

Bipolar Transistor

(–)50 V, (–)2 A, Low $V_{CE(sat)}$,
(PNP)NPN Single TP/TP-FA

2SB1201/2SD1801

Features

- Adoption of FBET, MBIT Processes
- Low Collector-to-Emitter Saturation Voltage
- Small and Slim Package Making it Easy to Make 2SB1201 / 2SD1801 – Used Sets Smaller
- Large Current Capacitance and Wide ASO
- These are Pb-Free Devices

Applications

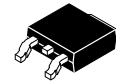
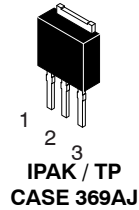
- Voltage Regulators, Relay Drivers, Lamp Drivers, Electrical Equipment

ABSOLUTE MAXIMUM RATINGS (at $T_a = 25^\circ\text{C}$)

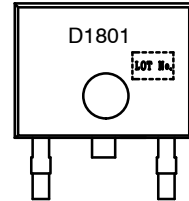
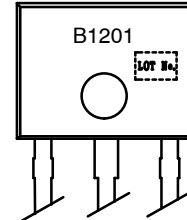
| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|-----------|--------------------------|-------------|------------------|
| Collector-to-Base Voltage | V_{CBO} | | (–)60 | V |
| Collector-to-Emitter Voltage | V_{CEO} | | (–)50 | V |
| Emitter-to-Base Voltage | V_{EBO} | | (–)6 | V |
| Collector Current | I_C | | (–)2 | A |
| Collector Current (Pulse) | I_{CP} | | (–)4 | A |
| Collector Dissipation | P_C | | 0.8 | W |
| | | $T_c = 25^\circ\text{C}$ | 15 | W |
| Junction Temperature | T_j | | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | | –55 to +150 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

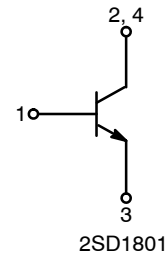
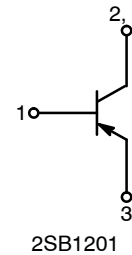
NOTE: Specifications (): 2SB1201



MARKING DIAGRAMS



ELECTRICAL CONNECTION



ORDERING INFORMATION

| Device | Package | Shipping† |
|---------------|------------------------|-------------------|
| 2SB1201S-E | IPAK / TP (Pb-Free) | 500 pcs / Bag |
| 2SB1201S-TL-E | DPAK / TP-FA (Pb-Free) | 700 / Tape & Reel |
| 2SB1201T-TL-E | DPAK / TP-FA (Pb-Free) | 700 / Tape & Reel |
| 2SD1801S-TL-E | DPAK / TP-FA (Pb-Free) | 700 / Tape & Reel |
| 2SD1801S-E | IPAK / TP (Pb-Free) | 500 pcs / Bag |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

2SB1201/2SD1801

ELECTRICAL CHARACTERISTICS (at Ta = 25°C)

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---------------|--|---------|------------|-----------|------|
| | | | Min | Typ | Max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB} = (-)50\text{ V}, I_E = 0\text{ A}$ | – | – | (–)100 | nA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = (-)4\text{ V}, I_C = 0\text{ A}$ | – | – | (–)100 | nA |
| DC Current Gain | h_{FE1} | $V_{CE} = (-)2\text{ V}, I_C = (-)100\text{ mA}$ | 100* | – | 560* | – |
| | h_{FE2} | $V_{CE} = (-)2\text{ V}, I_C = (-)1.5\text{ A}$ | 40 | – | – | – |
| Gain–Bandwidth Product | f_T | $V_{CE} = (-)10\text{ V}, I_C = (-)50\text{ mA}$ | – | 150 | – | MHz |
| Output Capacitance | C_{ob} | $V_{CB} = (-)10\text{ V}, f = 1\text{ MHz}$ | – | (22)12 | – | pF |
| Collector–to–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = (-)1\text{ A}, I_B = (-)50\text{ mA}$ | – | (–0.3)0.15 | (–0.7)0.4 | V |
| Base–to–Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C = (-)1\text{ A}, I_E = (-)50\text{ mA}$ | – | (–)0.9 | (–)1.2 | V |
| Collector–to–Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = (-)10\text{ }\mu\text{A}, I_E = 0\text{ A}$ | (–)60 | – | – | V |
| Collector–to–Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = (-)1\text{ mA}, R_{BE} = \infty$ | (–)50 | – | – | V |
| Emitter–to–Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = (-)10\text{ }\mu\text{A}, I_C = 0\text{ A}$ | (–)6 | – | – | V |
| Turn–ON Time | t_{on} | See specified Test Circuit. | – | (60)60 | – | ns |
| Storage Time | t_{stg} | | – | (450)550 | – | ns |
| Fall Time | t_f | | – | 30 | – | ns |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTE: Specifications (): 2SB1201

