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|---|----------|---|
|  | No.2048A | <h2 style="margin: 0;">2SB1168/2SD1725</h2> <p style="margin: 0;">PNP/NPN Epitaxial Planar Silicon Transistors</p> <p style="margin: 0;">100V/4A Switching Applications</p> |
|---|----------|---|

Applications

- . Relay drivers, high-speed inverters, converters

Features

- . Low collector-to-emitter saturation voltage
- . High f_T
- . Excellent linearity of h_{FE}
- . Fast switching time

(): 2SB1168

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

| | | | |
|------------------------------|-----------|------------------------|------------------|
| Collector-to-Base Voltage | V_{CB0} | (-)120 | V |
| Collector-to-Emitter Voltage | V_{CEO} | (-)100 | V |
| Emitter-to-Base Voltage | V_{EBO} | (-)6 | V |
| Collector Current | I_C | (-)4 | A |
| Collector Current (Pulse) | I_{CP} | (-)8 | A |
| Collector Dissipation | P_C | 1.2 | W |
| | | $T_c=25^\circ\text{C}$ | 20 |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics at $T_a=25^\circ\text{C}$

| | | | min | typ | max | unit |
|--------------------------|---------------|--|-----|--------|--------|---------------|
| Collector Cutoff Current | I_{CB0} | $V_{CB}=(-)100\text{V}, I_E=0$ | | | (-)1 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB}=(-)4\text{V}, I_C=0$ | | | (-)1 | μA |
| DC Current Gain | $h_{FE}(1)$ | $V_{CE}=(-)5\text{V}, I_C=(-)0.5\text{A}$ | 70* | | 400* | |
| | $h_{FE}(2)$ | $V_{CE}=(-)5\text{V}, I_C=(-)3\text{A}$ | 40 | | | |
| Gain-Bandwidth Product | f_T | $V_{CE}=(-)10\text{V}, I_C=(-)0.5\text{A}$ | | 180 | | MHz |
| | | | | (130) | | MHz |
| Output Capacitance | c_{ob} | $V_{CB}=(-)10\text{V}, f=1\text{MHz}$ | | 40 | | pF |
| | | | | (65) | | pF |
| C-E Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)2\text{A}, I_B=(-)0.2\text{A}$ | | 150 | 400 | mV |
| | | | | (-200) | (-500) | mV |

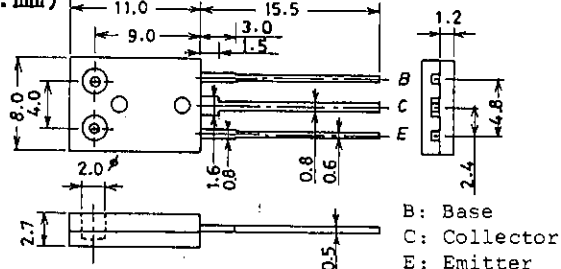
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*: The 2SB1168/2SD1725 are classified by 0.5A h_{FE} as follows:

| | | | | | | | | | | | |
|----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|
| 70 | Q | 140 | 100 | R | 200 | 140 | S | 280 | 200 | T | 400 |
|----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|

Package Dimensions 2043A

(unit:mm)

