Ordering number:ENN3013

PNP/NPN Epitaxial Planar Silicon Transistors

2SA1687/2SC4446

Low-Frequency General-Purpose Amplifier Applications

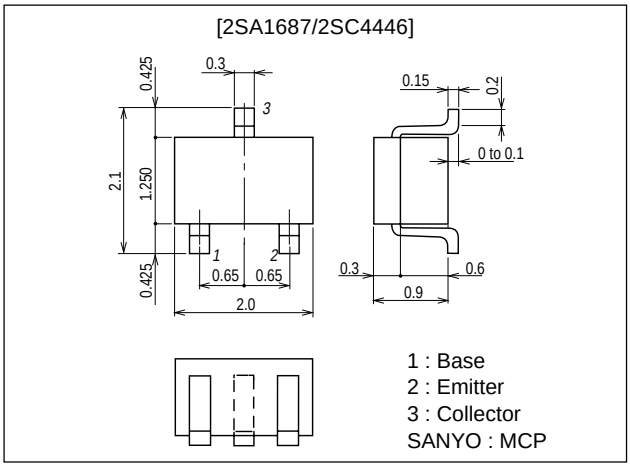
Features

- Ultrasmall-sized package permitting the 2SA1687/2SC4446-applied sets to be made small and slim.
- High V_{EBO}.

Package Dimensions

unit:mm

2059B



( ) : 2SA1687

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)60	V
Collector-to-Emitter Voltage	V_{CEO}		(–)50	V
Emitter-to-Base Voltage	V_{EBO}		(–)15	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}=(–)40V, I_E=0			(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)10V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(–)6V, I_C=(–)1mA	135*		600*	
Gain-Bandwidth Product	f_T	V_{CE}=(–)6V, I_C=(–)1mA		130		MHz

* : The 2SA1687/2SC4446 are classified by 1mA h_{FE} as follows :

Rank	5	6	7
h_{FE}	135 to 270	200 to 400	300 to 600

Marking : D (2SA1687)
H (2SC4446)
h_{FE} rank : 5, 6, 7

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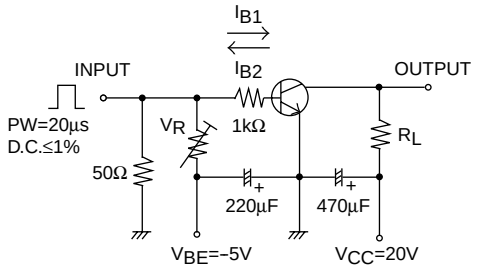
SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

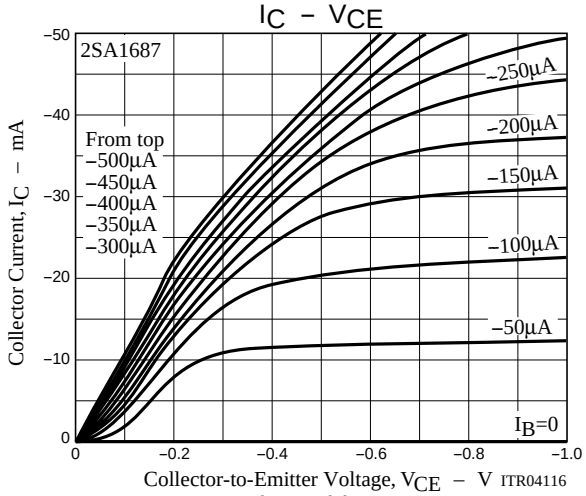
Continued from preceding page.

