

**2SC4005****Driver Applications****Applications**

- Suitable for use in switching of L load (motor drivers, printer hammer drivers, relay drivers).

**Features**

- High DC current gain.
- Large current capacity and wide ASO.
- On-chip Zener diode of  $50\pm 8\text{V}$  between collector and base.
- Uniformity in collector-to-base breakdown voltage due to accurate impurity diffusion process.
- Large inductive load handling capability.
- Micaless package facilitating mounting.

**Specifications****Absolute Maximum Ratings at  $T_a = 25^\circ\text{C}$** 

| Parameter                    | Symbol           | Conditions             | Ratings     | Unit             |
|------------------------------|------------------|------------------------|-------------|------------------|
| Collector-to-Base Voltage    | $V_{\text{CBO}}$ |                        | 42*         | V                |
| Collector-to-Emitter Voltage | $V_{\text{CEO}}$ |                        | 42*         | V                |
| Emitter-to-Base Voltage      | $V_{\text{EBO}}$ |                        | 6           | V                |
| Collector Current            | $I_{\text{C}}$   |                        | 2           | A                |
| Collector Current (Pulse)    | $I_{\text{CP}}$  |                        | 4           | A                |
| Base Current                 | $I_{\text{B}}$   |                        | 0.4         | A                |
| Collector Dissipation        | $P_{\text{C}}$   |                        | 2.0         | W                |
|                              |                  | $T_c=25^\circ\text{C}$ | 15          | W                |
| Junction Temperature         | $T_{\text{J}}$   |                        | 150         | $^\circ\text{C}$ |
| Storage Temperature          | $T_{\text{stg}}$ |                        | -55 to +150 | $^\circ\text{C}$ |

\* : On-chip Zener diode of  $50\pm 8\text{V}$ **Electrical Characteristics at  $T_a = 25^\circ\text{C}$** 

| Parameter                               | Symbol               | Conditions                                        | Ratings |      |     | Unit          |
|-----------------------------------------|----------------------|---------------------------------------------------|---------|------|-----|---------------|
|                                         |                      |                                                   | min     | typ  | max |               |
| Collector Cutoff Current                | $I_{\text{CBO}}$     | $V_{\text{CB}}=30\text{V}, I_{\text{E}}=0$        |         |      | 10  | $\mu\text{A}$ |
| Emitter Cutoff Current                  | $I_{\text{EBO}}$     | $V_{\text{EB}}=5\text{V}, I_{\text{C}}=0$         |         |      | 2   | mA            |
| DC Current Gain                         | $h_{\text{FE}}$      | $V_{\text{CE}}=5\text{V}, I_{\text{C}}=1\text{A}$ | 2000    | 4000 |     |               |
| Gain-Bandwidth Product                  | $f_{\text{T}}$       | $V_{\text{CE}}=5\text{V}, I_{\text{C}}=1\text{A}$ |         | 180  |     | MHz           |
| Collector-to-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_{\text{C}}=1\text{A}, I_{\text{B}}=4\text{mA}$ |         | 1.0  | 1.5 | V             |
| Base-to-Emitter Saturation Voltage      | $V_{\text{BE(sat)}}$ | $I_{\text{C}}=1\text{A}, I_{\text{B}}=4\text{mA}$ |         |      | 2.0 | V             |

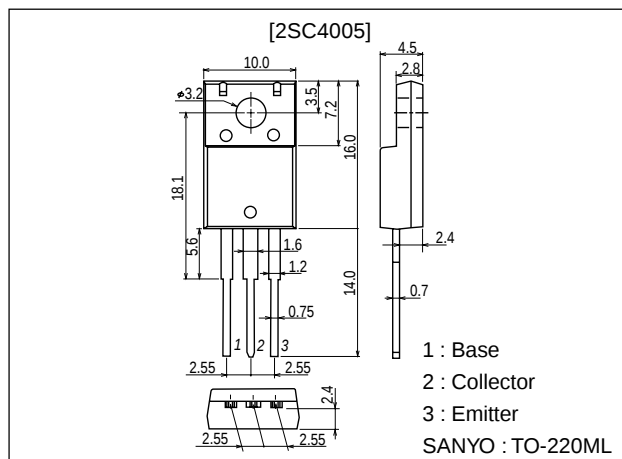
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**Package Dimensions**

unit:mm

2041A

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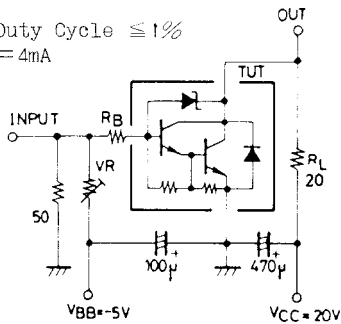
D1598HA (KT)/4277TA, TS No.2271-1/4