*The 2SB1201 / 2SD1801 are classified by 100 mA h_{FE} as follows :

Table 1.

| Rank | R | S | T | U |
|----------|------------|------------|------------|------------|
| h_{FE} | 100 to 200 | 140 to 280 | 200 to 400 | 280 to 560 |

Switching Time Test Circuit

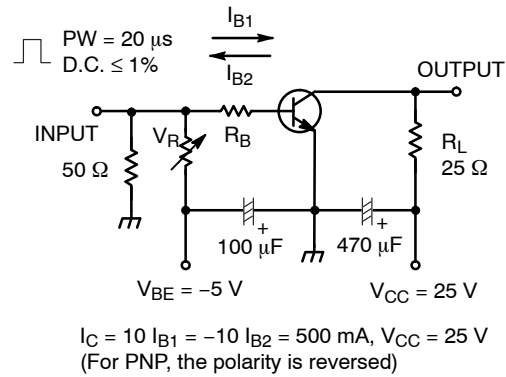


Figure 1. Switching Time Test Circuit

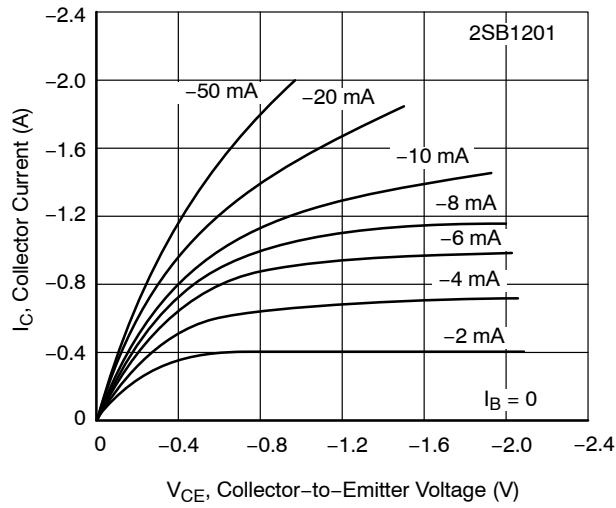


Figure 2. $I_C - V_{CE}$

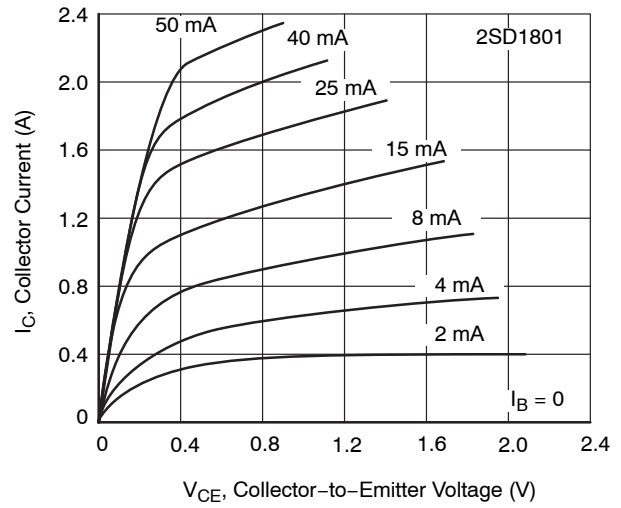


Figure 3. $I_C - V_{CE}$

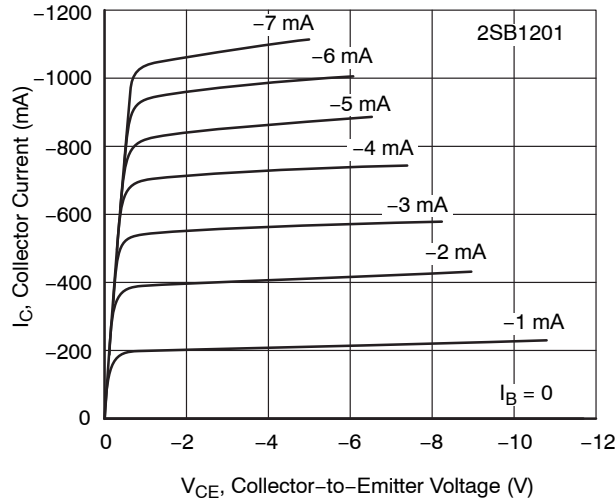


Figure 4. $I_C - V_{CE}$

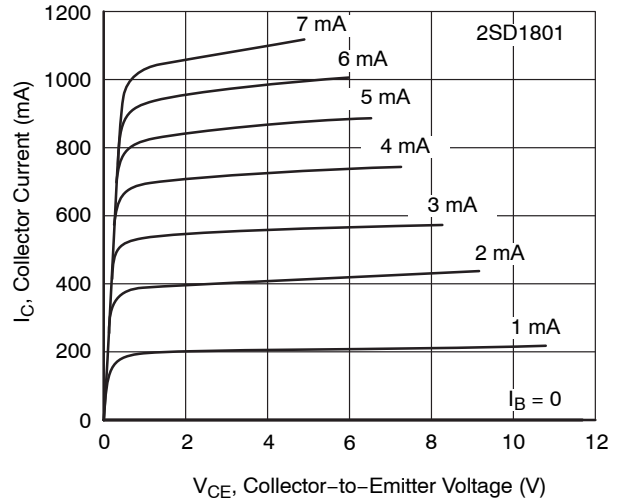


Figure 5. $I_C - V_{CE}$

