



# 2SA1416/2SC3646

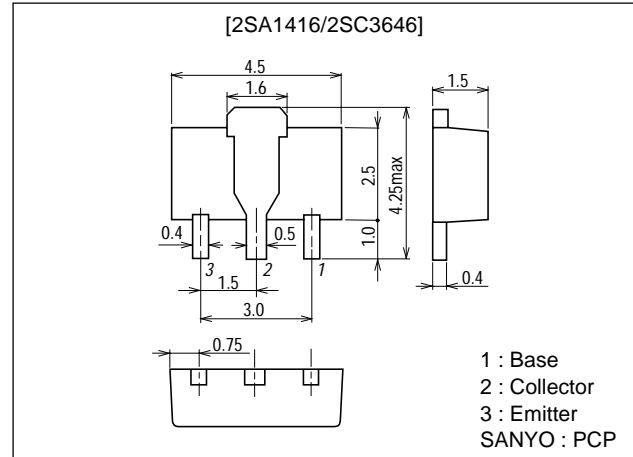
## High-Voltage Switching Applications

### Features

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

### Package Dimensions

unit:mm  
2038A



( ) : 2SA1416

### Specifications

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

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
		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  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=(-)100\text{V}, I_E=0$			(-)100	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=(-)4\text{V}, I_C=0$			(-)100	nA
DC Current Gain	$h_{FE}$	$V_{CE}=(-)5\text{V}, I_C=(-)100\text{mA}$	100*		400*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)10\text{V}, I_C=(-)100\text{mA}$		120		MHz

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

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Rank	R	S	T
$h_{FE}$	100 to 200	140 S 280	200 to 400

