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| SANYO | No.2221B | 2SC3987 |
| | | NPN Planar Silicon Darlington Transistor |

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 $60 \pm 10V$ between collector and base.
- Uniformity in collector-to-base breakdown voltage due to the adoption of an accurate impurity diffusion process.
- High inductive load handling capability.
- Micaless package facilitating mounting.

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

| | | | unit |
|------------------------------|--------------------|-------------|------------|
| Collector-to-Base Voltage | V_{CB0} | 50 ※ | V |
| Collector-to-Emitter Voltage | V_{CEO} | 50 ※ | V |
| Emitter-to-Base Voltage | V_{EBO} | 6 | V |
| Collector Current | I_C | 3 | A |
| Collector Current (Pulse) | I_{CP} | 6 | A |
| Base Current | I_B | 0.6 | A |
| Collector Dissipation | P_C | 2.0 | W |
| | $T_c = 25^\circ C$ | 20 | W |
| Junction Temperature | T_j | 150 | $^\circ C$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ C$ |

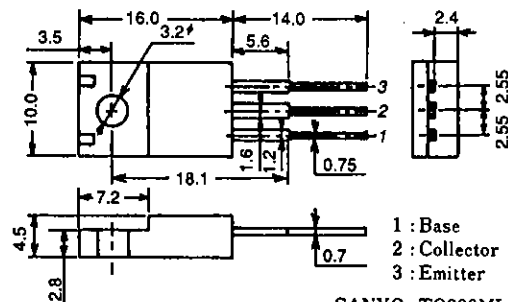
※ : With Zener diode ($60 \pm 10V$)

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

| | | min | typ | max | unit |
|------------------------------------|--|------|------|-----|---------|
| Collector Cutoff Current | I_{CBO} $V_{CB} = 40V, I_E = 0$ | | | 10 | μA |
| Emitter Cutoff Current | I_{EBO} $V_{EB} = 5V, I_C = 0$ | | | 2 | mA |
| DC Current Gain | h_{FE} $V_{CE} = 5V, I_C = 1.5A$ | 1000 | 4000 | | |
| Gain-Bandwidth Product | f_T $V_{CE} = 5V, I_C = 1.5A$ | | 180 | | MHz |
| C-E Saturation Voltage | $V_{CE(sat)}$ $I_C = 1.5A, I_B = 6mA$ | | 1.0 | 1.5 | V |
| B-E Saturation Voltage | $V_{BE(sat)}$ $I_C = 1.5A, I_B = 6mA$ | | | 2.0 | V |
| C-B Breakdown Voltage | $V_{(BR)CBO}$ $I_C = 0.1mA, I_E = 0$ | 50 | 60 | 70 | V |
| C-E Breakdown Voltage | $V_{(BR)CEO}$ $I_C = 1mA, R_{BE} = \infty$ | 50 | 60 | 70 | V |
| Inductive Load Handling Capability | E_s/b $L = 100mH, R_{BE} = 100\Omega$ | 30 | | | mJ |

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Package Dimensions 2041A
(unit: mm)



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Turn-ON Time
Storage Time
Fall Time

