

|   |           |                |
|---|-----------|----------------|
| <b>SANYO</b>                                  | No. 1012A | <b>2SC3089</b> |
| NPN Triple Diffused Planar Silicon Transistor |           |                |
| FOR SWITCHING REGULATORS                      |           |                |

**Features**

- . High breakdown voltage ( $V_{CBO} \geq 800V$ )
- . Fast switching speed.
- . Wide ASO.

**Absolute Maximum Ratings at  $T_a = 25^\circ C$**

|                              |           |                        | unit       |
|------------------------------|-----------|------------------------|------------|
| Collector-to-Base Voltage    | $V_{CBO}$ | 800                    | V          |
| Collector-to-Emitter Voltage | $V_{CEO}$ | 500                    | V          |
| Emitter-to-Base Voltage      | $V_{EBO}$ | 7                      | V          |
| Collector Current            | $I_C$     | 7                      | A          |
| Peak Collector Current       | $i_{cp}$  | 14                     | A          |
|                              |           | $PW \leq 300\mu s,$    |            |
|                              |           | Duty Cycle $\leq 10\%$ |            |
| Base Current                 | $I_B$     | 3                      | A          |
| Collector Dissipation        | $P_C$     | 2.5                    | W          |
|                              |           | $T_c = 25^\circ C$     |            |
|                              |           | 80                     | W          |
| Junction Temperature         | $T_j$     | 150                    | $^\circ C$ |
| Storage Temperature          | $T_{stg}$ | -55 to +150            | $^\circ C$ |

**Electrical Characteristics at  $T_a = 25^\circ C$**

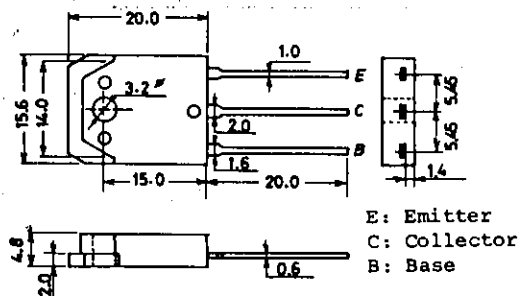
|                          |                |  |     | min | typ | max | unit    |
|--------------------------|----------------|--|-----|-----|-----|-----|---------|
| Collector Cutoff Current | $I_{CBO}$      | $V_{CB} = 500V, I_E = 0$                   |     |     |     | 10  | $\mu A$ |
| Emitter Cutoff Current   | $I_{EBO}$      | $V_{EB} = 5V, I_C = 0$                     |     |     |     | 10  | $\mu A$ |
| DC Current Gain          | $h_{FE}(1)$    | $V_{CE} = 5V, I_C = 0.6A$                  | 15* |     | 50* |     |         |
|                          | $h_{FE}(2)$    | $V_{CE} = 5V, I_C = 3A$                    | 8   |     |     |     |         |
| C-E Saturation Voltage   | $V_{CE(sat)}$  | $I_C = 3A, I_B = 0.6A$                     |     |     | 1.0 |     | V       |
| B-E Saturation Voltage   | $V_{BE(sat)}$  | $I_C = 3A, I_B = 0.6A$                     |     |     | 1.5 |     | V       |
| Gain-Bandwidth Product   | $f_T$          | $V_{CE} = 10V, I_C = 0.6A$                 |     | 18  |     |     | MHz     |
| Output Capacitance       | $c_{ob}$       | $V_{CB} = 10V, f = 1MHz$                   |     | 80  |     |     | pF      |
| C-B Breakdown Voltage    | $V_{(BR)CBO}$  | $I_C = 1mA, I_E = 0$                       | 800 |     |     |     | V       |
| C-E Breakdown Voltage    | $V_{(BR)CEO}$  | $I_C = 5mA, R_{BE} = \infty$               | 500 |     |     |     | V       |
| E-B Breakdown Voltage    | $V_{(BR)EBO}$  | $I_E = 1mA, I_C = 0$                       | 7   |     |     |     | V       |
| C-E Sustain Voltage      | $V_{CEO(sus)}$ | $I_C = 7A, I_B = 0.14A, L = 50\mu H$       | 500 |     |     |     | V       |
| C-E Sustain Voltage      | $V_{CEX(sus)}$ | $I_C = 7A, I_{B1} = 0.14A, L = 200\mu H,$  | 500 |     |     |     | V       |
|                          | (1)            | $I_{B2} = -0.14A, \text{clamped}$          |     |     |     |     |         |
| C-E Sustain Voltage      | $V_{CEX(sus)}$ | $I_C = 1.2A, I_{B1} = 0.24A, L = 200\mu H$ | 550 |     |     |     | V       |
|                          | (2)            | $I_{B2} = -0.24A, \text{clamped}$          |     |     |     |     |         |

Continued on next page.

