



## 2SA1685/2SC4443

### High-Speed Switching Applications

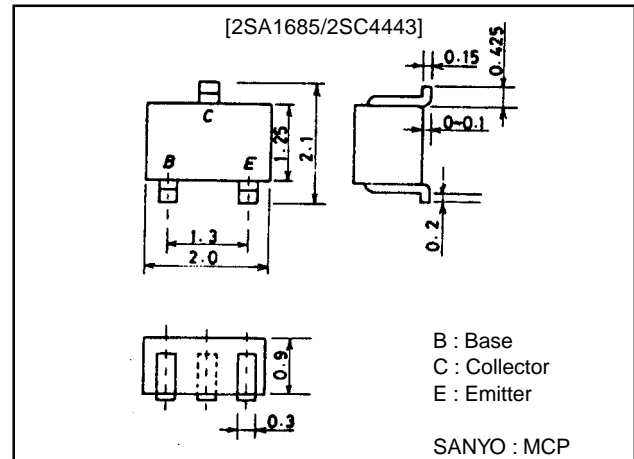
#### Features

- Fast switching speed.
- High gain-bandwidth product.
- Low saturation voltage.

#### Package Dimensions

unit:mm

2059



() : 2SA1685

#### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-)40	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-)20	V
Emitter-to-Base Voltage	$V_{EBO}$		(-)5	V
Collector Current	$I_C$		(-)150	mA
Collector Current (Pulse)	$I_{CP}$		(-)300	mA
Base Current	$I_B$		(-)30	mA
Collector Dissipation	$P_C$		150	mW
Junction Temperature	$T_J$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)30\text{V}, I_E = 0$			(-)0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4\text{V}, I_C = 0$			(-)0.1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = (-)1\text{V}, I_C = (-)10\text{mA}$	60*		270*	
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)10\text{V}, I_C = (-)10\text{mA}$		700		MHz
				(400)		MHz

Continued on next page.

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# 2SA1685/2SC4443

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10V, f=1MHz$		(2.9)		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)10mA, I_B=(-)1mA$		2.6		pF
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)10mA, I_B=(-)1mA$		0.08	(-0.2)	V
				(-0.07)		V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu A, I_E=0$		0.72	(-1.0)	V
				(-0.75)		V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu A, I_E=0$	(-40)			V
Collector-to-Base Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1mA, R_{BE}=\infty$	(-20)			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu A, I_C=0$	(-5)			V
Delay Time	$t_d$	See specified Test Circuit	(14)11		20	ns
Rise Time	$t_r$	See specified Test Circuit	(11)10		20	ns
Storage Time	$t_{stg}$	See specified Test Circuit	(80)70		180	ns
Fall Time	$t_f$	See specified Test Circuit	(16)15		25	ns

\* : 2SA1685/2SC4443 are classified by 10mA  $h_{FE}$  as follows :

