

# 2SA1416/2SC3646



## High-Voltage Switching Applications

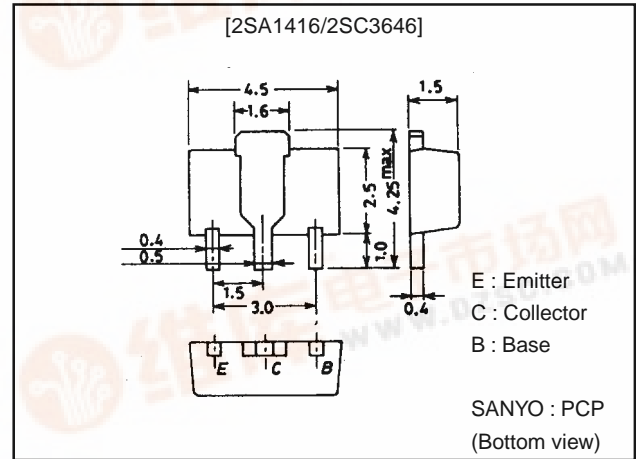
### Features

- Adoption of FBET, MBIT processes.
- High breakdown voltage and large current capacity.
- Fast switching time.
- Very small size making it easy to provide high-density, small-sized hybrid ICs.

### Package Dimensions

unit:mm

2038



( ) : 2SA1416

### Specifications

#### Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
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	$I_C$		(-)1	A
Collector Current (Pulse)	$I_{CP}$		(-)2	A
Collector Dissipation	$P_C$		500	mW
		Mounted 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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)100V, I_E = 0$			(-)100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4V, I_C = 0$			(-)100	nA
DC Current Gain	$h_{FE}$	$V_{CE} = (-)5V, I_C = (-)100mA$	100*		400*	
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)10V, I_C = (-)100mA$		120		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (-)10V, f = 1MHz$		(13)		pF
				8.5		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = (-)400mA, I_B = (-)40mA$		(-0.2)	(-0.6)	V
				0.1	0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = (-)400mA, I_B = (-)40mA$		(-)0.85	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = (-)10\mu A, I_E = 0$	(-)120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = (-)1mA, R_{BE} = \infty$	(-)100			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = (-)10\mu A, I_C = 0$	(-)6			V
Turn-ON Time	$t_{on}$	See specified Test Circuit.		(80)		ns
				80		ns
Storage Time	$t_{stg}$	See specified Test Circuit.		(700)		ns
				850		ns
Fall Time	$t_f$	See specified Test Circuit.		(40)		ns
				50		ns



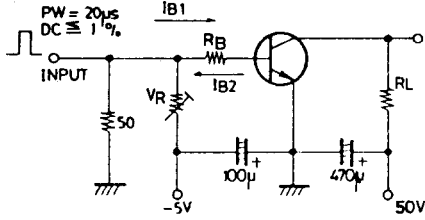
# 2SA1416/2SC3646

\* : The 2SA1416/2SC3646 are classified by 100mA  $h_{FE}$  as follows :

