

|   |         |   |
|---|---------|---|
| <b>SANYO</b>                            | No.2481 | 2 S C 4.1 6 0   |
|   |         | NPN Triple Diffused Planar Type<br>Silicon Transistor |
| <b>SWITCHING REGULATOR APPLICATIONS</b> |         |   |

**Features**

- . High breakdown voltage, high reliability
- . Fast switching speed ( $t_f=0.1\mu s$  typ)
- . Wide ASO
- . Adoption of MBIT process
- . Micaless package facilitating mounting

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

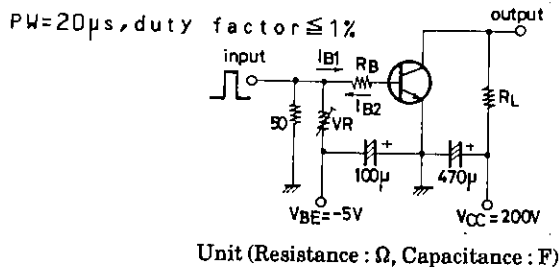
|                              |           |             |            |
|------------------------------|-----------|-------------|------------|
|                              |           |             | unit       |
| Collector-to-Base Voltage    | $V_{CB0}$ | 500         | V          |
| Collector-to-Emitter Voltage | $V_{CEO}$ | 400         | V          |
| Emitter-to-Base Voltage      | $V_{EBO}$ | 7           | V          |
| Collector Current            | $I_C$     | 4           | A          |
| Peak Collector Current       | $i_{cp}$  | 8           | A          |
| Base Current                 | $I_B$     | 1.5         | A          |
| Collector Dissipation        | $P_C$     | 2           | W          |
|                              |           | 25          | W          |
|                              |           | 150         | $^\circ C$ |
| Junction Temperature         | $T_j$     |             |            |
| Storage Temperature          | $T_{stg}$ | -55 to +150 | $^\circ C$ |

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

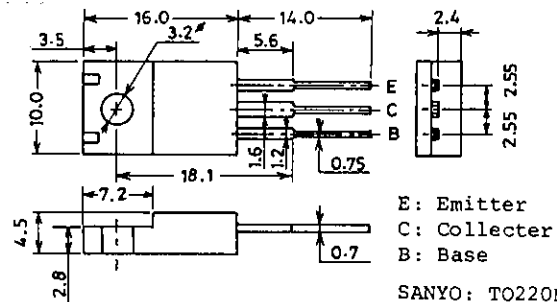
|                          |               |                          |     |     |            |
|--------------------------|---------------|--------------------------|-----|-----|------------|
|                          |               |                          |     |     |            |
| Collector Cutoff Current | $I_{CBO}$     | $V_{CB}=400V, I_E=0$     | min | typ | max unit   |
| Emitter Cutoff Current   | $I_{EBO}$     | $V_{EB}=5V, I_C=0$       |     |     | 10 $\mu A$ |
| DC Current Gain          | $h_{FE1}$     | $V_{CE}=5V, I_C=0.4A$    | 15* |     | 50*        |
|                          | $h_{FE2}$     | $V_{CE}=5V, I_C=2A$      | 10  |     |            |
|                          | $h_{FE3}$     | $V_{CE}=5V, I_C=10mA$    | 10  |     |            |
| Gain-Bandwidth Product   | $f_T$         | $V_{CE}=10V, I_C=0.4A$   |     | 20  | MHz        |
| Output Capacitance       | $c_{ob}$      | $V_{CB}=10V, f=1MHz$     |     | 50  | pF         |
| C-E Saturation Voltage   | $V_{CE(sat)}$ | $I_C=2A, I_B=0.4A$       |     |     | 0.8 V      |
| B-E Saturation Voltage   | $V_{BE(sat)}$ | $I_C=2A, I_B=0.4A$       |     |     | 1.5 V      |
| C-B Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C=1mA, I_E=0$         | 500 |     | V          |
| C-E Breakdown Voltage    | $V_{(BR)CEO}$ | $I_C=5mA, R_{BE}=\infty$ | 400 |     | V          |
| E-B Breakdown Voltage    | $V_{(BR)EBO}$ | $I_E=1mA, I_C=0$         | 7   |     | V          |

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**Switching Time Test Circuit**



