

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## 2SC458(K)

Silicon NPN Epitaxial

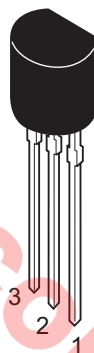
REJ03G0680-0200  
 (Previous ADE-208-1045)  
 Rev.2.00  
 Aug.10.2005

### 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	$\mu A$	$V_{CB} = 18 \text{ V}, I_E = 0$
Emitter cutoff current	$I_{EBO}$	—	—	1.0	$\mu A$	$V_{EB} = 4 \text{ V}, I_C = 0$
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.

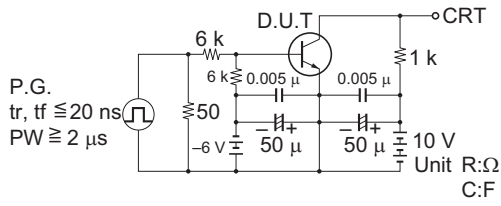
B	C
100 to 200	160 to 320

## Small Signal h Parameters

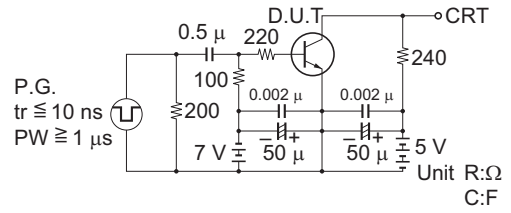
Item	Symbol	Typ	Unit	Test conditions
Input impedance	$h_{ie}$	16.5	$k\Omega$	$V_{CE} = 5 \text{ V}, I_C = 0.1 \text{ mA}, f = 270 \text{ Hz}$
Voltage feedback ratio	$h_{re}$	70	$\times 10^{-6}$	
Current transfer ratio	$h_{fe}$	130		
Output admittance	$h_{oe}$	11	$\mu S$	

Main Characteristics

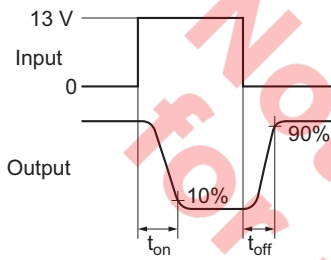
Switching Time Test Circuit  
 $t_{on}$ ,  $t_{off}$  Test Circuit



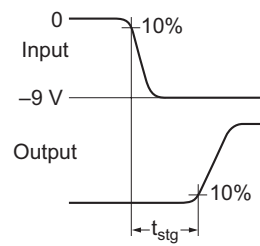
Switching Time Test Circuit  
 $t_{stg}$  Test Circuit



Response Waveform



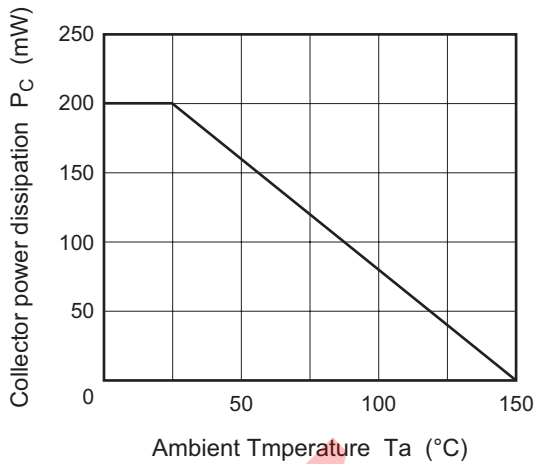
Response Waveform



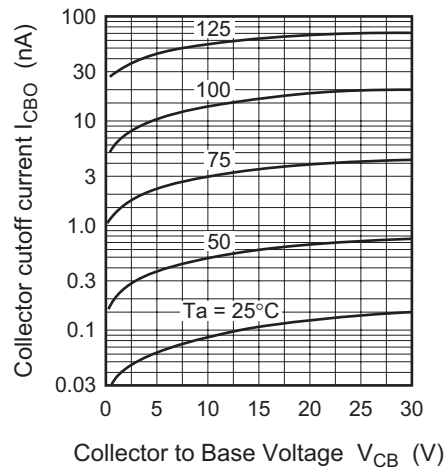
$I_C$	$I_{B1}$	$I_{B2}$	$V_{CC}$	$V_{BB}$	$V_{in}$
10 mA	1 mA	-1 mA	10 V	-6 V	13 V