Marking  
2SA1416 : AB  
2SC3646 : CB  
 $h_{FE}$  rank : R, S, T

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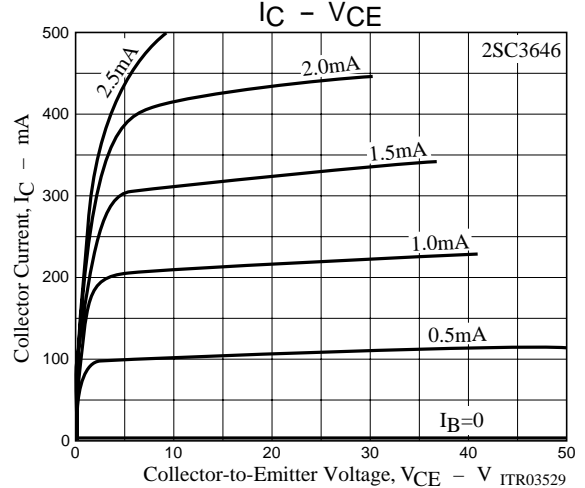
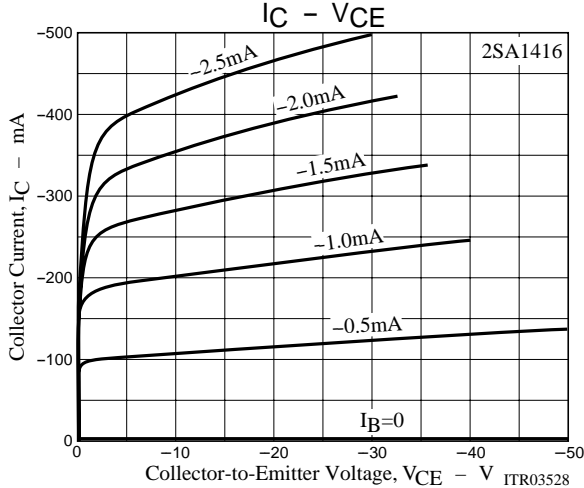
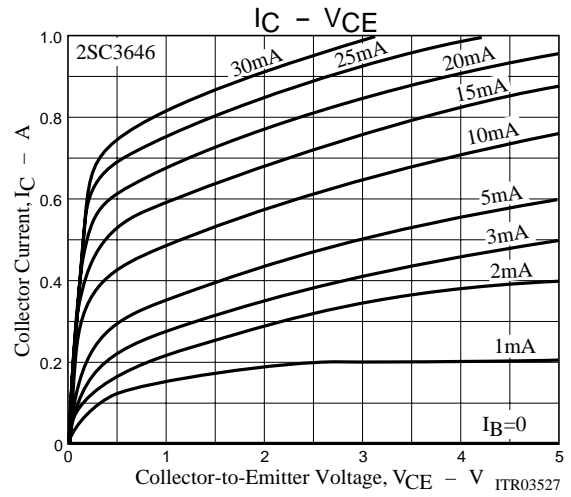
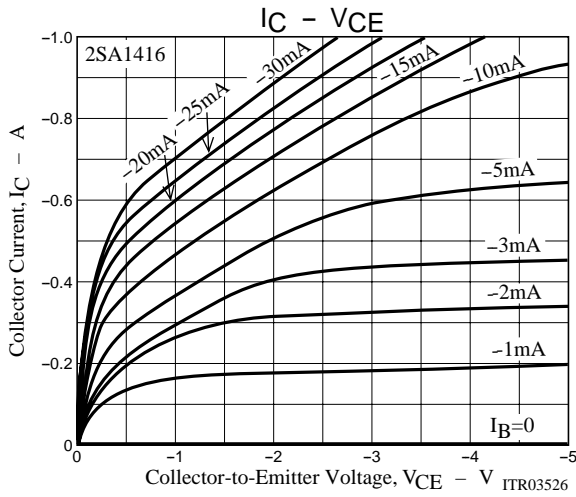
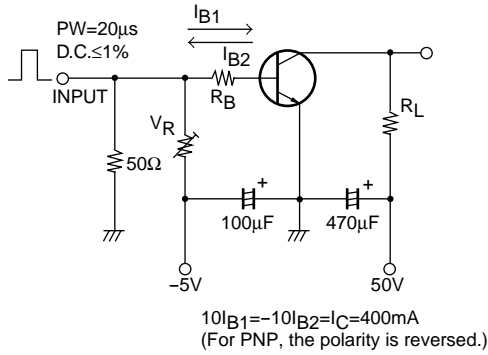
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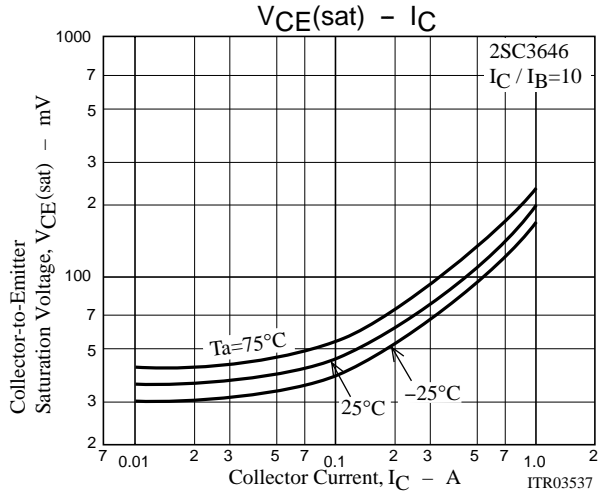
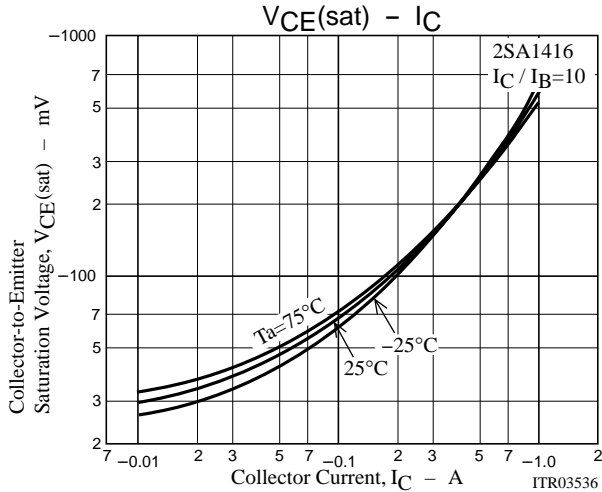
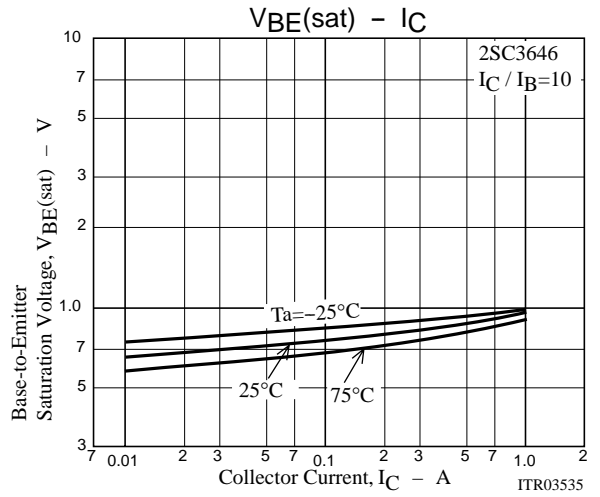