\*: The  $h_{FE}(1)$  of the 2SC3089 is classified as follows. When specifying the  $h_{FE}(1)$  rank, specify two ranks or more in principle.

|    |   |    |    |   |    |    |   |    |
|----|---|----|----|---|----|----|---|----|
| 15 | L | 30 | 20 | M | 40 | 30 | N | 50 |
|----|---|----|----|---|----|----|---|----|

**Package Dimensions 2022**  
(unit: mm)

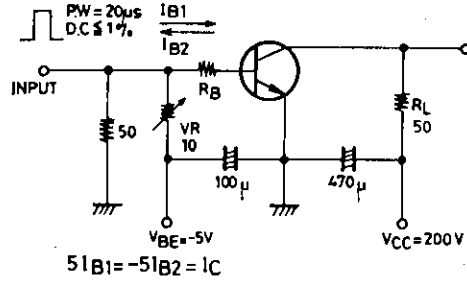


E: Emitter  
C: Collector  
B: Base

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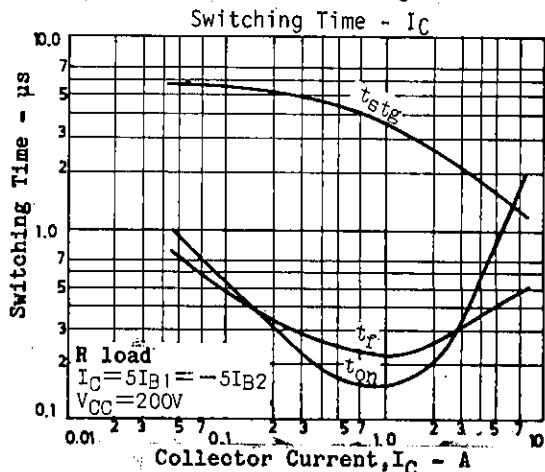
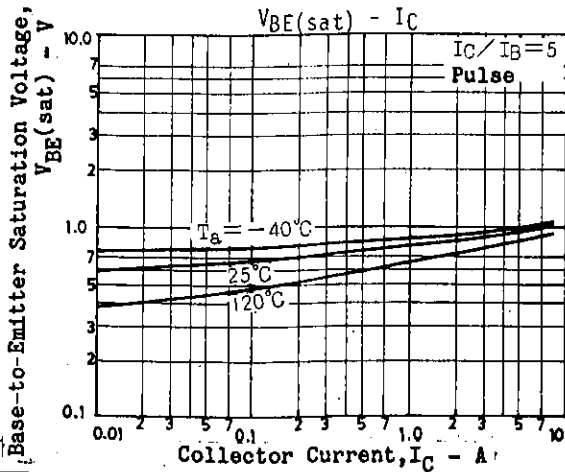
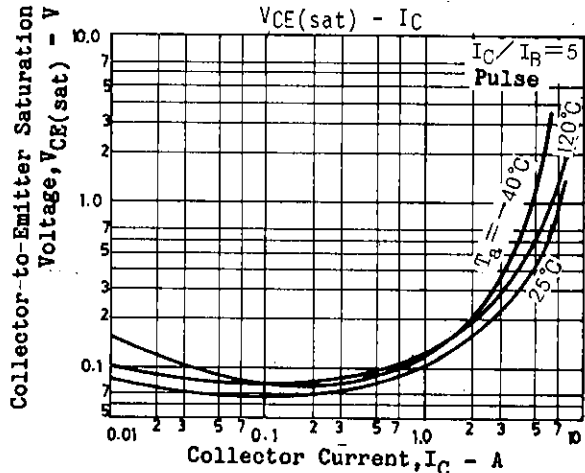
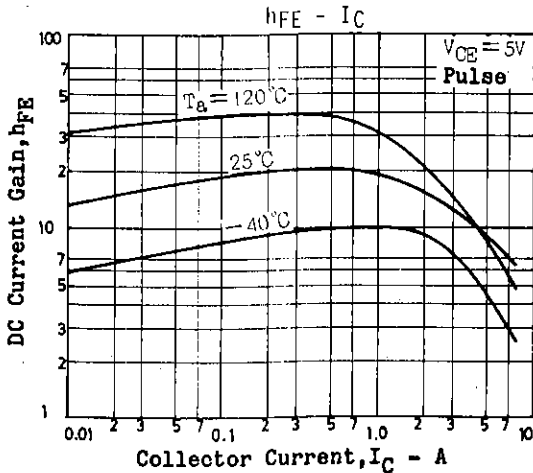
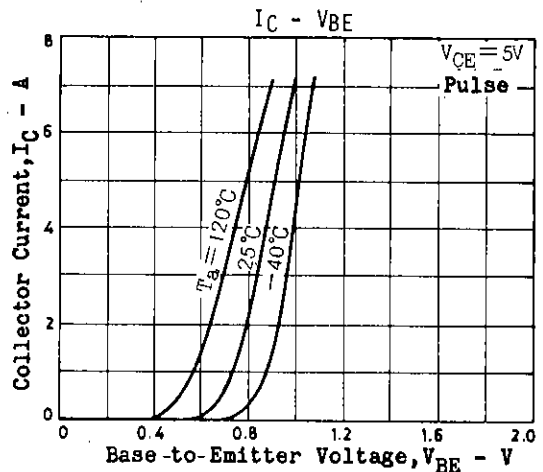
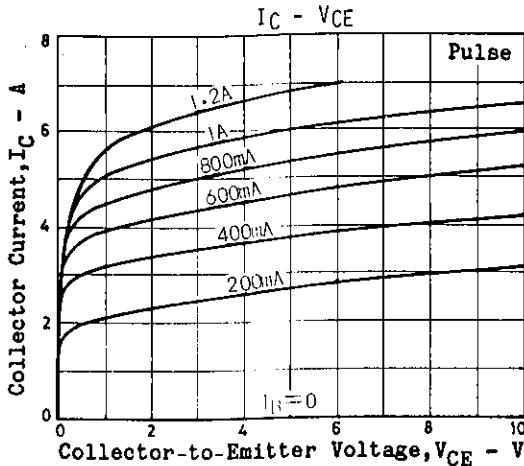
|              |           |                                      | min | typ | max | unit    |
|--------------|-----------|--------------------------------------|-----|-----|-----|---------|
| Turn-ON Time | $t_{on}$  | $I_C=4A, I_{B1}=0.8A, I_{B2}=-0.8A,$ |     |     | 1.0 | $\mu s$ |
|              |           | $R_L=50ohms, V_{CC}=200V$            |     |     |     |         |
| Storage Time | $t_{stg}$ | " "                                  |     |     | 3.0 | $\mu s$ |
| Fall Time    | $t_f$     | " "                                  |     |     | 1.0 | $\mu s$ |

