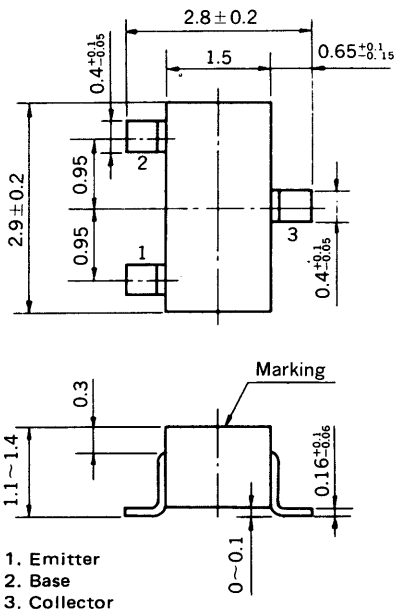
NEC
ELECTRON DEVICE

SILICON TRANSISTOR

2SA1461

HIGH FREQUENCY AMPLIFIER AND SWITCHING
PNP SILICON EPITAXIAL TRANSISTOR
MINI MOLD

PACKAGE DIMENSIONS
in millimeters



1. Emitter
2. Base
3. Collector

FEATURES

- High Speed Switching: t_{stg} = 110 ns
- High Gain Bandwidth Product : f_T = 510 MHz
- Complementary to 2SC3734

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Current (T_a = 25 °C)			
Collector to Base Voltage	V_{CBO}	−40	V
Collector to Emitter Voltage	V_{CEO}	−40	V
Emitter to Base Voltage	V_{EBO}	−5	V
Collector Current (DC)	I_C	−200	mA
Maximum Power Dissipation			
Total Power Dissipation at 25 °C Ambient Temperature	P_T	200	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} = −30 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			−100	nA	V_{EB} = −3.0 V, I_C = 0
DC Current Gain	h_{FE1}*	75	180	300		V_{CE} = −1.0 V, I_C = −10 mA
DC Current Gain	h_{FE2}*	25	100			V_{CE} = −10 V, I_C = −100 mA
Collector Saturation Voltage	$V_{CE(sat)}$*		−0.1	−0.4	V	I_C = −50 mA, I_B = −5.0 mA
Base Saturation Voltage	$V_{BE(sat)}$*		−0.8	−0.95	V	I_C = −50 mA, I_B = −5.0 mA
Gain Bandwidth Product	f_T	200	510		MHz	V_{CE} = −20 V, I_E = 10 mA
Output Capacitance	C_{ob}		2.5	4.5	pF	V_{CB} = −5.0 V, I_E = 0, f = 1.0 MHz
Turn-on Time	t_{on}			70	ns	V_{CC} = −3.0 V
Storage Time	t_{stg}		110	225	ns	I_C = −10 mA
Turn-off Time	t_{off}			300	ns	I_{B1} = −I_{B2} = −1.0 mA

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

h_{FE} Classification

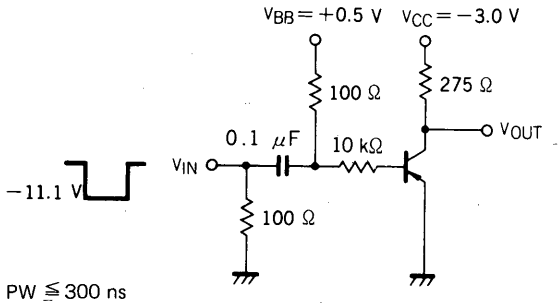
MARKING	Y22	Y23	Y24
h_{FE1}	75 to 150	100 to 200	150 to 300

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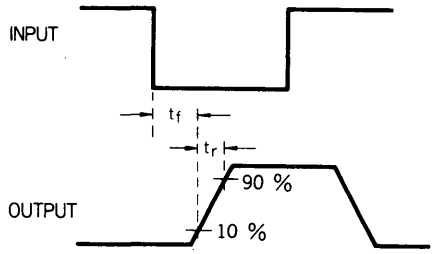
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SWITCHING TIME TEST CIRCUIT

