

# 2SC458(K)

Silicon NPN Epitaxial

# HITACHI

## Application

- Low frequency amplifier
- Medium speed switching

勝特力材料 886-3-5753170

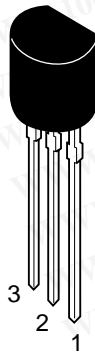
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## Outline

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	$I_C = 10 \mu A, I_E = 0$
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	—	500		$V_{CE} = 1 \text{ V}, I_C = 10 \text{ mA}$
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	D
100 to 200	160 to 320	250 to 500

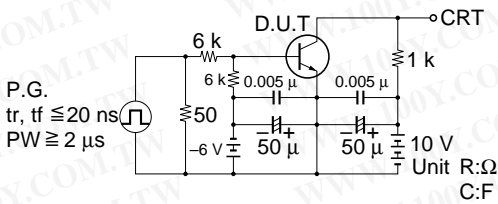
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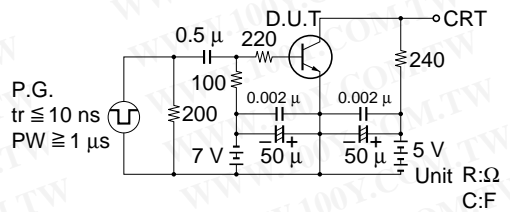
Small Signal h Parameters

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	$\mu\text{S}$	

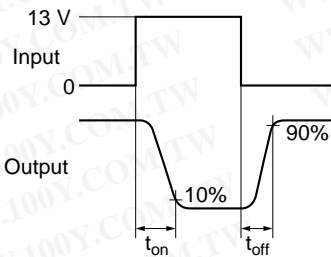
Switching Time Test Circuit  
 $t_{on}$ ,  $t_{off}$  Test Circuit



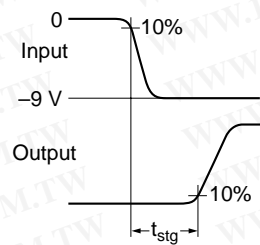
Switching Time Test Circuit  
 $t_{stg}$  Test Circuit



Response Waveform



Response Waveform

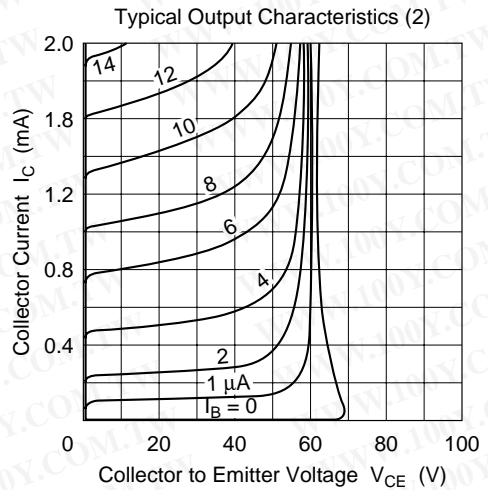
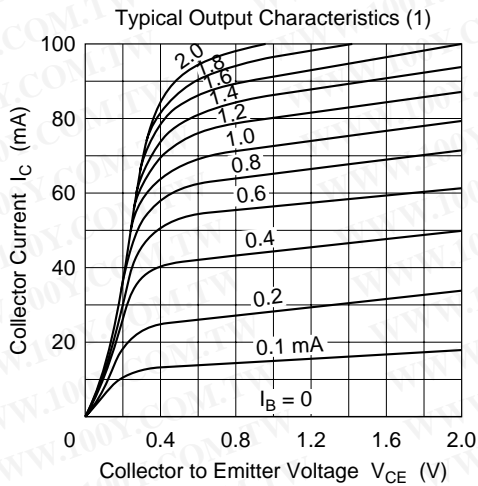
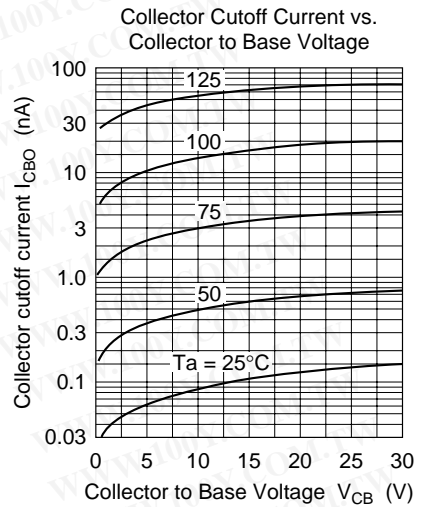
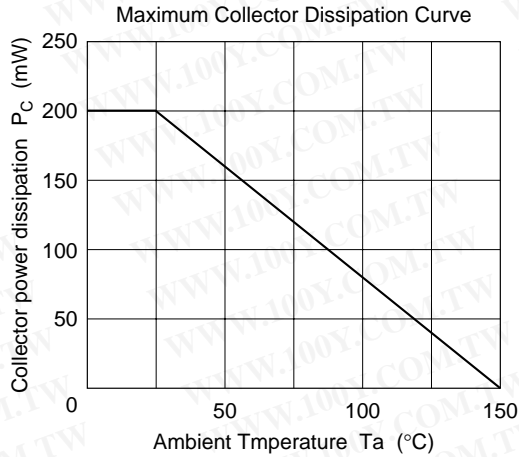