2SC4005

| Parameter                              | Symbol        | Conditions                                                              | Ratings |     |     | Unit    |
|----------------------------------------|---------------|-------------------------------------------------------------------------|---------|-----|-----|---------|
|                                        |               |                                                                         | min     | typ | max |         |
| Collector-to-Base Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C=0.1mA, I_E=0$                                                      | 42      | 50  | 58  | V       |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=1mA, R_{BE}=\infty$                                                | 42      | 50  | 58  | V       |
| Inductive Load Handling Capability     | Es/b          | $L=100mH, R_{BE}=100\Omega$                                             | 25      |     |     | mJ      |
| Turn-ON Time                           | $t_{on}$      | See specified Test Circuit.<br>$V_{CC}=20V, I_C=1A, I_{B1}=-I_{B2}=4mA$ |         | 0.2 |     | $\mu s$ |
| Storage Time                           | $t_{stg}$     | See specified Test Circuit.<br>$V_{CC}=20V, I_C=1A, I_{B1}=-I_{B2}=4mA$ |         | 3.5 |     | $\mu s$ |
| Fall Time                              | $t_f$         | See specified Test Circuit.<br>$V_{CC}=20V, I_C=1A, I_{B1}=-I_{B2}=4mA$ |         | 0.5 |     | $\mu s$ |

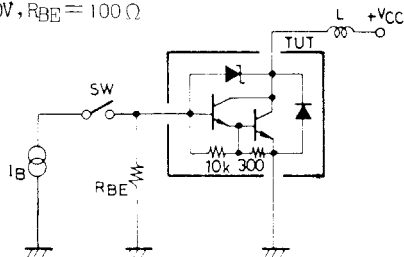
Switching Time Test Circuit

PW=50 $\mu$ s, Duty Cycle  $\leq$  1%  
 $I_{B1}=-I_{B2}=4mA$

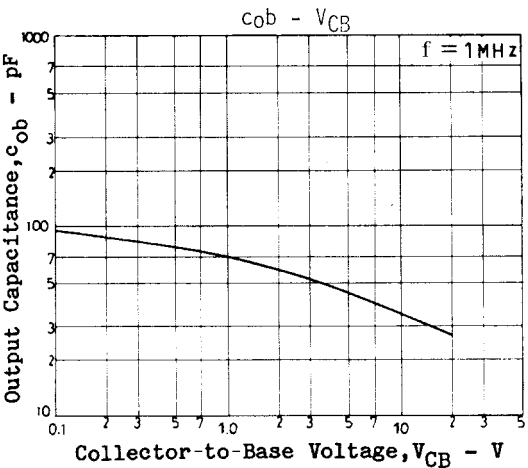
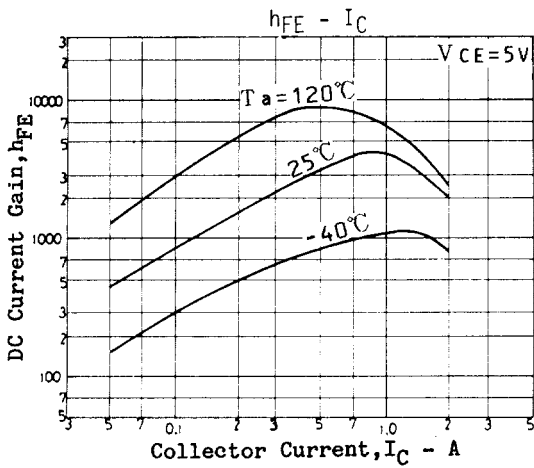
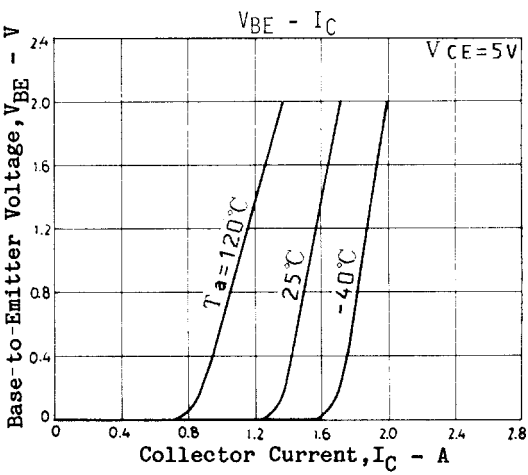
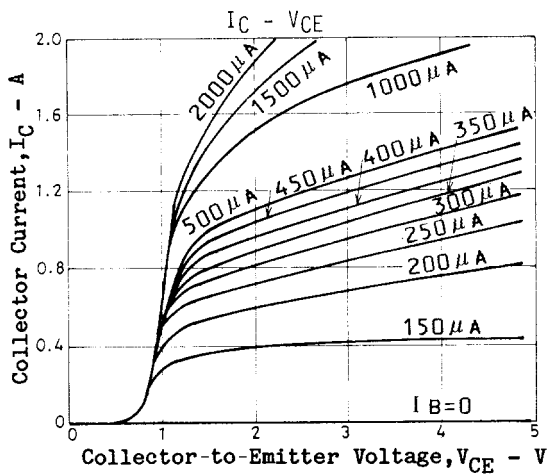


