

# Medium power transistor (−30V, −1.0A)

## 2SA2048

### ●Features

- 1) High speed switching. ( $T_f$  : Typ. : 20ns at  $I_c = -1.0A$ )
- 2) Low saturation voltage, typically  
(Typ. :  $-150mV$  at  $I_c = -500mA$ ,  $I_B = -50mA$ )
- 3) Strong discharge power for inductive load and capacitance load.
- 4) Complements the 2SC5730

### ●Applications

Small signal low frequency amplifier  
High speed switching

### ●Structure

PNP Silicon epitaxial planar transistor

### ●Packaging specifications

| Type    | Package                      | Taping |
|---------|------------------------------|--------|
|         | Code                         | TL     |
|         | Basic ordering unit (pieces) | 3000   |
| 2SA2048 |                              | ○      |

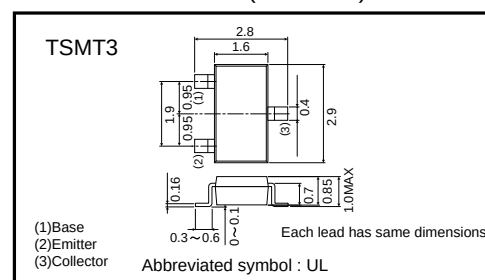
### ●Absolute maximum ratings ( $T_a = 25^\circ C$ )

| Parameter                    | Symbol    | Limits   | Unit  |
|------------------------------|-----------|----------|-------|
| Collector-base voltage       | $V_{CBO}$ | −30      | V     |
| Collector-emitter voltage    | $V_{CEO}$ | −30      | V     |
| Emitter-base voltage         | $V_{EBO}$ | −6       | V     |
| Collector current            | $I_c$     | −1.0     | A     |
|                              | $I_{CP}$  | −2.0     | A *1  |
| Power dissipation            | $P_C$     | 500      | mW *2 |
| Junction temperature         | $T_j$     | 150      | °C    |
| Range of storage temperature | $T_{stg}$ | −55~+150 | °C    |

\*1  $P_W = 10ms$

\*2 Each terminal mounted on a recommended land

### ●External dimensions (Units : mm)



## Transistor

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

| Parameter                            | Symbol        | Min. | Typ. | Max. | Unit    | Conditions                              |
|--------------------------------------|---------------|------|------|------|---------|-----------------------------------------|
| Collector-base breakdown voltage     | $BV_{CBO}$    | -30  | -    | -    | V       | $I_C = -100\mu A$                       |
| Collector-emitter breakdown voltage  | $BV_{CEO}$    | -30  | -    | -    | V       | $I_C = -1mA$                            |
| Emitter-base breakdown voltage       | $BV_{EBO}$    | -6   | -    | -    | V       | $I_E = -100\mu A$                       |
| Collector cut-off current            | $I_{CBO}$     | -    | -    | -1.0 | $\mu A$ | $V_{CB} = -20V$                         |
| Emitter cut-off current              | $I_{EBO}$     | -    | -    | -1.0 | $\mu A$ | $V_{EB} = -4V$                          |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | -    | -150 | -300 | mV      | $I_C = -500mA, I_B = -50mA$             |
| DC current gain                      | $h_{FE}$      | 120  | -    | 390  | -       | $V_{CE} = -2V, I_C = -10mA$             |
| Transition frequency                 | $f_r$         | -    | 350  | -    | MHz     | $V_{CE} = -10V, I_E = 100mA, f = 10MHz$ |
| Collector output capacitance         | $C_{ob}$      | -    | 10   | -    | pF      | $V_{CB} = -10V, I_E = 0A, f = 1MHz$     |
| Turn-on time                         | $T_{on}$      | -    | 30   | -    | ns      | $I_C = -1.0A$<br>$I_{B1} = -0.1A$       |
| Storage time                         | $T_{stg}$     | -    | 100  | -    | ns      | $I_{B2} = 0.1A$                         |
| Fall time                            | $T_f$         | -    | 20   | -    | ns      | $V_{CC} \approx -25V$                   |

● $h_{FE}$  RANK

| Q       | R       |
|---------|---------|
| 120-270 | 180-390 |

## ●Electrical characteristic curves

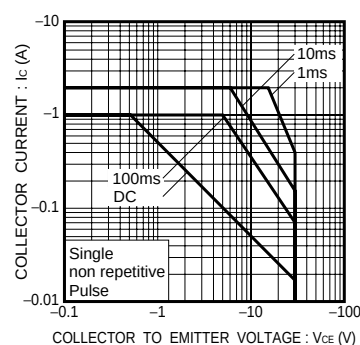


Fig.1 Safe Operating Area

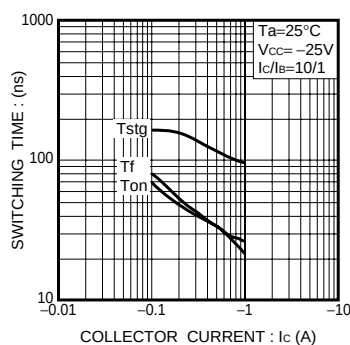


Fig.2 Switching Time

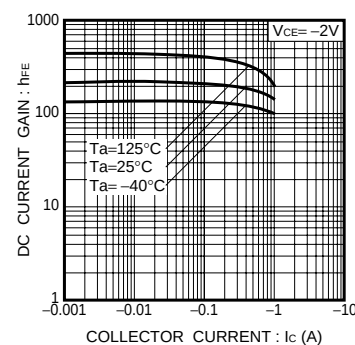


Fig.3 DC Current Gain vs. Collector Current (I)