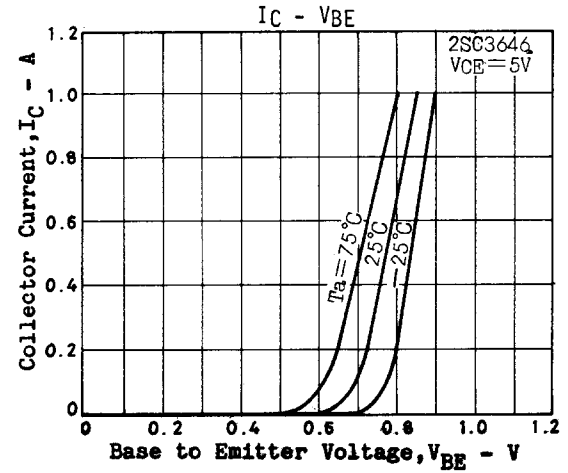
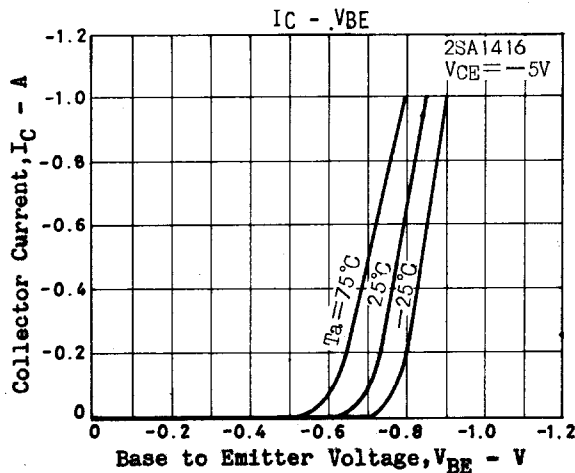
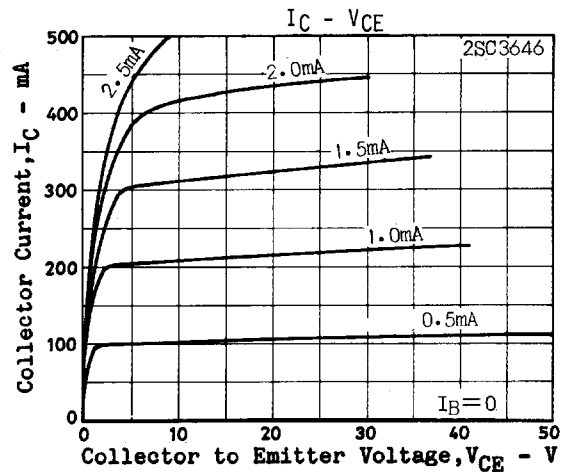
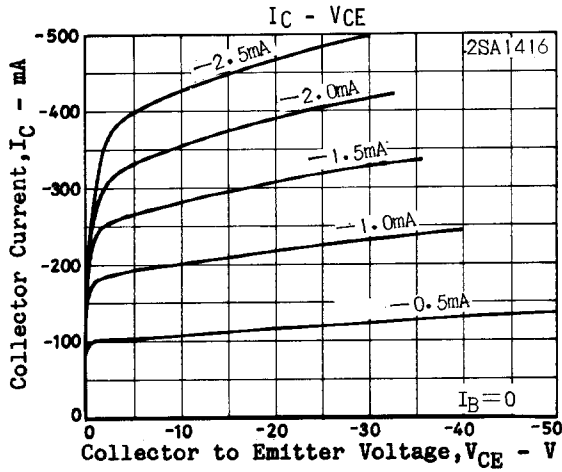
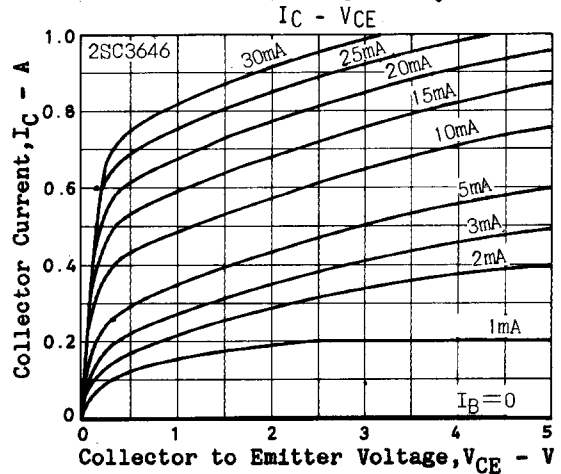
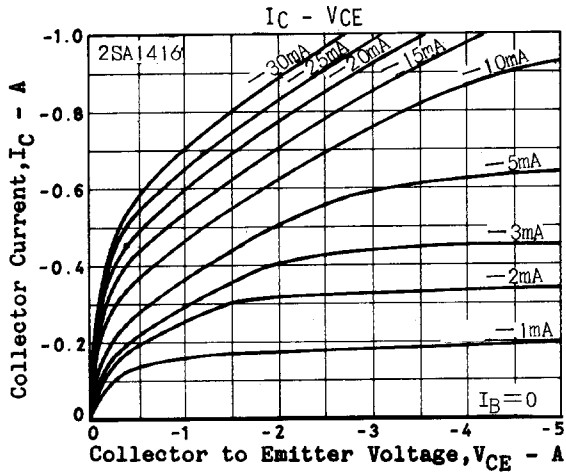
100	R	200	140	S	280	200	T	400
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Marking      2SA1416 : AB       $h_{FE}$  rank : R, S, T  
 2SC3646 : CB

