Ordering number:EN3200

PNP/NPN Epitaxial Planar Silicon Transistors

2SA1685/2SC4443

High-Speed Switching Applications

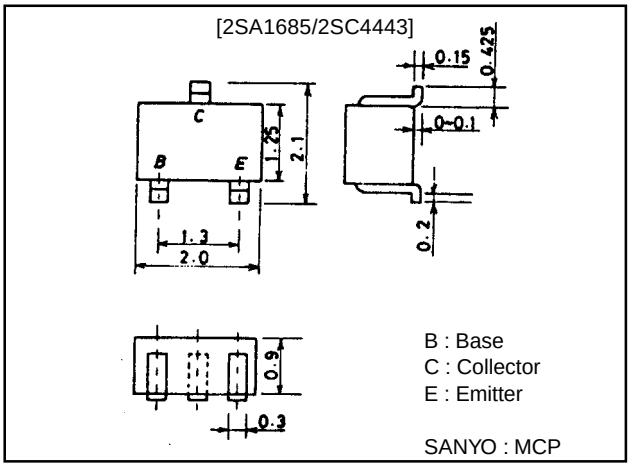
Features

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

Package Dimensions

unit:mm

2059



( ) : 2SA1685

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)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	Tj		150	˚C
Storage Temperature	Tstg		–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}=(–)30V, I_E=0			(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(–)1V, I_C=(–)10mA	60*		270*	
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)10mA		700		MHz
				(400)		MHz

Continued on next page.

SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output Capacitance	C_{ob}	V_{CB}=(–)10V, f=1MHz		(2.9)		pF
				2.6		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)10mA, I_B=(–)1mA		0.08	(–)0.2	V
				(–0.07)		V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)10mA, I_B=(–)1mA		0.72	(–)1.0	V
				(–0.75)		V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)40			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)20			V
Emitter-to-Base Breakdown Votage	$V_{(BR)EBO}$	I_E=(–)10μA, 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 follos :