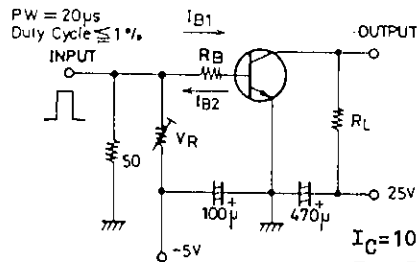


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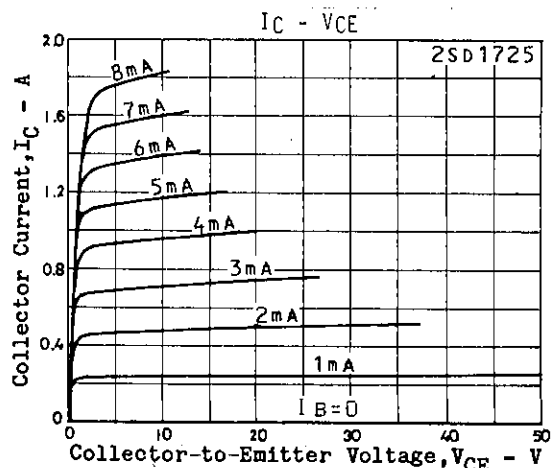
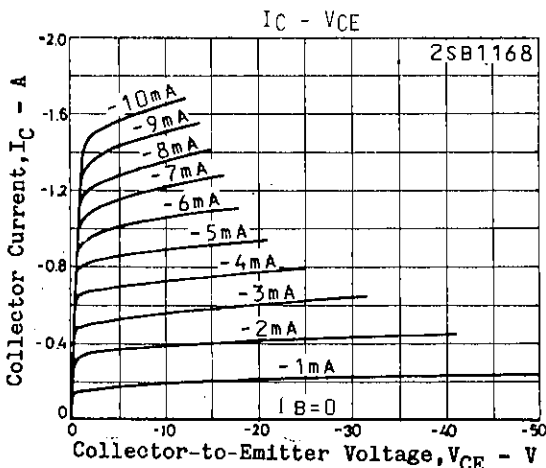
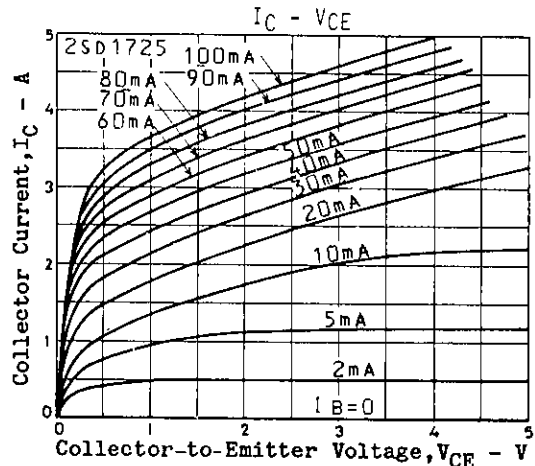
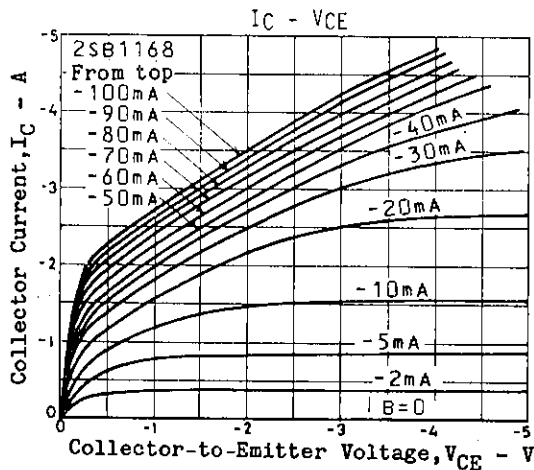
| | | | min | typ | max | unit |
|------------------------|---------------|-----------------------------|--------|--------|--------|------|
| B-E Saturation Voltage | $V_{BE(sat)}$ | $I_C=(-)2A, I_B=(-)0.2A$ | | (-)0.9 | (-)1.2 | V |
| C-B Breakdown Voltage | $V_{(BR)CBO}$ | $I_C=(-)10\mu A, I_E=0$ | (-)120 | | | V |
| C-E Breakdown Voltage | $V_{(BR)CEO}$ | $I_C=(-)1mA, R_{BE}=\infty$ | (-)100 | | | V |
| E-B Breakdown Voltage | $V_{(BR)EBO}$ | $I_E=(-)10\mu A, I_C=0$ | (-)6 | | | V |
| Turn-on Time | t_{on} | See specified Test Circuit. | | 100 | | ns |
| Storage Time | t_{stg} | " | | (100) | | ns |
| | | | | 900 | | ns |
| Fall Time | t_f | " | | (800) | | ns |
| | | | | 50 | | ns |
| | | | | (50) | | ns |

