



2SB1203/2SD1803

Bipolar Transistor (-50V, (-)5A, Low VCE(sat), (PNP)NPN Single TP/TP-FA

ON Semiconductor®

<http://onsemi.com>

Applications

- Relay drivers, high-speed inverters, converters, and other general high-current switching applications

Features

- Low collector-to-emitter saturation voltage
- Excellent linearity of hFE
- Small and slim package making it easy to make 2SB1203/2SD1803-applied sets smaller
- High current and high fT
- Fast switching speed

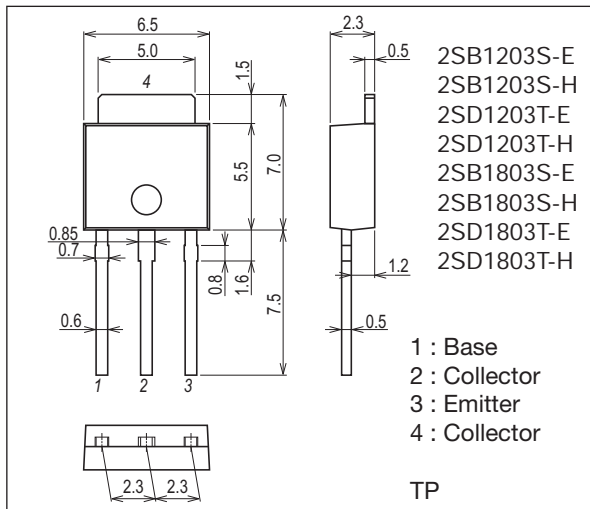
Specifications () : 2SB1203

Absolute Maximum Ratings at Ta=25°C

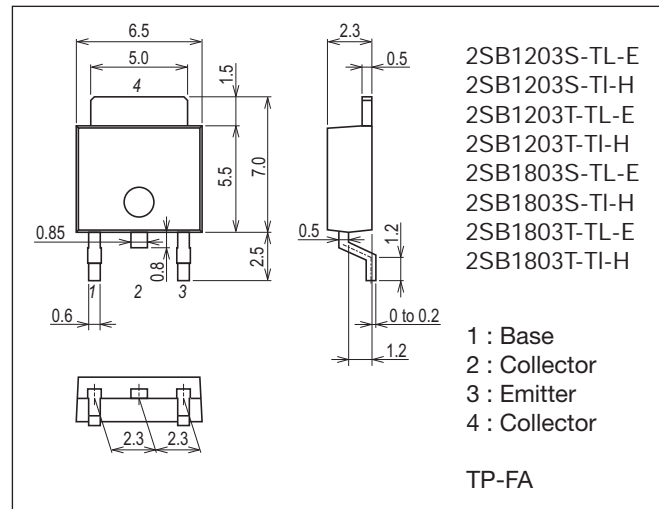
| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|------------------|------------|---------|------|
| Collector-to-Base Voltage | V _{CBO} | | (-)60 | V |
| Collector-to-Emitter Voltage | V _{CEO} | | (-)50 | V |
| Emitter-to-Base Voltage | V _{EBO} | | (-)6 | V |
| Collector Current | I _C | | (-)5 | A |
| Collector Current (Pulse) | I _{CP} | | (-)8 | A |

Continued on next page.

Package Dimensions unit : mm (typ) 7518-003



Package Dimensions unit : mm (typ) 7003-003

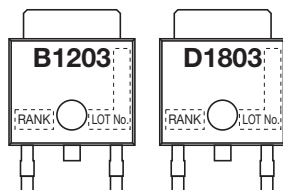


Product & Package Information

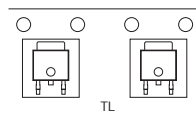
- Package : TP
- JEITA, JEDEC : SC-64, TO-251
- Minimum Packing Quantity : 500 pcs./bag

- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252
- Minimum Packing Quantity : 700 pcs./reel

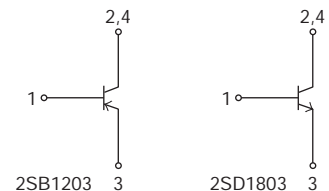
Marking (TP, TP-FA)