**Package Dimensions 2041 (unit: mm)**



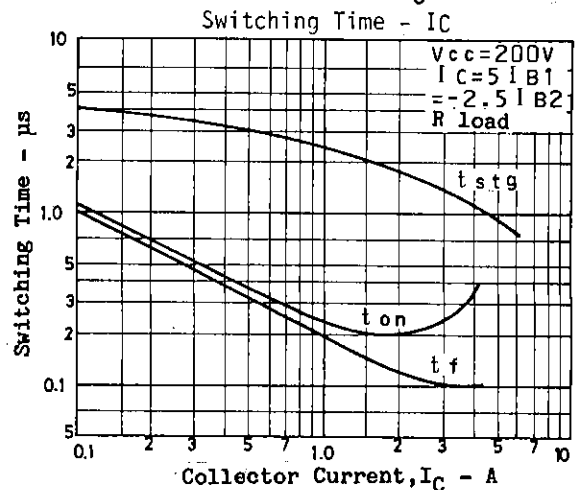
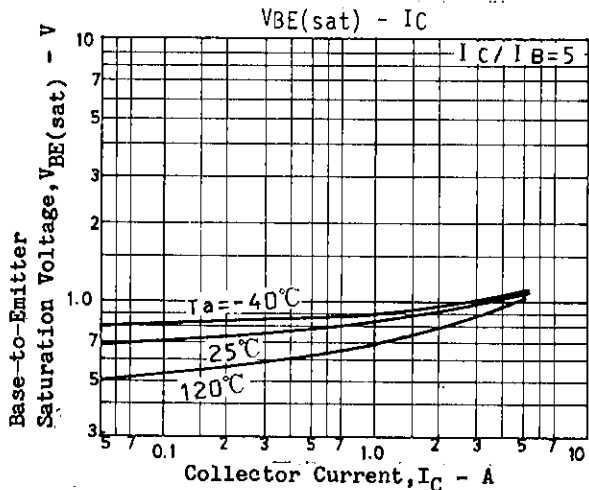
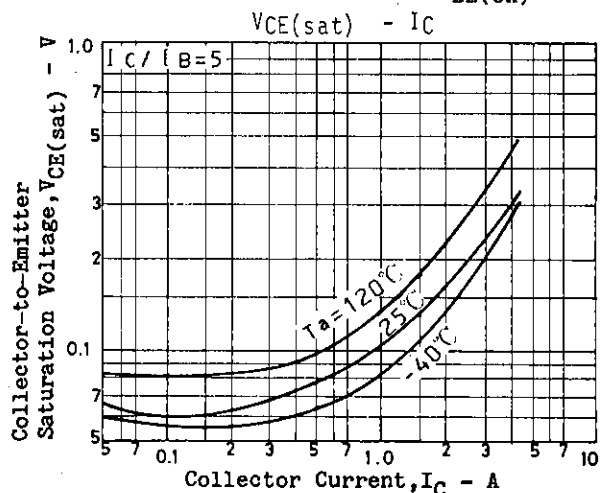
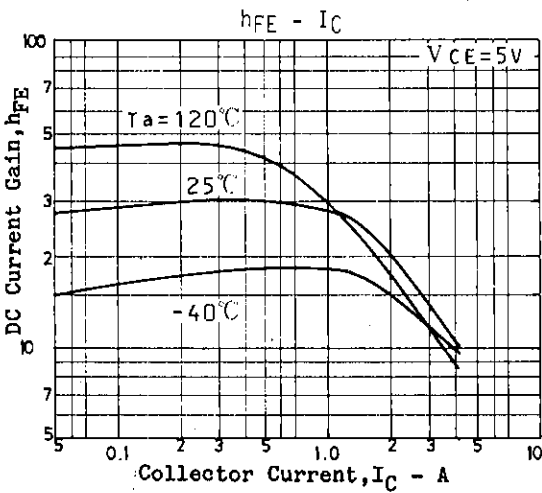
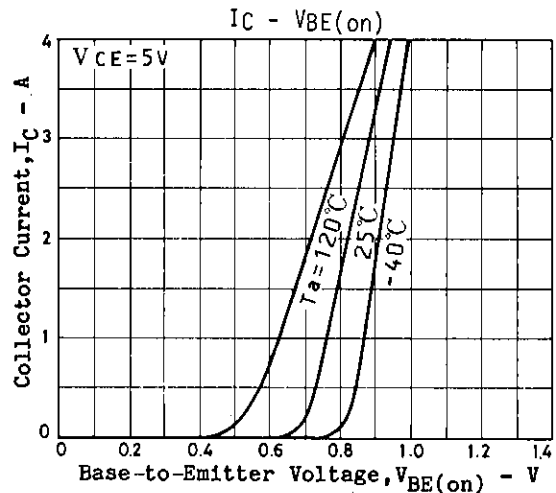
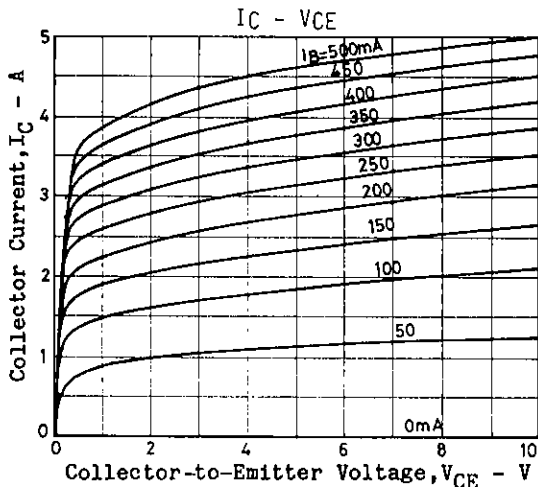
2SC4160

