Ordering number:EN3872

PNP/NPN Epitaxial Planar Silicon Transistors

# 2SA1824/2SC4728

## 50V/5A Switching Applications

## Applications

· Relay drivers, high-speed inverters, converters, and other general high-current switching applications.

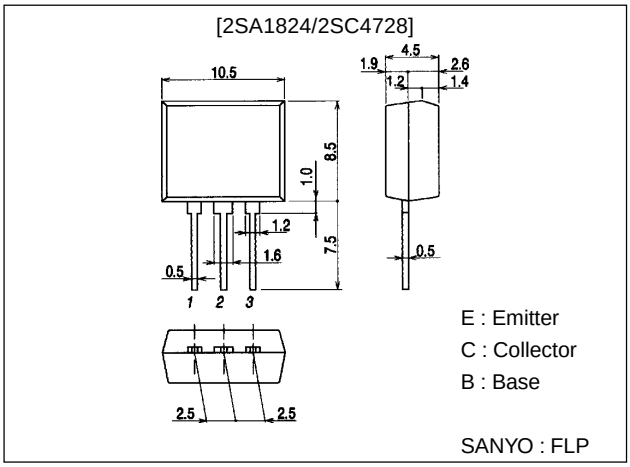
## Features

· Low collector-to-emitter saturation voltage.
· High Gain-Bandwidth Product.
· Excellent linearity of DC Current Gain.
· Fast switching speed.

## Package Dimensions

unit:mm

2084




( ) : 2SA1824

## Specifications

### Absolute Maximum Ratings at Ta = 25˚C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Collector-to-Base Voltage | $V_{CBO}$ | | (–)60 | V |
| Collector-to-Emitter Voltage | $V_{CEO}$ | | (–)50 | V |
| Emitter-to-Base Voltage | $V_{EBO}$ | | (–)6 | V |
| Collector Current | $I_C$ | | (–)5 | A |
| Collector Current (Pulse) | $I_{CP}$ | | (–)8 | A |
| Base Current | $I_B$ | | (–)1 | A |
| Collector Dissipation | $P_C$ | | 1.5 | W |
| Junction Temperature | Tj | | 150 | ˚C |
| Storage Temperature | Tstg | | –55 to +150 | ˚C |

### Electrical Characteristics at Ta = 25˚C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector Cutoff Current | $I_{CBO}$ | $V_{CB}$=(–)40V, $I_E$=0 | | | (–)1 | μA |
| Emitter Cutoff Current | $I_{EBO}$ | $V_{EB}$=(–)4V, $I_C$=0 | | | (–)1 | μA |
| DC Current Gain | $h_{FE}1$ | $V_{CE}$=(–)2V, $I_C$=(–)500mA | 100* | | 400* | |
| | $h_{FE}2$ | $V_{CE}$=(–)2V, $I_C$=(–)4A | 35 | | | |
| Gain-Bandwidth Product | $f_T$ | $V_{CE}$=(–)5V, $I_C$=(–)1A | | (130) | | MHz |
| | | | | 180 | | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$=(–)10V, f=1MHz | | (60)40 | | pF |

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges,or other parameters) listed in products specifications of any and all SANYO products described or contained herein.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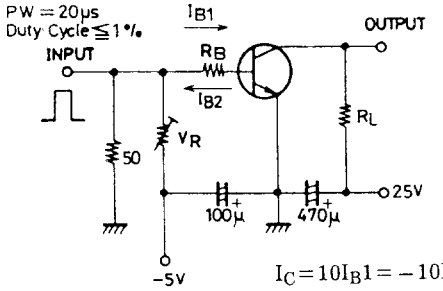
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$=(–)3A, $I_B$=(–)0.15A | | (–280) | (–550) | mV |
| | | | | 220 | 400 | mV |
| Base-to-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C$=(–)3mA, $I_B$=(–)0.15A | | (–)0.95 | (–)1.3 | V |
| Collector-to-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$=(–)10μA, $I_E$=0 | (–)60 | | | V |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$=(–)1mA, $R_{BE}$=∞ | (–)50 | | | V |
| Emitter-to-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$=(–)10μA, $I_C$=0 | (–)6 | | | V |
| Turn-ON Time | $t_{on}$ | See specified Test Circuit | | 50 | | ns |
| Storage Time | $t_{stg}$ | See specified Test CIrcuit | | (450) | | ns |
| | | | | 500 | | ns |
| Fall Time | $t_f$ | See specified Test Circuit | | 20 | | ns |