Packing Type (TP-FA) : TL



Electrical Connection



2SB1203 / 2SD1803

Continued from preceding page.

| Parameter | Symbol | Conditions | Ratings | Unit |
|-----------------------|------------------|----------------------|-------------|------|
| Collector Dissipation | PC | | 1 | W |
| | | T _c =25°C | 20 | W |
| Junction Temperature | T _j | | 150 | °C |
| Storage Temperature | T _{stg} | | -55 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

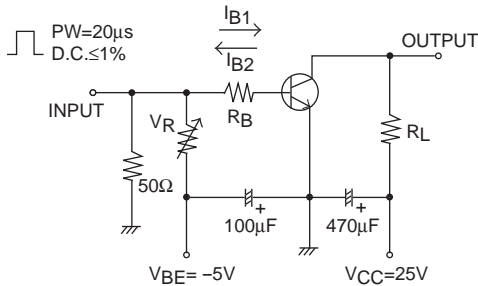
Electrical Characteristics at T_a=25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|----------------------|---|---------|-----------|-----------|------|
| | | | min | typ | max | |
| Collector Cutoff Current | I _{CBO} | V _{CB} =(-)40V, I _E =0A | | | (-)1 | μA |
| Emitter Cutoff Current | I _{EBO} | V _{EB} =(-)4V, I _C =0A | | | (-)1 | μA |
| DC Current Gain | h _{FE1} | V _{CE} =(-)2V, I _C =(-)0.5A | 70* | | 400* | |
| | h _{FE2} | V _{CE} =(-)2V, I _C =(-)4A | 35 | | | |
| Gain-Bandwidth Product | f _T | V _{CE} =(-)5V, I _C =(-)1A | | (130)180 | | MHz |
| Output Capacitance | C _{ob} | V _{CB} =(-)10V, f=1MHz | | (60)40 | | pF |
| Collector-to-Emitter Saturation Voltage | V _{CE(sat)} | I _C =(-)3A, I _B =(-)0.15A | | (-280)220 | (-550)400 | mV |
| Base-to-Emitter Saturation Voltage | V _{BE(sat)} | I _C =(-)3A, I _B =(-)0.15A | | (-)0.95 | (-)1.3 | V |
| Collector-to-Base Breakdown Voltage | V(BR)CBO | I _C =(-)10μA, I _E =0A | (-)60 | | | V |
| Collector-to-Emitter Breakdown Voltage | V(BR)CEO | I _C =(-)1mA, R _{BE} =∞ | (-)50 | | | V |
| Emitter-to-Base Breakdown Voltage | V(BR)EBO | I _E =(-)10μA, I _C =0A | (-)6 | | | V |
| Turn-On Time | t _{on} | See specified Test Circuit. | | (50)50 | | ns |
| Storage Time | t _{stg} | | | (450)500 | | ns |
| Fall Time | t _f | | | (20)20 | | ns |

* : The 2SB1203/2SD1803 are classified by 0.5A h_{FE} as follows :

| Rank | Q | R | S | T |
|-----------------|-----------|------------|------------|------------|
| h _{FE} | 70 to 140 | 100 to 200 | 140 to 280 | 200 to 400 |