2SA1685	60	3	120	90	4	180			
2SC4443	60	3	120	90	4	180	135	5	270

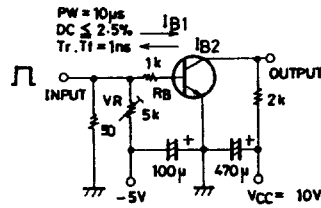
Marking 2SA1685 : YL

2SC4443 : GT

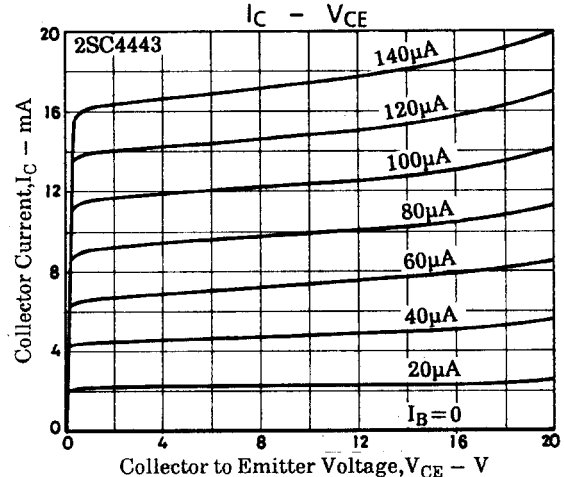
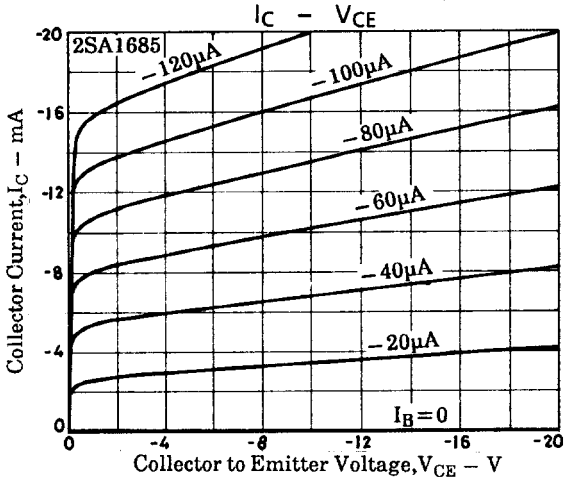
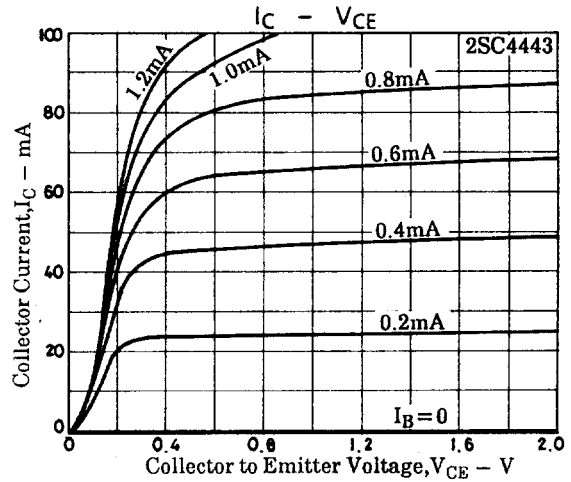
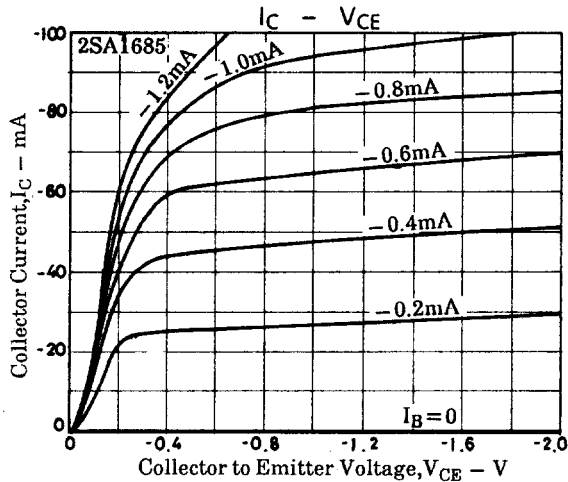
$h_{FE}$  rank 2SA1685 : 3, 4