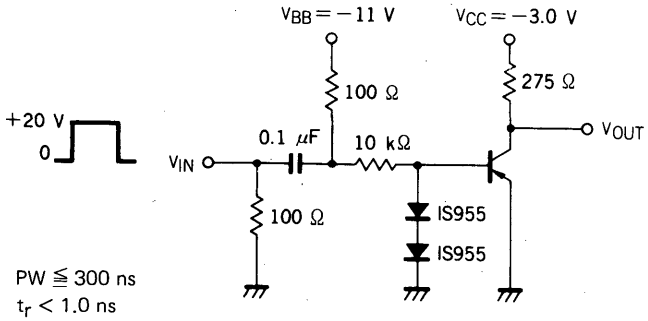


PW ≦ 300 ns
t_r < 1.0 ns
Z_{IN} = 50 Ω
Duty Cycle = 2 %

t_{on} SWITCHING

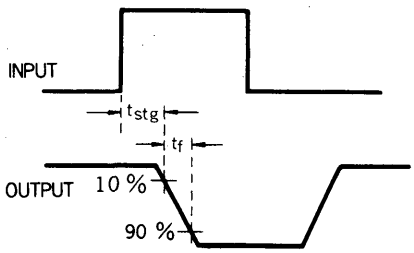


VOLTAGE WAVEFORMS



PW ≦ 300 ns
t_r < 1.0 ns
Duty Cycle = 2 %

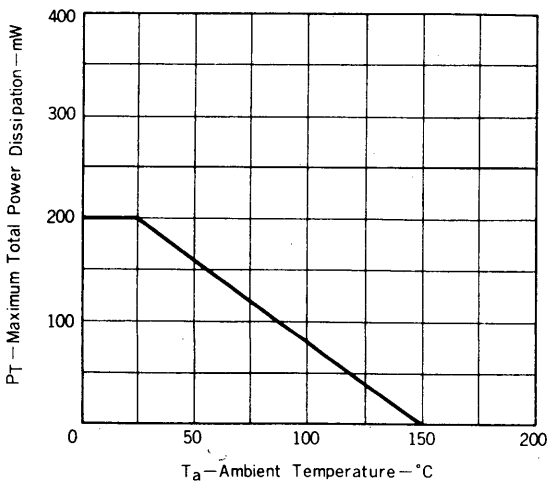
t_{off} SWITCHING



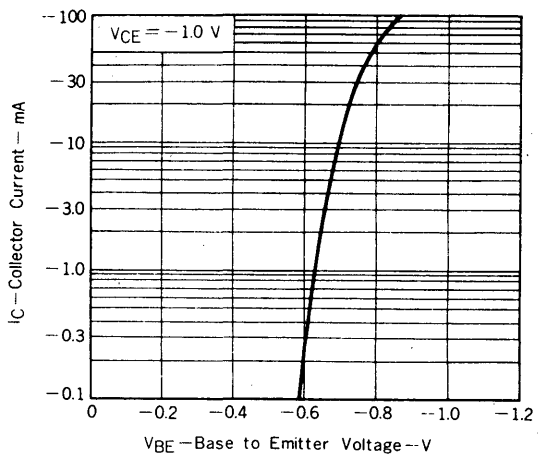
VOLTAGE WAVEFORMS

TYPICAL CHARACTERISTICS (T_a = 25 °C)

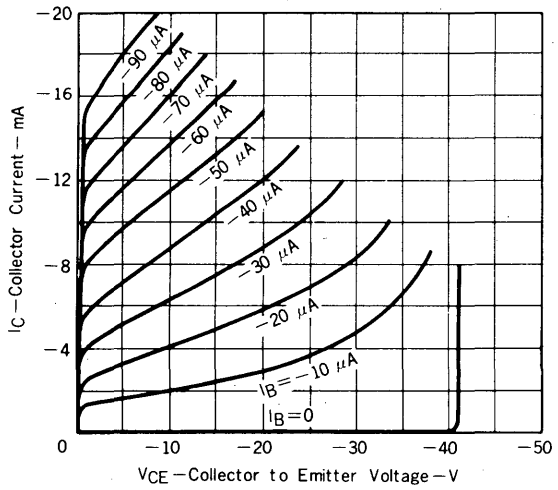
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