Switching Time Test Circuit



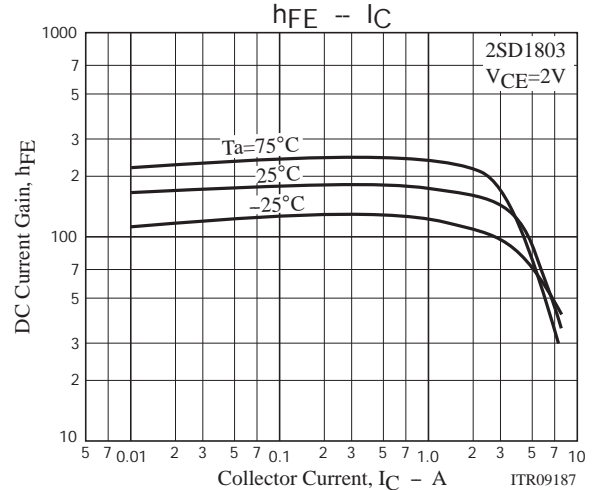
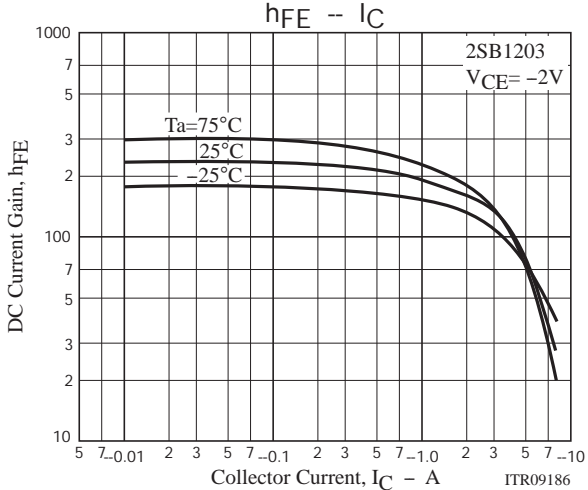
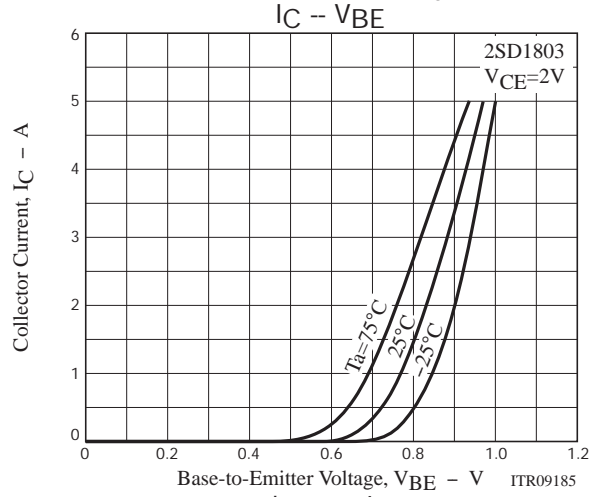
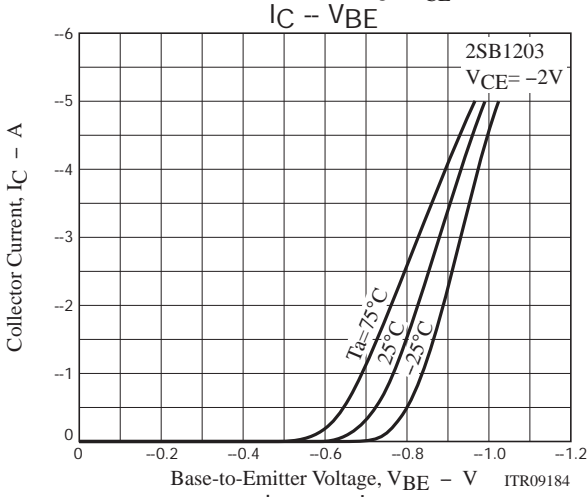