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

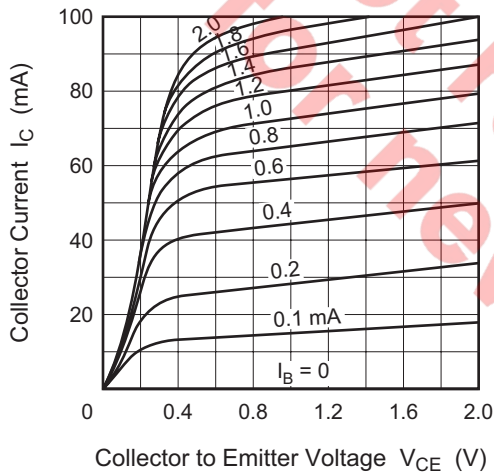
Maximum Collector Dissipation Curve



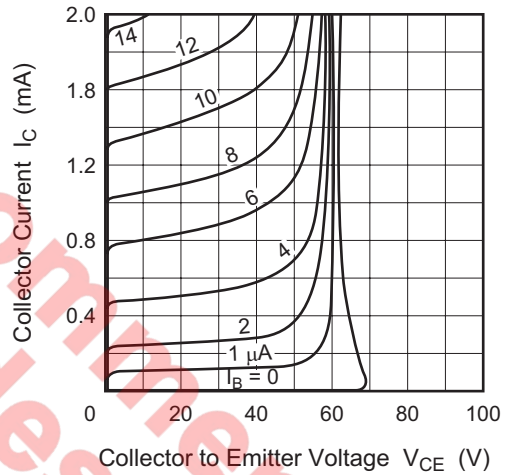
Collector Cutoff Current vs. Collector to Base Voltage



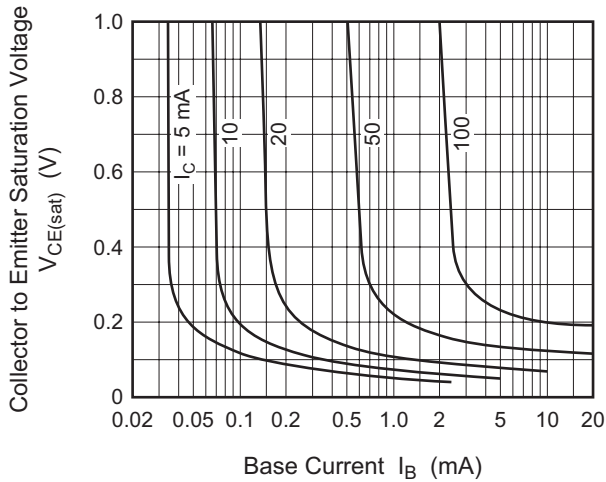
Typical Output Characteristics (1)



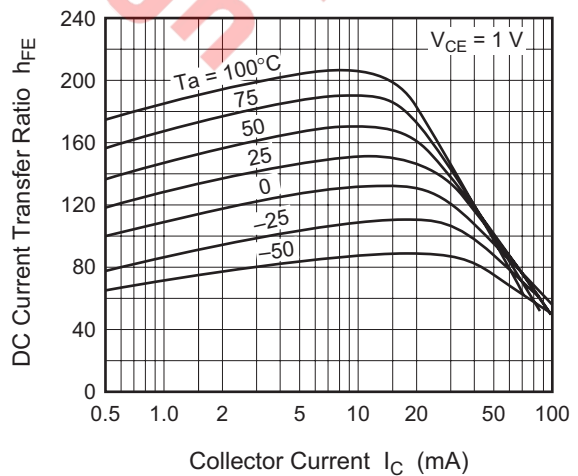
Typical Output Characteristics (2)