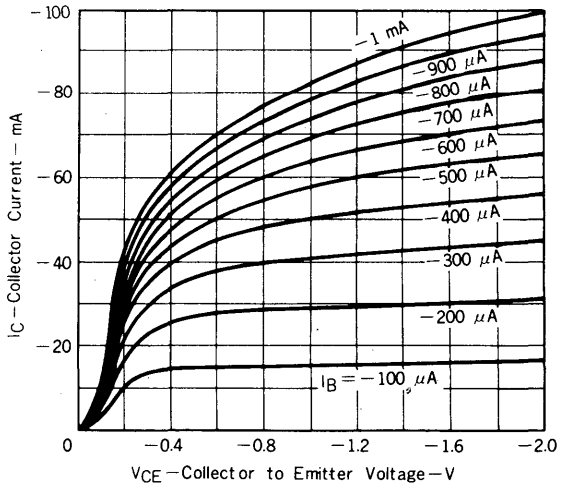
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



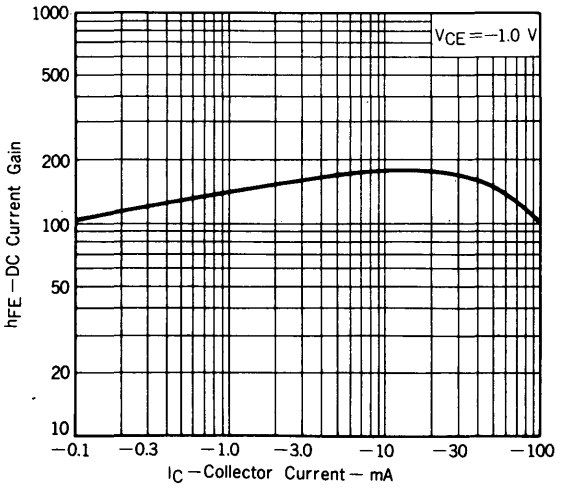
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



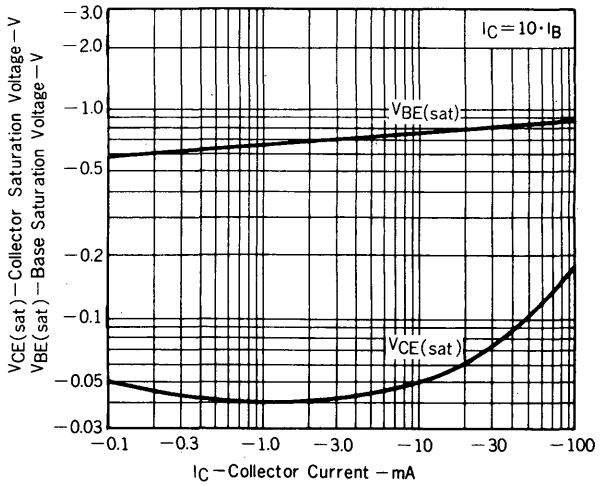
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



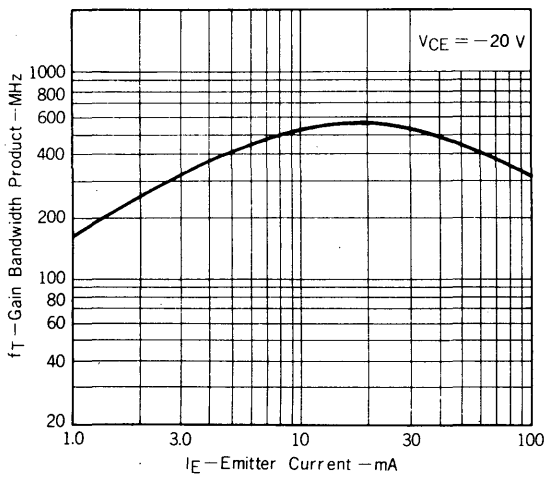
DC CURRENT GAIN vs.
COLLECTOR CURRENT



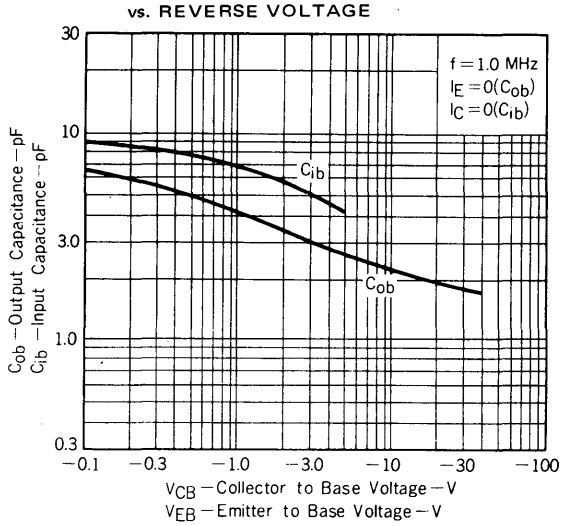
BASE AND COLLECTOR SATURATION VOLTAGE
vs. COLLECTOR CURRENT