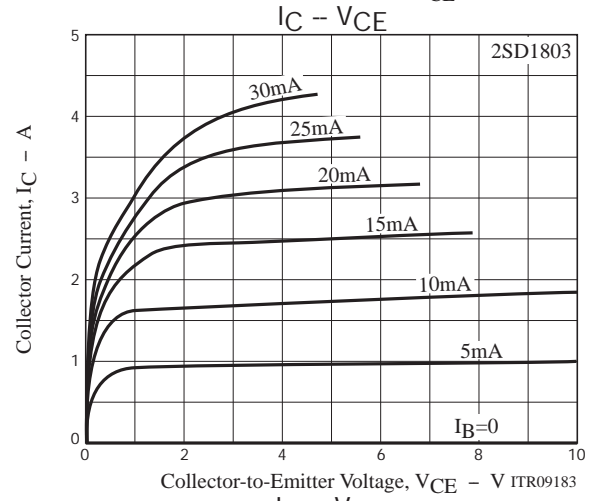
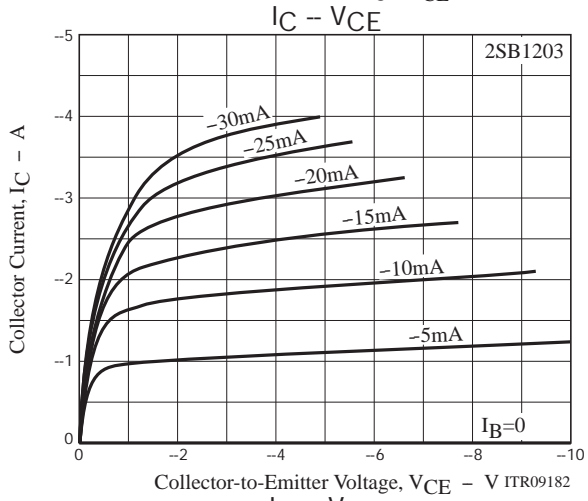
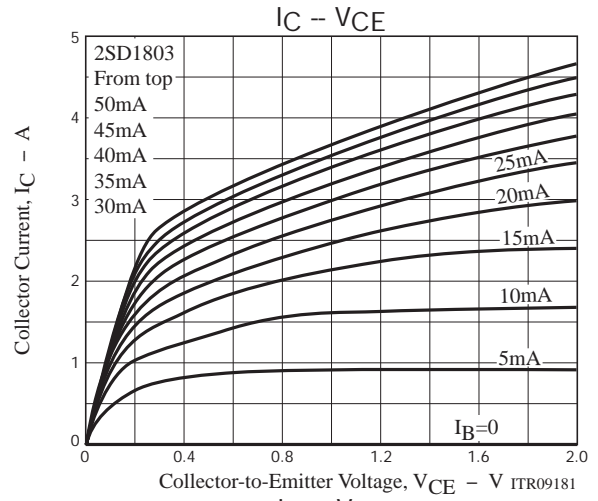
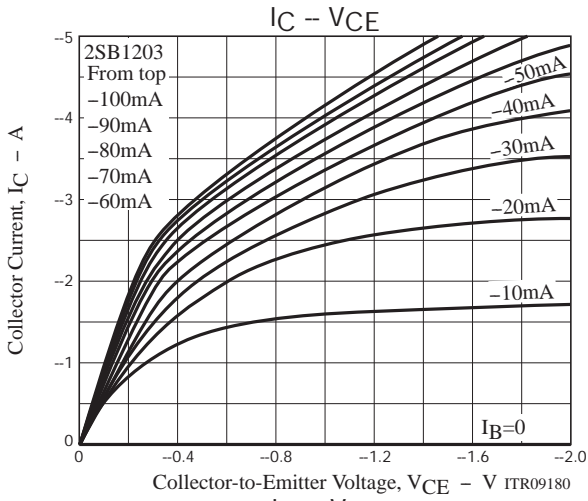
$$I_C = 10I_{B1} = -10I_{B2} = 2A$$