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

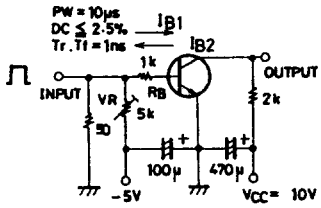
Marking 2SA1685 : YL

2SC4443 : GT

h_{FE} rank 2SA1685 : 3, 4

2SC4443 : 3, 4, 5

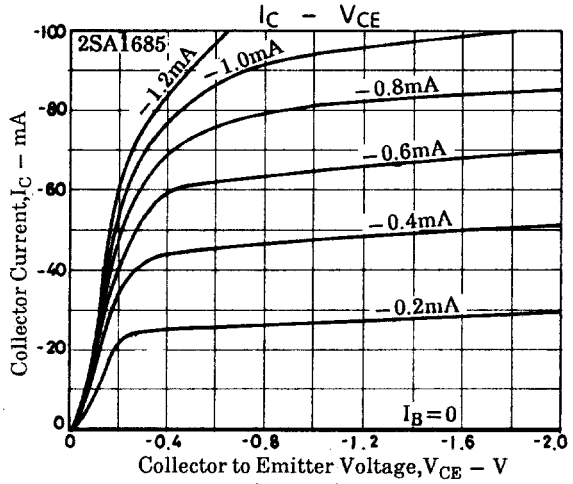
Switching Time Test Circuit

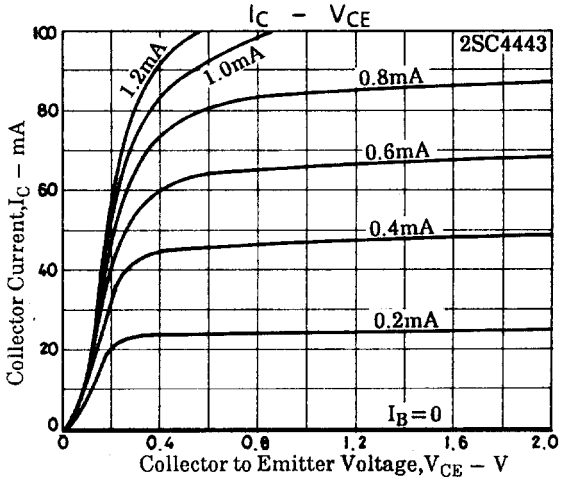


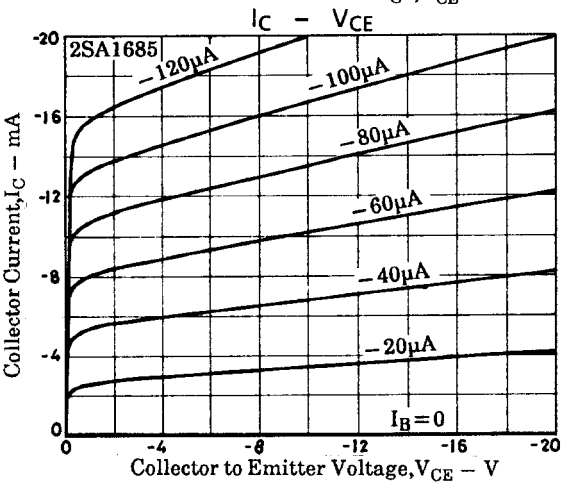
$5I_{B1} = -5I_{B2} = I_C = 50mA$

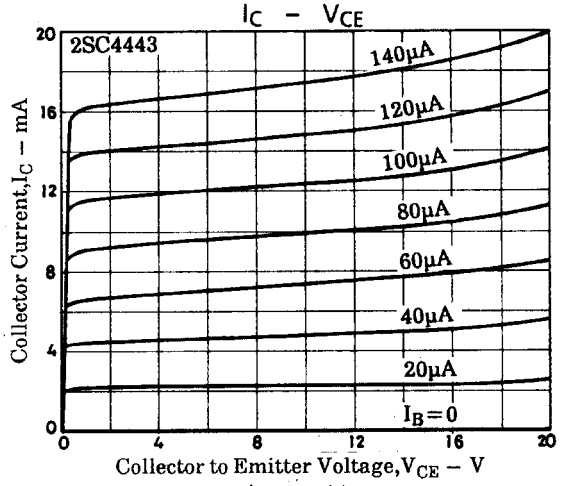
(For PNP, the polarity is reversed.)

Unit (resistance : Ω, capacitance : F)