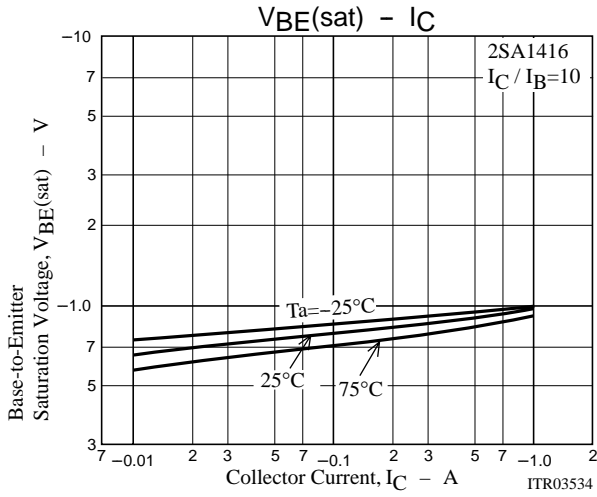
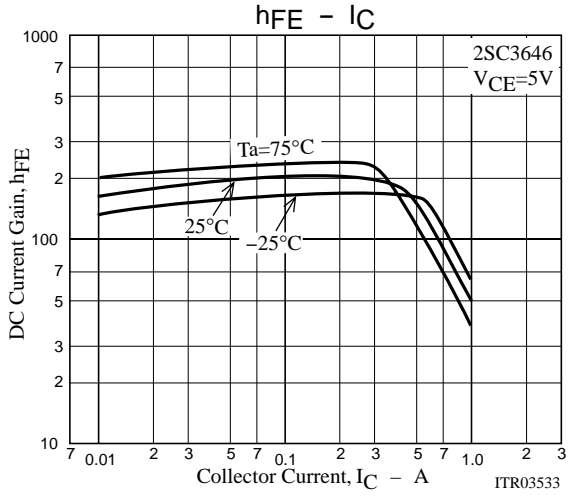
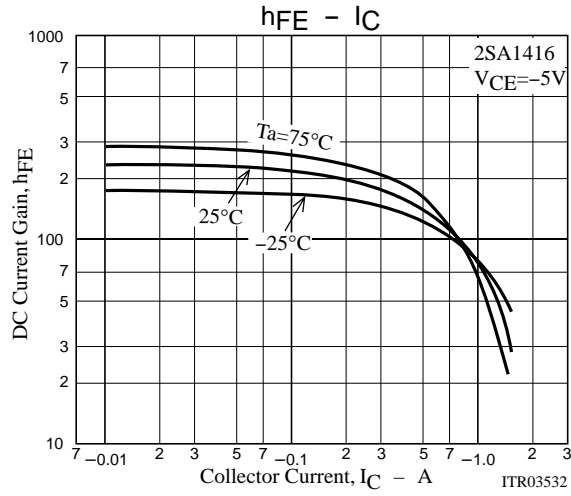
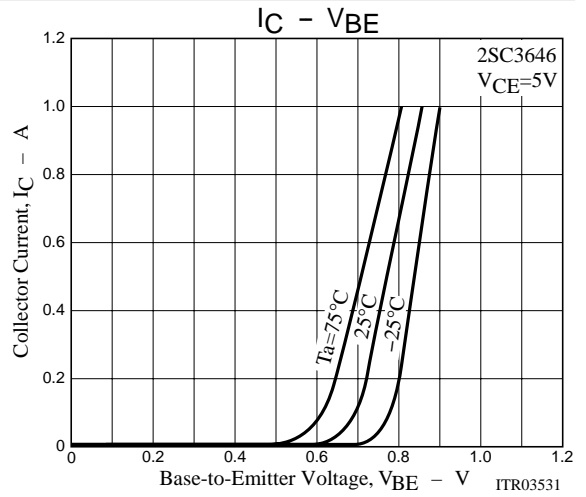
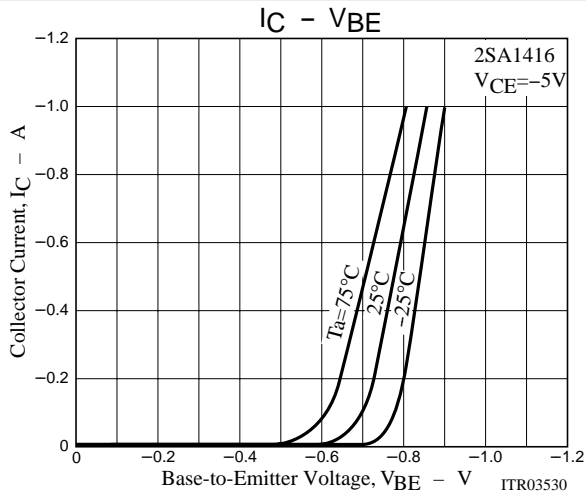
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10V, f=1MHz$		(13)		pF
				8.5		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)400mA, I_B=(-)40mA$		(-0.2)	(-0.6)	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)400mA, I_B=(-)40mA$		0.1	0.4	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

