



## 2SA1415/2SC3645

### High-Voltage Switching, Predriver Applications

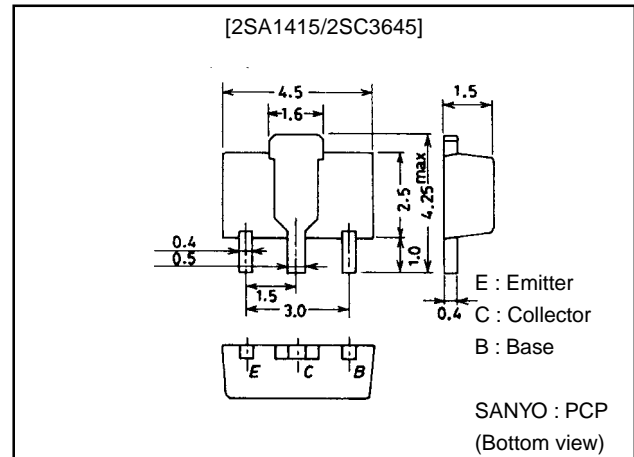
#### Features

- 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	$PC1$		500	mW
	$PC2$	Mounted on ceramic board (250mm <sup>2</sup> ×0.8mm)	1.3	W
Junction Temperature	$T_j$		150	$^\circ C$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ C$

##### 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 specified Test Circuit.		0.1		$\mu s$
Storage Time	$t_{stg}$	See specified Test Circuit.		1.5		$\mu s$
Fall Time	$t_f$	See specified Test Circuit.		0.1		$\mu s$

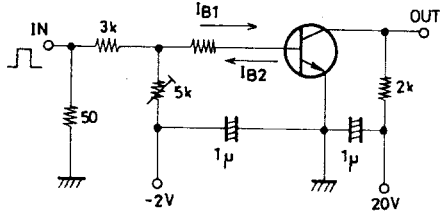
\* : The 2SA1415/2SC3645 are classified by 10mA  $h_{FE}$  as follows :

100	R	200	140	S	280	200	T	400
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Marking 2SA1415 : AA                       $h_{FE}$  rank : R, S, T  
 2SC3645 : CA

