



## 2SA1415/2SC3645

### High-Voltage Switching, Predriver Applications

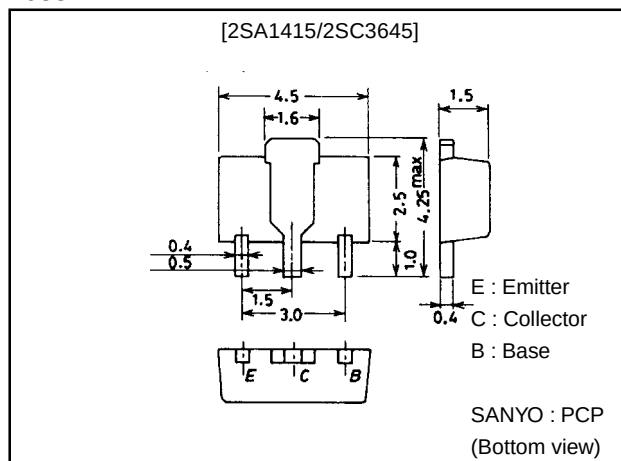
#### Features

- Adoption of FBET process.
- High breakdown voltage ( $V_{CEO}=160V$ ).
- Excellent linearity of  $h_{FE}$  and small  $C_{ob}$ .
- Fast switching speed.
- Very small size marking it easy to provide high-density, small-sized hybrid ICs.

#### Package Dimensions

unit:mm

2038



() : 2SA1415

#### Specifications

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

| Parameter                    | Symbol    | Conditions                                           | Ratings     | Unit |
|------------------------------|-----------|------------------------------------------------------|-------------|------|
| Collector-to-Base Voltage    | $V_{CBO}$ |                                                      | (-)180      | V    |
| Collector-to-Emitter Voltage | $V_{CEO}$ |                                                      | (-)160      | V    |
| Emitter-to-Base Voltage      | $V_{EBO}$ |                                                      | (-)5        | V    |
| Collector Current            | $I_C$     |                                                      | (-)140      | mA   |
| Collector Current (Pulse)    | $I_{CP}$  |                                                      | (-)200      | mA   |
| Collector Dissipation        | $P_{C1}$  |                                                      | 500         | mW   |
|                              | $P_{C2}$  | Moutned on ceramic board (250mm <sup>2</sup> ×0.8mm) | 1.3         | W    |
| Junction Temperature         | $T_j$     |                                                      | 150         | °C   |
| Storage Temperature          | $T_{stg}$ |                                                      | -55 to +150 | °C   |

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

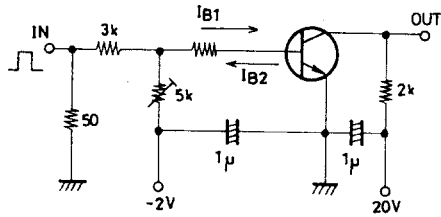
| Parameter                               | Symbol        | Conditions                   | Ratings |         |        | Unit |
|-----------------------------------------|---------------|------------------------------|---------|---------|--------|------|
|                                         |               |                              | min     | typ     | max    |      |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB}=(-)80V, I_E=0$       |         |         | (-)100 | nA   |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=(-)4V, I_C=0$        |         |         | (-)100 | nA   |
| DC Current Gain                         | $h_{FE}$      | $V_{CE}=(-)5V, I_C=(-)10mA$  | 100*    |         | 400*   |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=(-)10V, I_C=(-)10mA$ |         | 150     |        | MHz  |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=(-)10V, f=1MHz$      |         | (4.0)   |        | pF   |
|                                         |               |                              |         | 3.0     |        | pF   |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=(-)50mA, I_B=(-)5mA$    |         | (-0.14) | (-0.4) | V    |
|                                         |               |                              |         | 0.07    | 0.3    | V    |
| Turn-ON Time                            | $t_{on}$      | See sepcified Test Circuit.  |         | 0.1     |        | μs   |
| Storage Time                            | $t_{stg}$     | See sepcified Test Circuit.  |         | 1.5     |        | μs   |
| Fall Time                               | $t_f$         | See sepcified Test Circuit.  |         | 0.1     |        | μs   |

\* : The 2SA1415/2SC3645 are classified by 10mA  $h_{FE}$  as follows :