2SC4443 : 3, 4, 5

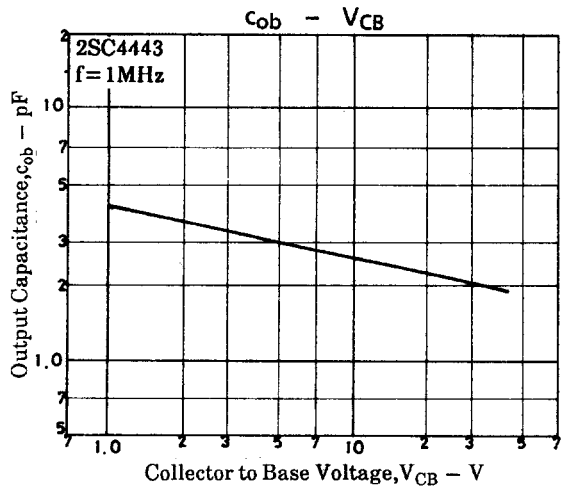
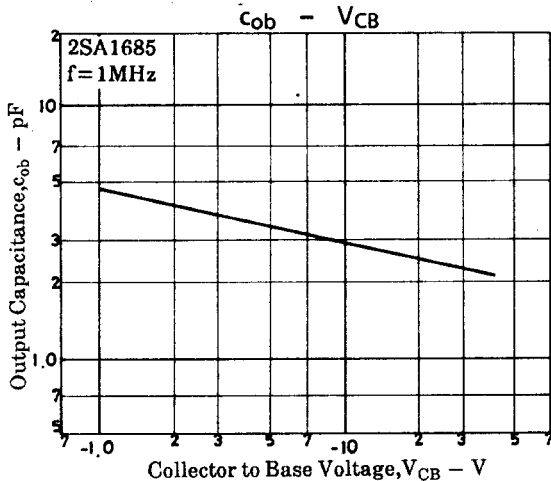
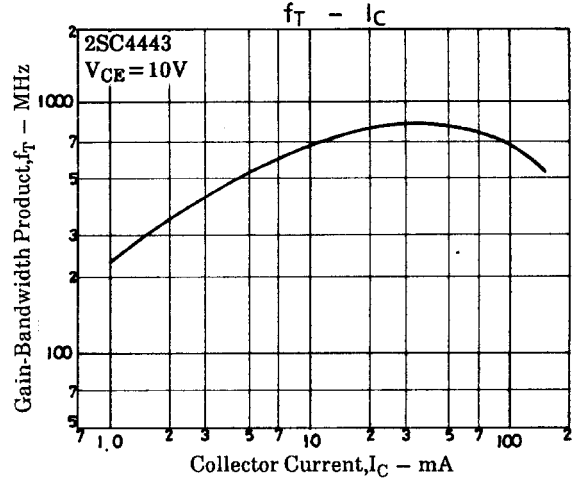
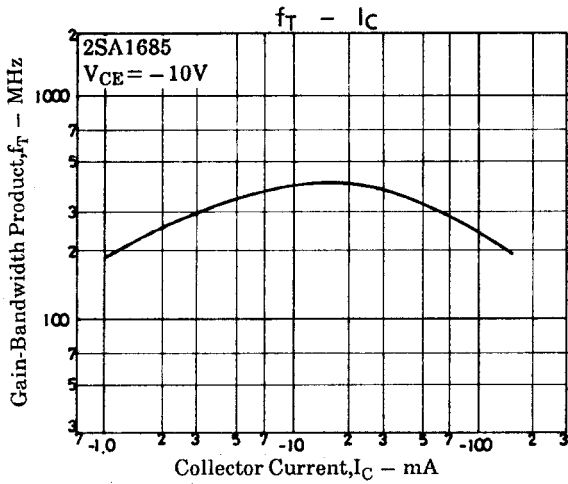
