

NPN Triple Diffused Planar Silicon Darlington Transistor



2SD1838

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

Specifications

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

| Parameter                    | Symbol    | Conditions       | Ratings     | 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            | $I_C$     |                  | 5           | A          |
| Collector Current (Pulse)    | $I_{CP}$  |                  | 8           | A          |
| Base Current                 | $I_B$     |                  | 0.5         | A          |
| Collector Dissipation        | $P_C$     |                  | 2.0         | W          |
|                              |           | $T_c=25^\circ C$ | 25          | W          |
| Junction Temperature         | $T_J$     |                  | 150         | $^\circ C$ |
| Storage Temperature          | $T_{stg}$ |                  | -55 to +150 | $^\circ C$ |

\* : With Zener diode of  $(60\pm 10V)$ .

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

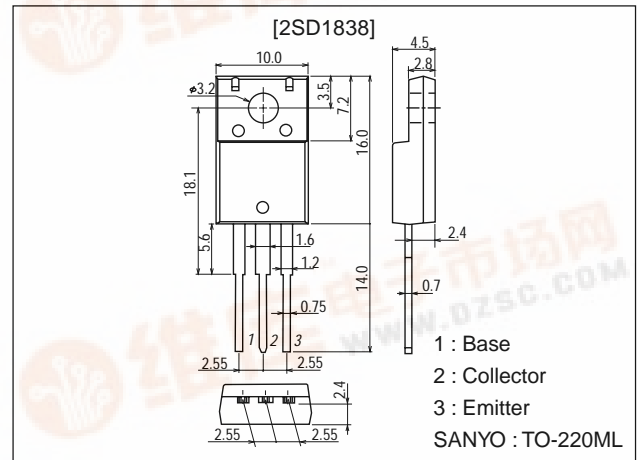
| Parameter                               | Symbol        | Conditions            | Ratings |      |     | Unit    |
|---|---------------|-----------------------|---------|------|-----|---------|
|   |               |                       | min     | typ  | max |         |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB}=40V, I_E=0$   |         |      | 100 | $\mu A$ |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=5V, I_C=0$    |         |      | 3   | mA      |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=3V, I_C=2.5A$ | 1000    | 4000 |     |         |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=5V, I_C=2.5A$ |         | 20   |     | MHz     |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=2.5A, I_B=5mA$   |         | 0.9  | 1.5 | V       |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=2.5A, I_B=5mA$   |         |      | 2.0 | V       |

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Package Dimensions

unit:mm

2041A



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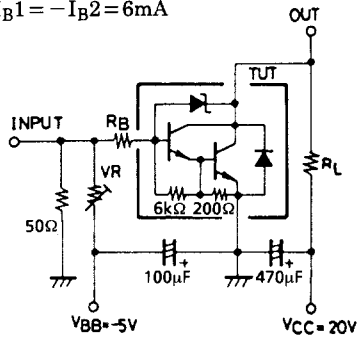
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| Parameter                              | Symbol        | Conditions  | Ratings |     |     | Unit    |
|--|---------------|---|---------|-----|-----|---------|
|  |               |   | min     | typ | max |         |
| Collector-to-Base Breakdown Voltage    | $V_{(BR)CBO}$ | $I_C=5mA, I_E=0$  | 50      | 60  | 70  | V       |
| Collector-to-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=50mA, R_{BE}=\infty$   | 50      | 60  | 70  | V       |
| Inductive Load Handling Capability     | Es/b          | $L=100mH, R_{BE}=100\Omega$   | 50      |     |     | mJ      |
| Rise Time                              | $t_{on}$      | See specified Test Circuit.<br>$V_{CC}=20V, I_C=3.0A, I_{B1}=-I_{B2}=6mA$ |         | 0.6 |     | $\mu s$ |
| Storage Time                           | $t_{stg}$     | See specified Test Circuit.<br>$V_{CC}=20V, I_C=3.0A, I_{B1}=-I_{B2}=6mA$ |         | 4.0 |     | $\mu s$ |
| Fall Time                              | $t_f$         | See specified Test Circuit.<br>$V_{CC}=20V, I_C=3.0A, I_{B1}=-I_{B2}=6mA$ |         | 1.5 |     | $\mu s$ |