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

Marking 2SA1415 : AA  $h_{FE}$  rank : R, S, T  
 2SC3645 : CA

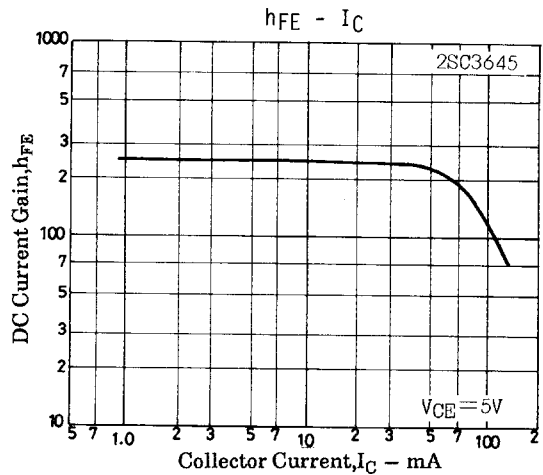
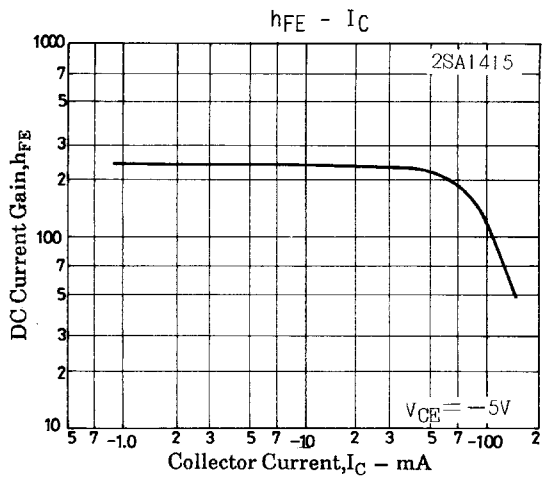
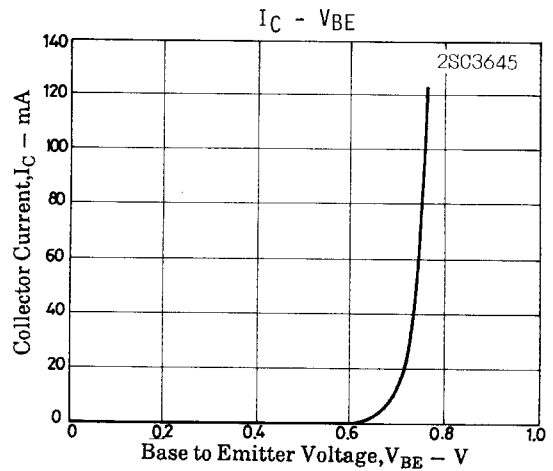
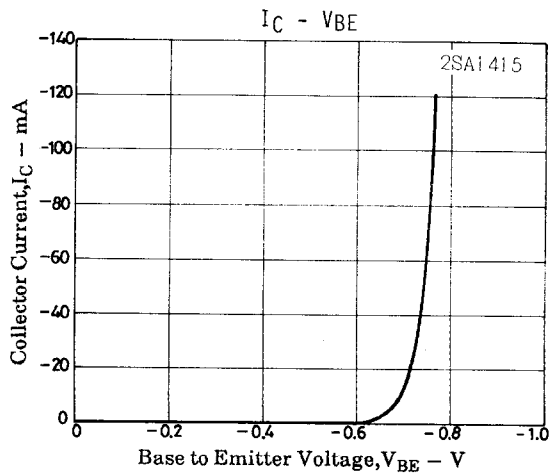
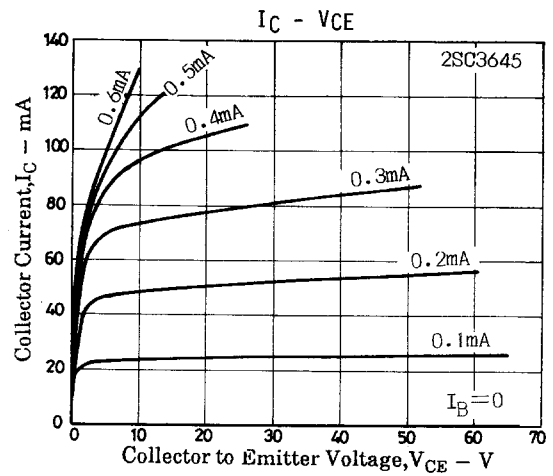
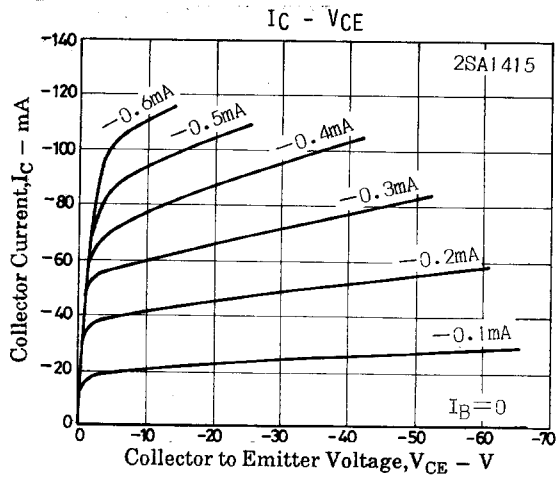
Switching Time Test Circuit