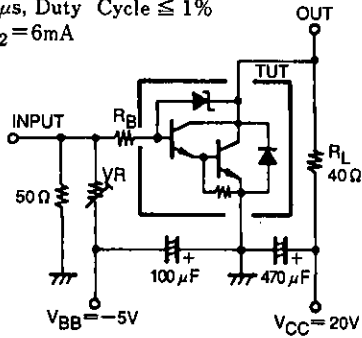
t_{on}
 t_{stg}
 t_f

See specified Test Circuit.
 $V_{CC}=20V, I_C=1.5A,$
 $I_{B1}=-I_{B2}=6mA$

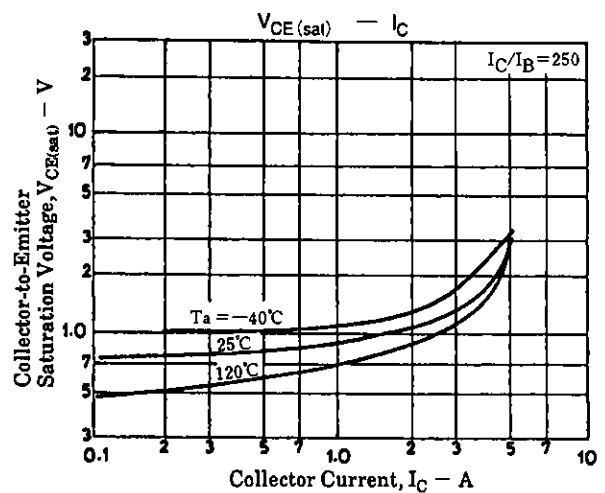
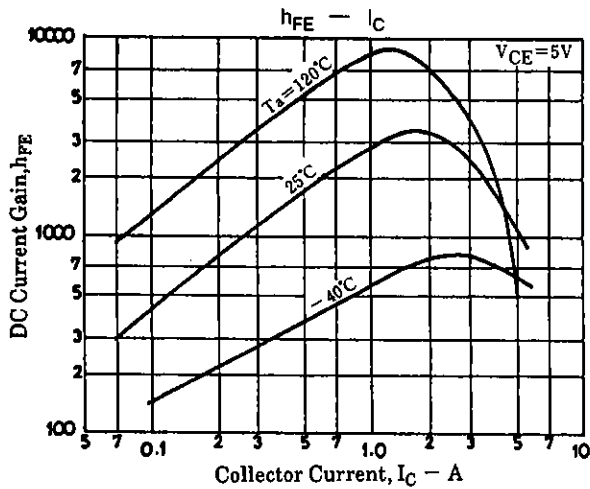
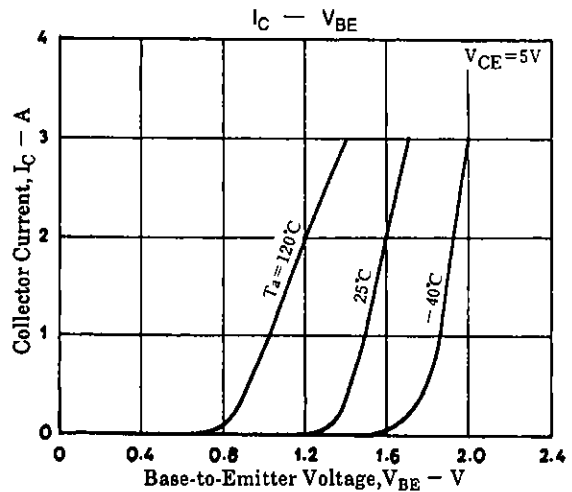
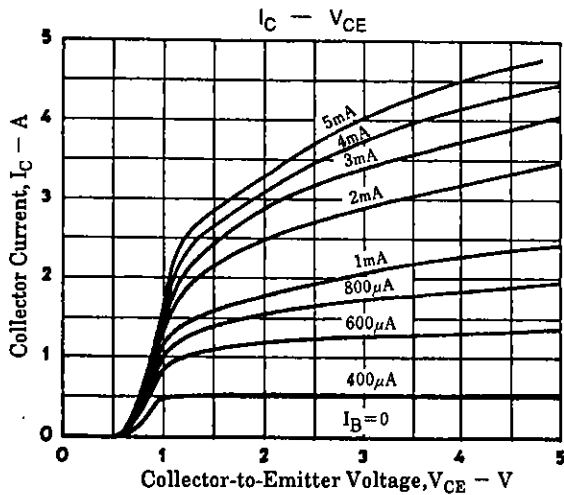
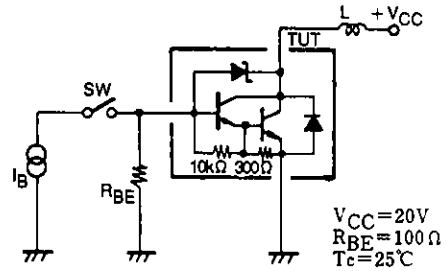
| | min | typ | max | unit |
|--------------|-----|-----|-----|---------|
| Turn-ON Time | | 0.2 | | μs |
| Storage Time | | 3.0 | | μs |
| Fall Time | | 0.7 | | μs |