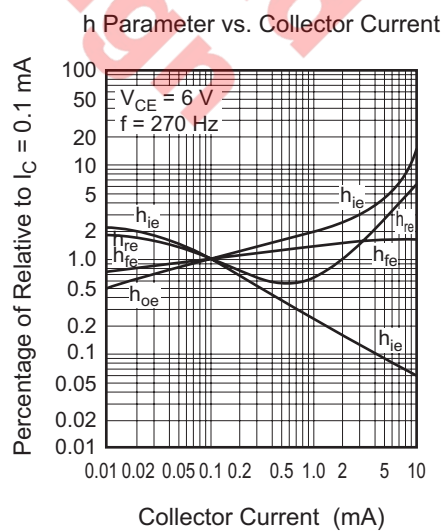
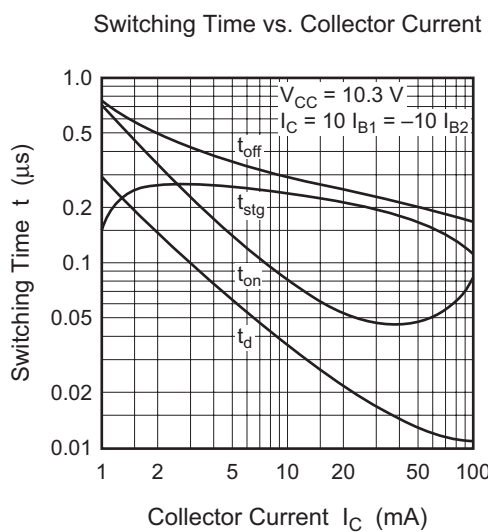
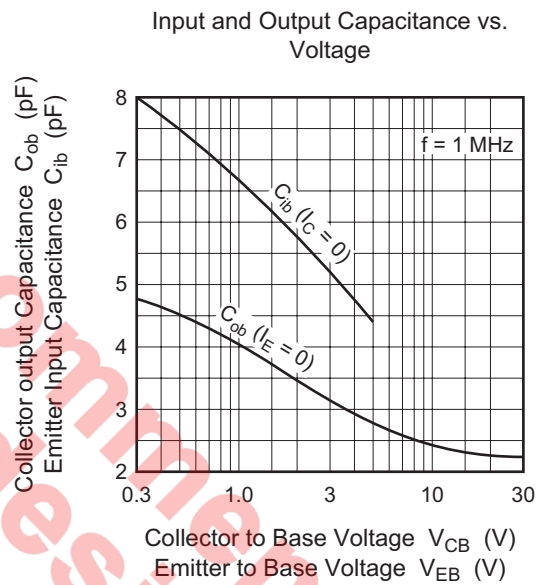
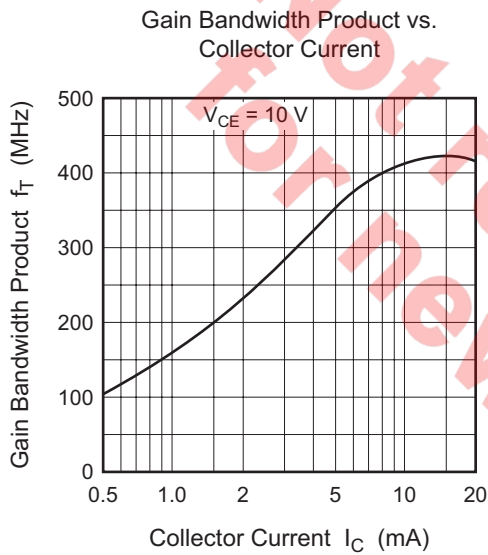
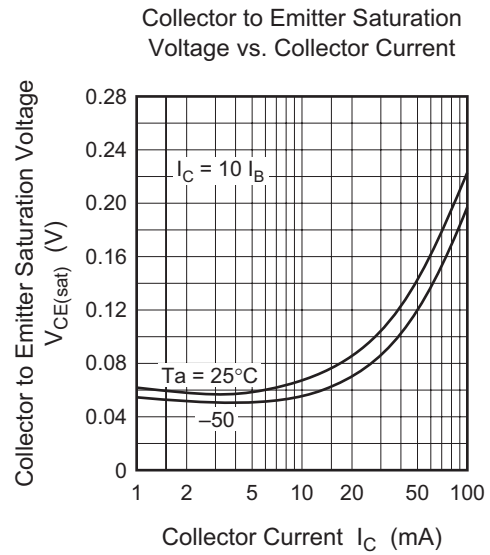
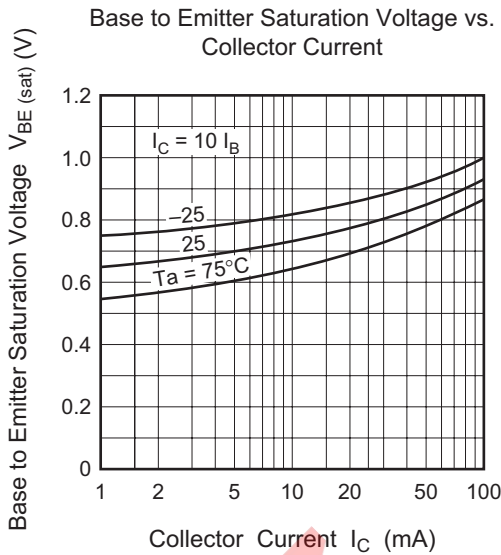