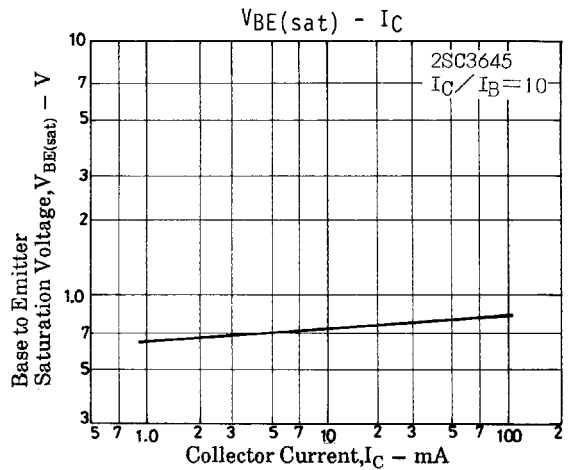
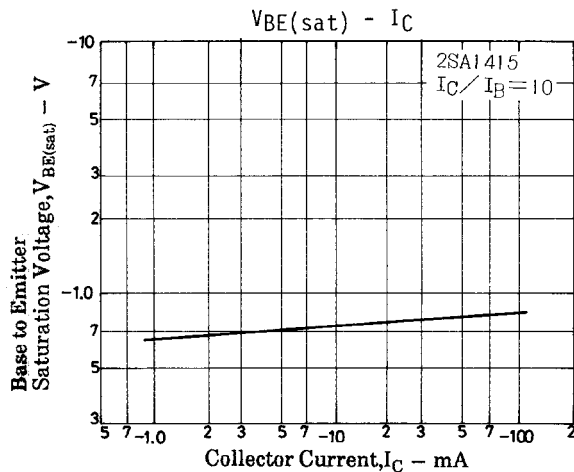
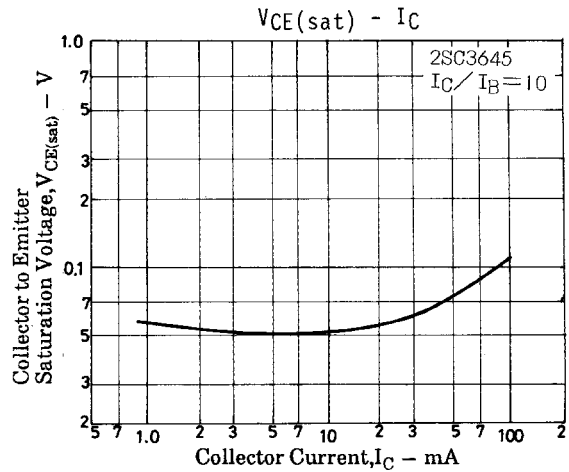
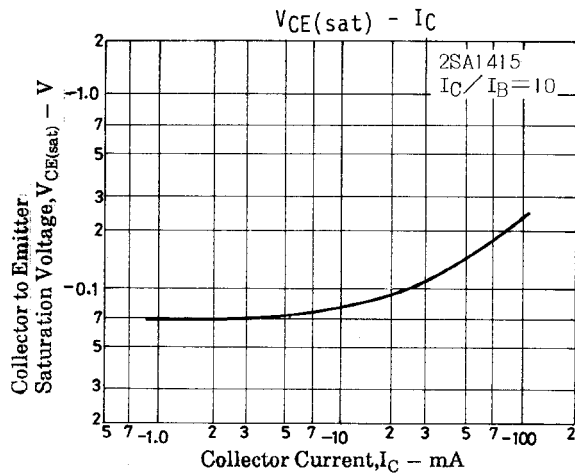
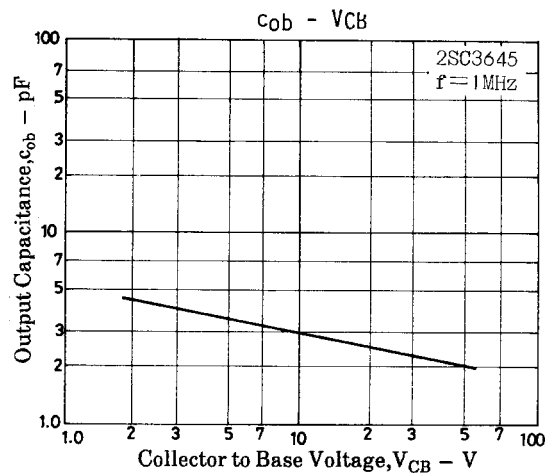
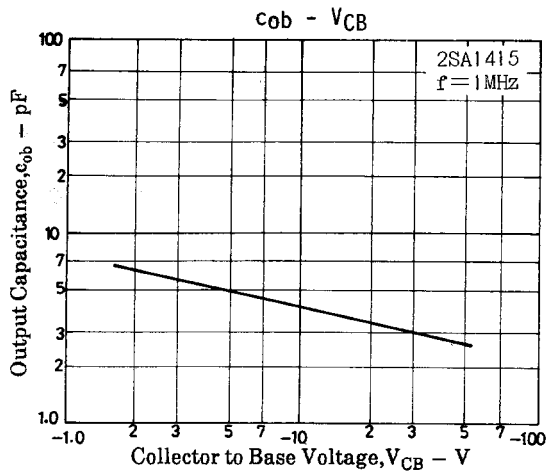
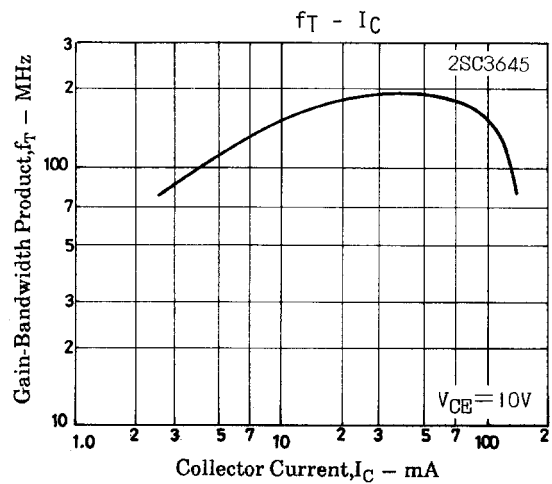
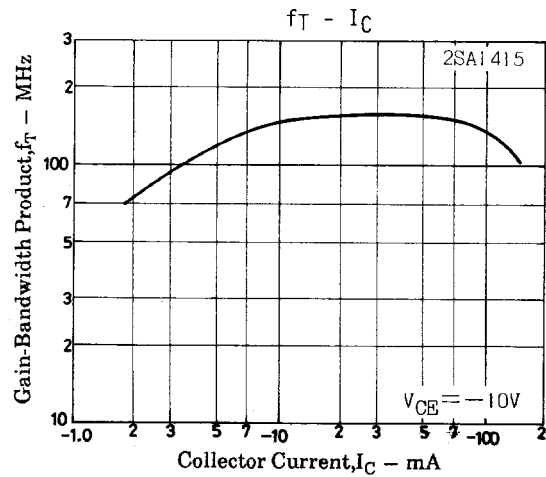
$$I_C = 10I_{B1} = 10I_{B2} = 10\text{mA}$$