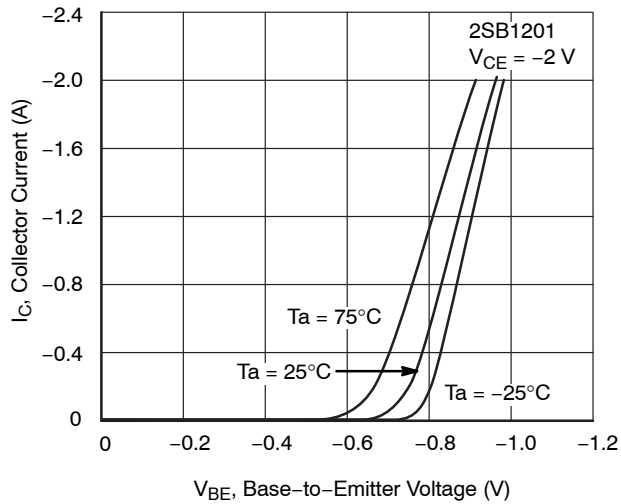


Figure 6. $I_C - V_{BE}$

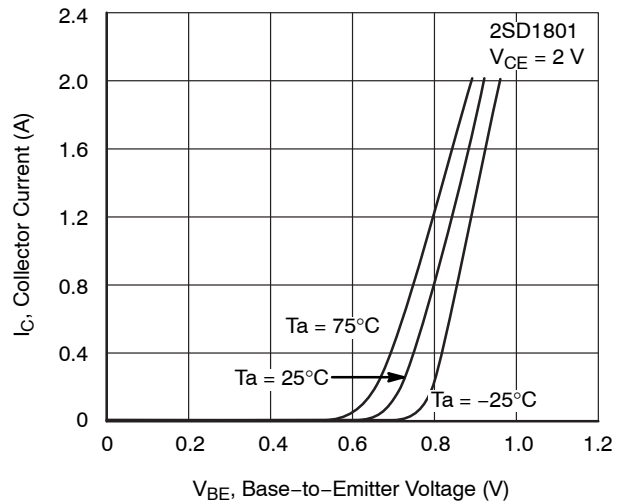


Figure 7. $I_C - V_{BE}$

2SB1201/2SD1801

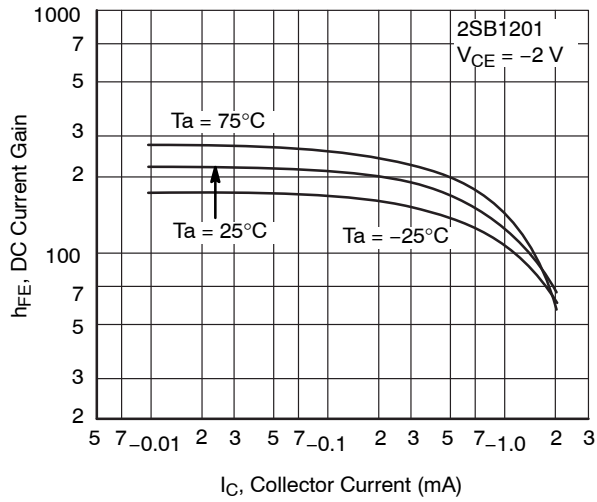


Figure 8. $h_{FE} - I_C$

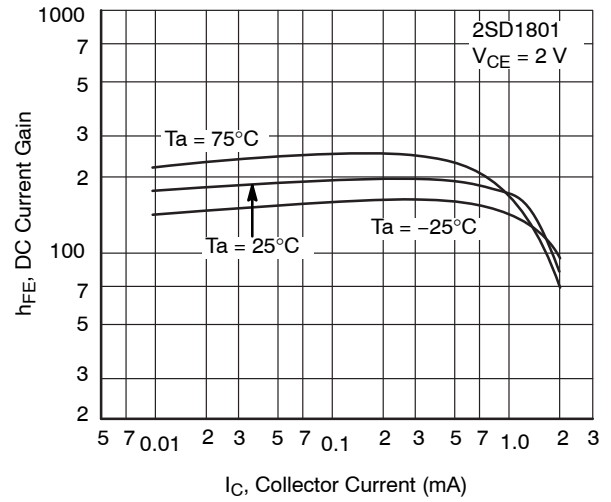


Figure 9. $h_{FE} - I_C$

