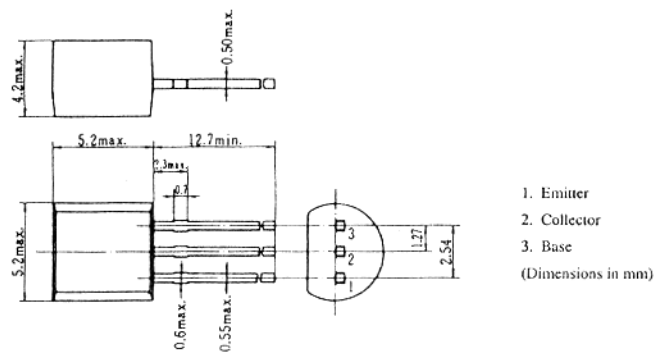


## 2SC458 (K)

SILICON NPN EPITAXIAL  
MEDIUM SPEED SWITCHING

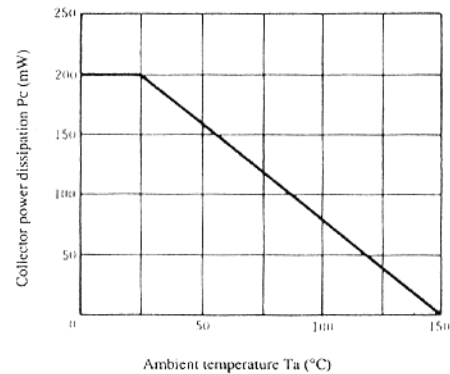


(JEDEC TO-92)

### ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Item	Symbol	2SC458 (K)	Unit
Collector to base voltage	V <sub>CB0</sub>	30	V
Collector to emitter voltage	V <sub>CE0</sub>	30	V
Emitter to base voltage	V <sub>EB0</sub>	5	V
Collector current	I <sub>C</sub>	100	mA
Emitter current	I <sub>E</sub>	-100	mA
Collector power dissipation	P <sub>C</sub>	200	mW
Junction temperature	T <sub>J</sub>	150	°C
Storage temperature	T <sub>sig</sub>	-55 to +150	°C

### MAXIMUM COLLECTOR DISSIPATION CURVE



### ■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

Item	Symbol	Test Condition	min.	typ.	max.	Unit
Collector to base breakdown voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0	30	—	—	V
Collector to emitter breakdown voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 1mA, R <sub>BE</sub> = ∞	30	—	—	V
Emitter to base breakdown voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> = 10μA, I <sub>C</sub> = 0	5	—	—	V
Collector cutoff current	I <sub>CBO</sub>	V <sub>CB</sub> = 18V, I <sub>E</sub> = 0	—	—	0.5	μA
Emitter cutoff current	I <sub>EBO</sub>	V <sub>EB</sub> = 4V, I <sub>C</sub> = 0	—	—	1.0	μA
DC current transfer ratio	h <sub>FE</sub> *	V <sub>CE</sub> = 1V, I <sub>C</sub> = 10mA	100	—	500	
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA	—	—	0.4	V
Base to emitter saturation voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA	—	—	1.0	V
Gain bandwidth product	f <sub>T</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA	100	—	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	—	—	4	pF
Turn on time	t <sub>on</sub>	I <sub>C</sub> = 10I <sub>B1</sub> = -10I <sub>B2</sub> = 10mA, V <sub>CC</sub> = 10V	—	80	—	ns
Turn off time	t <sub>off</sub>		—	300	—	ns
Storage time	t <sub>sig</sub>	I <sub>C</sub> = I <sub>B1</sub> = -I <sub>B2</sub> = 20mA, V <sub>CC</sub> = 5V	—	260	—	ns

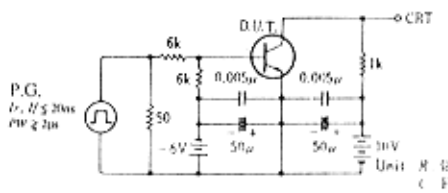
\* The 2SC458 (K) is grouped by h<sub>FE</sub> as follows.