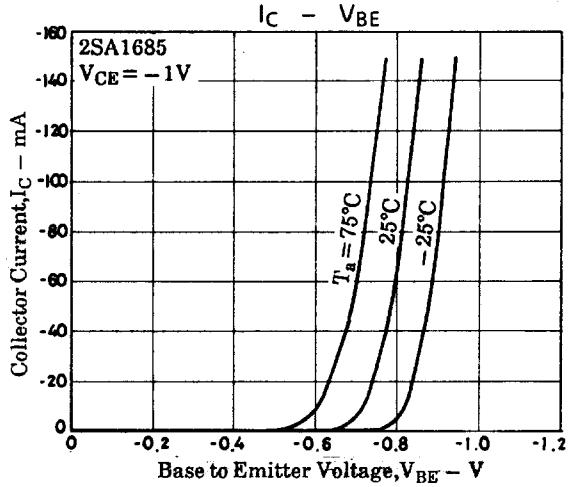




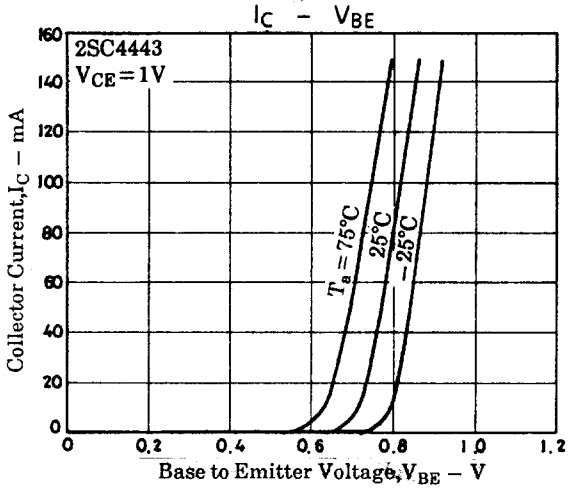




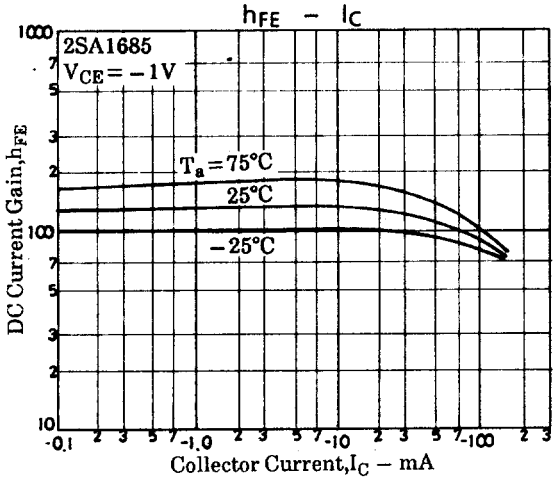
I_C – V_{BE}



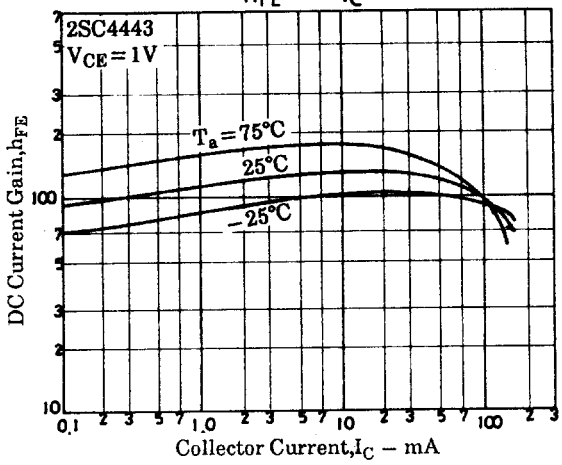
I_C – V_{BE}



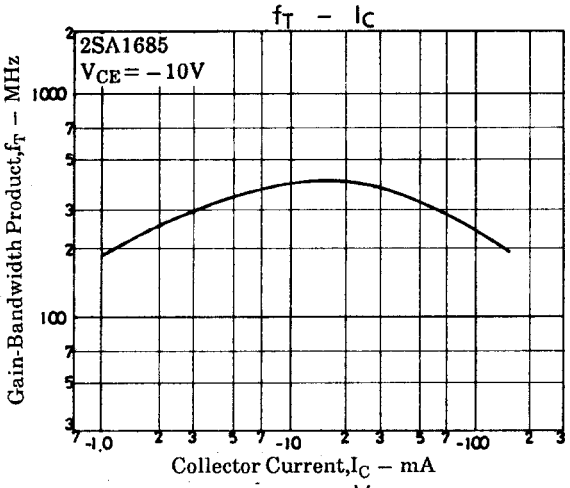
h_{FE} – I_C



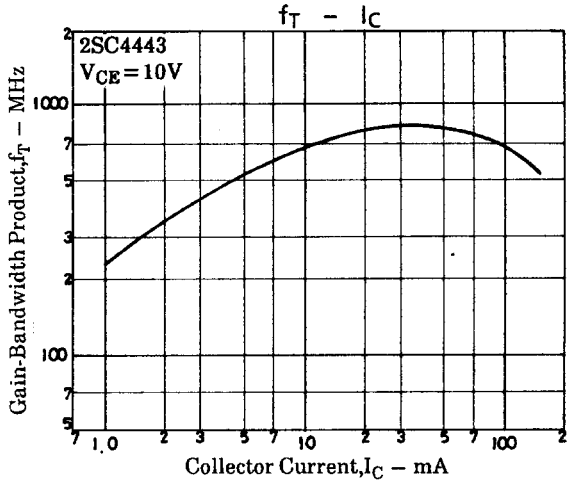
h_{FE} – I_C



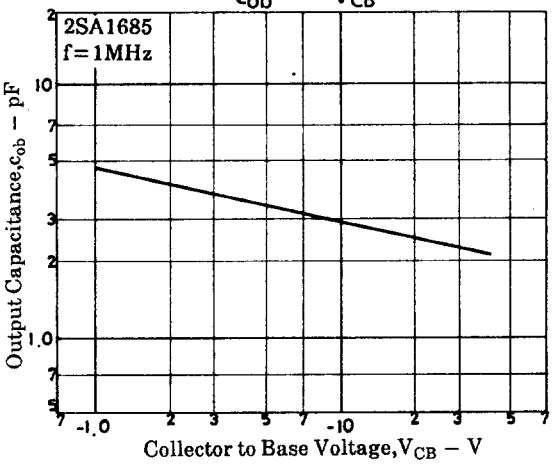
f_T – I_C



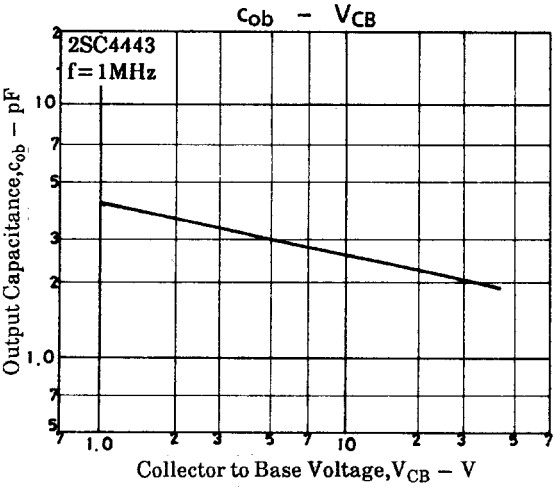
f_T – I_C

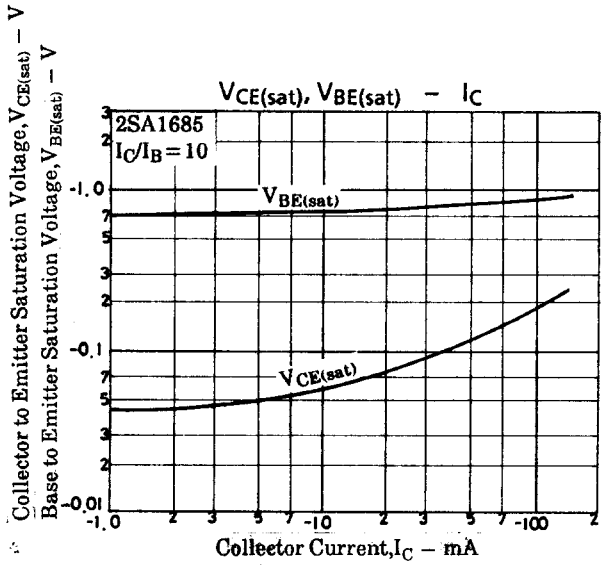