Switching Time Test Circuit

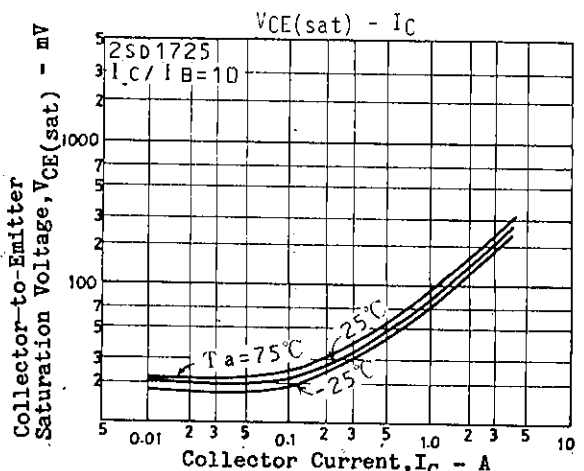
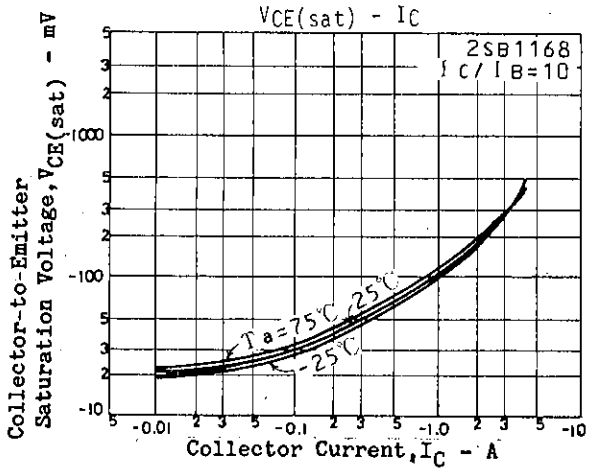
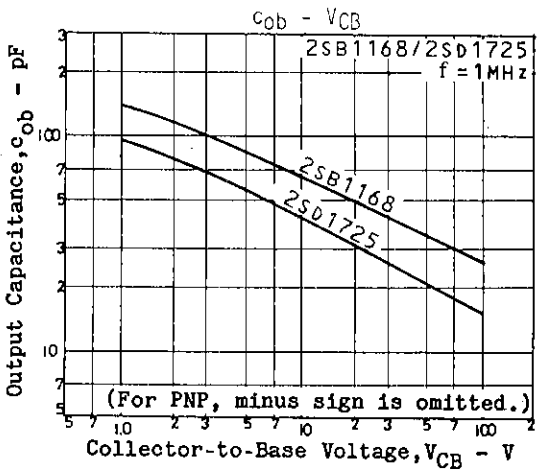
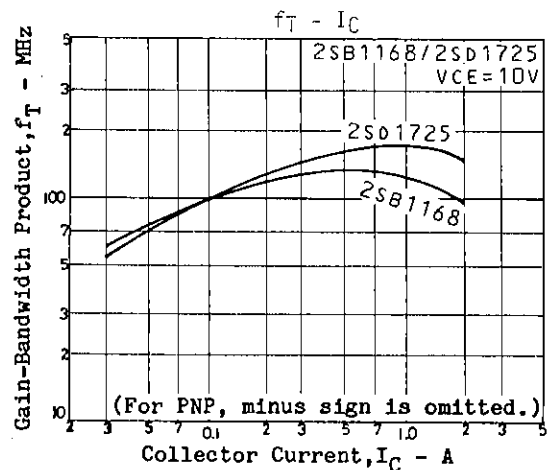
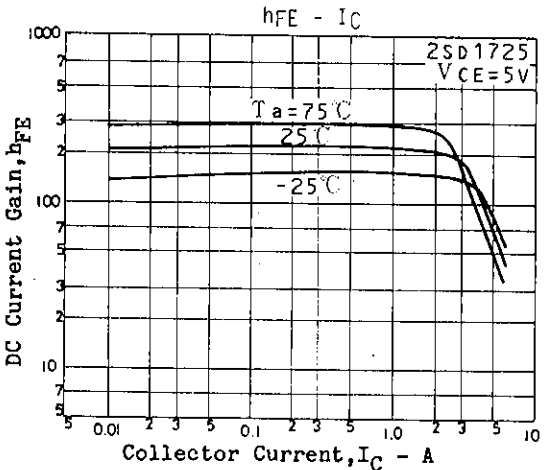
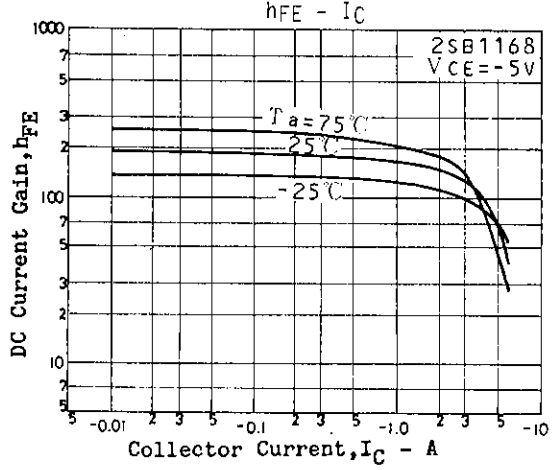
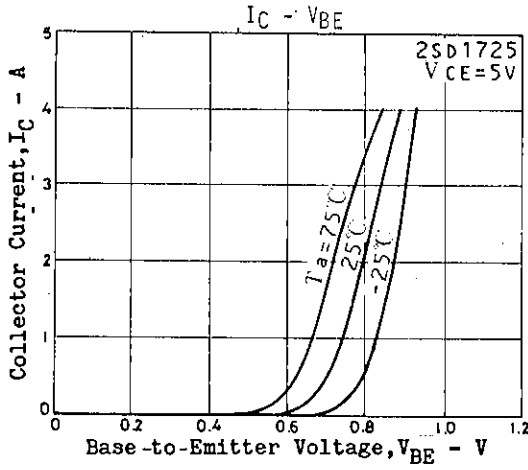
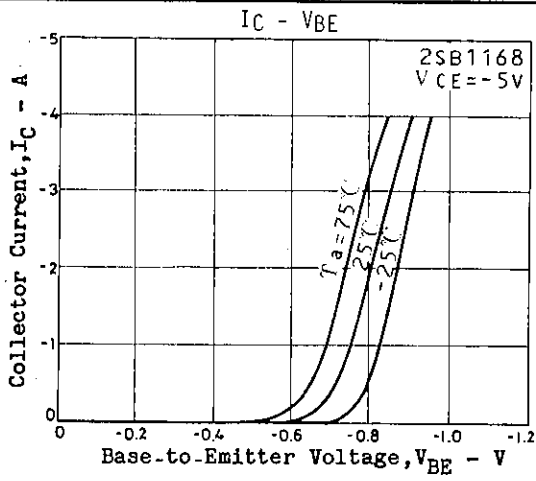