$I_C$	$I_{B1}$	$I_{B2}$	$V_{CC}$	$V_{BB}$	$V_{in}$
10 mA	1 mA	-1 mA	10 V	-6 V	13 V

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

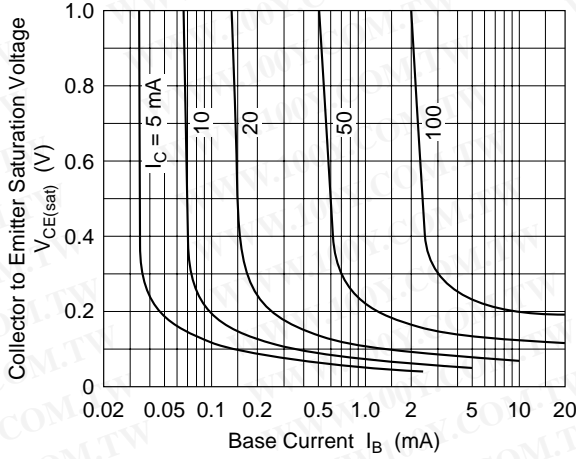
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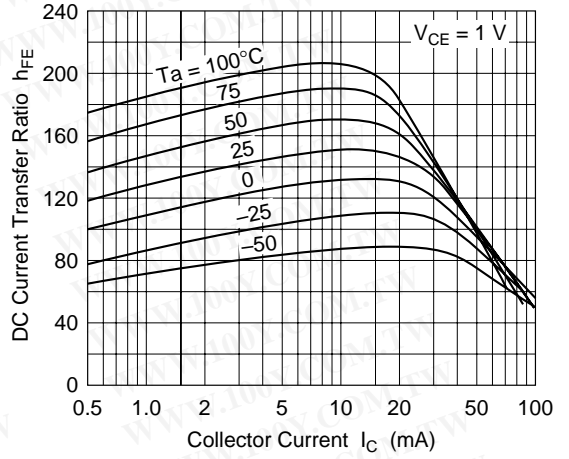


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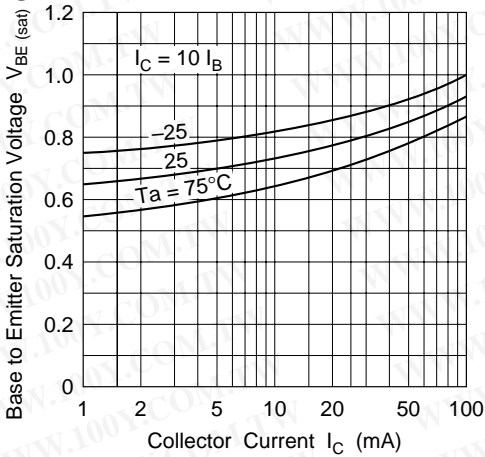
Collector to Emitter Saturation Voltage vs. Base Current



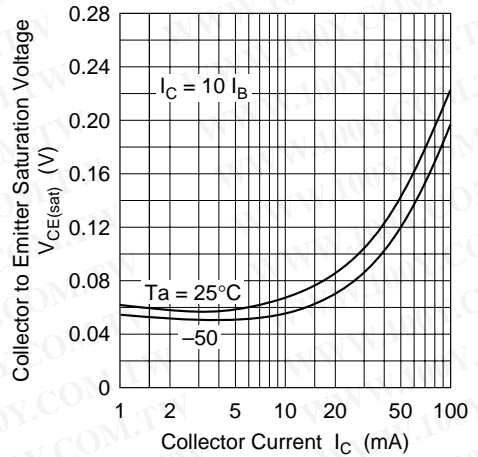
DC Current Transfer Ratio vs. Collector Current



