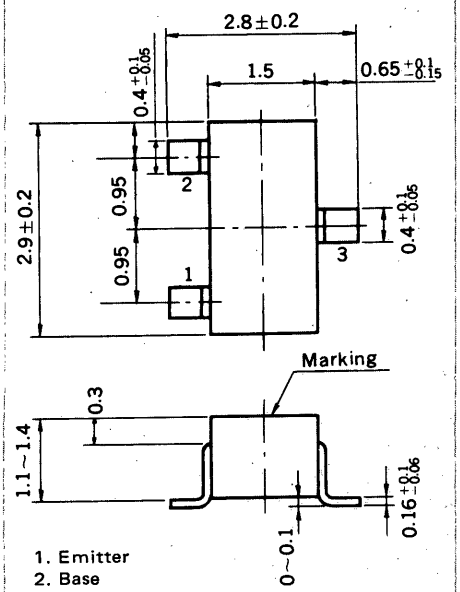
DATA SHEET

NEC
ELECTRON DEVICE

# SILICON TRANSISTOR
# 2SA1464

## HIGH FREQUENCY AMPLIFIER AND SWITCHING
## PNP SILICON EPITAXIAL TRANSISTOR
## MINI MOLD

**PACKAGE DIMENSIONS**
in millimeters




1. Emitter
2. Base
3. Collector

### FEATURES

- High $f_T$ : $f_T$ = 400 MHz
- Complementary to 2SC3739

### ABSOLUTE MAXIMUM RATINGS

| | | | |
|---|---|---|---|
| Maximum Voltages and Current ($T_a$ = 25 °C) | | | |
| Collector to Base Voltage | $V_{CBO}$ | −60 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | −40 | V |
| Emitter to Base Voltage | $V_{EBO}$ | −5.0 | V |
| Collector Current (DC) | $I_C$ | −500 | 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 | $V_{CB}$ = −40 V, $I_E$ = 0 |
| Emitter Cutoff Current | $I_{EBO}$ | | | −100 | nA | $V_{EB}$ = −4.0 V, $I_C$ = 0 |
| DC Current Gain | $h_{FE1}$* | 75 | 140 | 300 | | $V_{CE}$ = −2.0 V, $I_C$ = −150 mA |
| DC Current Gain | $h_{FE2}$* | 20 | 50 | | | $V_{CE}$ = −2.0 V, $I_C$ = −500 mA |
| Collector Saturation Voltage | $V_{CE(sat)}$* | | −0.45 | −0.75 | V | $I_C$ = −500 mA, $I_B$ = −50 mA |
| Base Saturation Voltage | $V_{BE(sat)}$* | | −1.0 | −1.30 | V | $I_C$ = −500 mA, $I_B$ = −50 mA |
| Gain Bandwidth Product | $f_T$ | 150 | 400 | | MHz | $V_{CE}$ = −10 V, $I_E$ = 20 mA |
| Output Capacitance | $C_{ob}$ | | 5.0 | 8.0 | pF | $V_{CB}$ = −10 V, $I_E$ = 0, f = 1.0 MHz |
| Turn-on Time | $t_{on}$ | | | 35 | ns | $V_{CC}$ = −30 V |
| Storage Time | $t_{stg}$ | | | 225 | ns | $I_C$ = 150 mA |
| Turn-off Time | $t_{off}$ | | | 255 | ns | $I_{B1}$ = −$I_{B2}$ = 15 mA |

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

### $h_{FE}$ Classification

| Making | Y12 | Y13 | Y14 |
|---|---|---|---|
| $h_{FE1}$ | 75 to 150 | 100 to 200 | 150 to 300 |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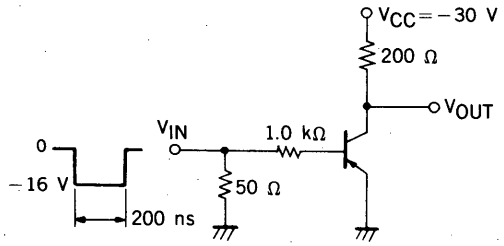
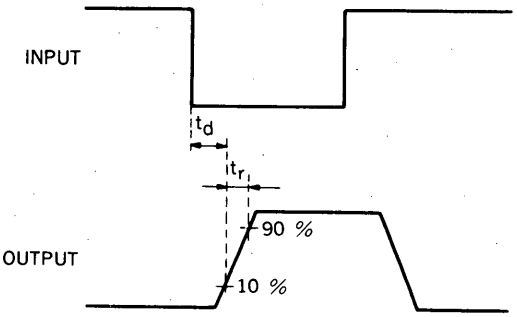
## SWITCHING TIME TEST CIRCUIT



