2SC458(K)

Silicon NPN Epitaxial

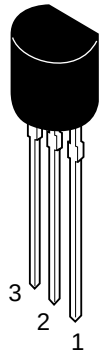
HITACHI

Application

- Low frequency amplifier
- Medium speed switching

Outline

TO-92 (1)



1. Emitter
2. Collector
3. Base

Hitachi semiconductor

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	Tj	150	°C
Storage temperature	Tstg	–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	Cob	—	—	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

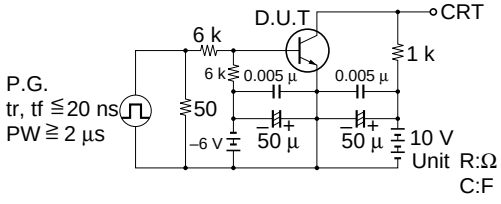
Note: 1. The 2SC458 (K) is grouped by h_{FE} as follows.

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

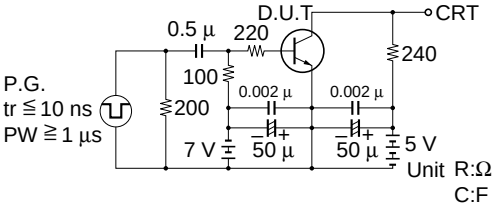
Small Signal h Parameters

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

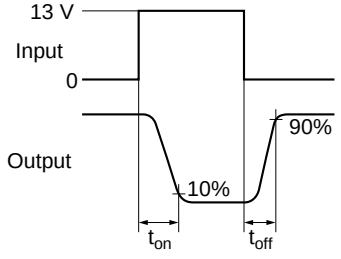
Switching Time Test Circuit
t_{on}, t_{off} Test Circuit



Switching Time Test Circuit
t_{stg} Test Circuit

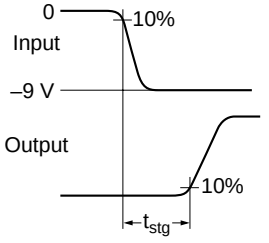


Response Waveform



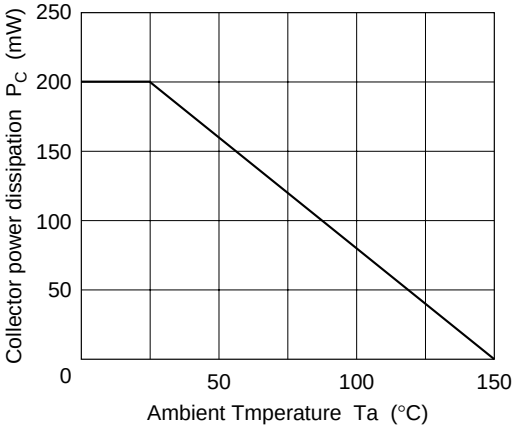
I_C	I_{B1}	I_{B2}	V_{CC}	V_{BB}	V_{in}
10 mA	1 mA	–1 mA	10 V	–6 V	13 V

Response Waveform

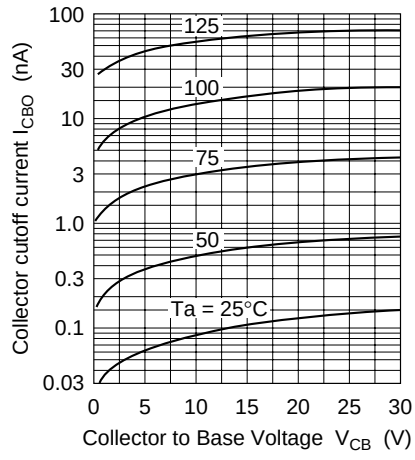


I_C	I_{B1}	I_{B2}	V_{CC}	V_{BB}	V_{in}
20 mA	20 mA	–20 mA	5 V	7 V	–9 V

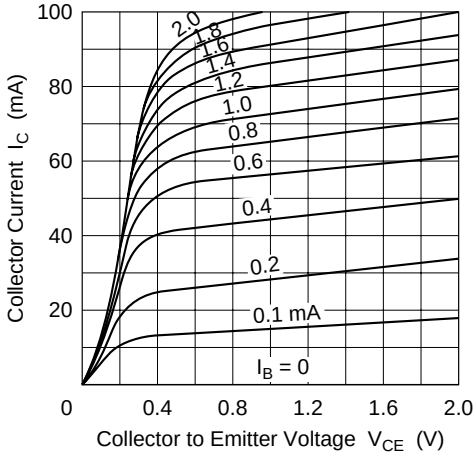
Maximum Collector Dissipation Curve



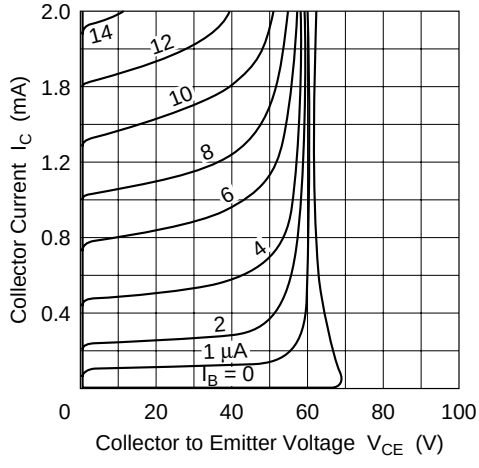
Collector Cutoff Current vs. Collector to Base Voltage