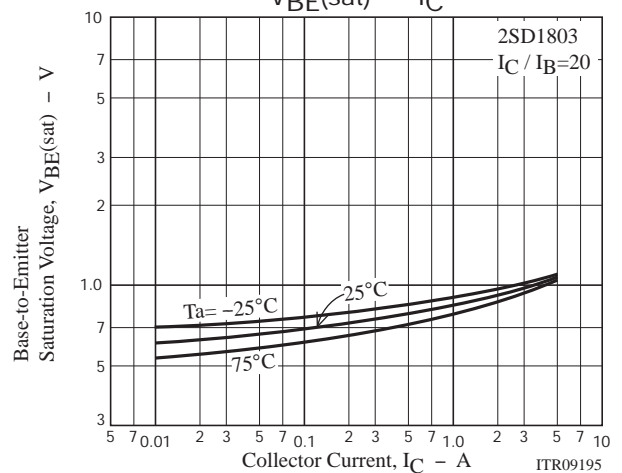
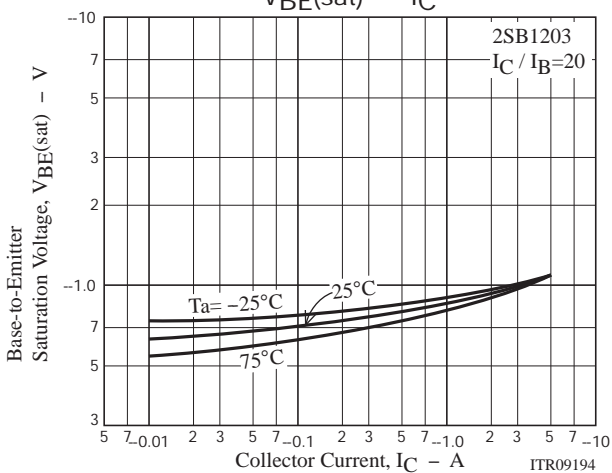
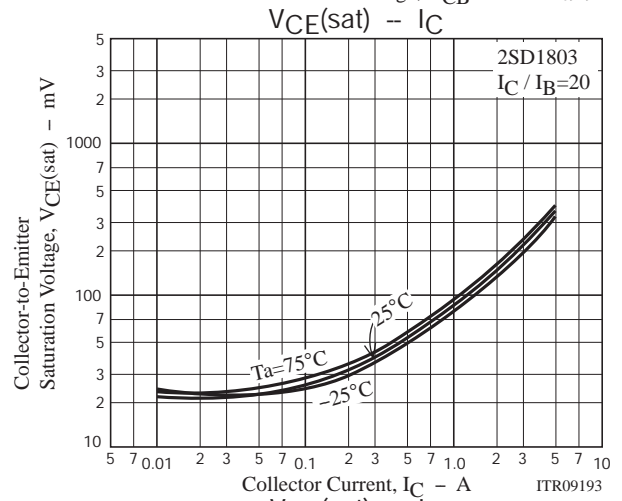
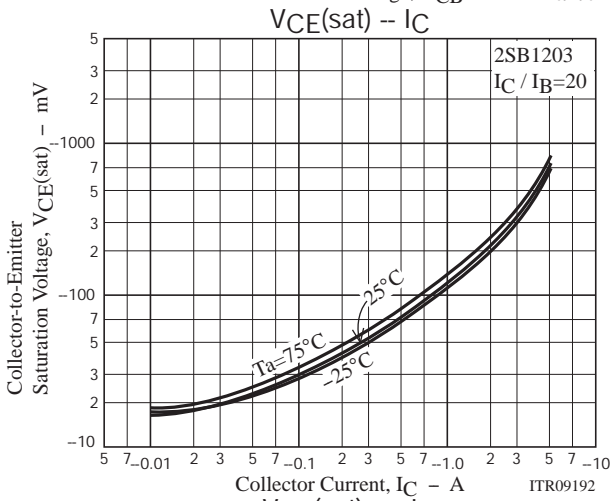