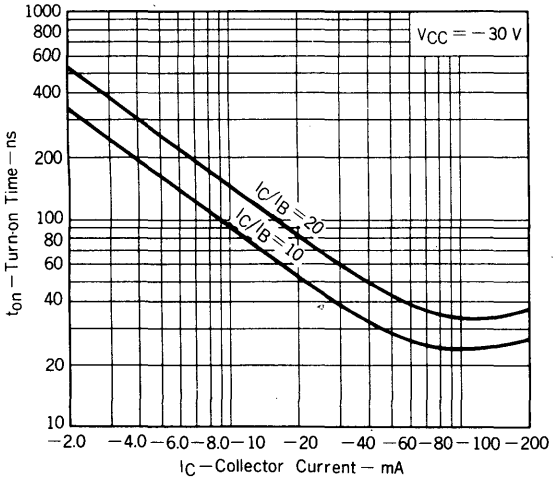
GAIN BANDWIDTH PRODUCT
vs. EMITTER CURRENT



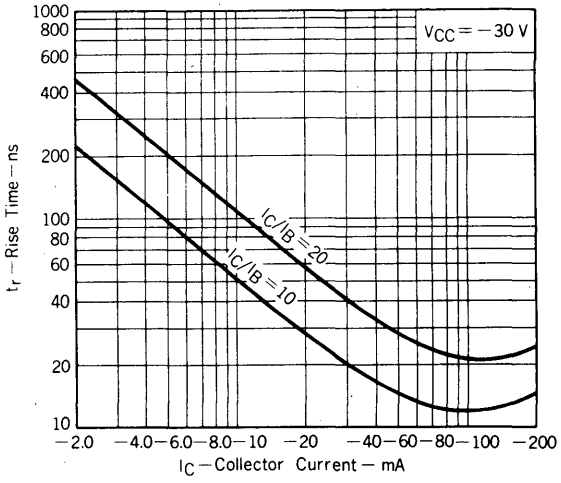
INPUT AND OUTPUT CAPACITANCE
vs. REVERSE VOLTAGE



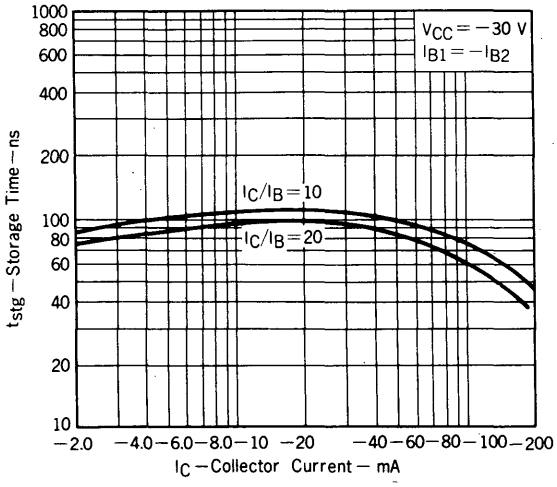
TURN-ON TIME vs.
COLLECTOR CURRENT



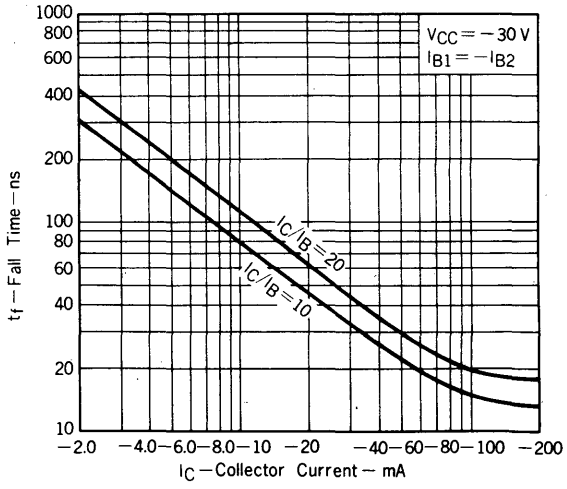
RISE TIME vs.
COLLECTOR CURRENT



STORAGE TIME vs.
COLLECTOR CURRENT



FALL TIME vs.
COLLECTOR CURRENT



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