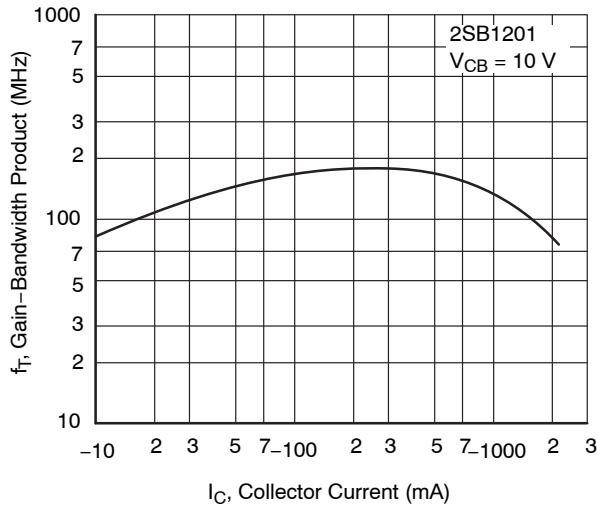


Figure 10. $f_T - I_C$

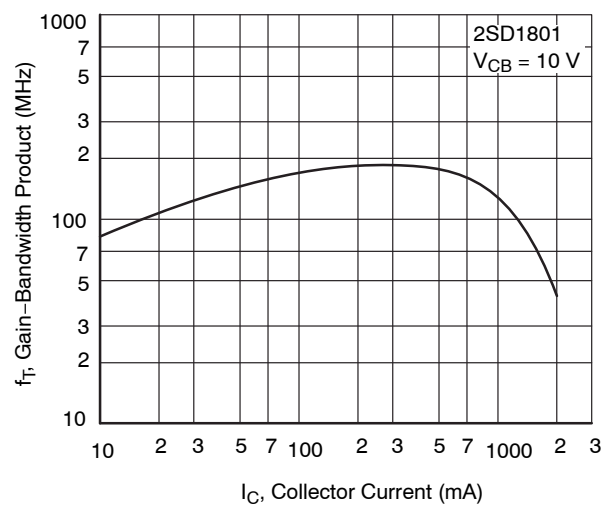


Figure 11. $f_T - I_C$

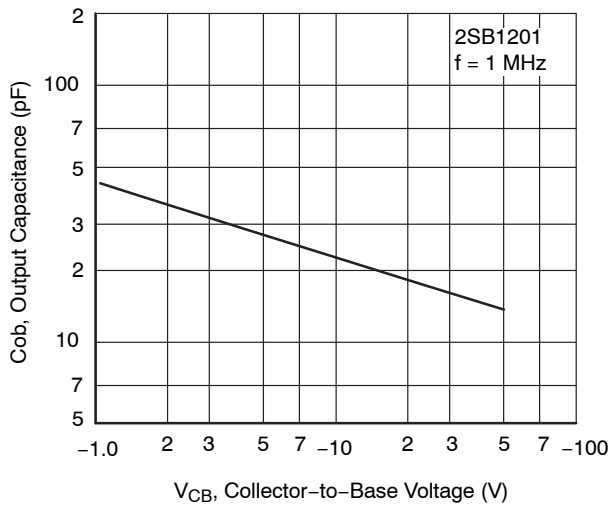


Figure 12. $C_{ob} - V_{CB}$

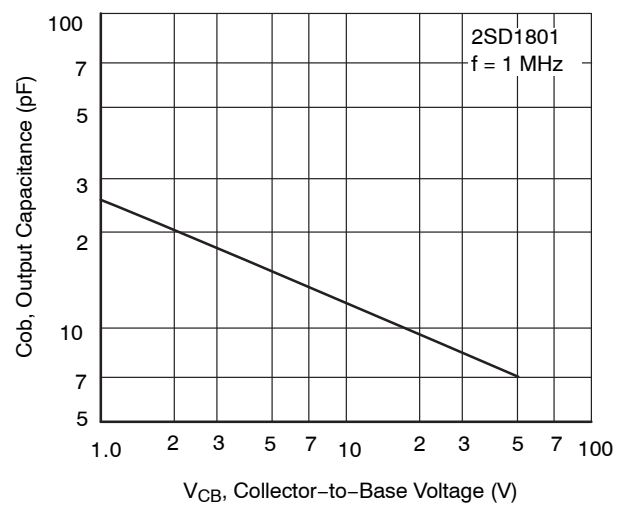


Figure 13. $C_{ob} - V_{CB}$

2SB1201/2SD1801

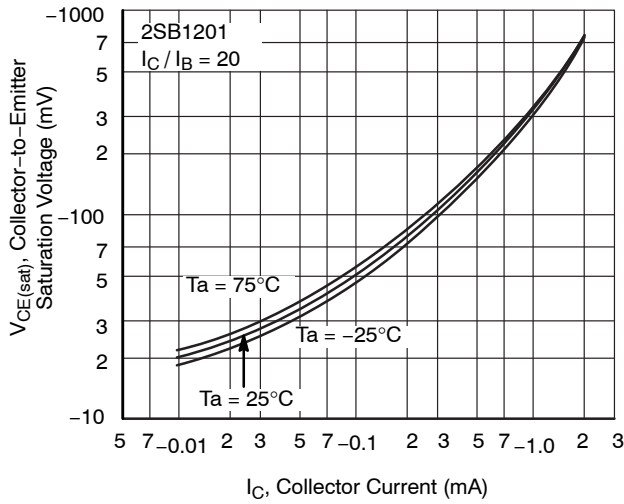