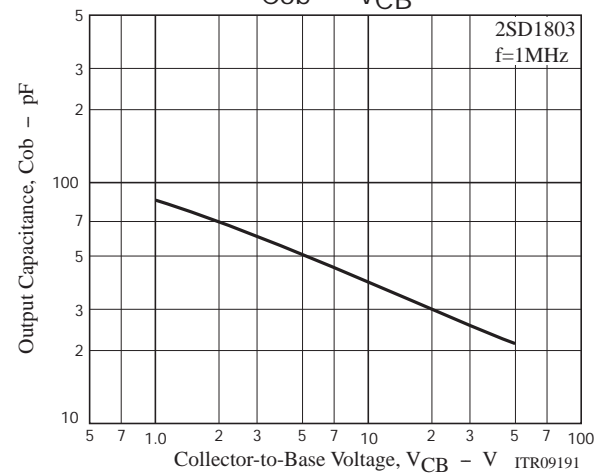
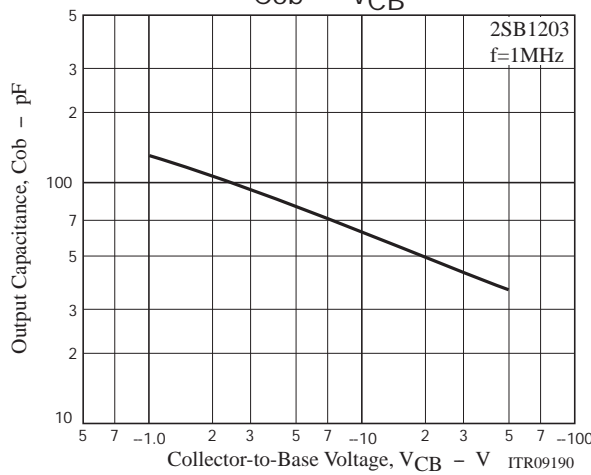
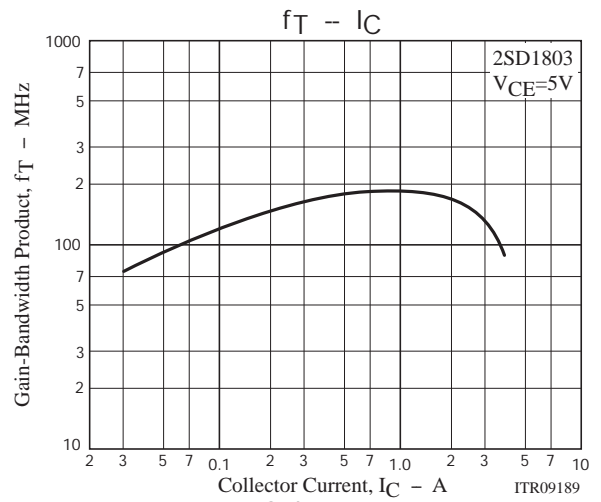
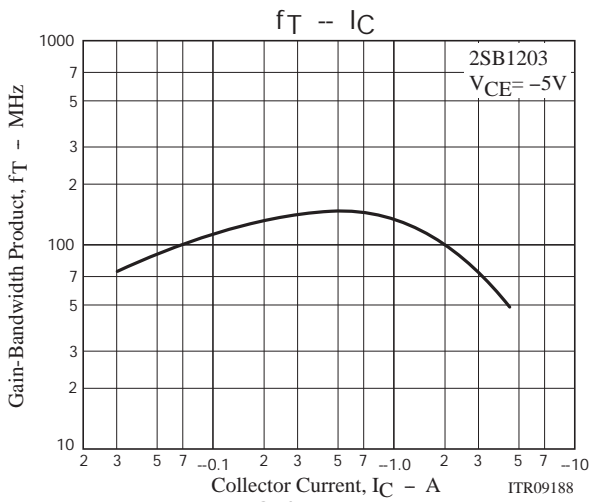
For PNP, the polarity is reversed.