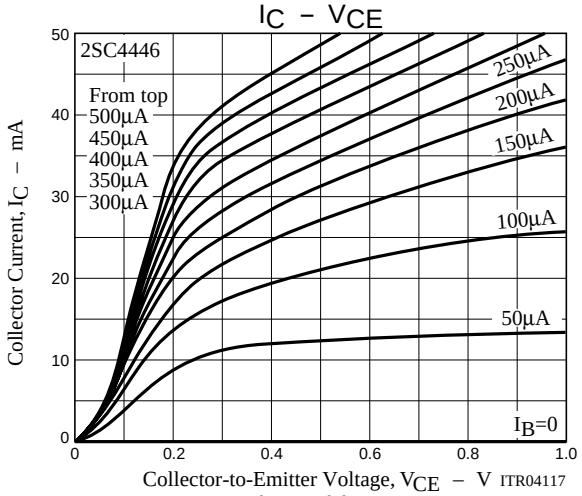
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)50mA, I_B=(–)5mA		0.15	(–)0.5	V
				(–0.25)		V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)50mA, I_B=(–)5mA		(–)0.85	(–)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)50			V
Emitter-to-Base Breakdown Votage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)15			V
Output Capacitance	C_{ob}	V_{CB}=(–)6V, f=1MHz		(3.5)		pF
				2.2		pF
Turn-ON Time	t_{on}	See specified Test Circuit		50		ns
Storage Time	t_{stg}	See specified Test Circuit		(460)		ns
				590		ns
Fall Time	t_f	See specified Test Circuit		(60)		ns
				110		ns

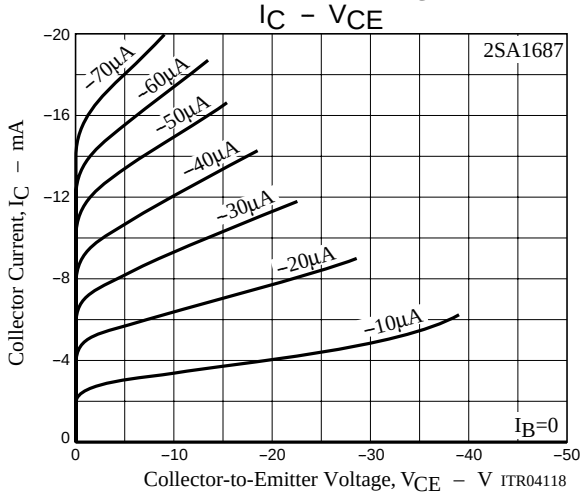
Switching Time Test Circuit

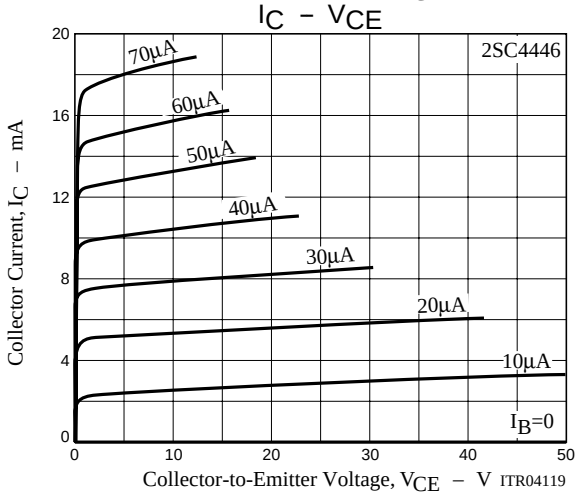


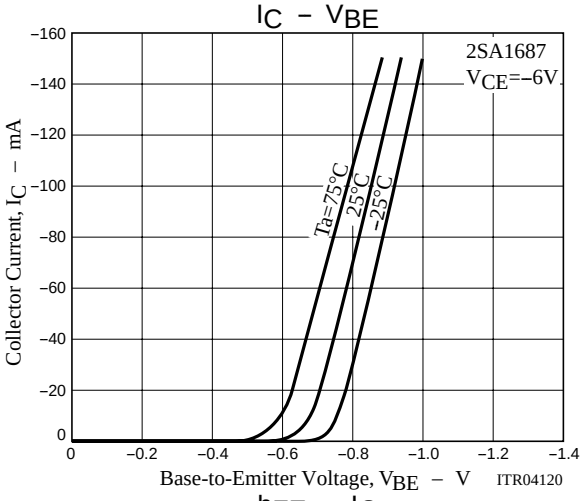
$10I_{B1}$= $-10I_{B2}$= I_C=50mA
For PNP, the polarity is reversed.