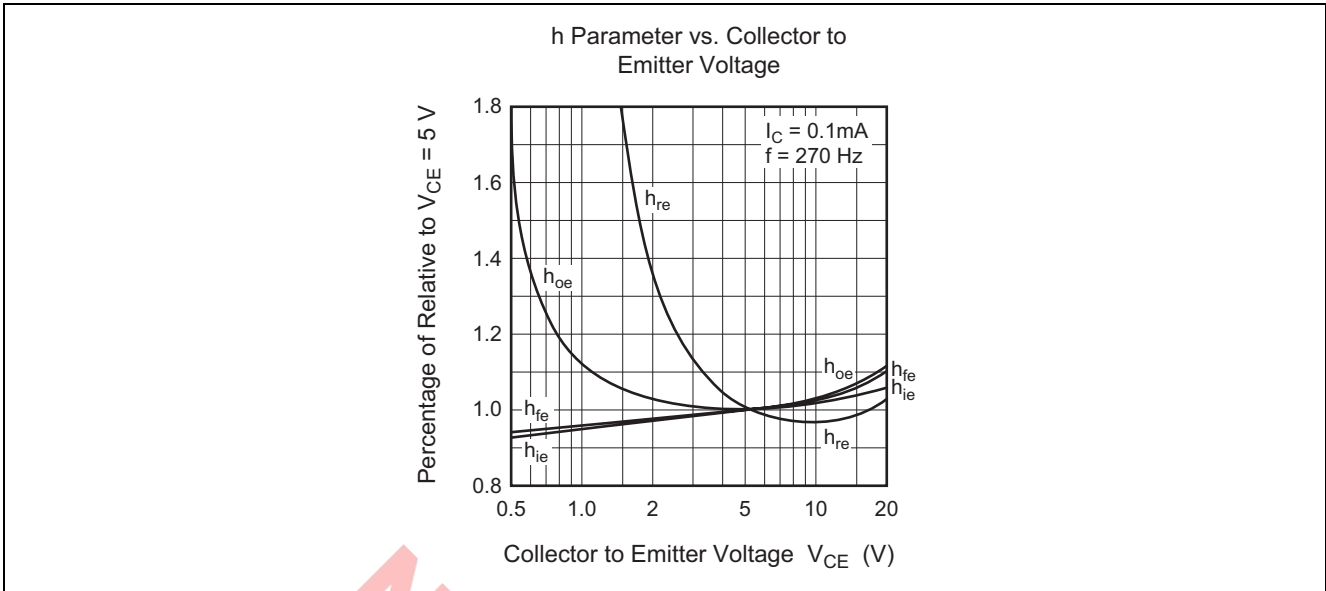
Collector to Emitter Saturation Voltage vs. Base Current