Figure 14. $V_{CE(sat)} - I_C$

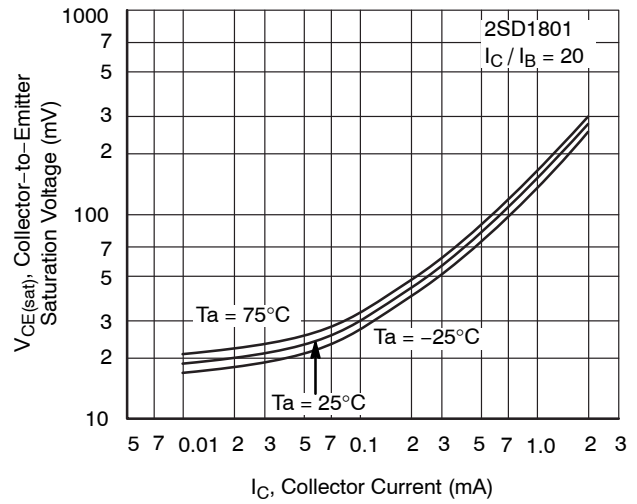


Figure 15. $V_{CE(sat)} - I_C$

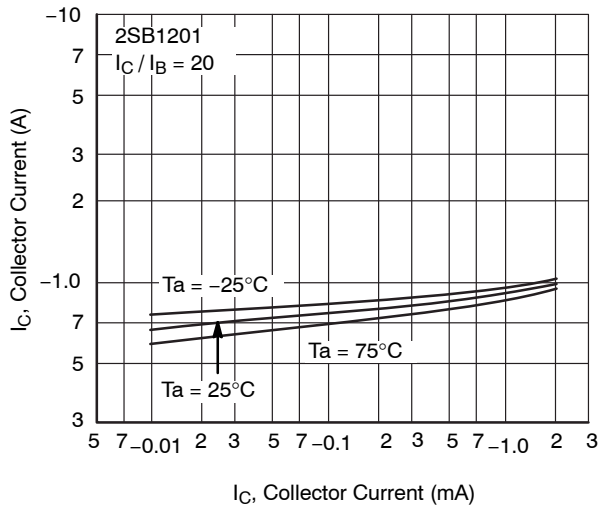


Figure 16. $V_{BE(sat)} - I_C$

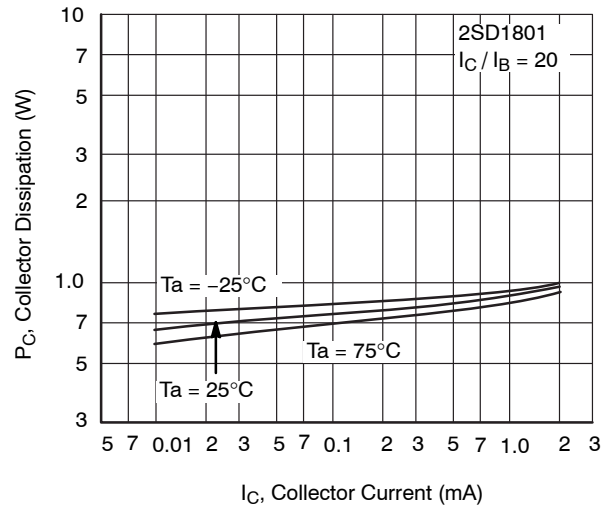


Figure 17. $V_{BE(sat)} - I_C$

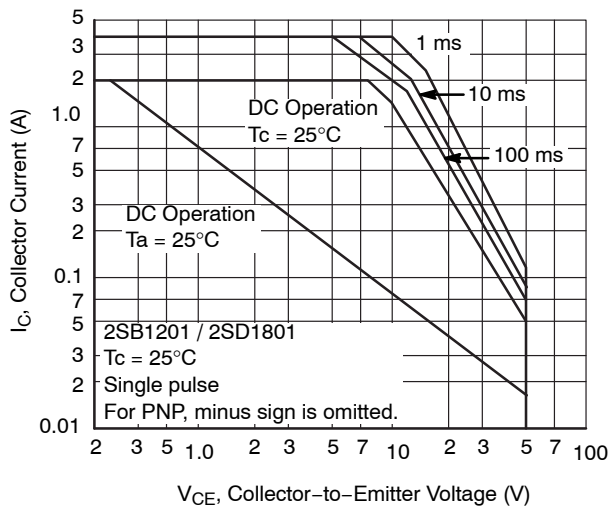