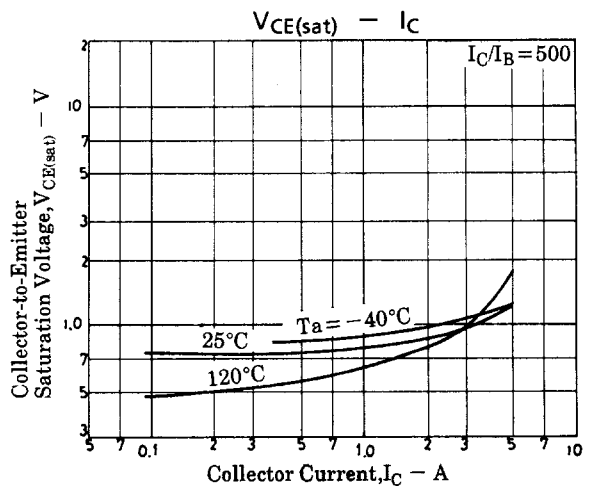
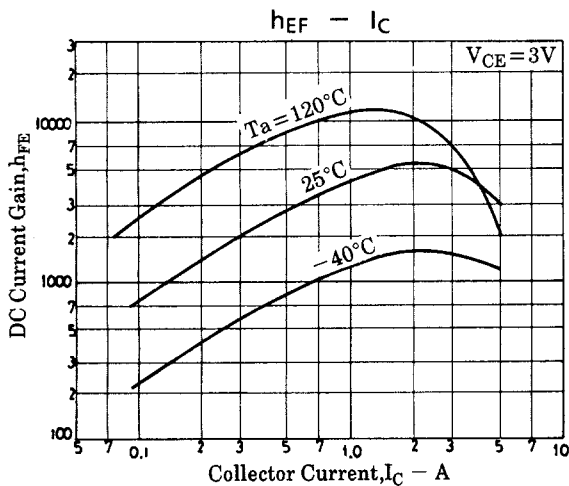
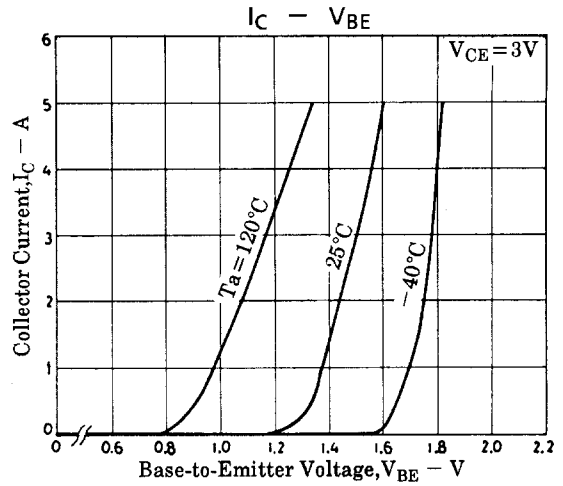
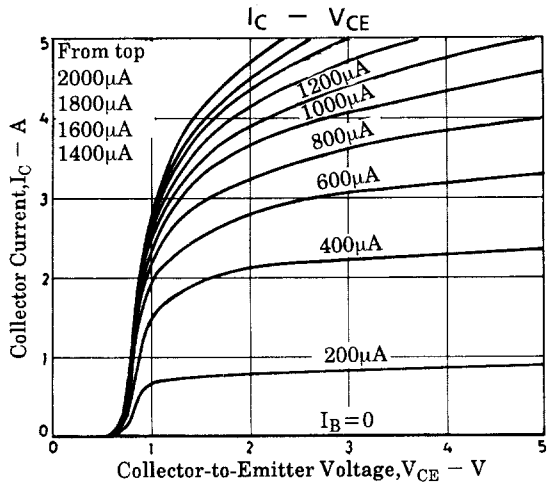
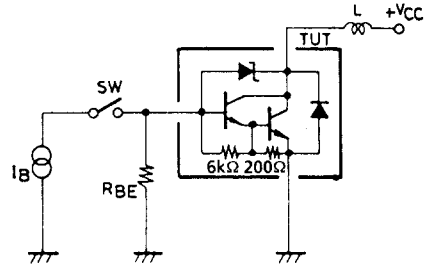
## Specified Test Circuit

