

# –1A / –60V Bipolar transistor

**2SA2092**

## ●Features

- 1) High speed switching. ( $t_f$  : Typ. : 30ns at  $I_c = -1A$ )
- 2) Low saturation voltage.  
(Typ. : –200mV at  $I_c = -500mA$ ,  $I_B = -50mA$ )
- 3) Strong discharge resistance for inductive load and capacitance load.
- 4) Low switching noise.

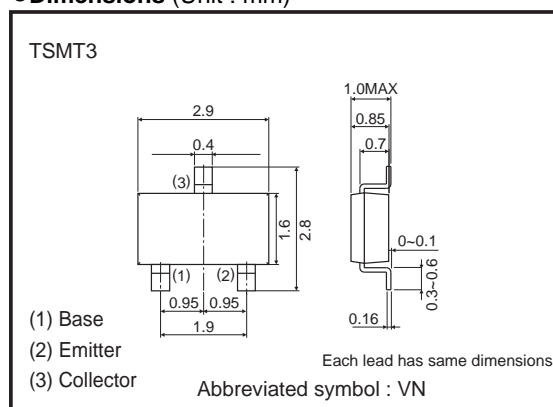
## ●Applications

High-speed switching, low frequency amplification

## ●Structure

PNP epitaxial planar silicon transistor

## ●Dimensions (Unit : mm)



## ●Packaging specifications

|          |                              |        |
|----------|------------------------------|--------|
| Part No. | Package                      | TSMT3  |
|          | Packaging type               | Taping |
|          | Code                         | TL     |
|          | Basic ordering unit (pieces) | 3000   |
| 2SA2092  |                              | ○      |

## ●Absolute maximum ratings (Ta=25°C)

| Parameter                    | Symbol           | Limits              | Unit |
|------------------------------|------------------|---------------------|------|
| Collector-base voltage       | $V_{CB0}$        | –60                 | V    |
| Collector-emitter voltage    | $V_{CE0}$        | –60                 | V    |
| Emitter-base voltage         | $V_{EB0}$        | –6                  | V    |
| Collector current            | DC               | $I_c$               | –1   |
|                              | PULSE            | $I_{CP} \text{ *1}$ | –2   |
| Power dissipation            | $P_c \text{ *2}$ | 500                 | mW   |
| Junction temperature         | $T_j$            | 150                 | °C   |
| Range of storage temperature | $T_{stg}$        | –55 to +150         | °C   |

 \*1  $P_w=10ms$ 

\*2 Each terminal mounted on a recommended land

## ●Electrical characteristics (Ta=25°C)

| Parameter                            | Symbol              | Min. | Typ. | Max. | Unit          | Conditions   |
|--------------------------------------|---------------------|------|------|------|---------------|--|
| Collector-emitter breakdown voltage  | $BV_{CEO}$          | -60  | -    | -    | V             | $I_C = -1\text{mA}$  |
| Collector-base breakdown voltage     | $BV_{CBO}$          | -60  | -    | -    | V             | $I_C = -100\mu\text{A}$  |
| Emitter-base breakdown voltage       | $BV_{EBO}$          | -6   | -    | -    | V             | $I_E = -100\mu\text{A}$  |
| Collector cut-off current            | $I_{CBO}$           | -    | -    | -1.0 | $\mu\text{A}$ | $V_{CB} = -40\text{V}$   |
| Emitter cut-off current              | $I_{EBO}$           | -    | -    | -1.0 | $\mu\text{A}$ | $V_{EB} = -4\text{V}$  |
| Collector-emitter saturation voltage | $V_{CE(sat)}$       | -    | -200 | -500 | mV            | $I_C = -500\text{mA}$ , $I_B = -50\text{mA}$                       |
| DC current gain                      | $h_{FE} \text{ *3}$ | 120  | -    | 270  | -             | $V_{CE} = -2\text{V}$ , $I_C = -100\text{mA}$                      |
| Transition frequency                 | $f_T \text{ *1}$    | -    | 300  | -    | MHz           | $V_{CE} = -10\text{V}$ , $I_E = 100\text{mA}$ , $f = 10\text{MHz}$ |
| Collector output capacitance         | $C_{ob}$            | -    | 15   | -    | pF            | $V_{CB} = -10\text{V}$ , $I_E = 0$ , $f = 1\text{MHz}$             |
| Turn-on time                         | $t_{on}$            | -    | 30   | -    | ns            | $I_C = -1\text{A}$ ,<br>$I_{B1} = -100\text{mA}$                   |
| Storage time                         | $t_{stg}$           | -    | 100  | -    | ns            | $I_{B2} = 100\text{mA}$  |
| Fall time                            | $t_f \text{ *2}$    | -    | 30   | -    | ns            | $V_{CC} = -25\text{V}$   |