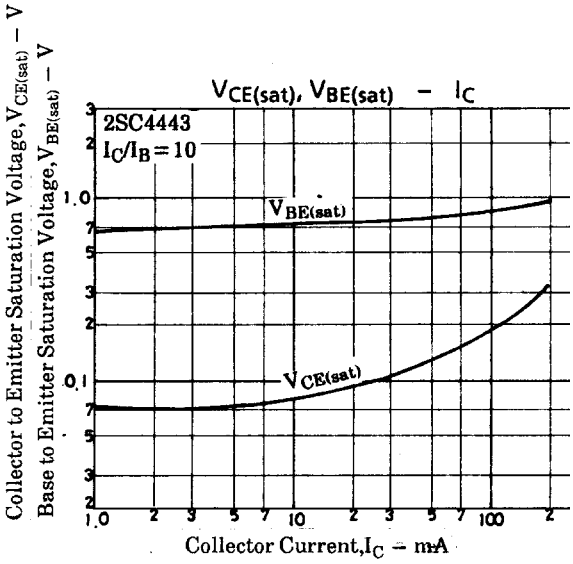
C_{ob} – V_{CB}

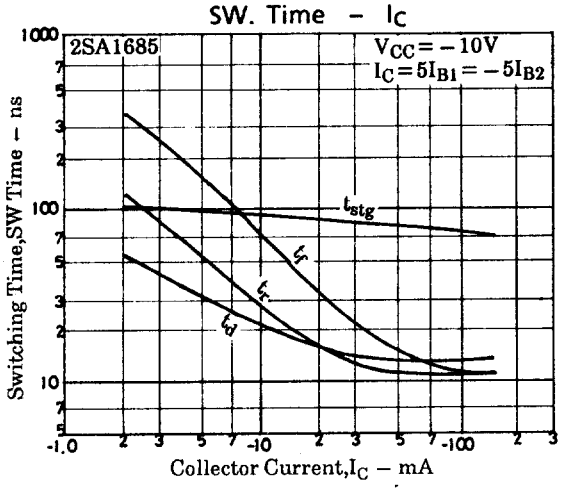


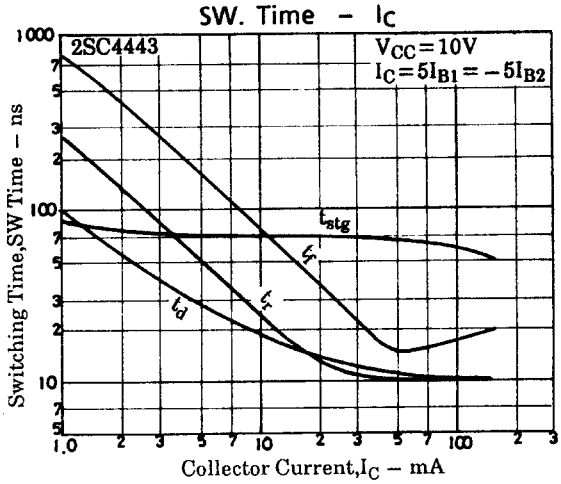
C_{ob} – V_{CB}

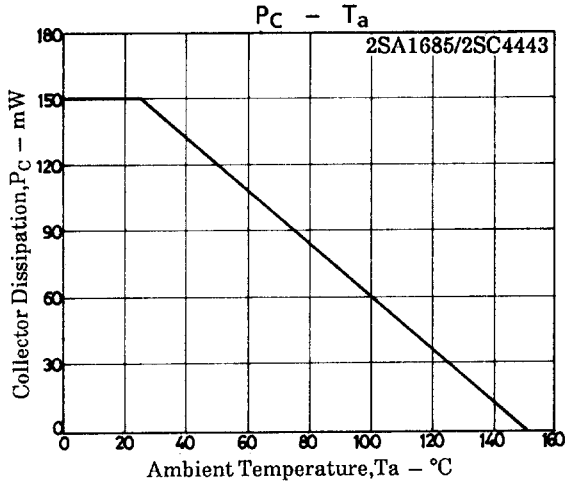



VCE(sat), VBE(sat) – IC
2SA1685
IC/IB=10
VBE(sat)
VCE(sat)
Collector to Emitter Saturation Voltage,VCE(sat) – V
Base to Emitter Saturation Voltage,VBE(sat) – V
Collector Current,IC – mA


VCE(sat), VBE(sat) – IC
2SC4443
IC/IB=10
VBE(sat)
VCE(sat)
Collector to Emitter Saturation Voltage,VCE(sat) – V
Base to Emitter Saturation Voltage,VBE(sat) – V
Collector Current,IC – mA


SW. Time – IC
2SA1685
VCC=–10V
IC=5IB1=–5IB2
tstg
tf
tr
Switching Time,SW Time – ns
Collector Current,IC – mA


SW. Time – IC
2SC4443
VCC=10V
IC=5IB1=–5IB2
tstg
tf
tr
Switching Time,SW Time – ns
Collector Current,IC – mA


PC – Ta
2SA1685/2SC4443
Collector Dissipation,PC – mW
Ambient Temperature,Ta – °C