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

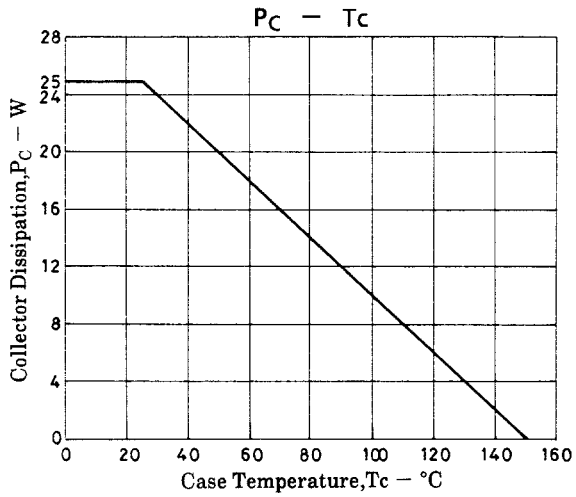
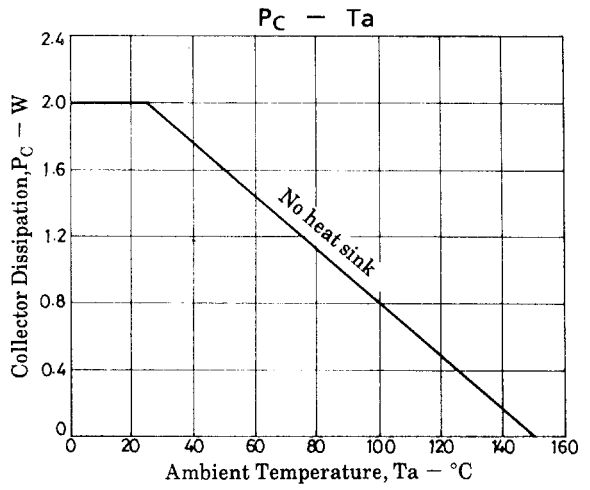
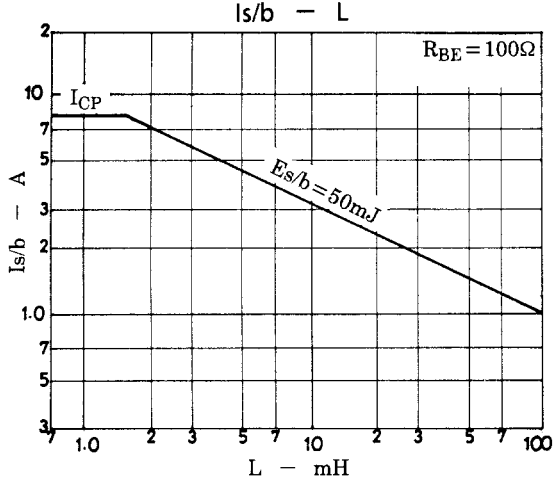
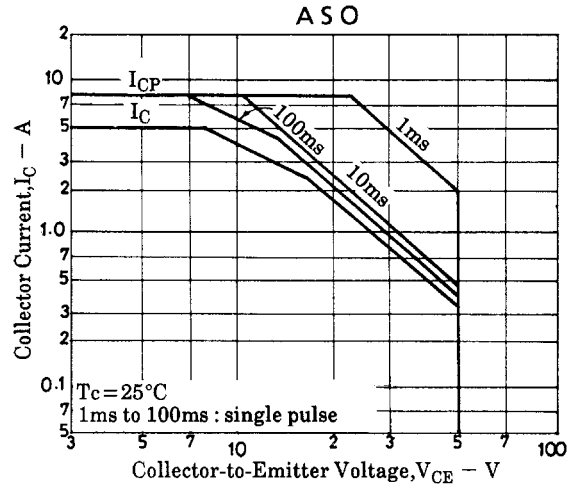
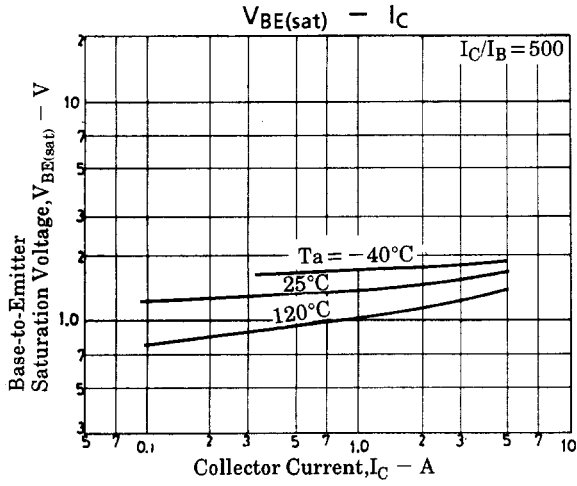


## Es/b Test Circuit

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



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