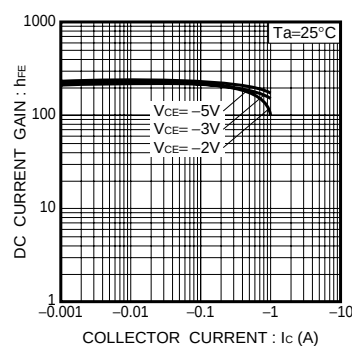


Fig.4 DC Current Gain vs. Collector Current (II)

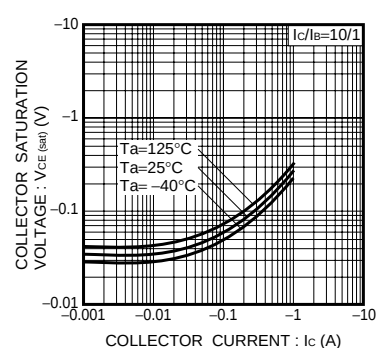


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

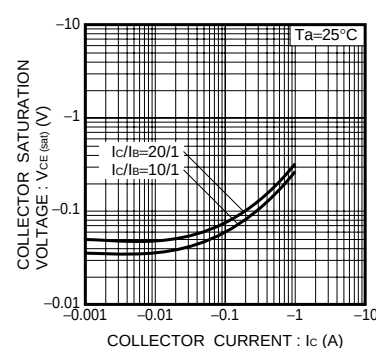


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

## Transistor

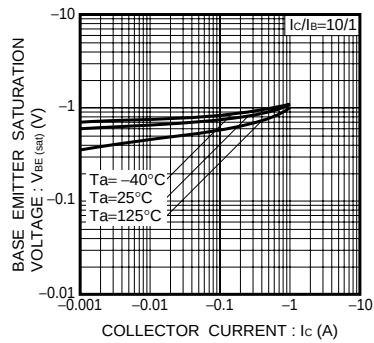


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

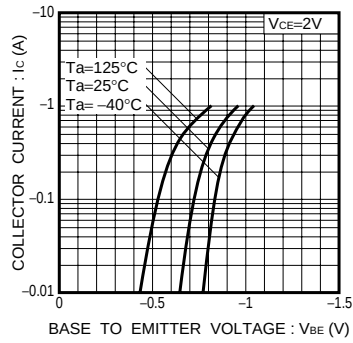


Fig.8 Grounded Emitter Propagation Characteristics

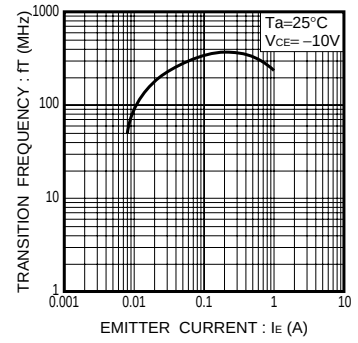


Fig.9 Transition Frequency

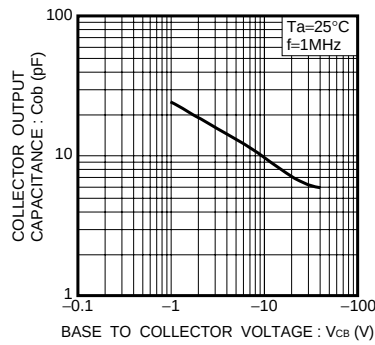
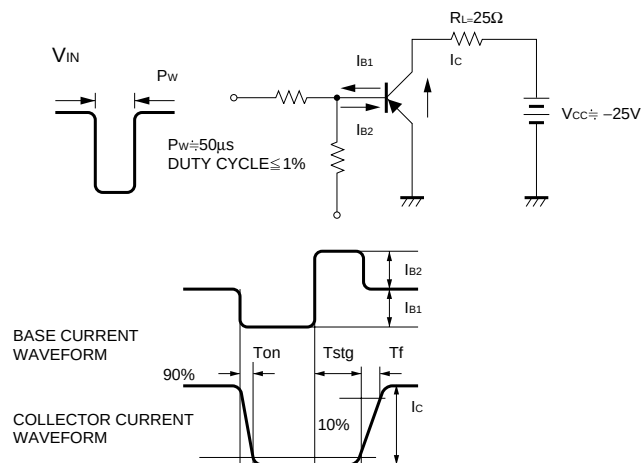


Fig.10 Collector Output Capacitance

● Switching characteristics measurement circuits



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