$I_C=10I_{B1}=-10I_{B2}=2A$
For PNP, the polarity is reversed.

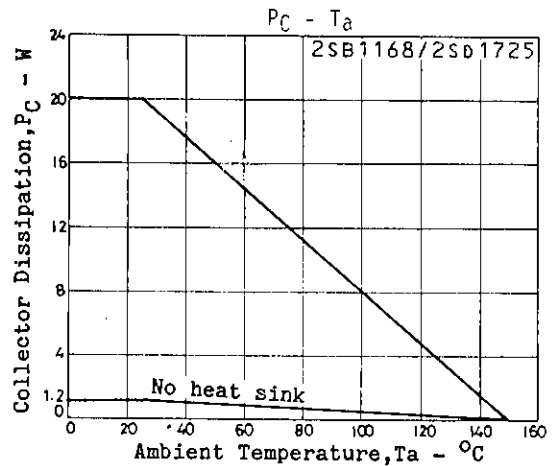
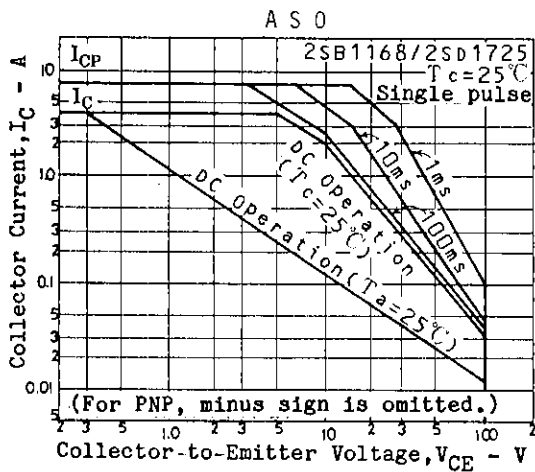
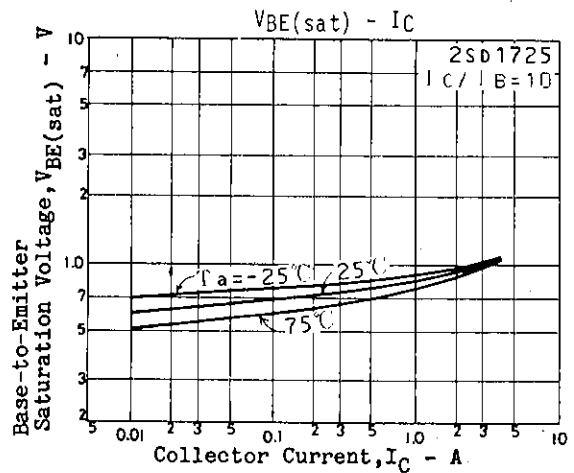
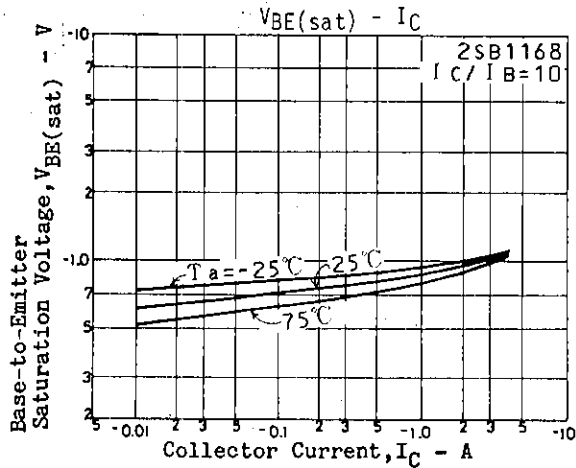
Unit (Resistance : Ω , Capacitance : F)



2SB1168/2SD1725



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