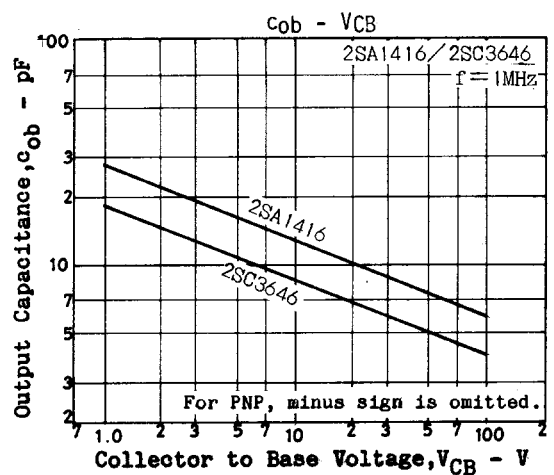
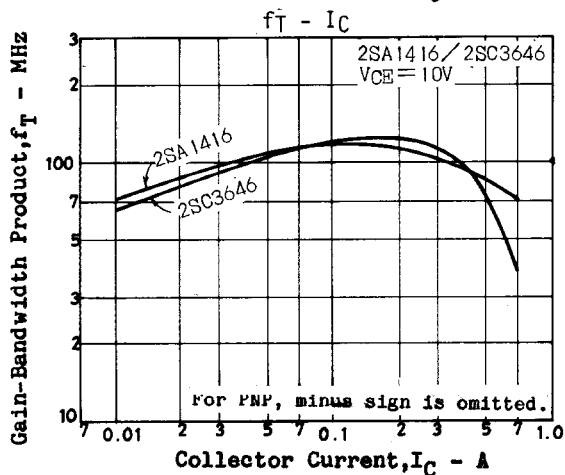
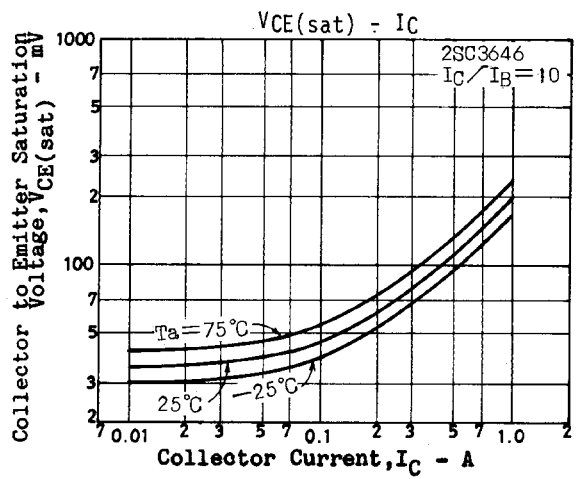
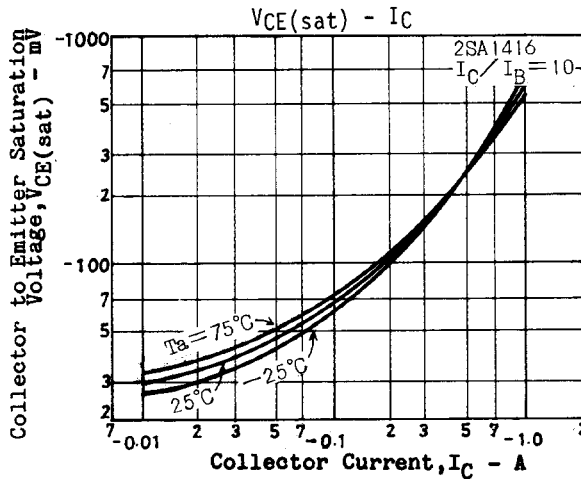
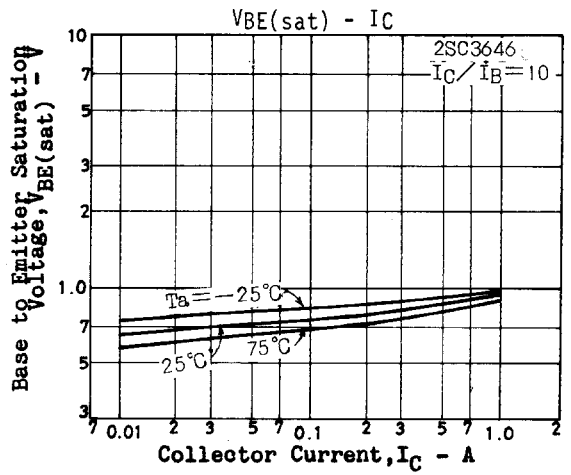
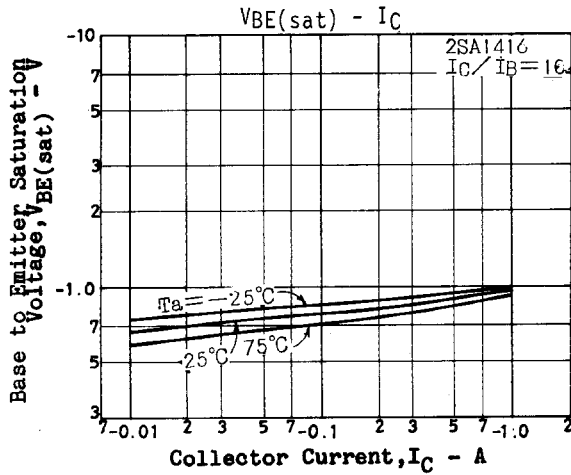
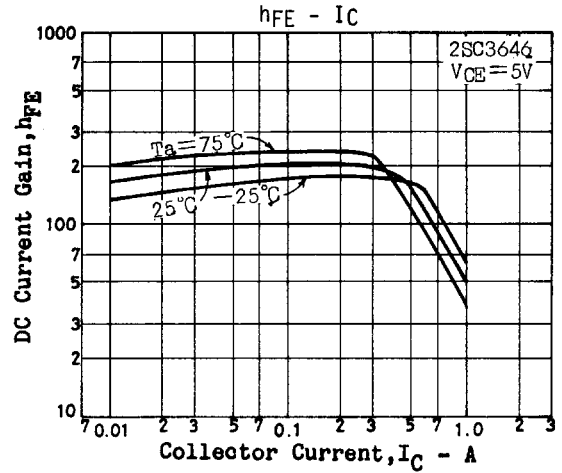
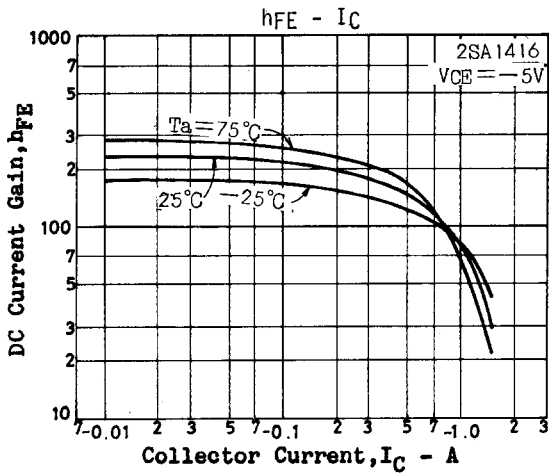
## Switching Time Test Circuit