* : The 2SA1824/2SC4728 are classified by 500mA $h_{FE}$ as follows :

| | | |
|---|---|---|
| 100 R 200 | 140 S 280 | 200 T 400 |

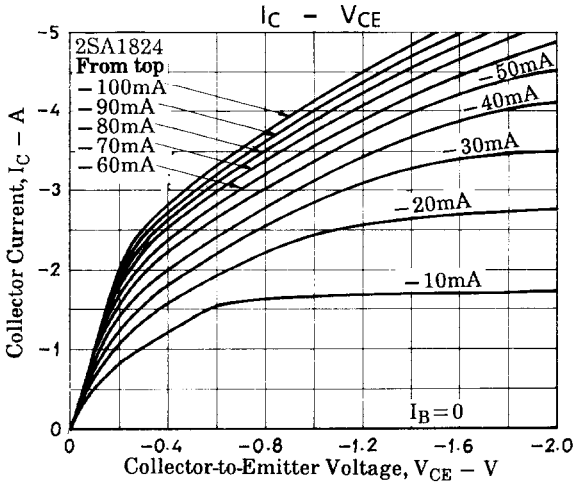
## Switching Time Test Circuit

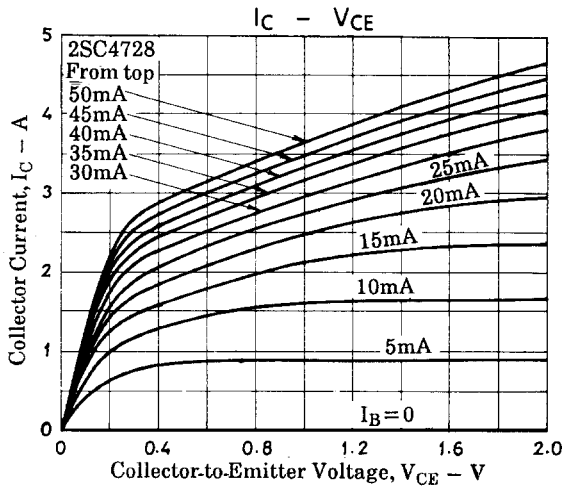


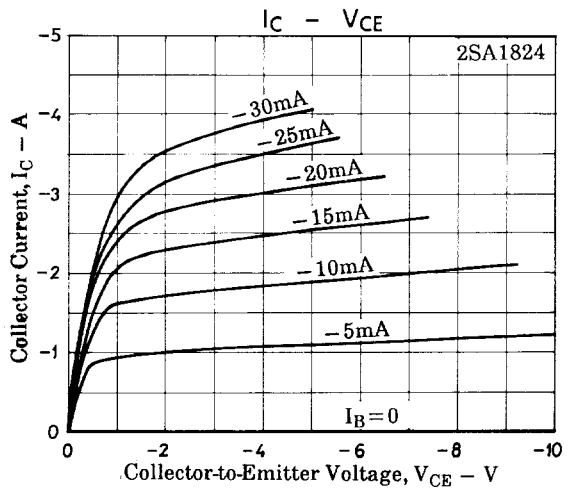

$I_C = 10I_B1 = -10I_B2 = 2A$

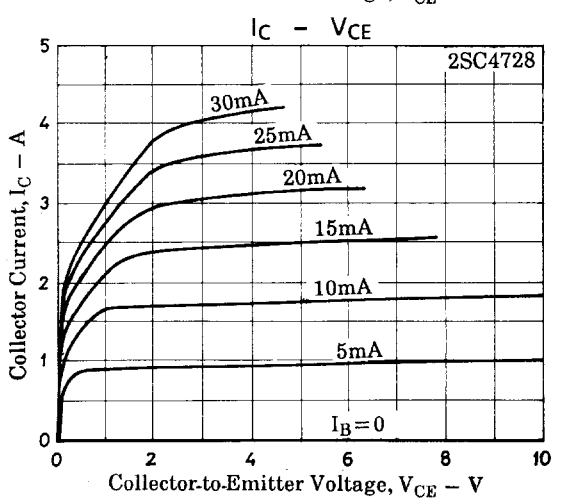
(For PNP, the polarity is reversed).