Figure 18. ASO

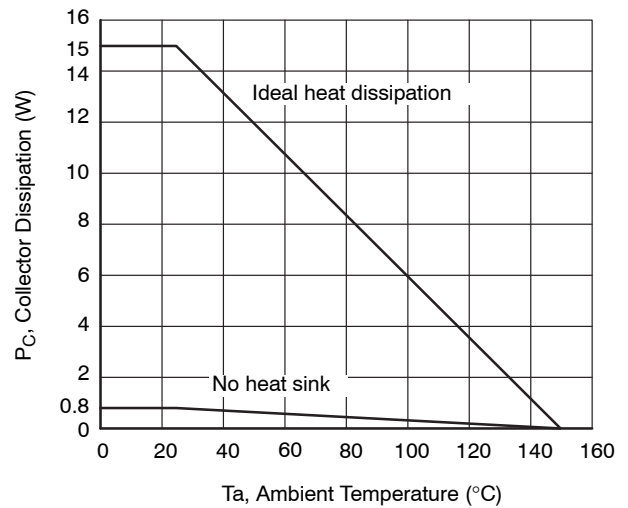


Figure 19. $P_C - T_a$

MECHANICAL CASE OUTLINE

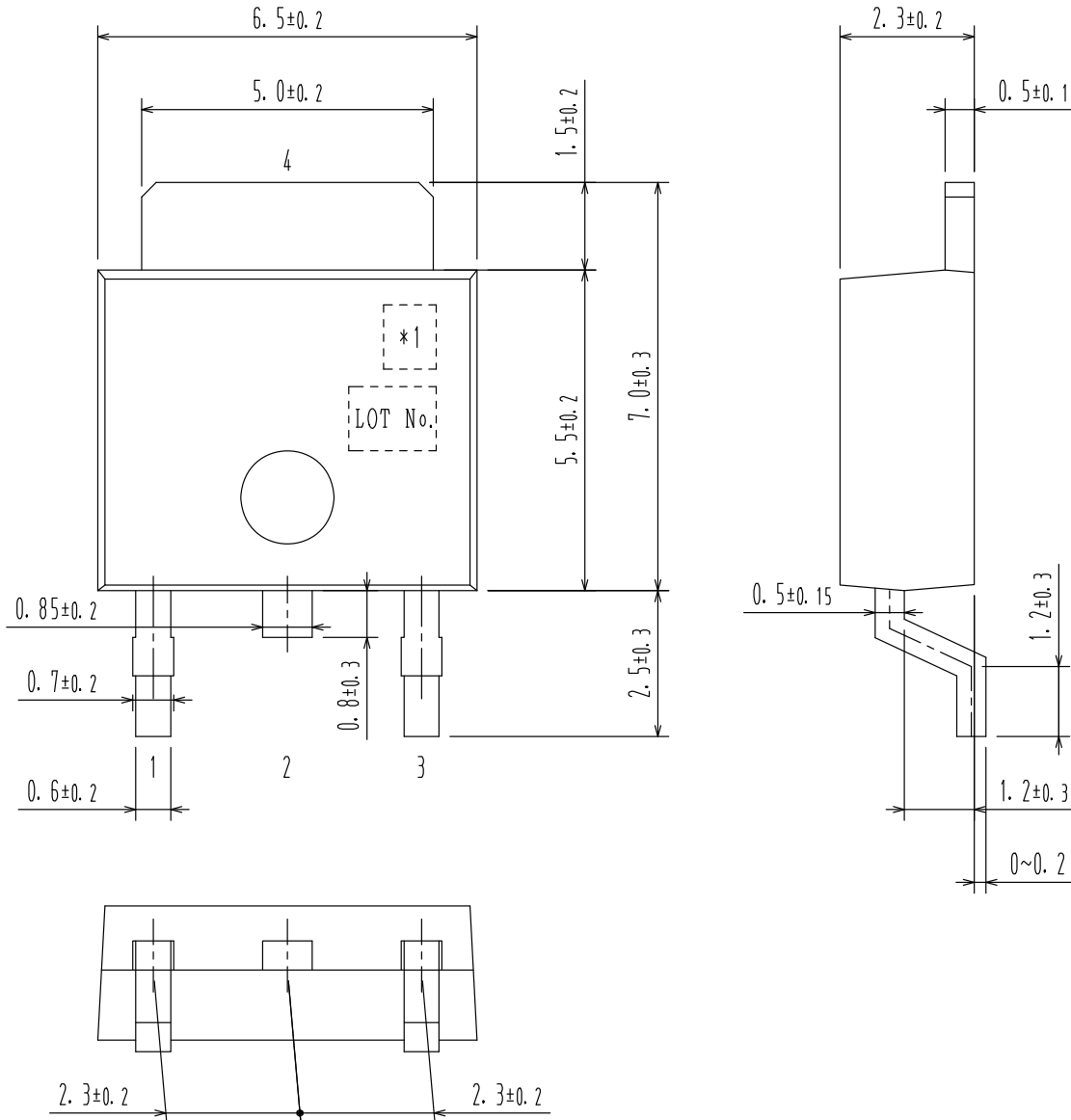
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DDAK / TP-FA
CASE 369AH
ISSUE O

DATE 30 JAN 2012



Pin 2 is idle pin with electrical designation only carried.

