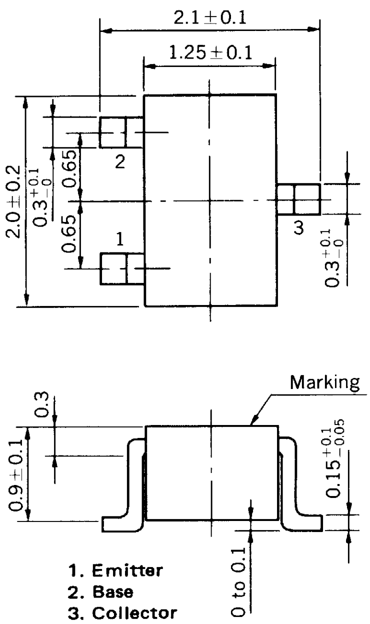
NEC
ELECTRON DEVICE

SILICON TRANSISTOR
2SA1610

HIGH SPEED SWITCHING
PNP SILICON EPITAXIAL TRANSISTOR

PACKAGE DIMENSIONS

in millimeters



FEATURES

- High Speed Switching : t_{on} = 9.0 ns TYP.
  t_{off} = 19.0 ns TYP.
- High f_T : f_T = 1 800 MHz TYP.
- Low C_{ob} : C_{ob} = 2.0 pF TYP.
- Complementary to 2SC4176

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Current (T_a = 25 °C)			
Collector to Base Voltage	V_{CBO}	−15	V
Collector to Emitter Voltage	V_{CEO}	−15	V
Emitter to Base Voltage	V_{EBO}	−4.5	V
Collector Current (DC)	I_C	−50	mA
Maximum Power Dissipation			
Total power Dissipation at 25 °C Ambient Temperature	P_T	150	mW
Maximum Temperatures			
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			−100	nA	V_{CB} = −8.0 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			−100	nA	V_{EB} = −3.0 V, I_C = 0
DC Current Gain	h_{FE1} *	30	70			V_{CE} = −1.0 V, I_C = −1.0 mA
DC Current Gain	h_{FE2} *	50	80	150		V_{CE} = −1.0 V, I_C = −10 mA
Collector Saturation Voltage	$V_{CE(sat)}$ *		−0.09	−0.20	V	I_C = −10 mA, I_B = −1.0 mA
Base Saturation Voltage	$V_{BE(sat)}$ *		−0.80	−0.95	V	I_C = −10 mA, I_B = −1.0 mA
Gain Bandwidth Product	f_T	800	1800		MHz	V_{CE} = −10 V, I_E = 10 mA
Output Capacitance	C_{ob}		2.0	3.0	pF	V_{CB} = −5.0 V, I_E = 0, f = 1.0 MHz
Turn-on Time	t_{on}		9.0	20	ns	See Test Circuit
Storage Time	t_{stg}		16	40	ns	
Turn-off Time	t_{off}		19	40	ns	

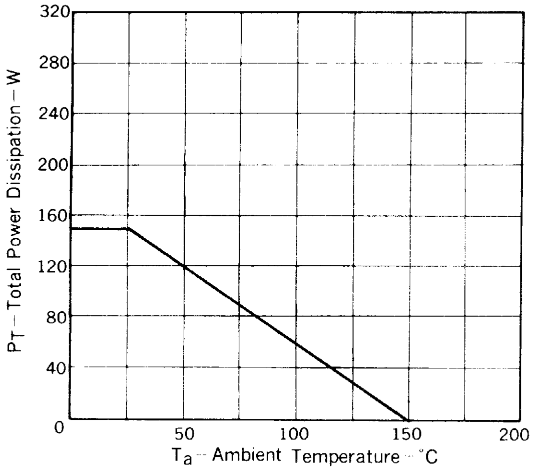
* Pulsed: PW ≦ 350 μs, Duty Cycle ≦ 2 %

h_{FE2} Classification

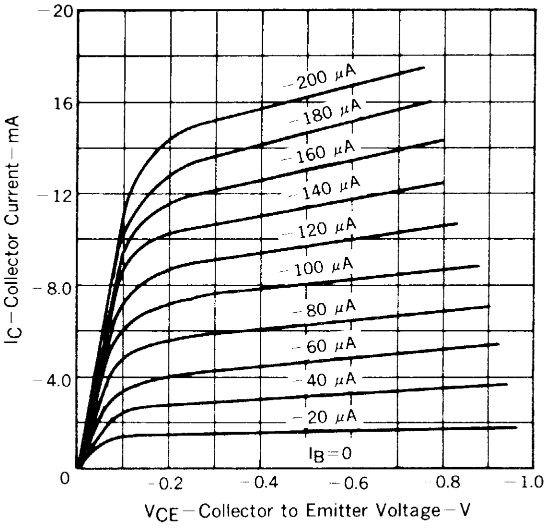
Making	Y33	Y34
h_{FE2}	50 to 100	75 to 150

