NEC

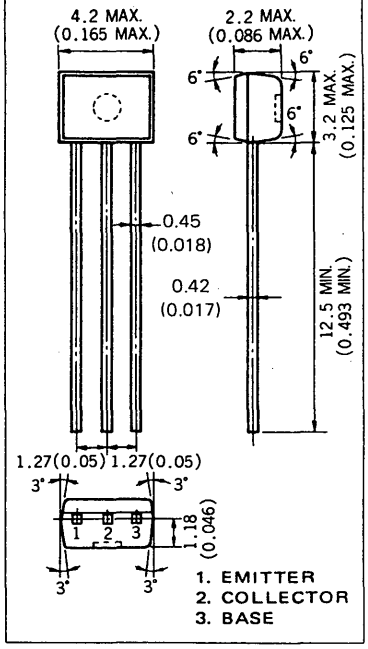
PNP SILICON TRANSISTOR
2SA1459

DESCRIPTION The 2SA1459 is designed for general purpose amplifier and high speed switching applications.

FEATURES

- High Frequency Current Gain.
- High Speed Switching.
- Small Output Capacitance.
- Low Collector Saturation Voltage.

PACKAGE DIMENSIONS
in millimeters (inches)



ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Maximum Temperatures
- Storage Temperature . . . . . −55 to +150 °C
- Junction Temperature . . . . . 150 °C Maximum

Maximum Power Dissipation (T_a = 25 °C)
- Total Power Dissipation . . . . . 250 mW

Maximum Voltages and Currents (T_a = 25 °C)
- V_{CBO} Collector to Base Voltage . . . . . −15 V
- V_{CEO} Collector to Emitter Voltage . . . . . −15 V
- V_{EBO} Emitter to Base Voltage . . . . . −4.5 V
- I_C Collector Current (DC) . . . . . −50 mA
- I_C Collector Current (Pulse)* . . . . . −100 mA

* PW ≦ 2 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
t_{on}	Turn-on Time		9.0	20	ns	See Test Circuit.
t_{off}	Turn-off Time		19	40	ns	See Test Circuit.
t_{stg}	Storage Time		16	40	ns	See Test Circuit.
f_T	Gain Bandwidth Product	800	1800		MHz	V_{CE} = −10 V, I_E = 10 mA, f = 100 MHz
C_{ob}	Output Capacitance		2.0	3.0	pF	V_{CB} = −5.0 V, I_E = 0, f = 1 MHz
h_{FE1}**	DC Current Gain	50	80	150	−	V_{CE} = −1.0 V, I_C = −10 mA
h_{FE2}**	DC Current Gain	30	70		−	V_{CE} = −1.0 V, I_C = −1.0 mA
$V_{CE(sat)}$**	Collector Saturation Voltage		−0.09	−0.20	V	I_C = −10 mA, I_B = −1.0 mA
$V_{BE(sat)}$**	Base Saturation Voltage		−0.80	−0.95	V	I_C = −10 mA, I_B = −1.0 mA
I_{CBO}	Collector Cutoff Current			−0.1	μA	V_{CB} = −8.0 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			−0.1	μA	V_{EB} = −3.0 V, I_C = 0

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

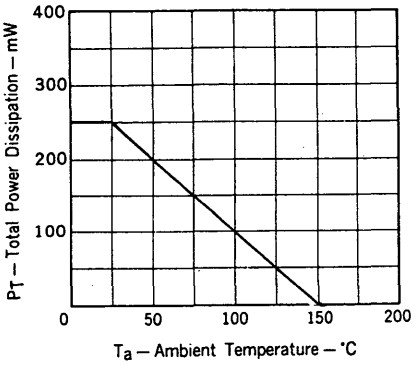
Classification of h_{FE1}

Rank	L	K
Range	50 to 100	75 to 150

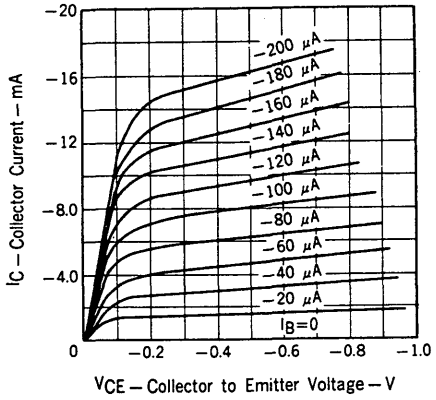
h_{FE2} Test Conditions: V_{CE} = −1.0 V, I_C = −10 mA

TYPICAL CHARACTERISTICS (T_a = 25 °C)

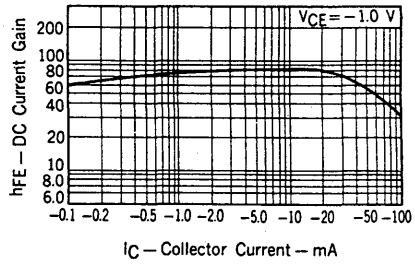
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



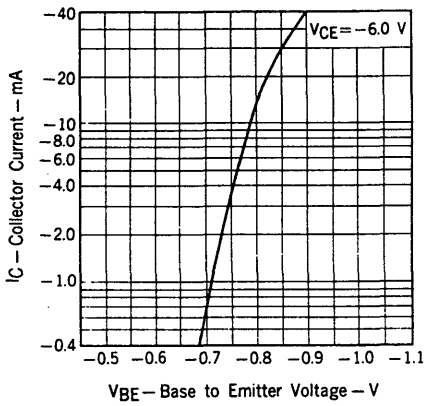
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