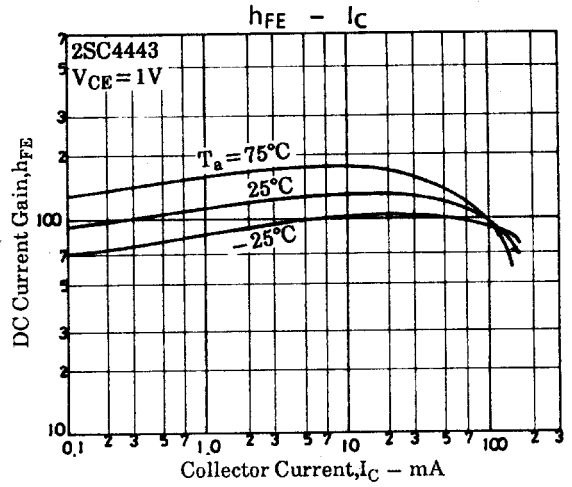
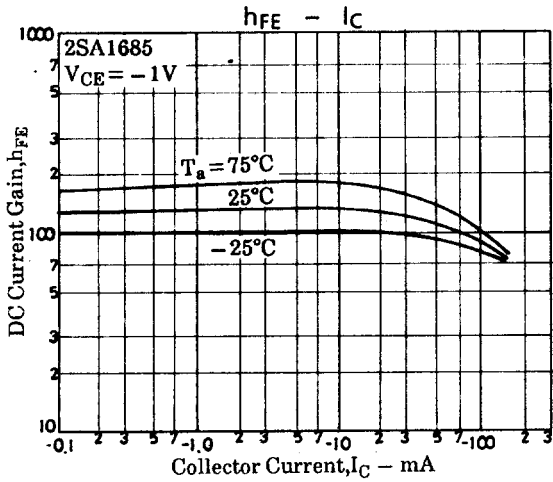
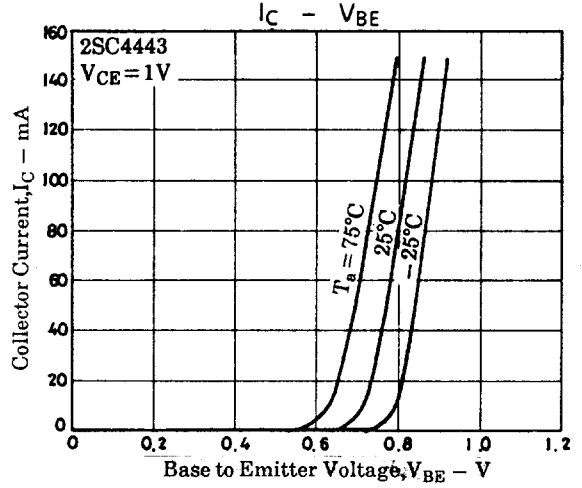
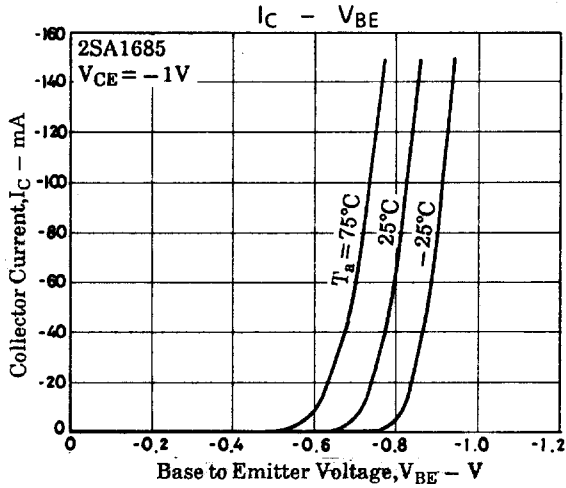
## Switching Time Test Circuit