TYPICAL CHARACTERISTICS (T_a = 25 °C)

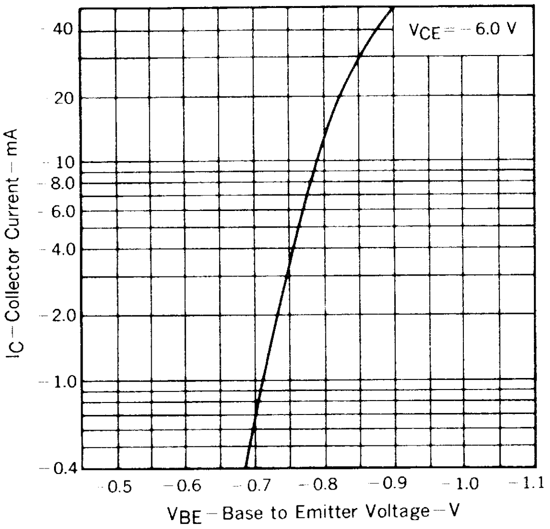
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



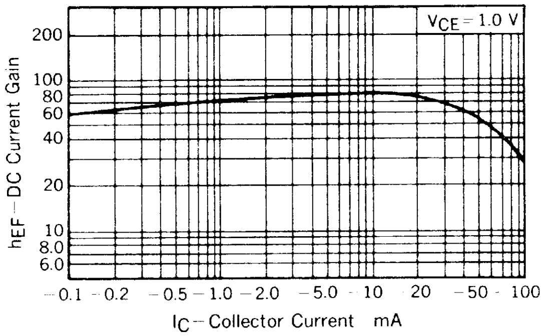
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



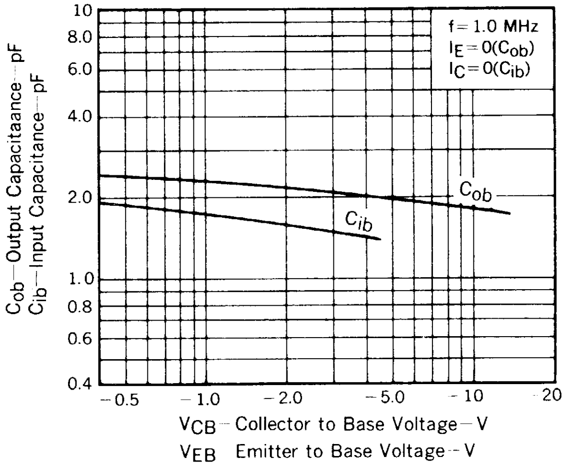
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



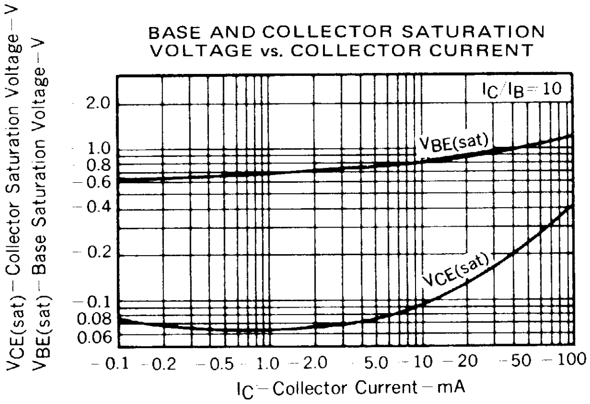
DC CURRENT GAIN vs. COLLECTOR CURRENT



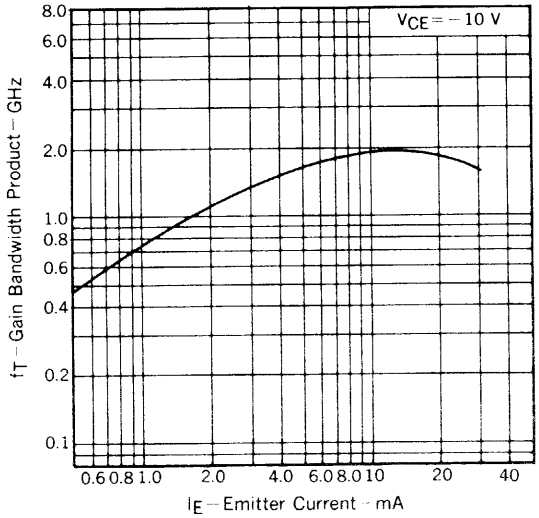
INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