1:
2:
3:
*1: Lot indication 4:

| | | |
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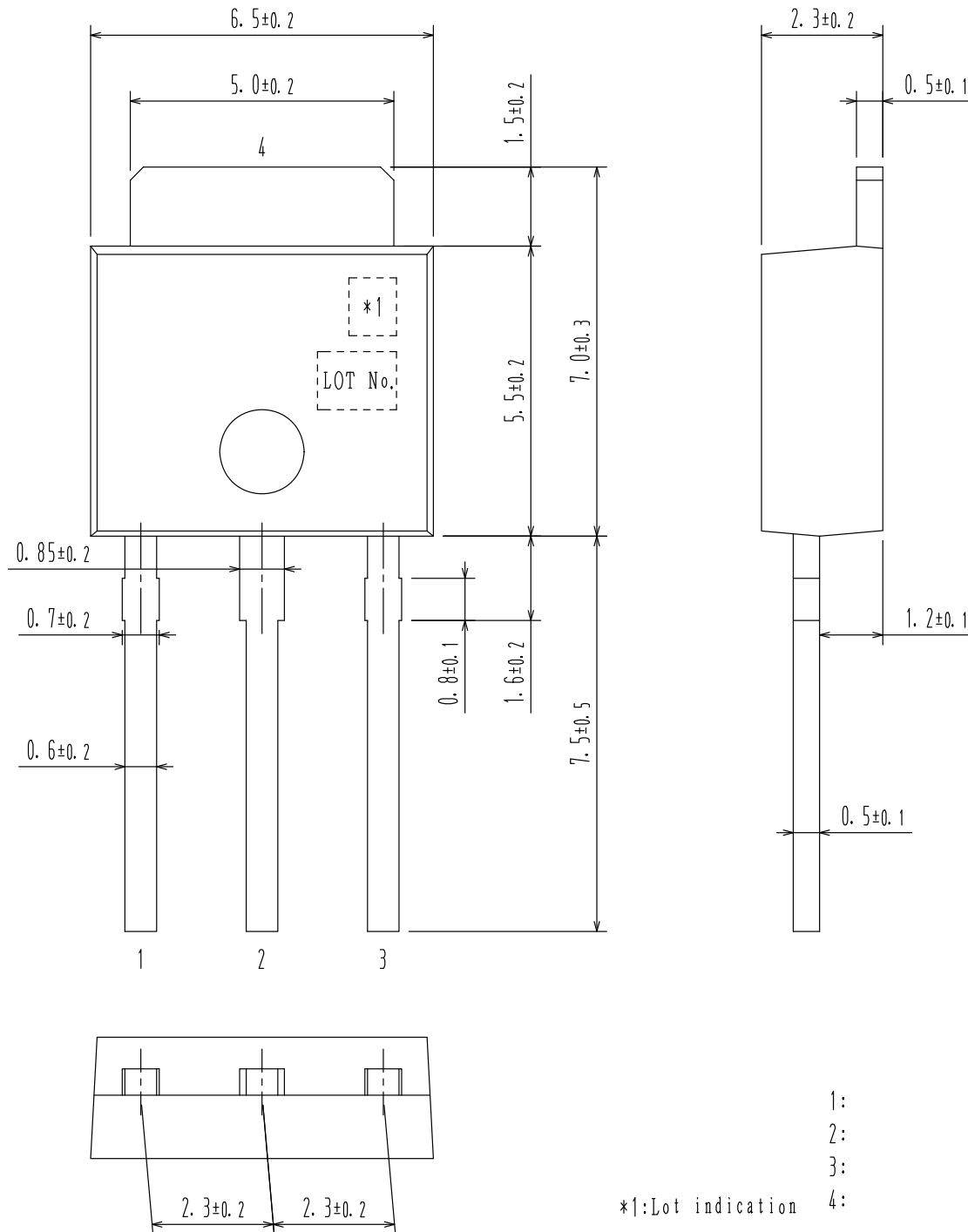
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