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

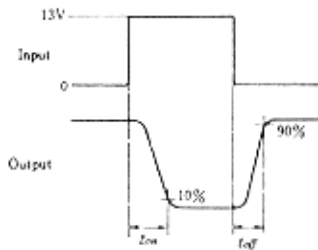
### SMALL SIGNAL h PARAMETERS

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

SWITCHING TIME TEST CIRCUIT  
 $t_{on}, t_{off}$  TEST CIRCUIT

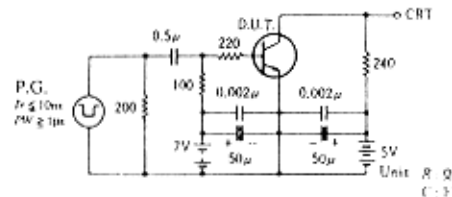


RESPONSE WAVEFORM

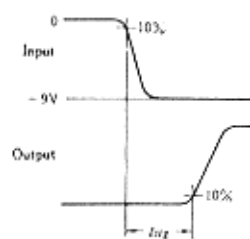


$I_c$	$I_{B1}$	$I_{B2}$	$V_{CC}$	$V_{BB}$	$V_{in}$
10mA	1mA	-1mA	10V	-6V	13V

SWITCHING TIME TEST CIRCUIT  
 $t_{stg}$  TEST CIRCUIT

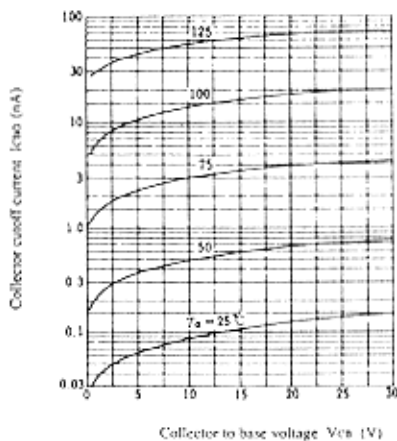


RESPONSE WAVEFORM

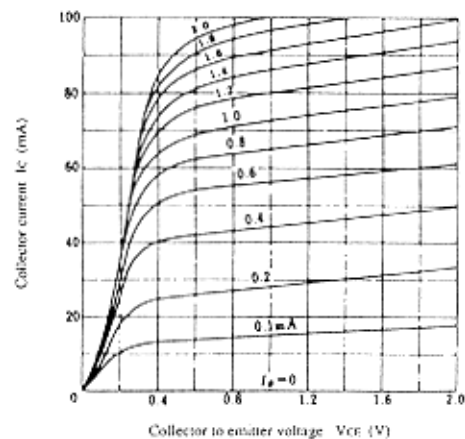


$I_c$	$I_{B1}$	$I_{B2}$	$V_{CC}$	$V_{BB}$	$V_{in}$
20mA	20mA	-20mA	5V	7V	-9V

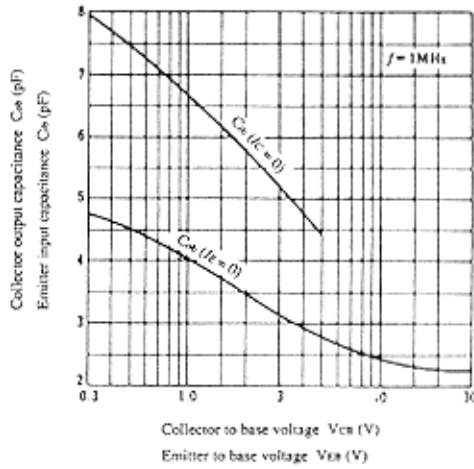
COLLECTOR CUTOFF CURRENT VS.  
COLLECTOR TO BASE VOLTAGE



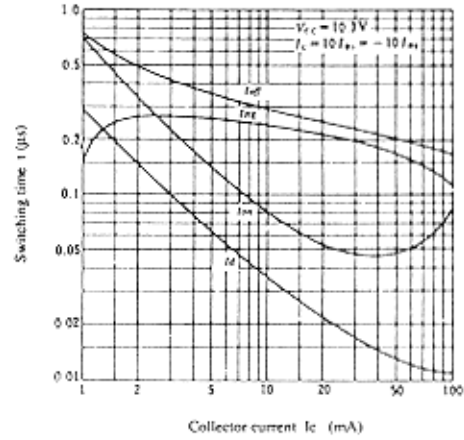
TYPICAL OUTPUT CHARACTERISTICS (1)