# 2SA1415/2SC3645

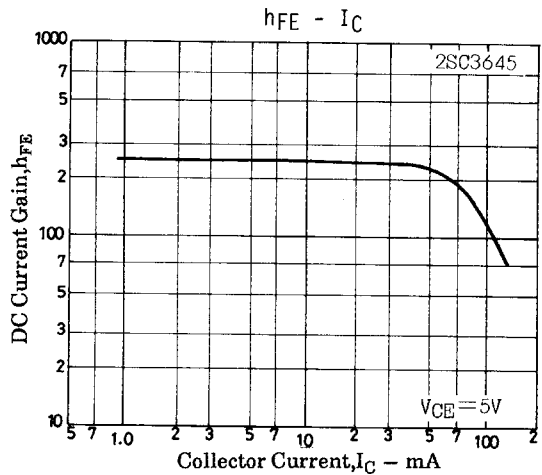
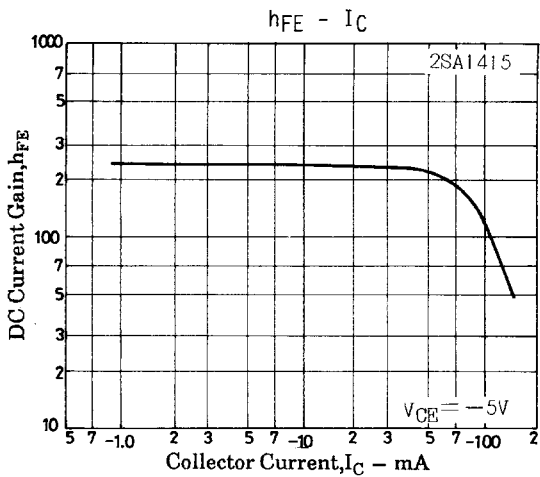
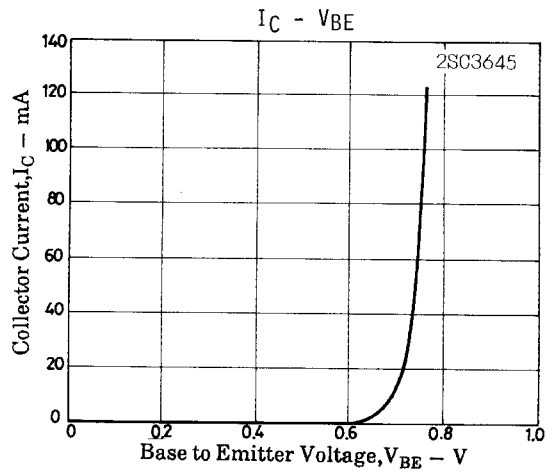
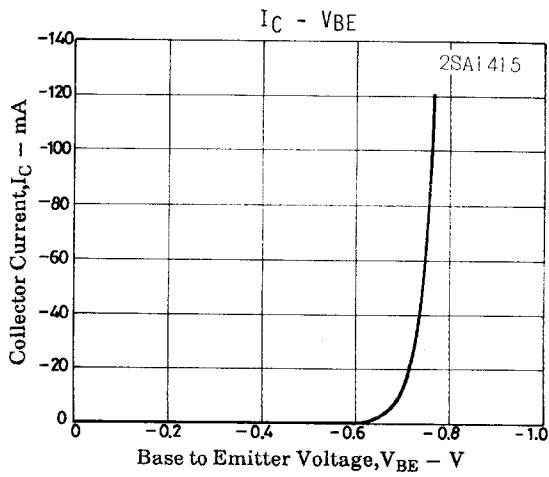
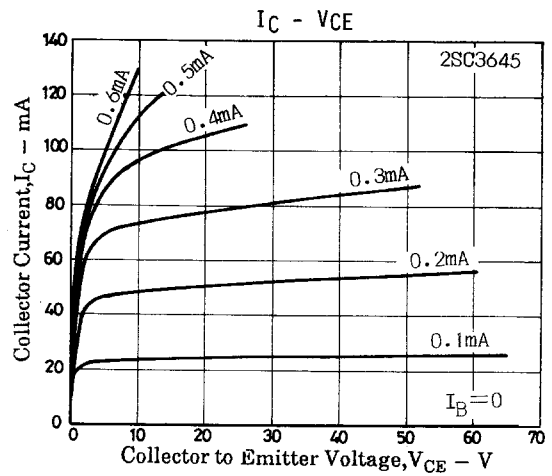
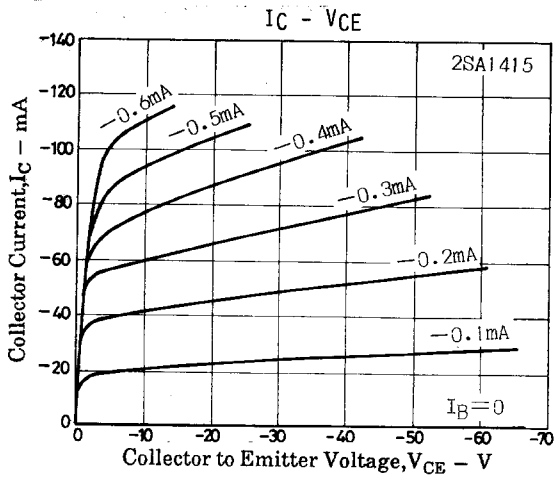
## Switching Time Test Circuit