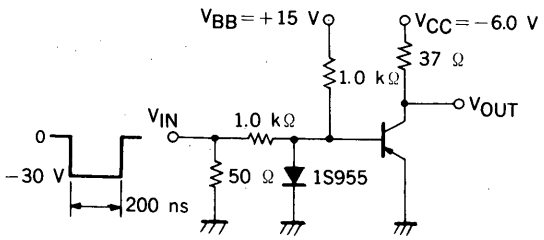

$Z_O$ = 50 Ω
PRF = 150 pps
$t_r \leqslant$ 2.0 ns

TO OSCILLOSCOPE
$t_r \leqslant$ 5.0 ns
$Z_{IN}$ = 10 MΩ

**$t_{on}$ SWITCHING**



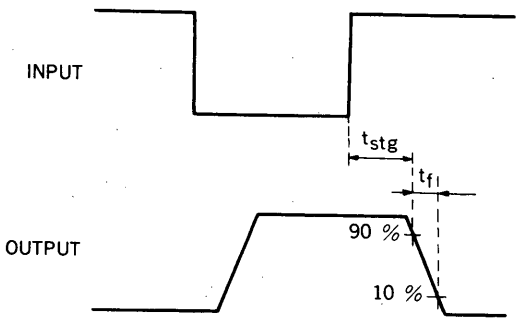

**VOLTAGE WAVEFORMS**




$Z_O$ = 50 Ω
PRF = 150 pps
$t_r \leqslant$ 2.0 ns

TO OSCILLOSCOPE
$t_r \leqslant$ 5.0 ns
$Z_{IN}$ = 10 MΩ

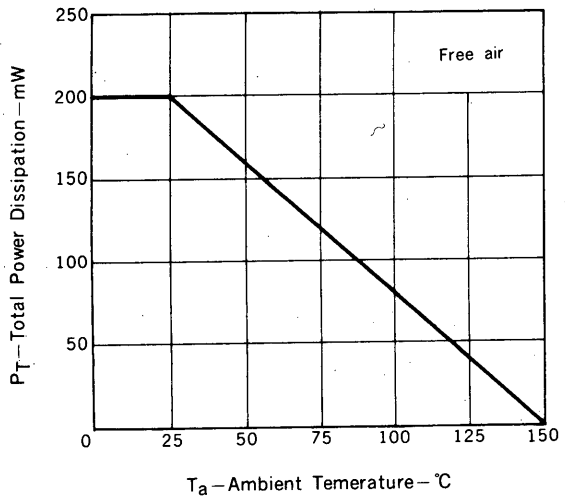
**$t_{off}$ SWITCHING**



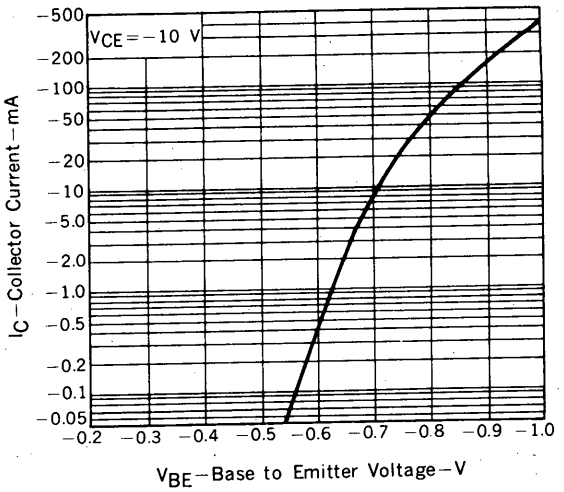

**VOLTAGE WAVEFORMS**

## TYPICAL CHARACTERISTICS ($T_a$ = 25 °C)

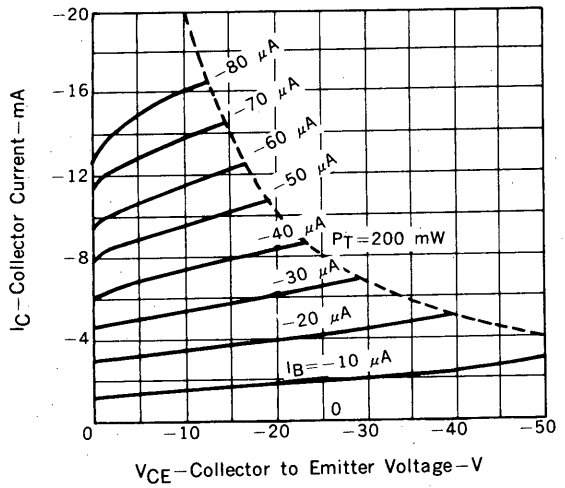
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