Ordering Information

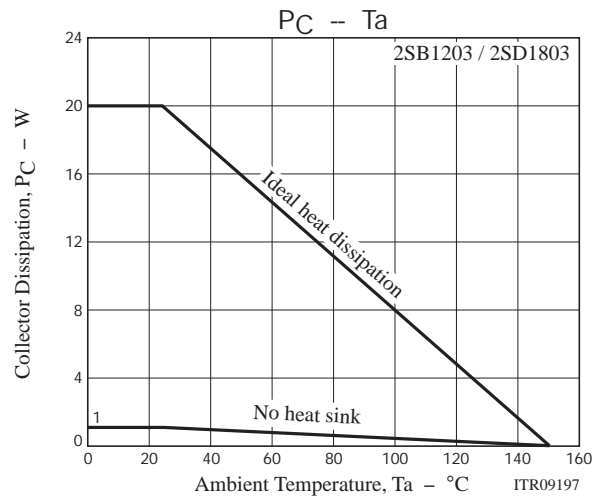
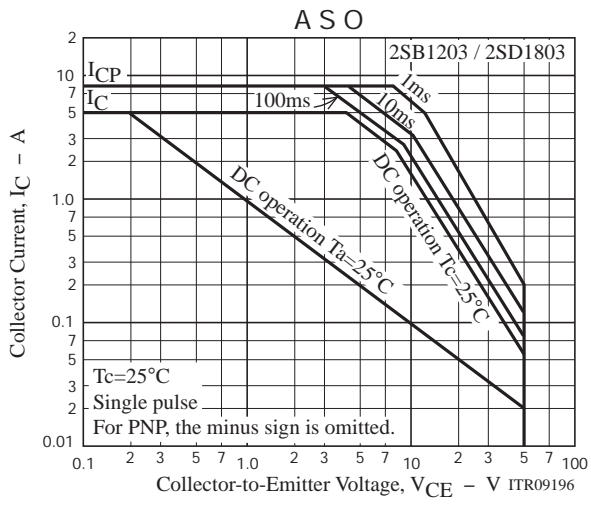
| Device | Package | Shipping | memo |
|---------------|---------|--------------|--------------------------|
| 2SB1203S-E | TP | 500pcs./bag | Pb Free |
| 2SB1203S-H | TP | 500pcs./bag | Pb Free and Halogen Free |
| 2SD1203T-E | TP | 500pcs./bag | Pb Free |
| 2SD1203T-H | TP | 500pcs./bag | Pb Free and Halogen Free |
| 2SB1803S-E | TP | 500pcs./bag | Pb Free |
| 2SB1803S-H | TP | 500pcs./bag | Pb Free and Halogen Free |
| 2SD1803T-E | TP | 500pcs./bag | Pb Free |
| 2SD1803T-H | TP | 500pcs./bag | Pb Free and Halogen Free |
| 2SB1203S-TL-E | TP-FA | 700pcs./reel | Pb Free |
| 2SB1203S-TI-H | TP-FA | 700pcs./reel | Pb Free and Halogen Free |
| 2SB1203T-TL-E | TP-FA | 700pcs./reel | Pb Free |
| 2SB1203T-TI-H | TP-FA | 700pcs./reel | Pb Free and Halogen Free |
| 2SB1803S-TL-E | TP-FA | 700pcs./reel | Pb Free |
| 2SB1803S-TI-H | TP-FA | 700pcs./reel | Pb Free and Halogen Free |
| 2SB1803T-TL-E | TP-FA | 700pcs./reel | Pb Free |
| 2SB1803T-TI-H | TP-FA | 700pcs./reel | Pb Free and Halogen Free |