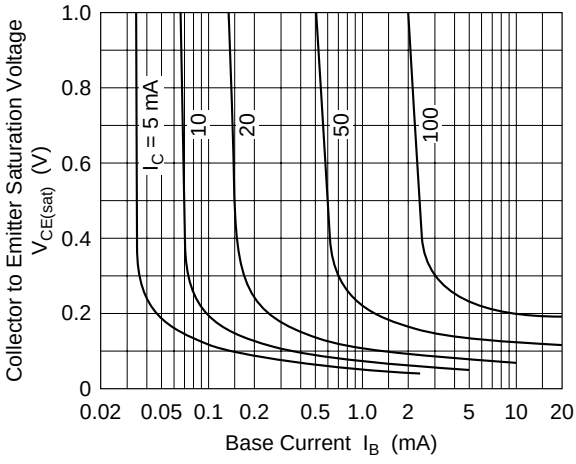
Typical Output Characteristics (1)



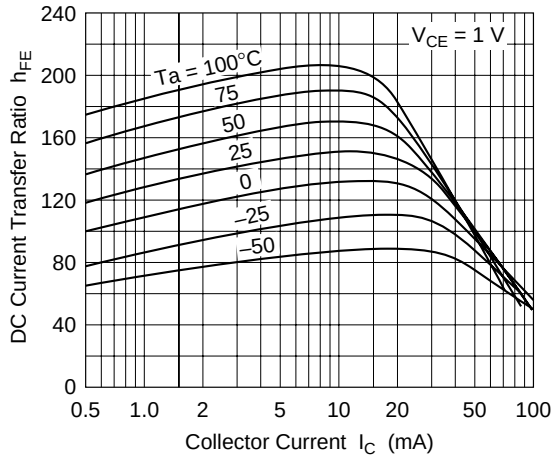
Typical Output Characteristics (2)



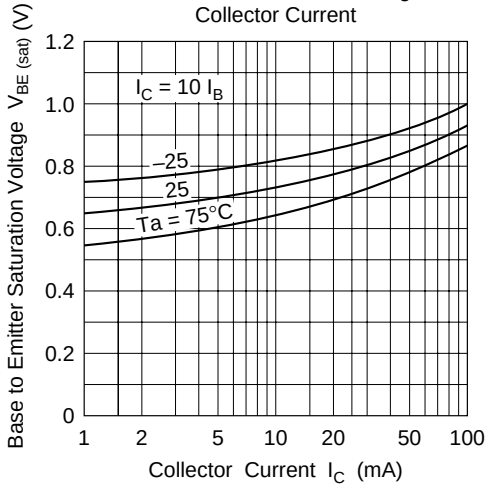
Collector to Emitter Saturation Voltage vs. Base Current



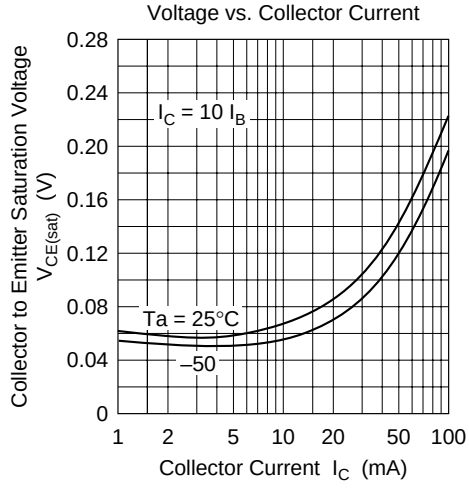
DC Current Transfer Ratio vs. Collector Current



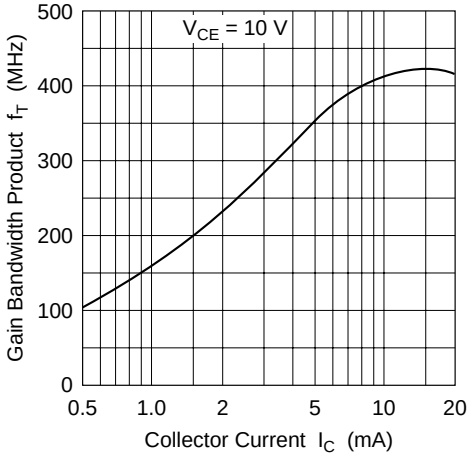
Base to Emitter Saturation Voltage vs. Collector Current