DC Current Transfer Ratio vs. Collector Current

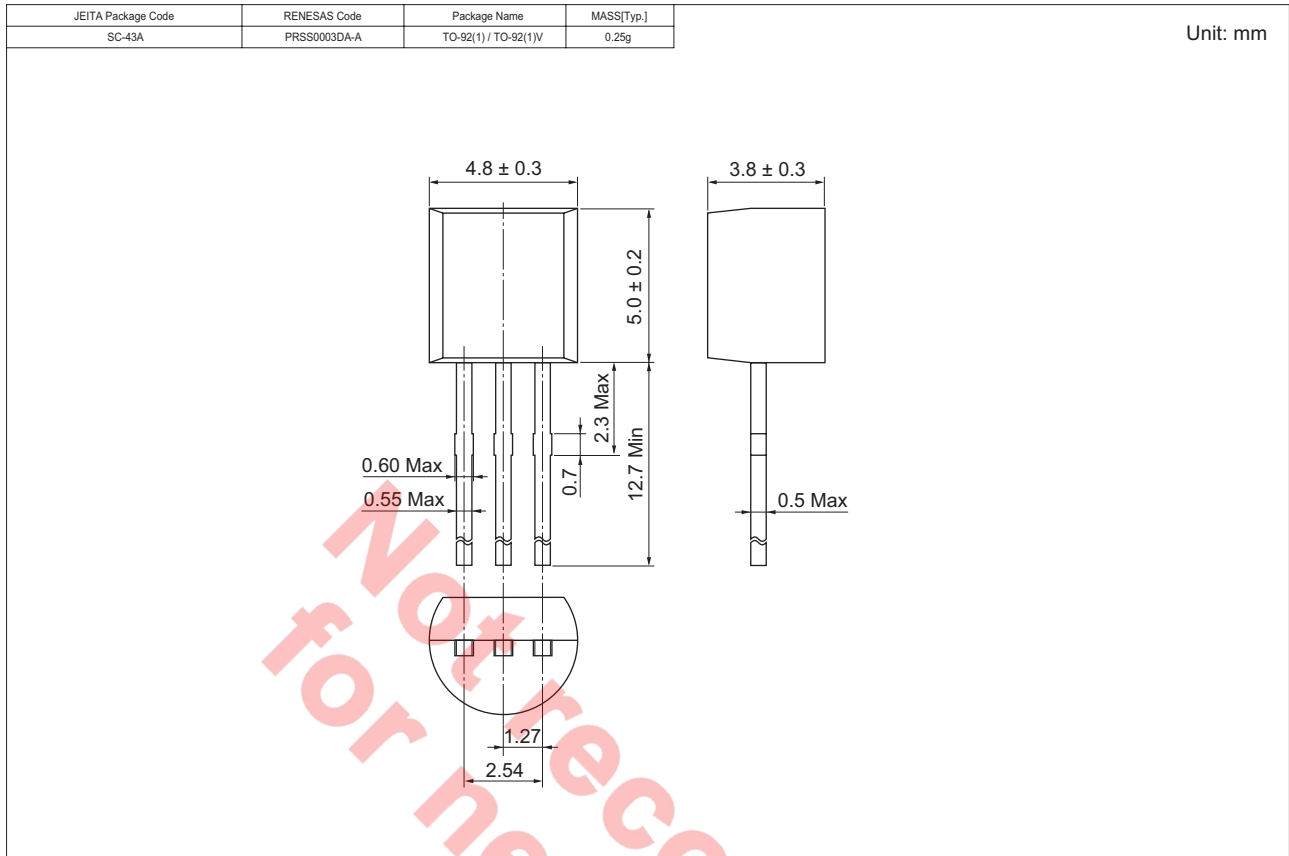






Not recommend  
for new design

## Package Dimensions



## Ordering Information

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

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