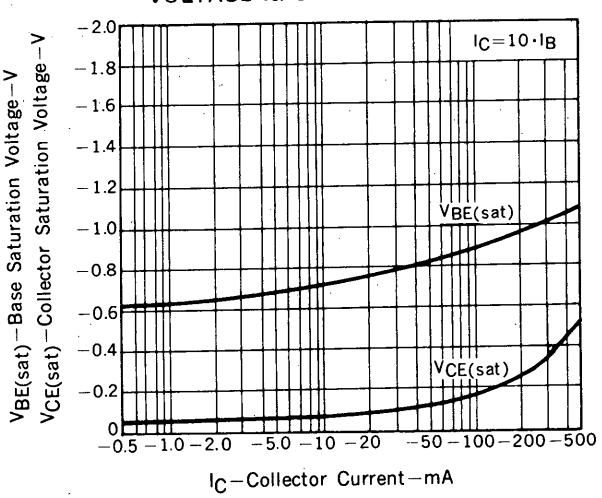

COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



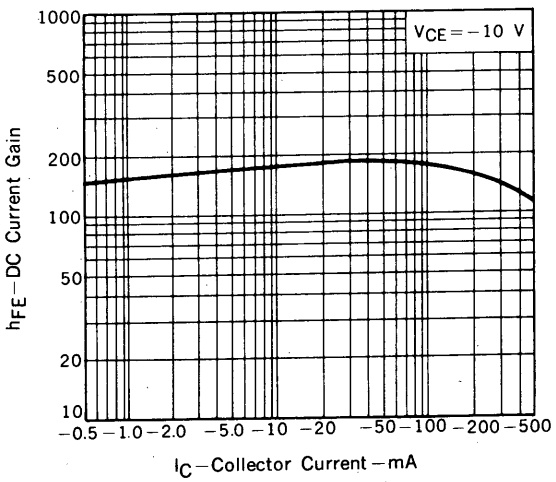

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



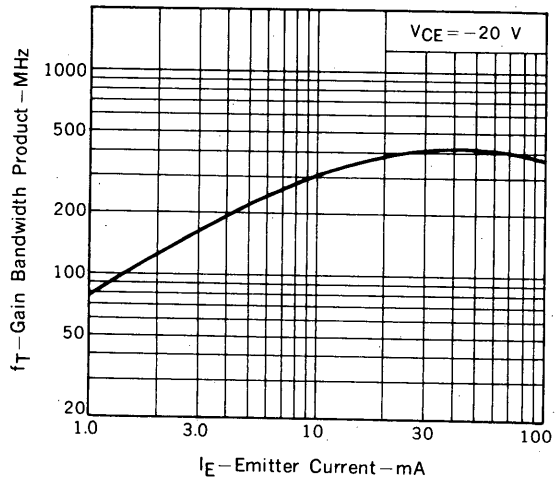

COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



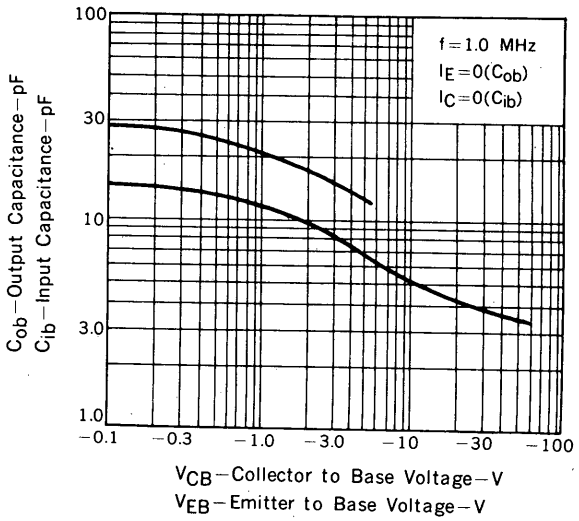

DC CURRENT GAIN vs. COLLECTOR CURRENT



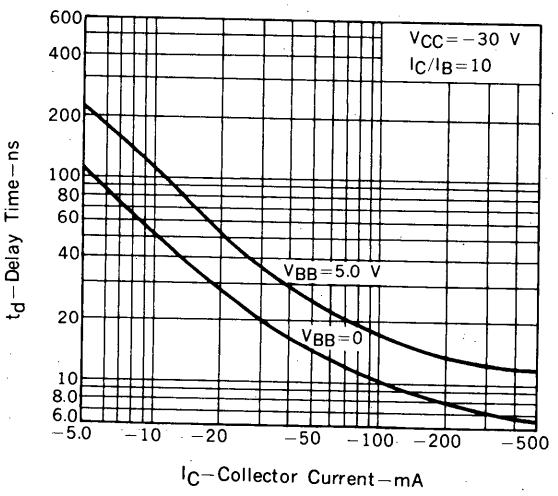
GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT



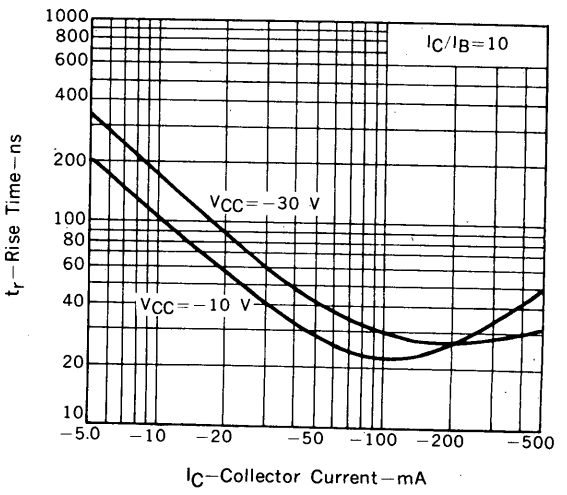

INPUT AND OUTPUT CAPACITANCE vs.
REVERSE VOLTAGE



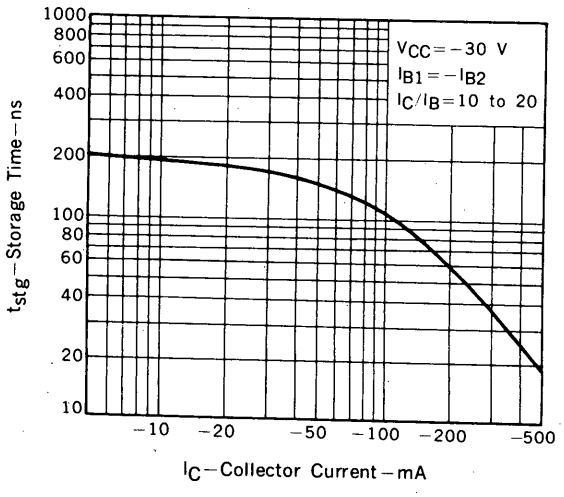

DELAY TIME vs.
COLLECTOR CURRENT



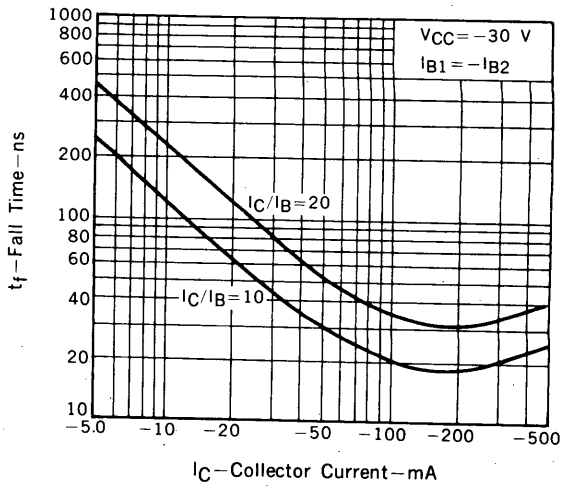

RISE TIME vs.
COLLECTOR CURRENT




STORAGE TIME vs.
COLLECTOR CURRENT




FALL TIME vs.
COLLECTOR CURRENT



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