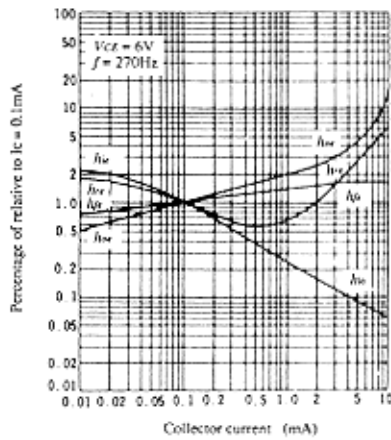
### INPUT AND OUTPUT CAPACITANCE VS. VOLTAGE



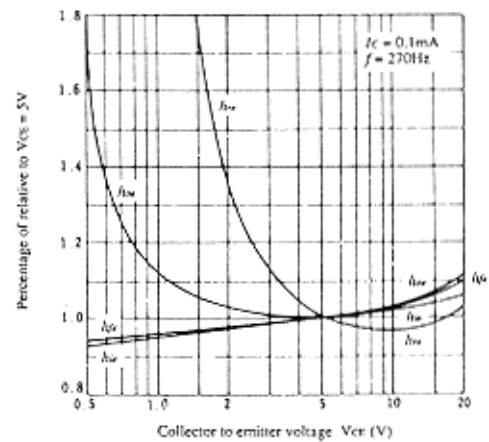
### SWITCHING TIME VS. COLLECTOR CURRENT



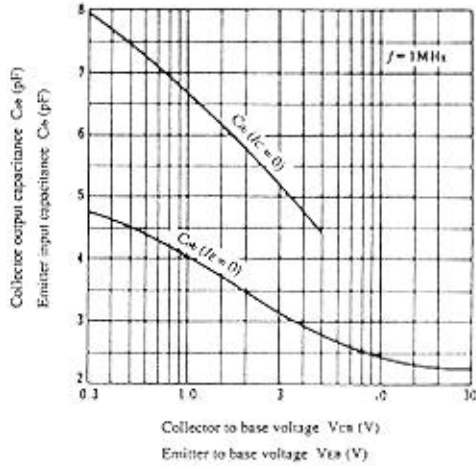
### h PARAMETER VS. COLLECTOR CURRENT



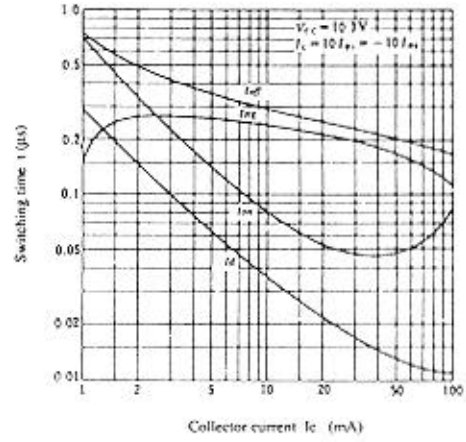
### h PARAMETER VS. COLLECTOR TO EMITTER VOLTAGE



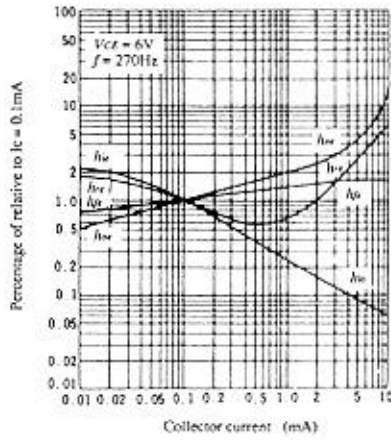
### INPUT AND OUTPUT CAPACITANCE VS. VOLTAGE



### SWITCHING TIME VS. COLLECTOR CURRENT



### h PARAMETER VS. COLLECTOR CURRENT



### h PARAMETER VS. COLLECTOR TO EMITTER VOLTAGE

