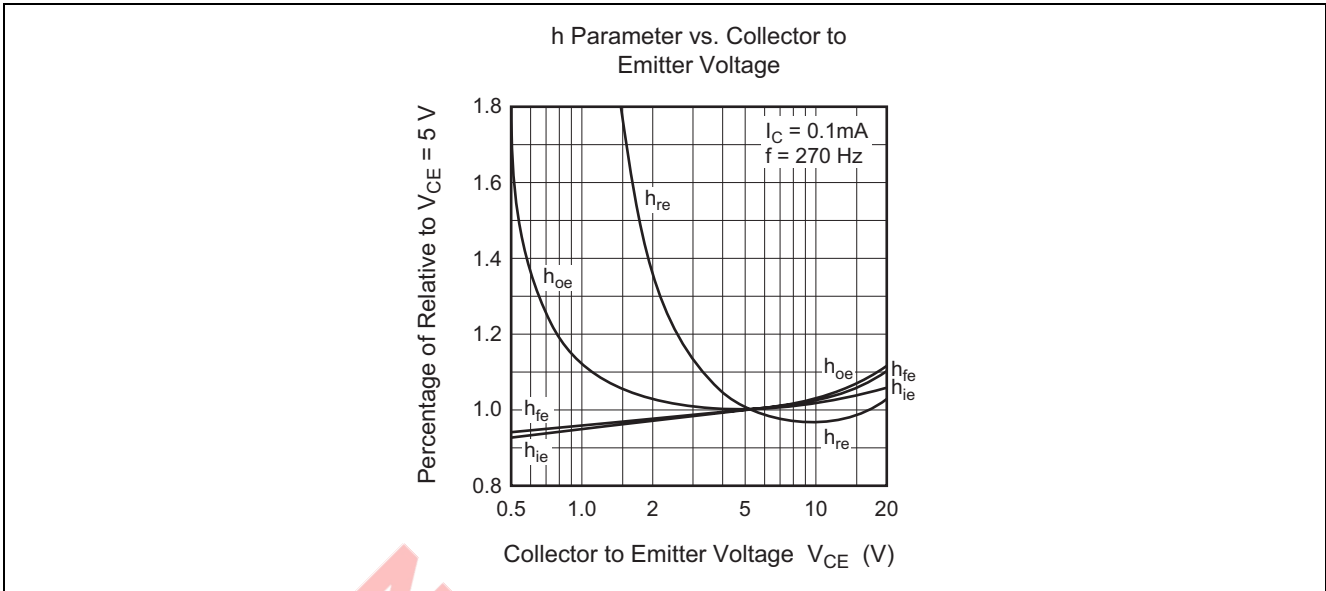
Collector to Emitter Saturation Voltage vs. Base Current



DC Current Transfer Ratio vs. Collector Current

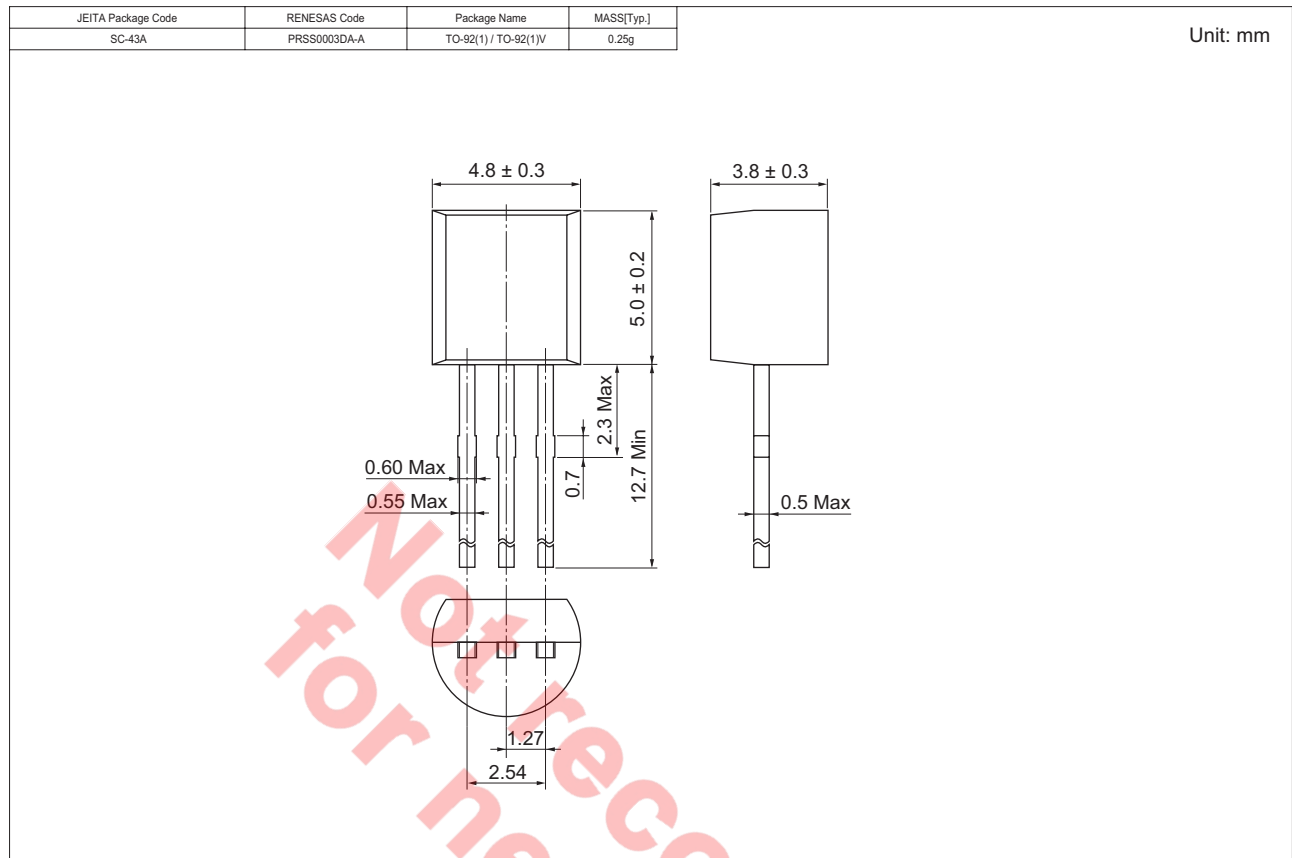






Not recommend
for new design

Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
2SC458KBTZ-E	2500	Hold Box, Radial Taping
2SC458KCTZ-E		

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