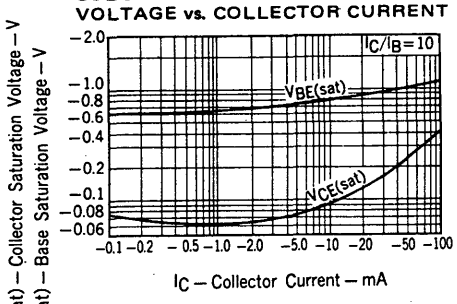
DC CURRENT GAIN vs. COLLECTOR CURRENT



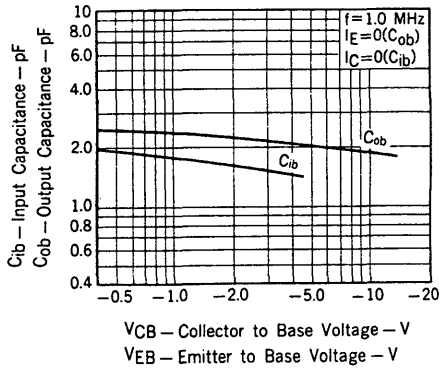
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



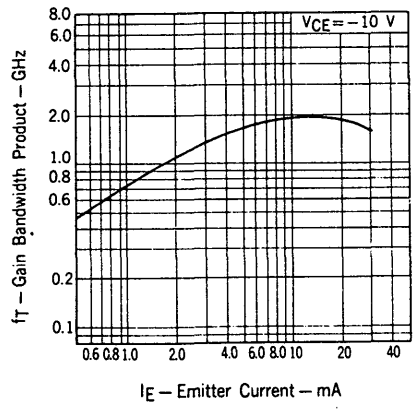
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



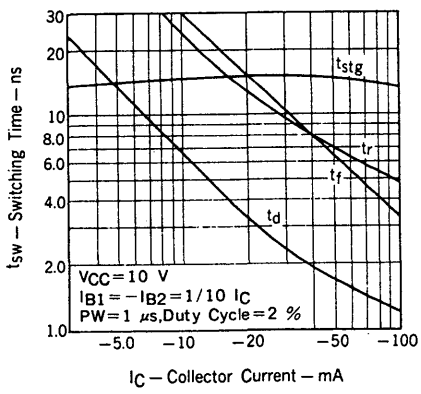
INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



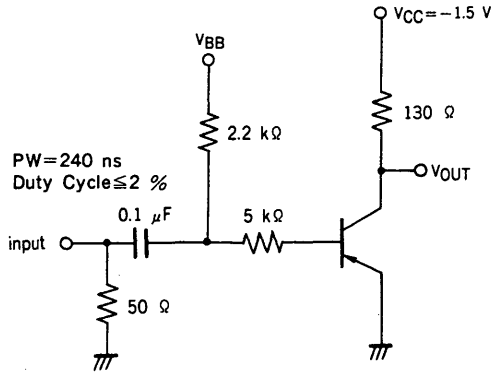
GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



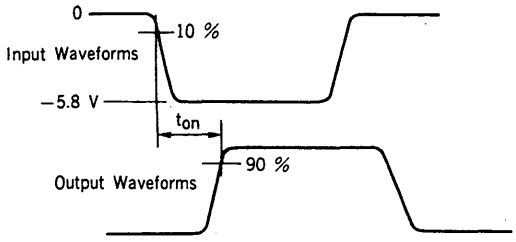
SWITCHING TIME vs. COLLECTOR CURRENT



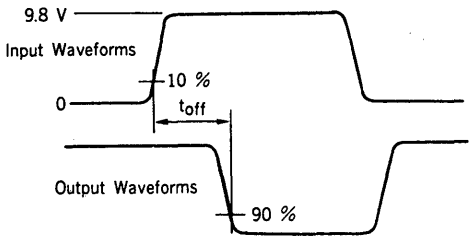
SWITCHING TIME TEST CIRCUIT



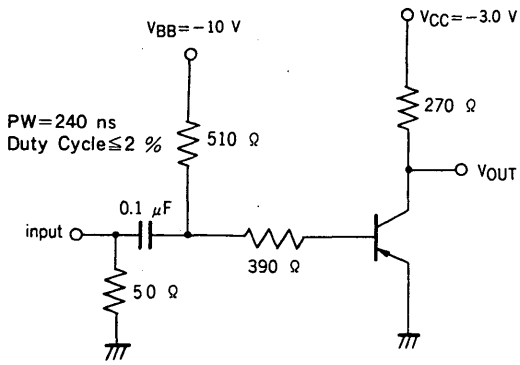
t_{on}, t_{off} Test Circuit



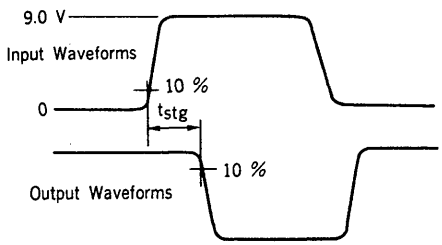
t_{on} Test Waveforms (V_{BB}=GROUND)



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



t_{stg} Test Circuit



t_{stg} Test Waveforms