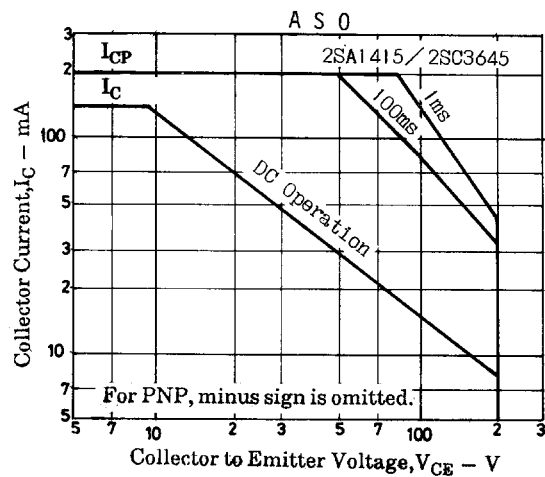
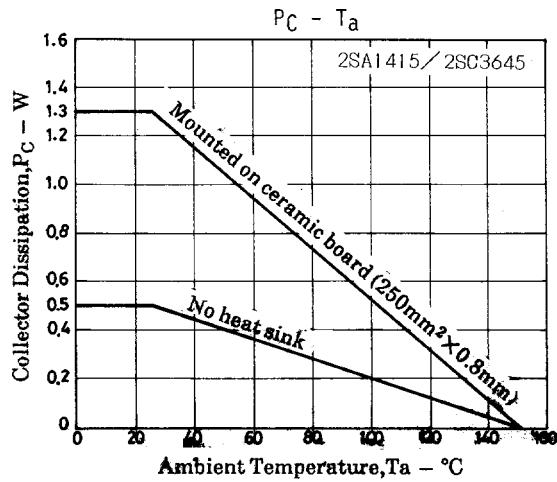
(For PNP, the polarity is reversed)

Unit (resistance :  $\Omega$ , capacitance : F)



# 2SA1415/2SC3645





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