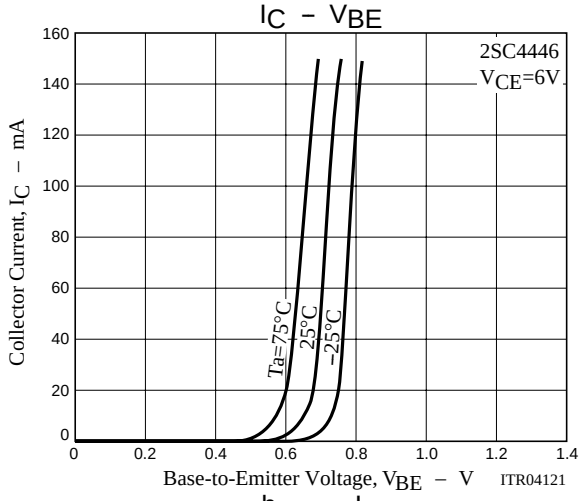


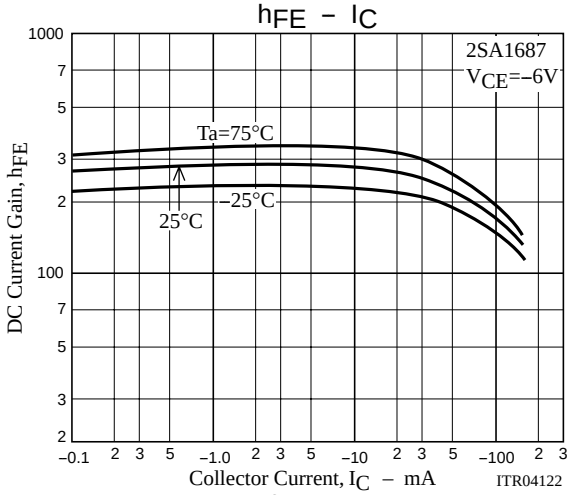


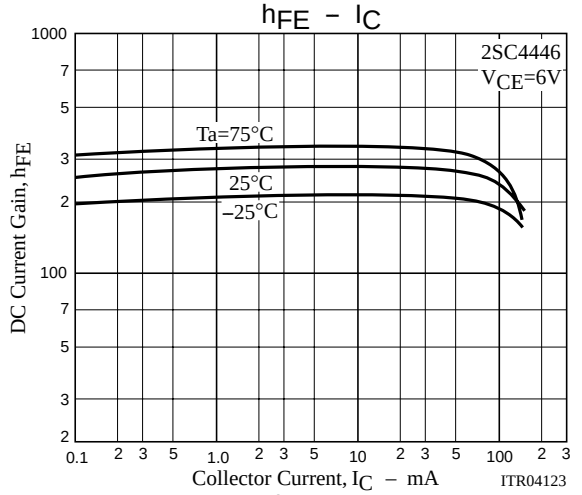


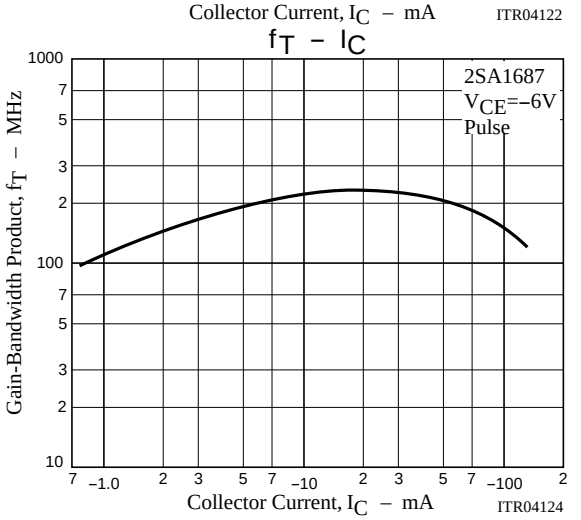


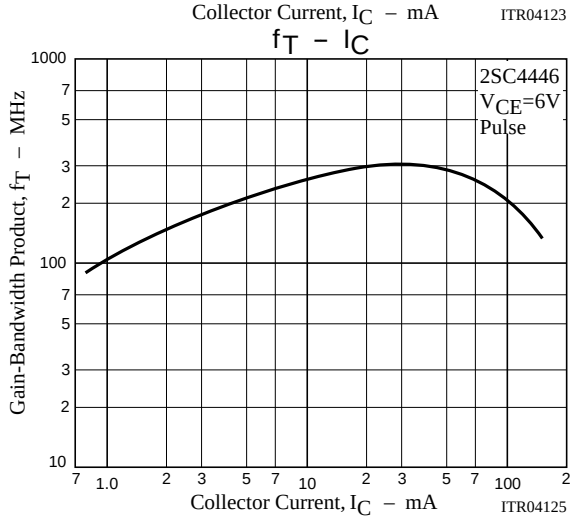

IC – VBE
2SA1687
VCE=–6V
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
ITR04120