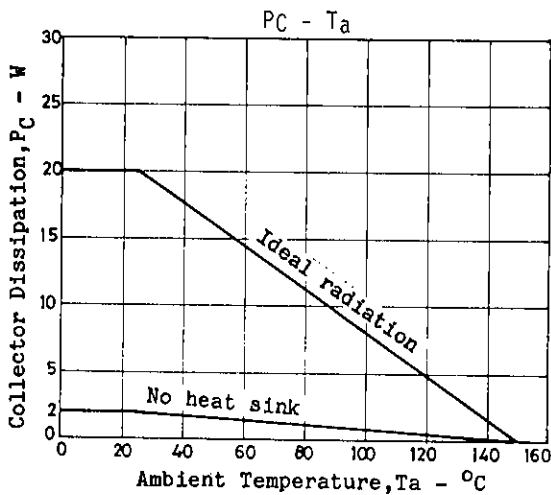
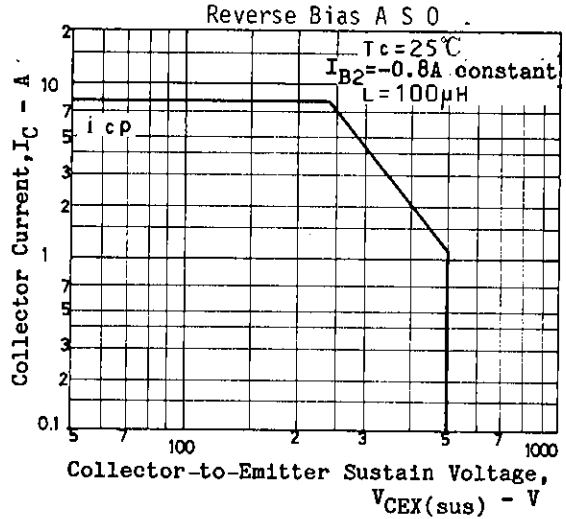
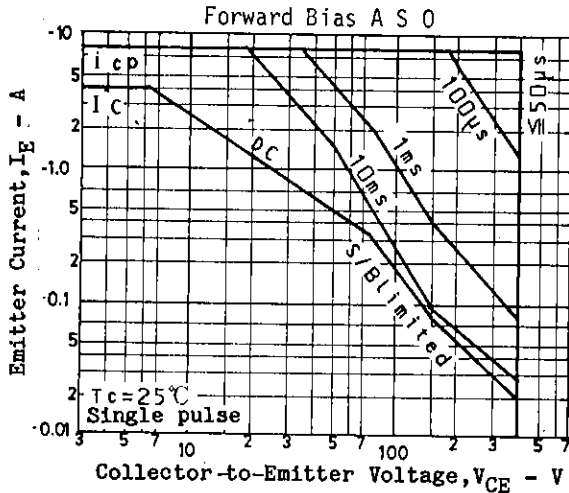
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|                     |                |   | min | typ | max | unit    |
|---------------------|----------------|---|-----|-----|-----|---------|
| C-E Sustain Voltage | $V_{CEX(sus)}$ | $I_C=2A, I_{B1}=0.2A,$<br>$I_{B2}=-0.8A, L=1mH, \text{clamped}$       | 400 |     |     | V       |
| Turn-on Time        | $t_{on}$       | $I_C=3A, I_{B1}=0.6A, I_{B2}=-1.2A,$<br>$R_L=66.6\Omega, V_{CC}=200V$ |     |     | 0.5 | $\mu s$ |
| Storage Time        | $t_{stg}$      | " "   |     |     | 2.5 | $\mu s$ |
| Fall Time           | $t_f$          | " "   |     |     | 0.3 | $\mu s$ |

\*: The  $h_{FE1}$  of the 2SC4160 is classified as follows. When specifying the  $h_{FE1}$  rank, specify two ranks or more in principle.

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





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