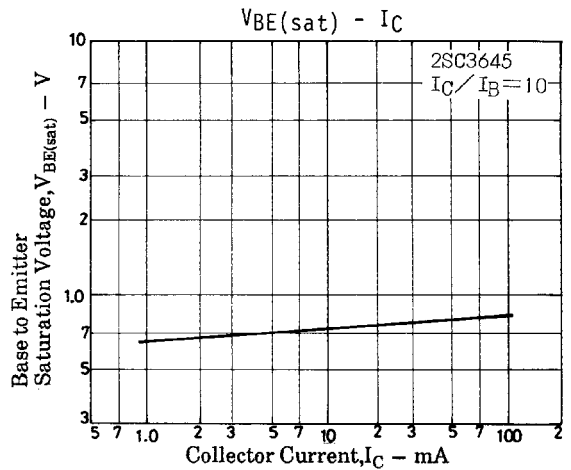
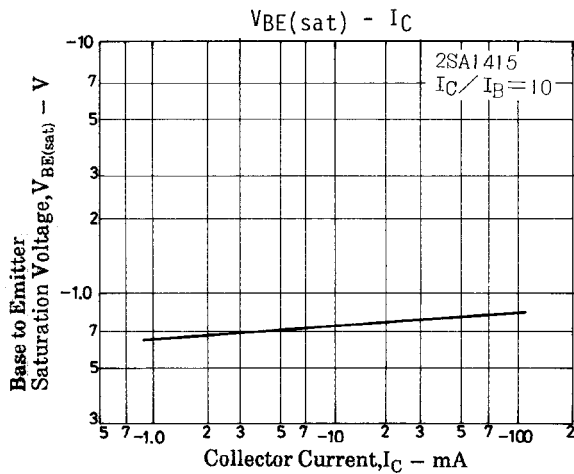
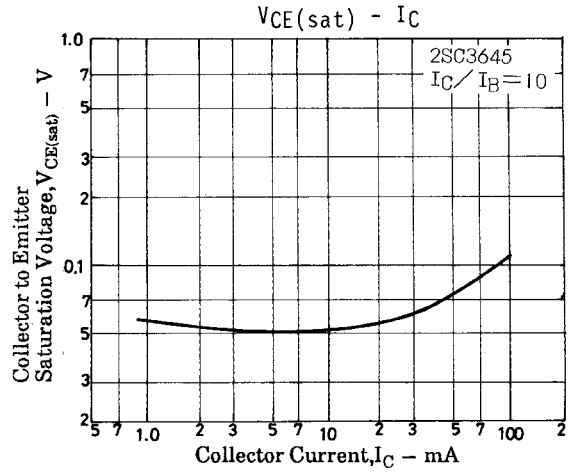
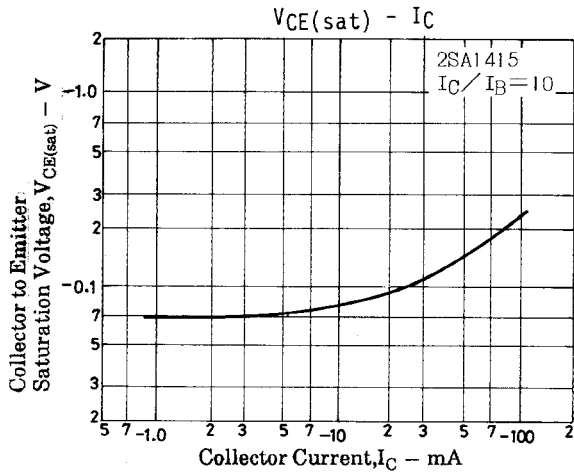
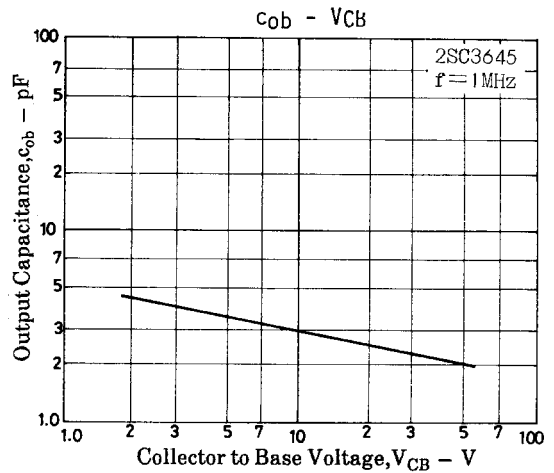
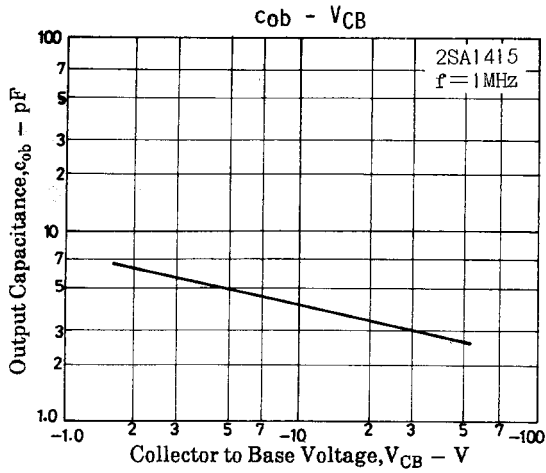
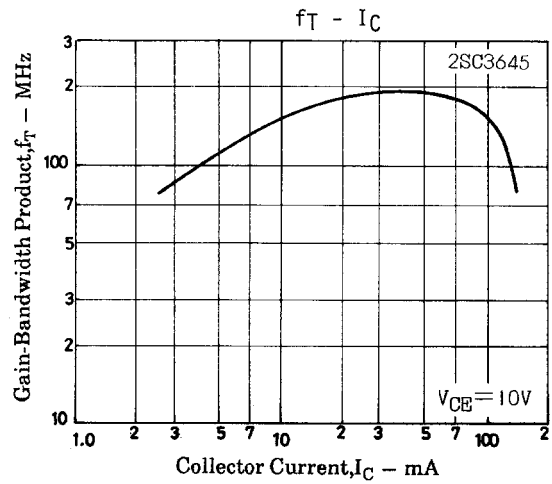
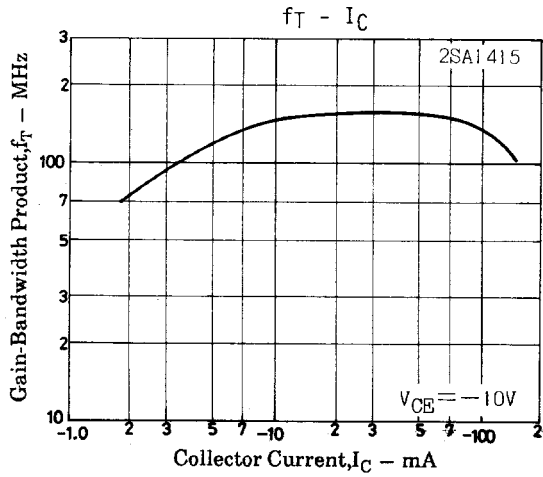
$$I_C = 10I_{B1} = 10I_{B2} = 10\text{mA}$$