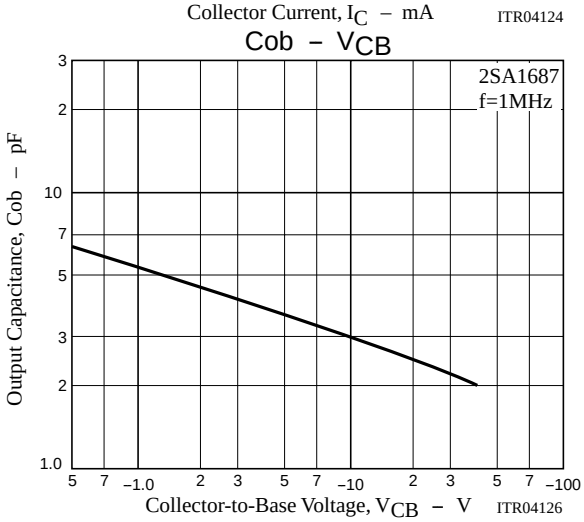

IC – VBE
2SC4446
VCE=6V
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
ITR04121

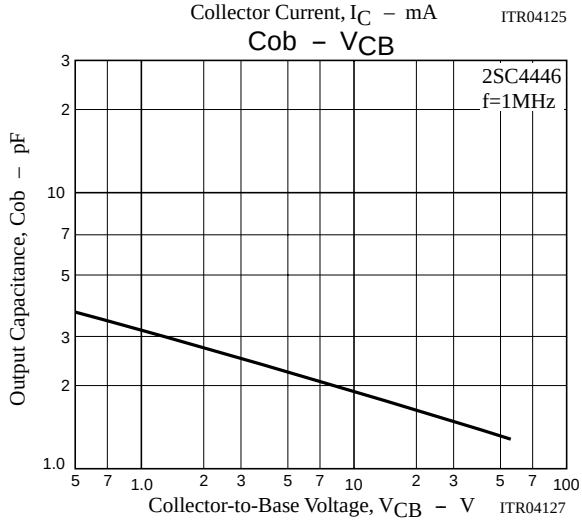

hFE – IC
2SA1687
VCE=–6V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – mA
ITR04122

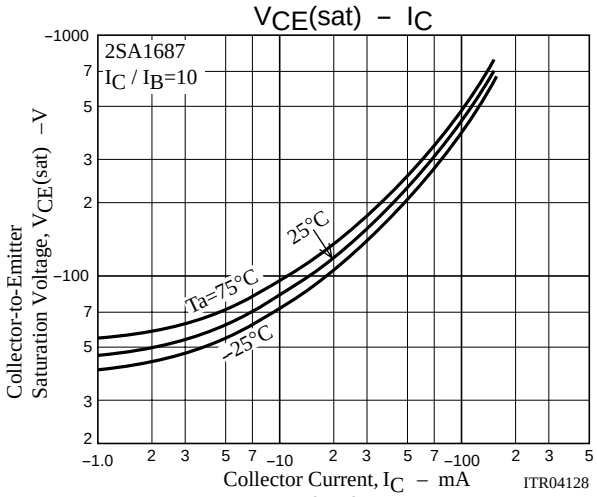

hFE – IC
2SC4446
VCE=6V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – mA
ITR04123

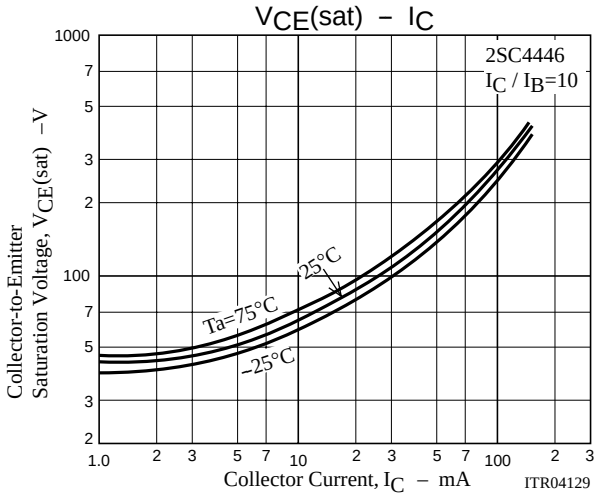

fT – IC
2SA1687
VCE=–6V
Pulse
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR04124