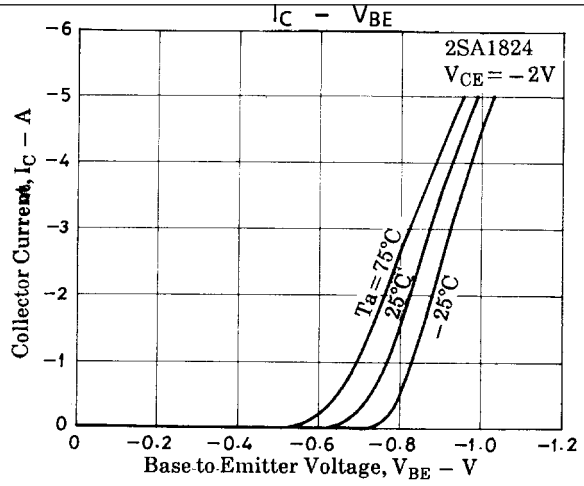
Unit (resistance : Ω, capacitance : F)

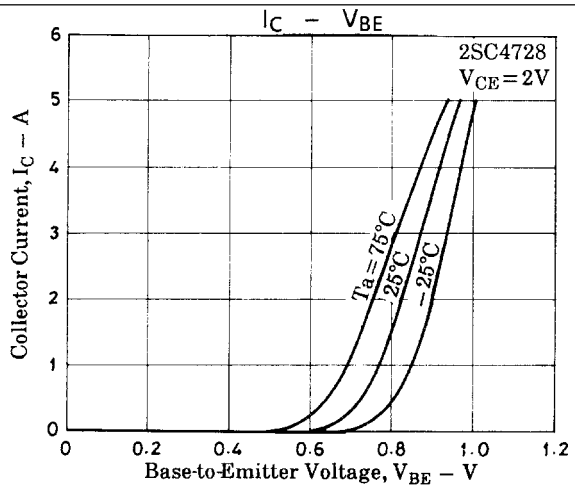


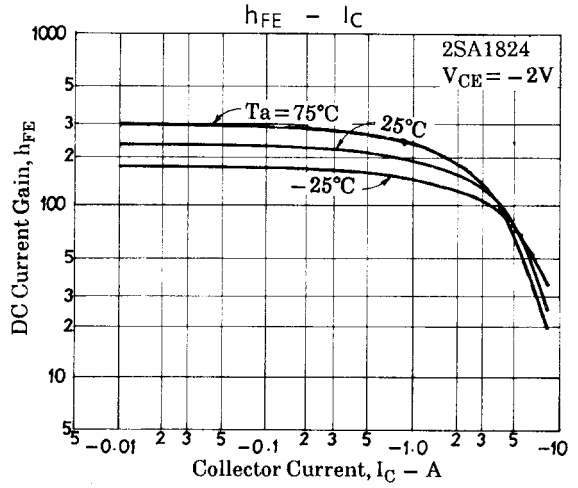



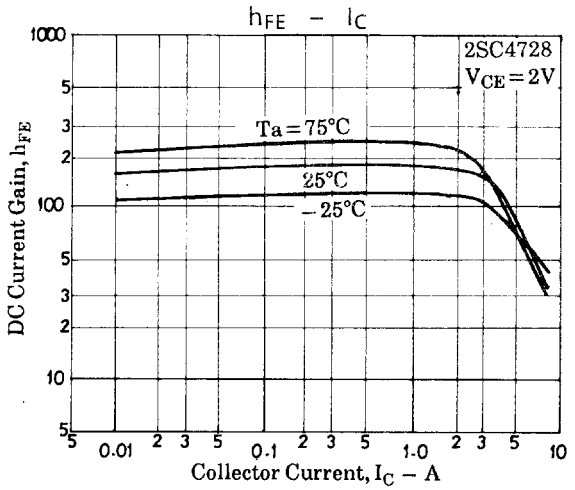



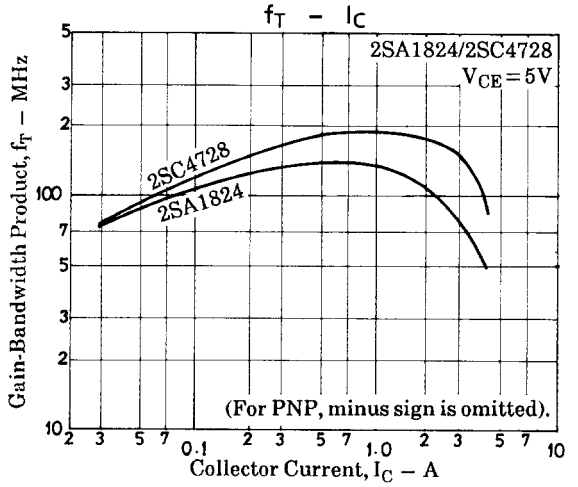



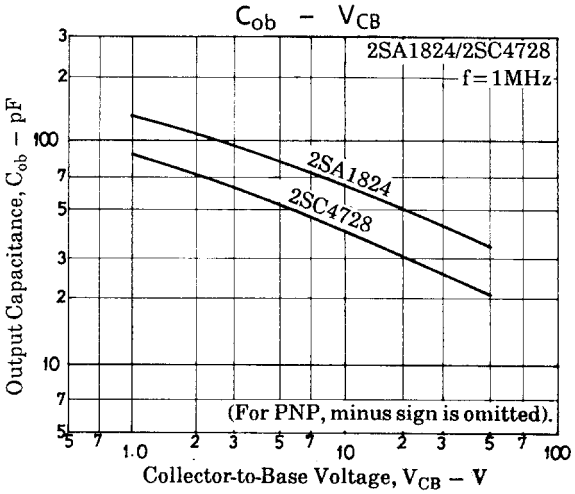

IC – VBE
2SA1824
VCE = –2V
Ta = 75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V

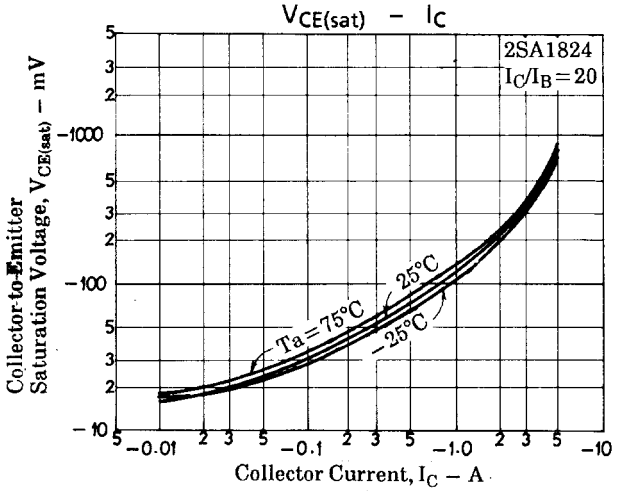

IC – VBE
2SC4728
VCE = 2V
Ta = 75°C
25°C
–25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V

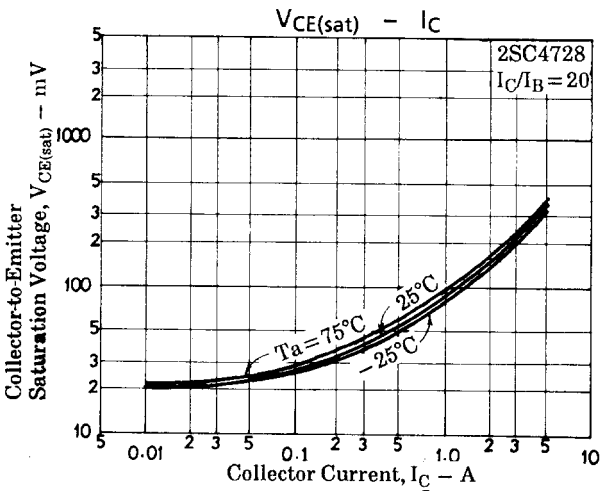

hFE – IC
2SA1824
VCE = –2V
Ta = 75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A


hFE – IC
2SC4728
VCE = 2V
Ta = 75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – A


fT – IC
2SA1824/2SC4728
VCE = 5V
2SC4728
2SA1824
(For PNP, minus sign is omitted).
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A


Cob – VCB
2SA1824/2SC4728
f = 1MHz
2SA1824
2SC4728
(For PNP, minus sign is omitted).
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V


VCE(sat) – IC
2SA1824
IC/IB = 20
Ta = 75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A


VCE(sat) – IC
2SC4728
IC/IB = 20
Ta = 75°C
25°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A