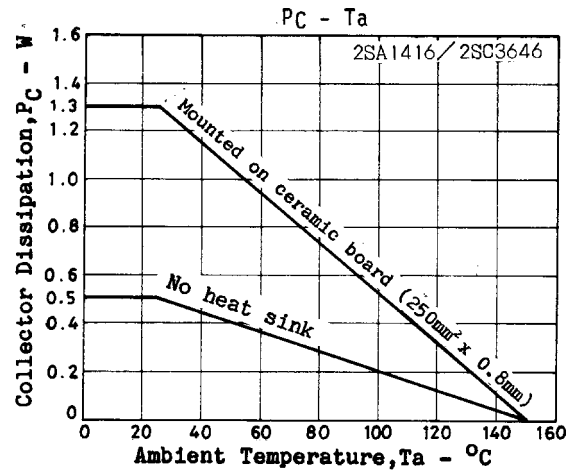
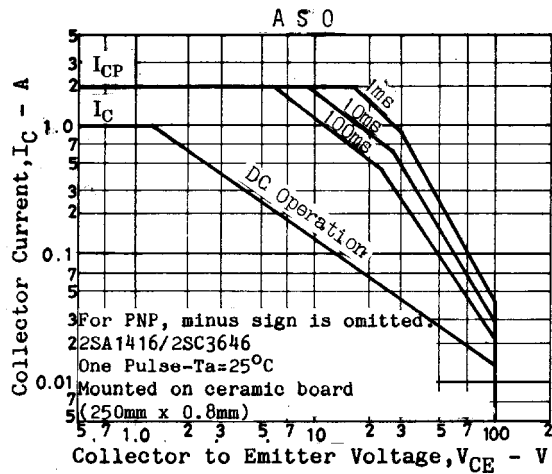
$10I_{B1} = -10I_{B2} = I_C = 400\text{mA}$   
 (For PNP, the polarity is reversed)  
 Unit (resistance :  $\Omega$ , capacitance : F)



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