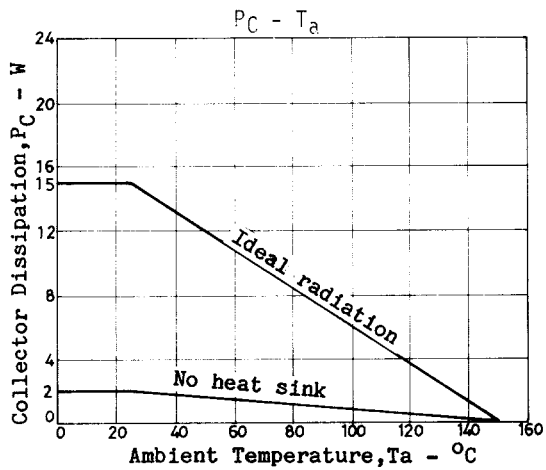
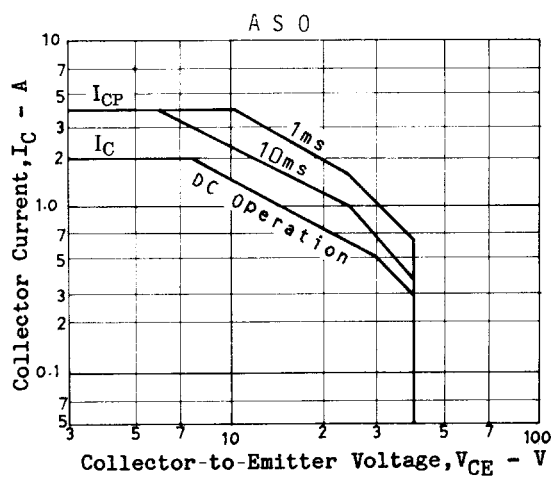
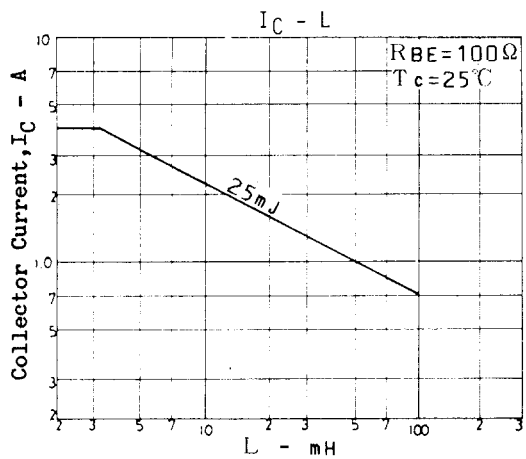
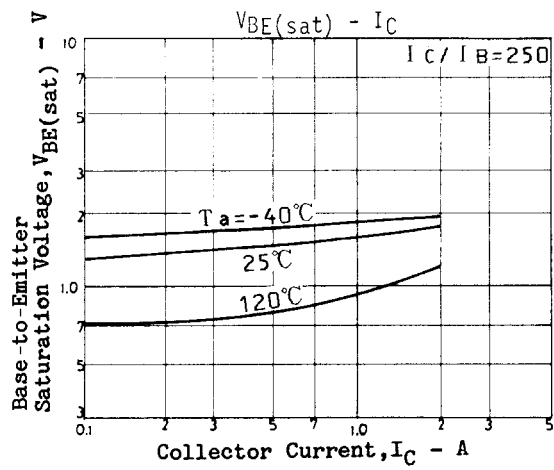
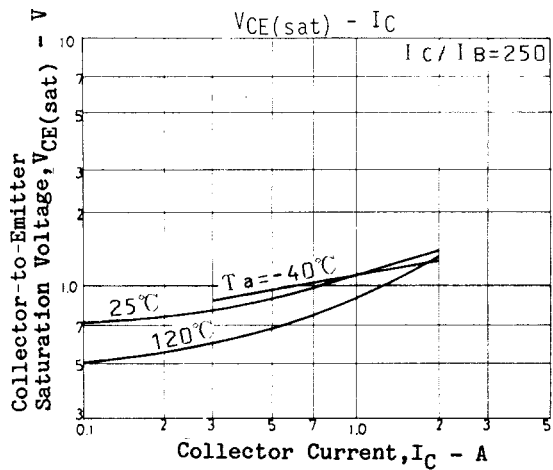
Es/b Test Circuit

$V_{CC}=20V, R_{BE}=100\Omega$



Unit (resistance:  $\Omega$ , capacitance: F)





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