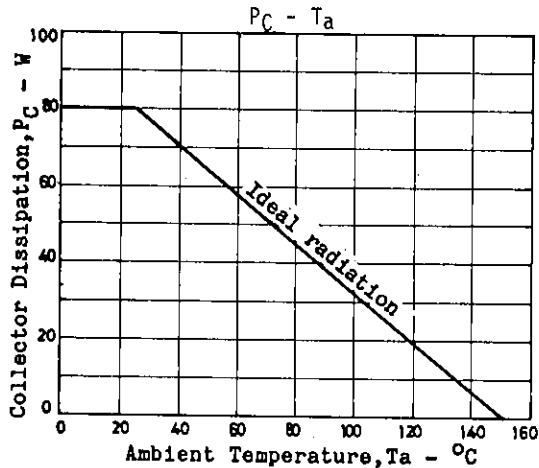
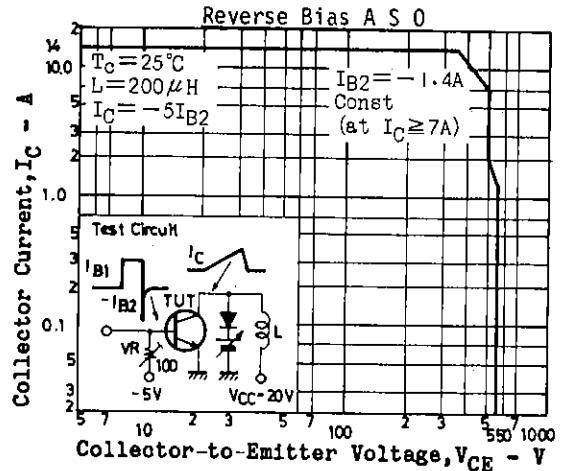
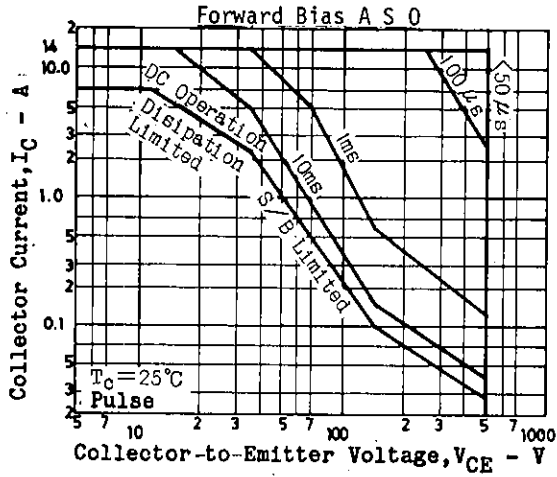
Switching Time Test Circuit



$5I_{B1} = -5I_{B2} = I_C$

Unit (Resistance :  $\Omega$ , Capacitance : F)





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