2SB1203 / 2SD1803





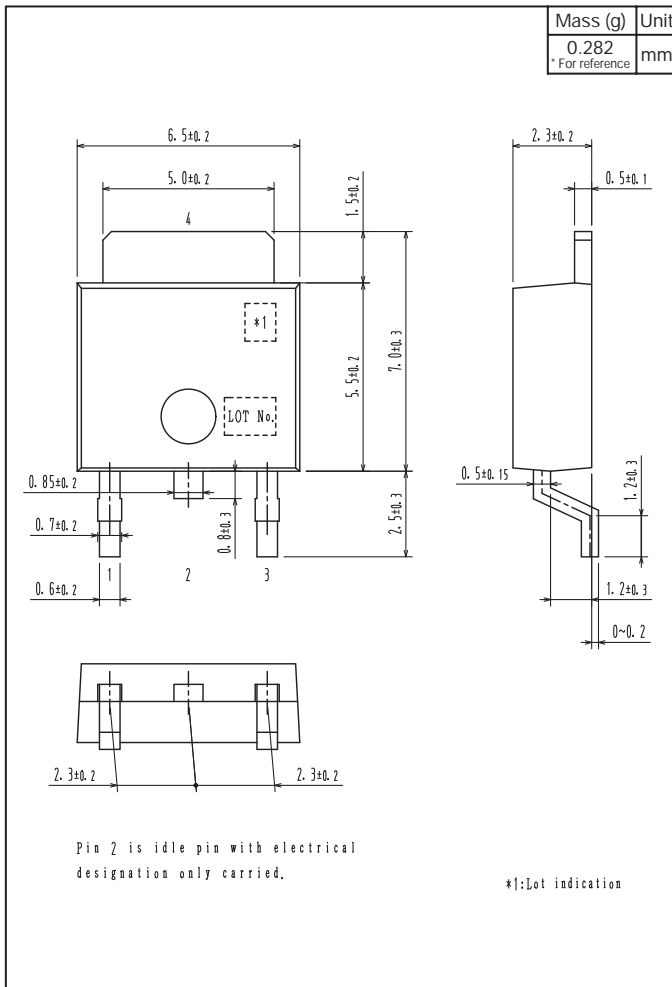
2SB1203 / 2SD1803



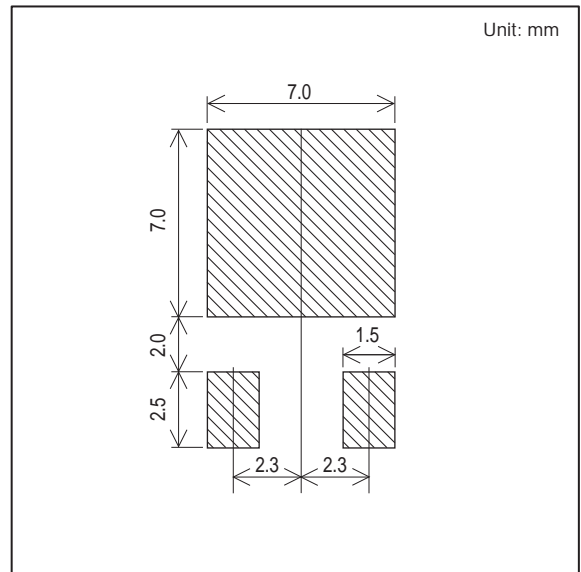
2SB1203 / 2SD1803

Outline Drawing

2SB1203S-TL-E, 2SB1203S-TI-H, 2SB1203T-TL-E, 2SB1203T-TI-H, 2SB1803S-TL-E, 2SB1803S-TI-H, 2SB1803T-TL-E, 2SB1803T-TI-H



Land Pattern Example



2SB1203 / 2SD1803

Bag Packing Specification

2SB1203S-E, 2SB1203S-H, 2SD1203T-E, 2SD1203T-H, 2SB1803S-E, 2SB1803S-H, 2SD1803T-E, 2SD1803T-H

1. Packing Format

| Package Name | Maximum Number of devices contained (pcs) | | | |
|--------------|---|------------|-------------|-------------|
| | Bag | Inner box | Outer box | |
| TP | 500 | B-1 | A-1 | A-2 |
| | | 10,000 | 50,000 | 30,000 |
| | Packing format (Dimensions:mm (external)) | | | |
| | | Inner box | Outer box | |
| | | B-1 | A-1 | A-2 |
| | | 445×225×55 | 470×250×300 | 470×250×190 |

2. Bag dimensions (unit:mm)



3. Bag label, Inner box label (unit:mm)



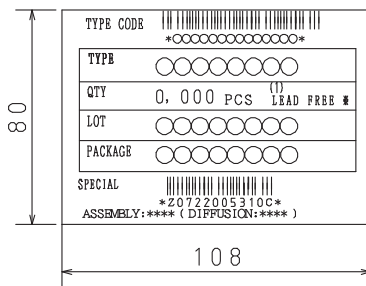
4. Outer box label (unit:mm)

It is a label at the time of factory shipments.
The form of a label may change in physical distribution process.

NOTE (1)

The LEAD FREE * description shows that the surface treatment of the terminal is lead free.

| Label | JEITA Phase |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3 |



2SB1203 / 2SD1803

Outline Drawing

2SB1203S-E, 2SB1203S-H, 2SD1203T-E, 2SD1203T-H, 2SB1803S-E, 2SB1803S-H, 2SD1803T-E, 2SD1803T-H



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