(For PNP, the polarity is reversed)

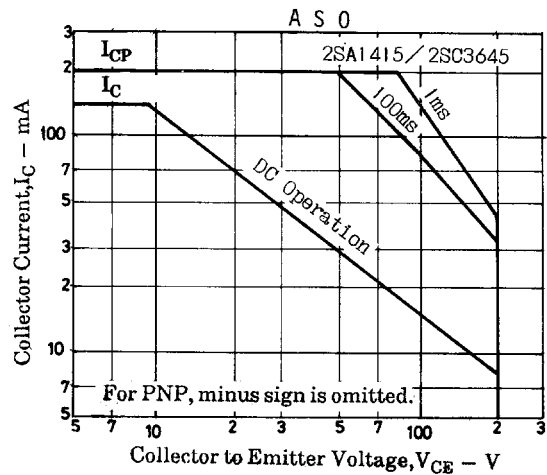
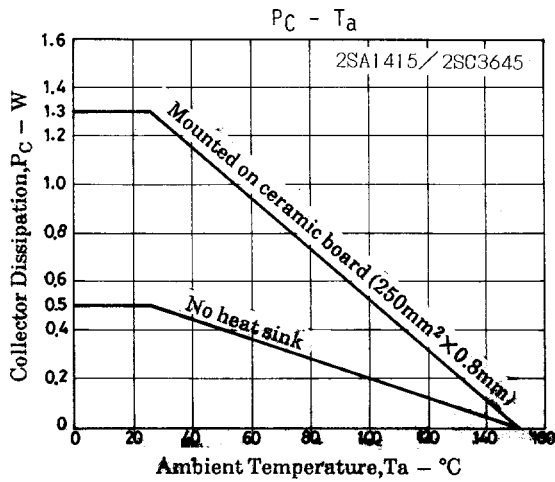
Unit (resistance :  $\Omega$ , capacitance : F)



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