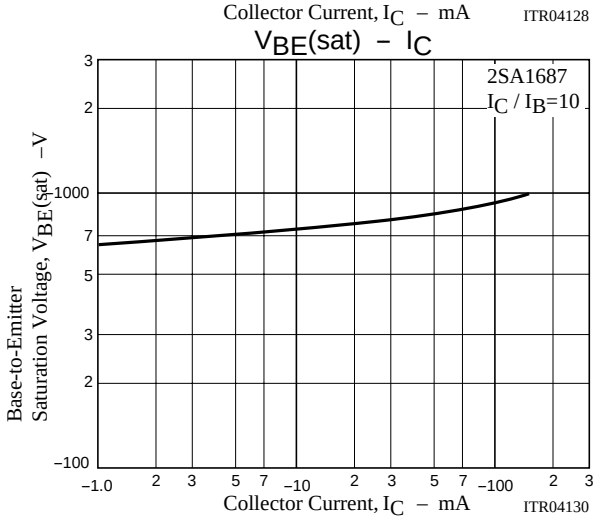

fT – IC
2SC4446
VCE=6V
Pulse
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR04125

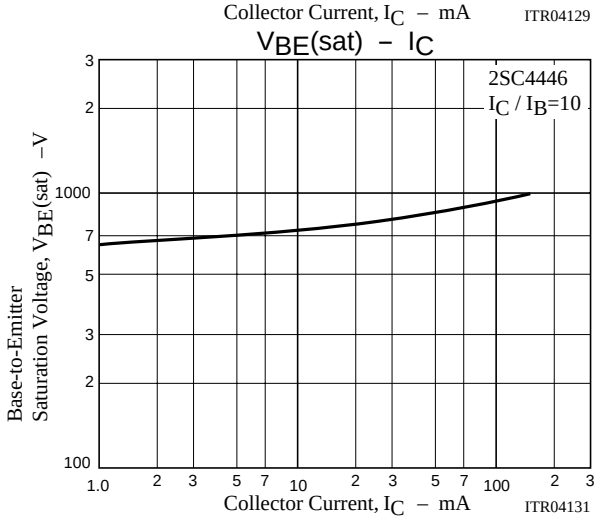

Cob – VCB
2SA1687
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR04126

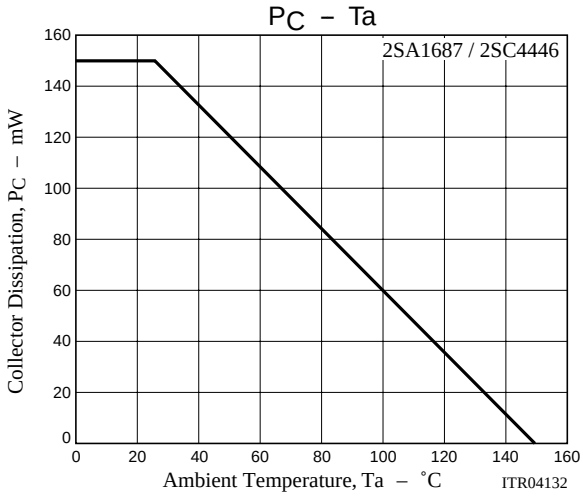

Cob – VCB
2SC4446
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR04127


VCE(sat) – IC
2SA1687
IC / IB=10
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) –V
Collector Current, IC – mA
ITR04128


VCE(sat) – IC
2SC4446
IC / IB=10
25°C
Ta=75°C
–25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) –V
Collector Current, IC – mA
ITR04129


VBE(sat) – IC
2SA1687
IC / IB=10
Base-to-Emitter Saturation Voltage, VBE(sat) –V
Collector Current, IC – mA
ITR04130


VBE(sat) – IC
2SC4446
IC / IB=10
Base-to-Emitter Saturation Voltage, VBE(sat) –V
Collector Current, IC – mA
ITR04131


PC – Ta
2SA1687 / 2SC4446
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
ITR04132