\*1 Pulse measurement

\*2 See switching test circuit

\*3  $h_{FE}$  rank● $h_{FE}$  RANK

| Q       |
|---------|
| 120-270 |

## ●Electrical characteristic curves

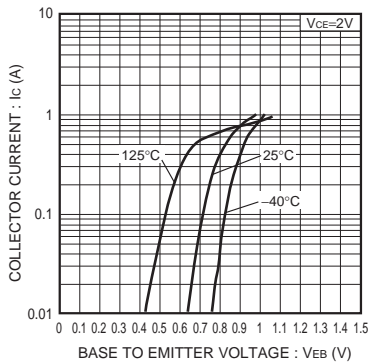


Fig.1 Grounded emitter propagation characteristics

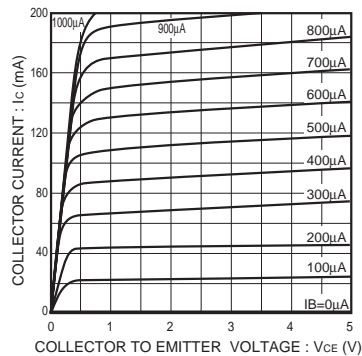


Fig.2 Typical output characteristics

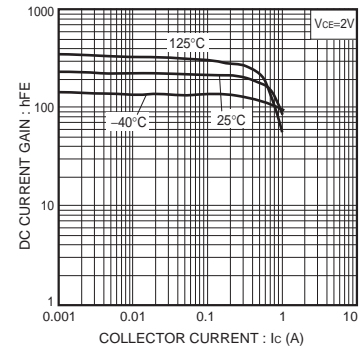


Fig.3 DC current gain vs. collector current (I)

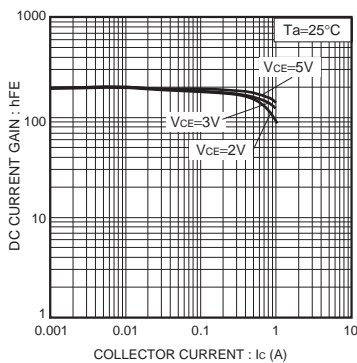


Fig.4 DC current gain vs. collector current (II)

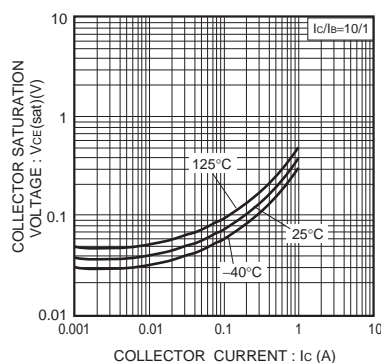


Fig.5 Collector-emitter saturation voltage vs. collector current (I)

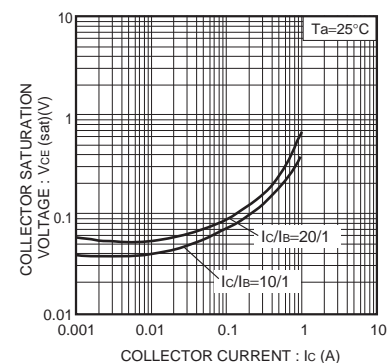


Fig.6 Collector-emitter saturation voltage vs. collector current (II)

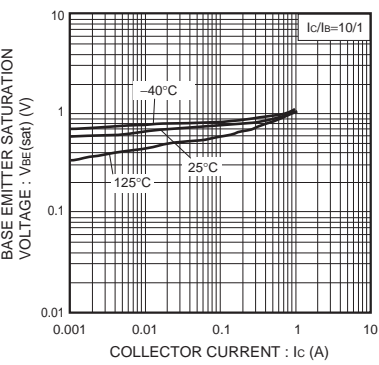


Fig.7 Base-emitter saturation voltage vs. collector current

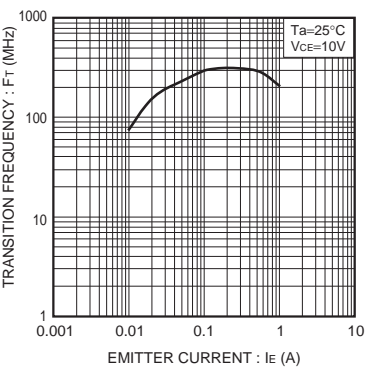


Fig.8 Transition frequency

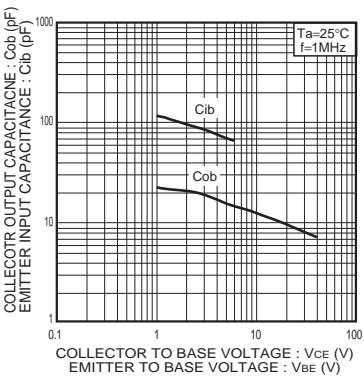


Fig.9 Collector output capacitance Emitter input capacitance

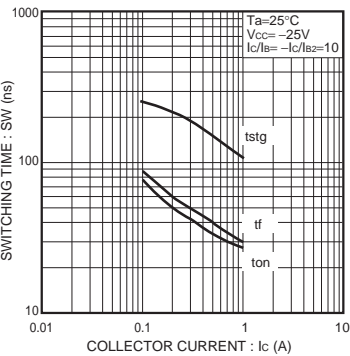
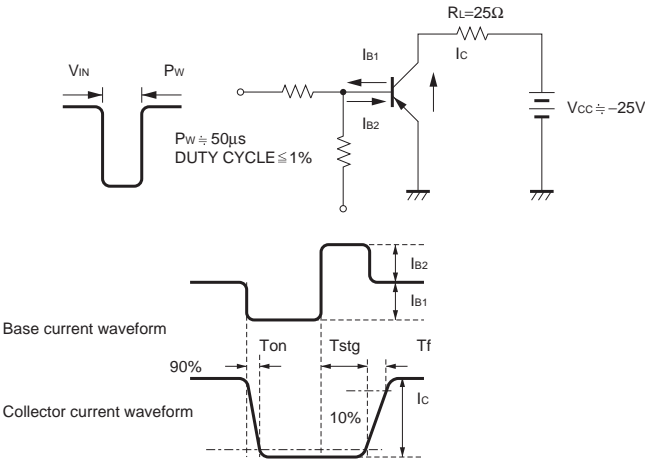


Fig.10 Switching Time

●Switching characteristics measurement circuits



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