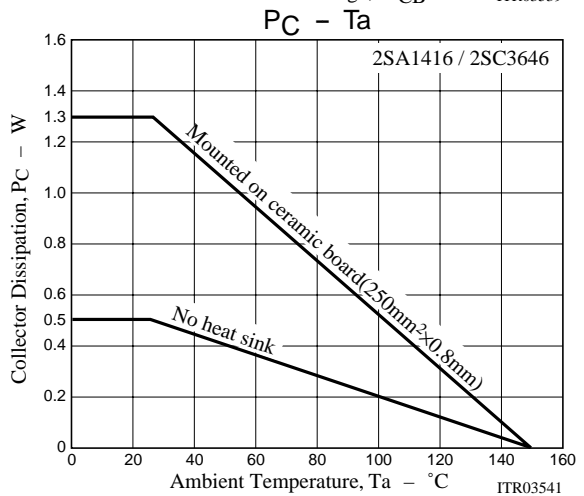
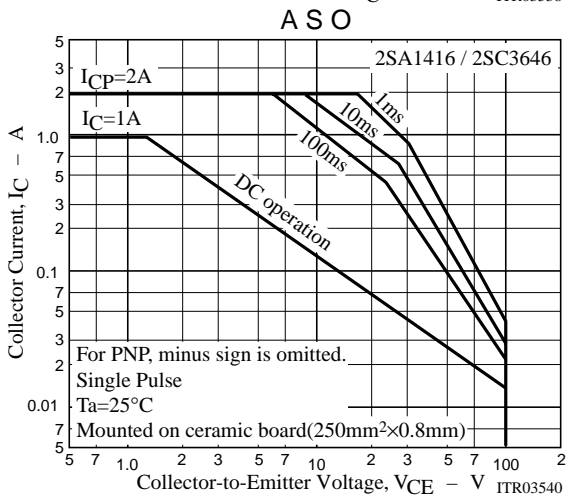
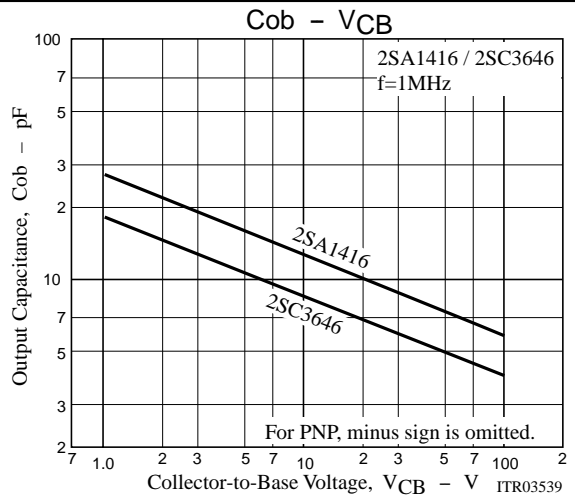
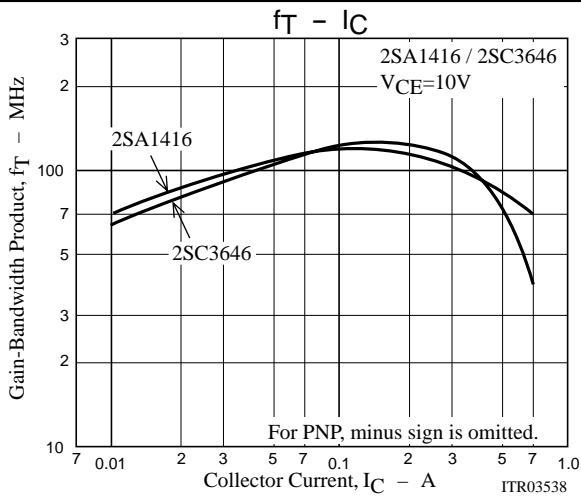
## Switching Time Test Circuit



# 2SA1416/2SC3646



## 2SA1416/2SC3646



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