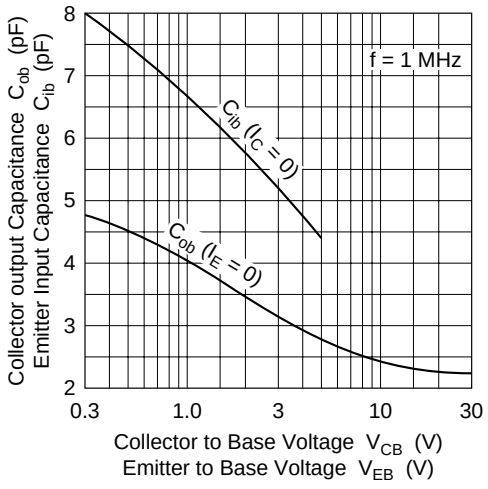
Collector to Emitter Saturation Voltage vs. Collector Current



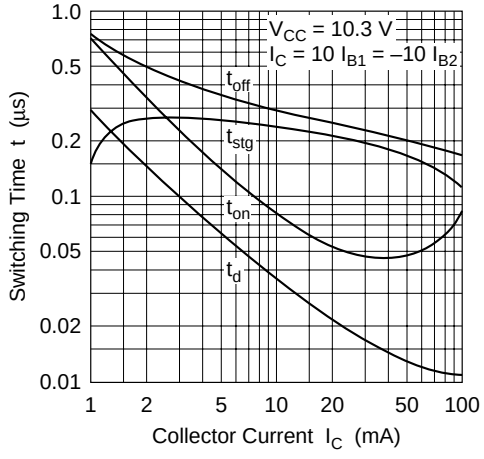
Gain Bandwidth Product vs. Collector Current



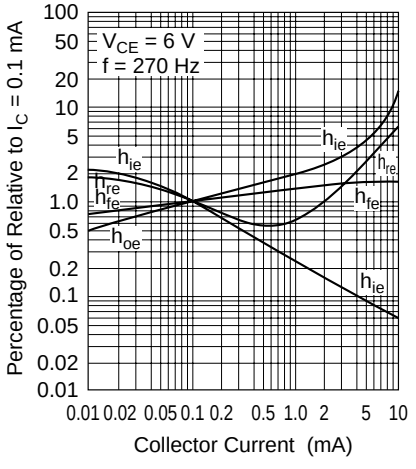
Input and Output Capacitance vs. Voltage



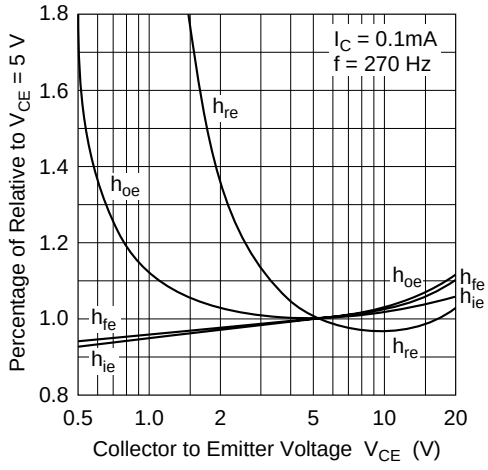
Switching Time vs. Collector Current



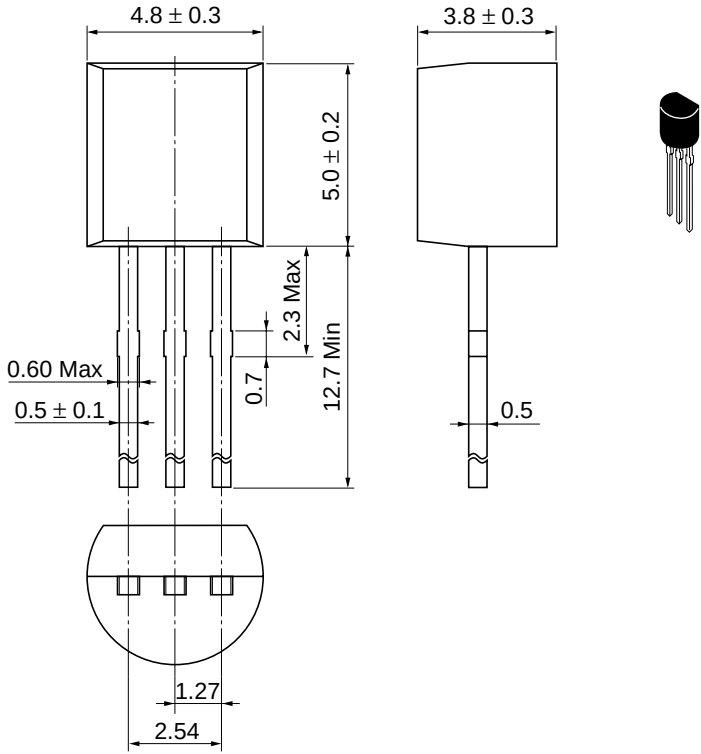
h Parameter vs. Collector Current



h Parameter vs. Collector to Emitter Voltage



Unit: mm



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JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.25 g

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