Base to Emitter Saturation Voltage vs. Collector Current

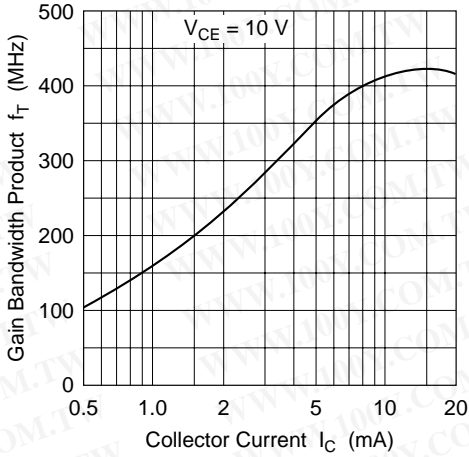


Collector to Emitter Saturation Voltage vs. Collector Current

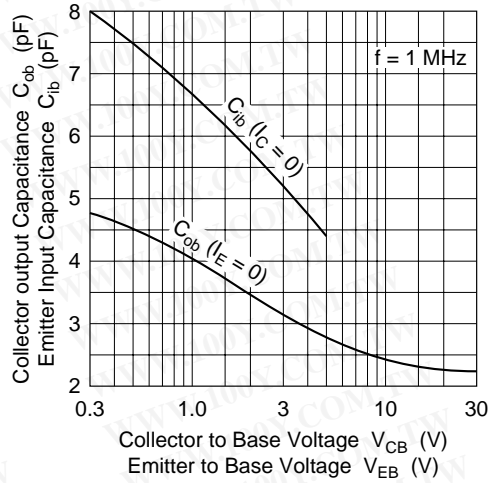


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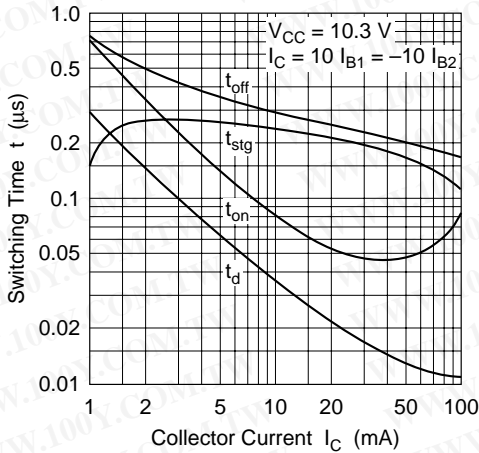
Gain Bandwidth Product vs. Collector Current



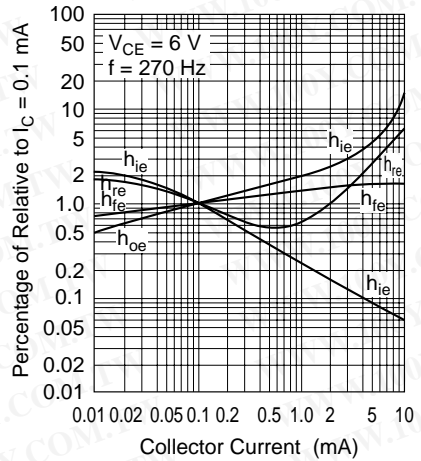
Input and Output Capacitance vs. Voltage



Switching Time vs. Collector Current



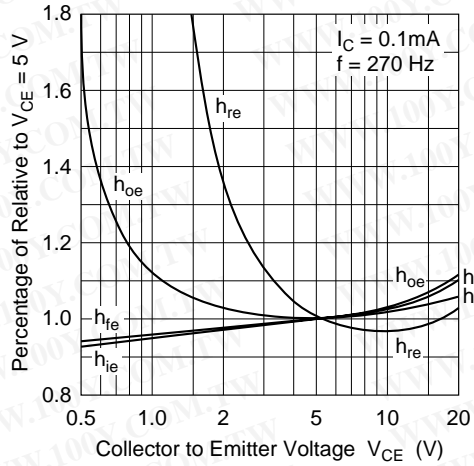
h Parameter vs. Collector Current



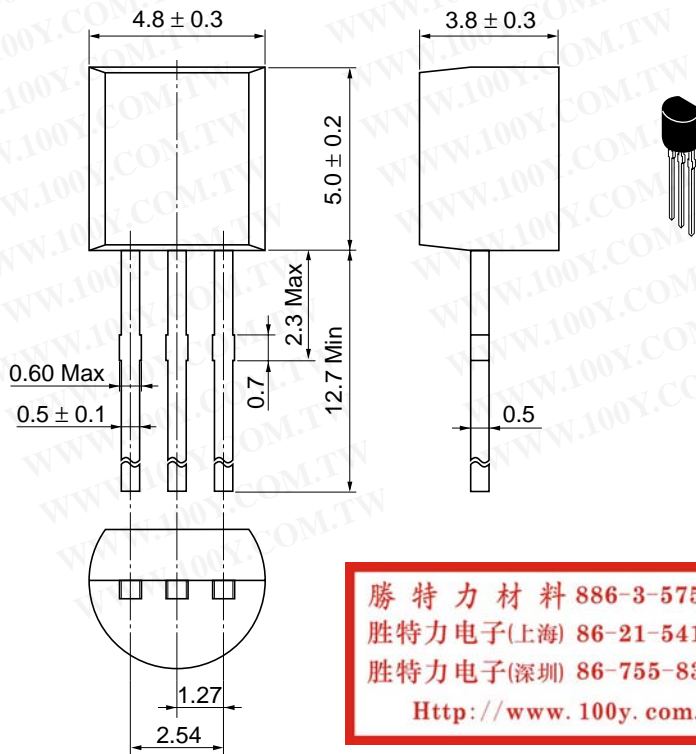
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h Parameter vs. Collector to Emitter Voltage



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



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