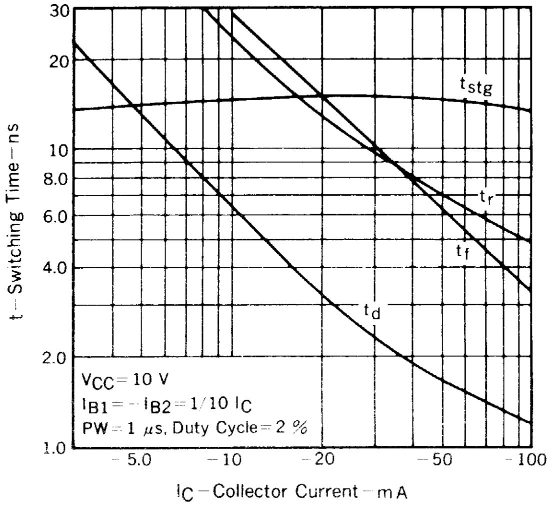
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



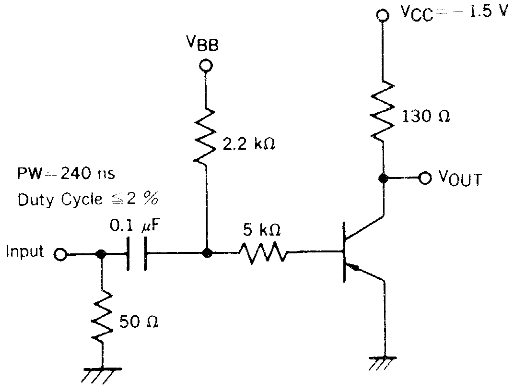
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



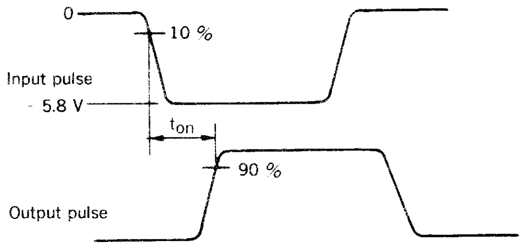
SWITCHING TIME vs. COLLECTOR CURRENT



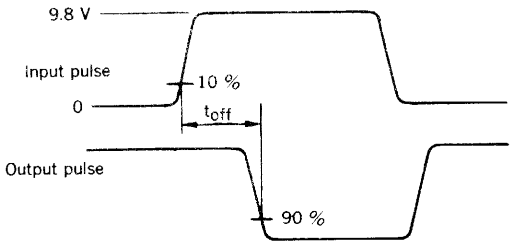
SWITCHING TIME TEST CIRCUIT



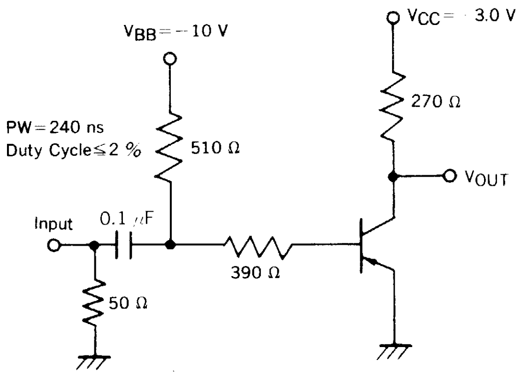
t_{on}, t_{off} Switching



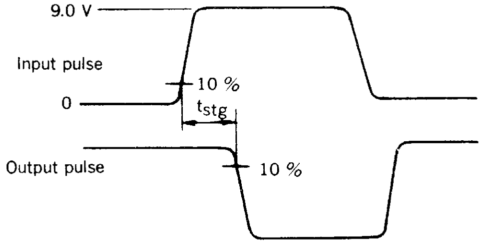
t_{on} Voltage Waveforms (V_{BB} = GROUND)



t_{off} Voltage Waveforms (V_{BB} = −8.0 V)



t_{stg} Switching



t_{stg} Voltage Waveforms

TC−2114
October 1987M
Printed in Japan