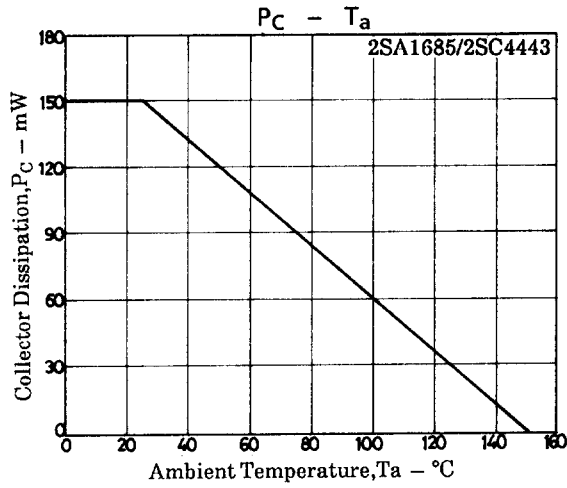
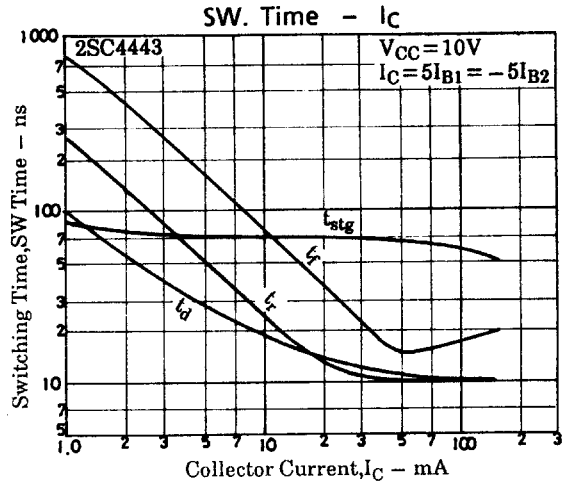
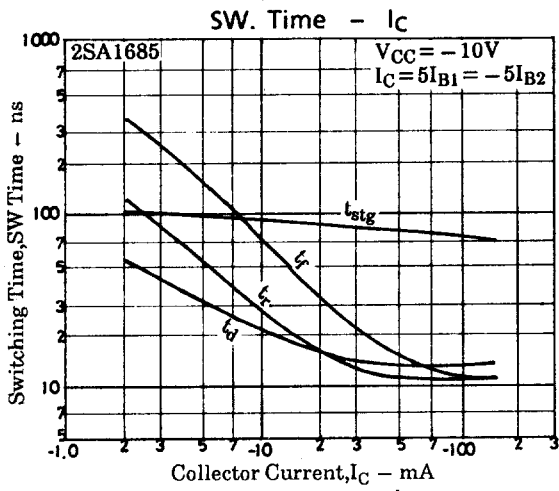
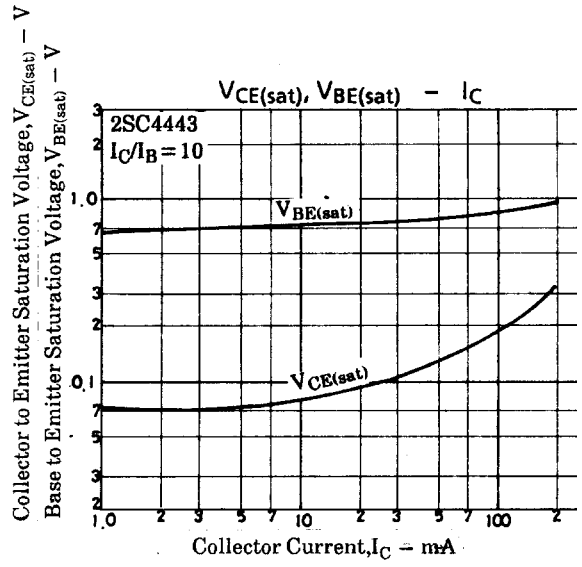
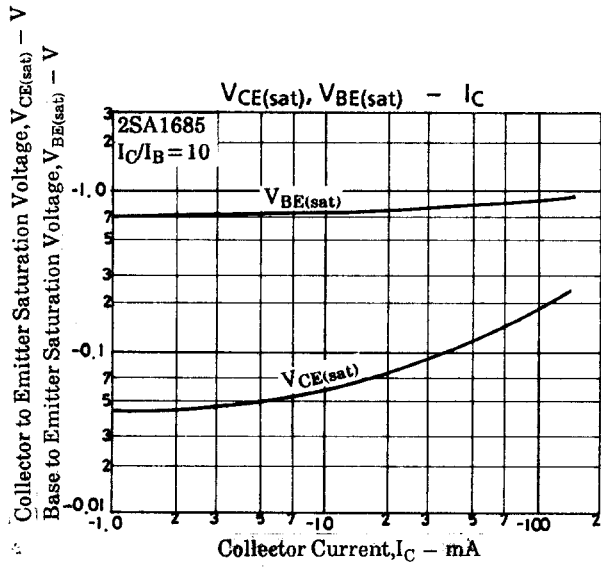
$5I_{B1} = -5I_{B2} = I_C = 50mA$   
 (For PNP, the polarity is reversed.)  
 Unit (resistance :  $\Omega$ , capacitance : F)



# 2SA1685/2SC4443



2SA1685/2SC4443



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