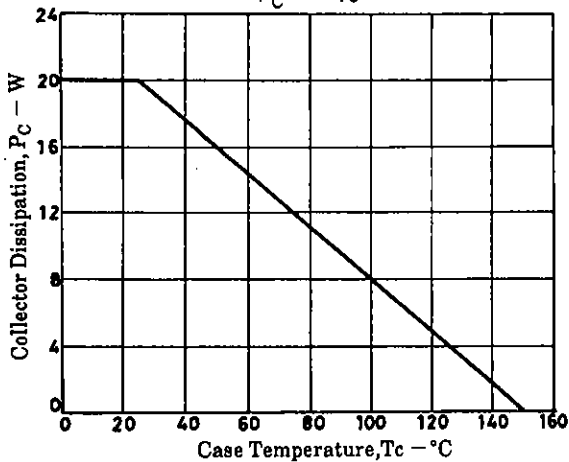
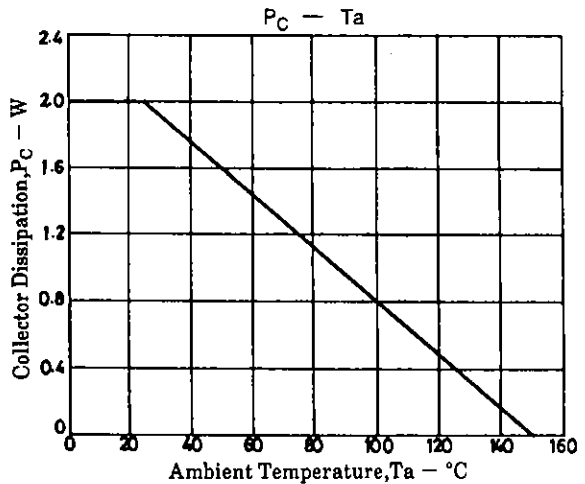
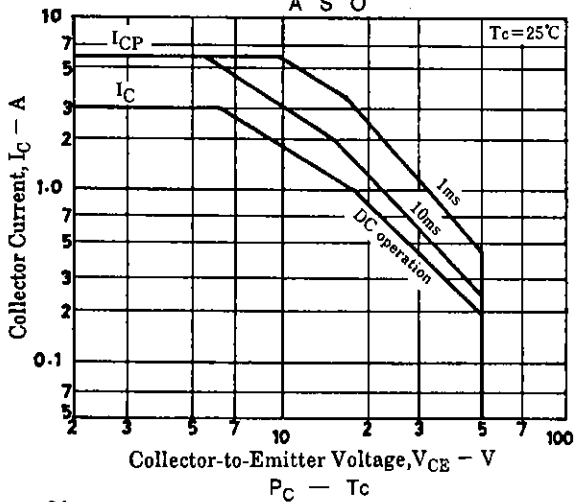
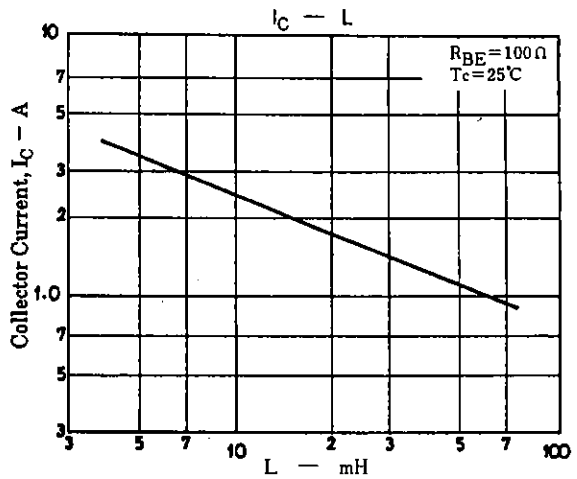
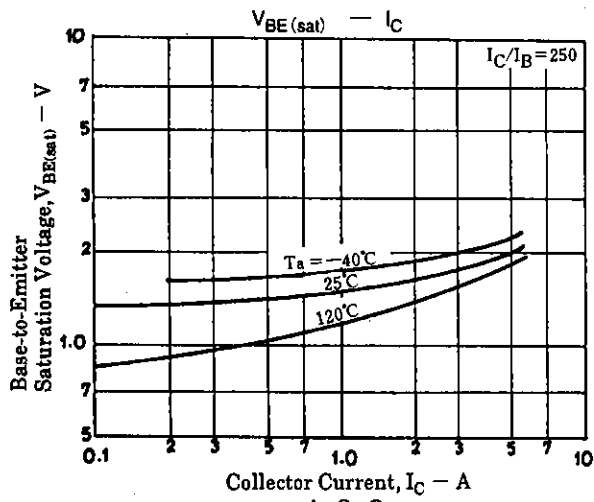
Switching Time Test Circuit

PW = 50 μs , Duty Cycle $\leq 1\%$
 $I_{B1}=-I_{B2}=6mA$



Es/b Test Circuit





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