Ordering number:EN2006A

PNP/NPN Epitaxial Planar Silicon Transistors

2SA1417/2SC3647

High-Voltage Switching Applications

Features

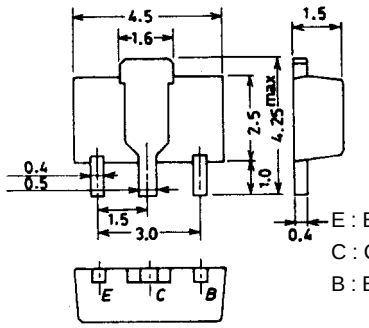
- Adoption of FBET, MBIT processes.
- High breakdown voltage and large current capacity.
- Fast switching time.
- Very small size making it easy to provide high-density, small-sized hybrid ICs.

Package Dimensions

unit:mm

2038

[2SA1417/2SC3647]



E : Emitter
C : Collector
B : Base

SANYO : PCP
(Bottom view)

( ) : 2SA1417

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–)120	V
Collector-to-Emitter Voltage	V_{CEO}		(–)100	V
Emitter-to-Base Voltage	V_{EBO}		(–)6	V
Collector Current	I_C		(–)2	A
Collector Current (Pulse)	I_{CP}		(–)3	A
Collector Dissipation	P_C		500	mW
		Moutned on ceramic board (250^2×0.8mm)	1.5	W
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}=(–)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		(25)		pF
				16		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)1A, I_B=(–)100mA		(–0.22)	(–0.6)	V
				0.13	0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)1A, I_B=(–)100mA		(–)0.85	(–)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)120			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)100			V
Emitter-to-Base Breakdown Votage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		(80)		ns
				80		ns
Stotage Time	t_{stg}	See specified Test Circuit.		(750)		ns
				1000		ns
Fall Time	t_f	See specified Test Circuit.		(40)		ns
				50		ns

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

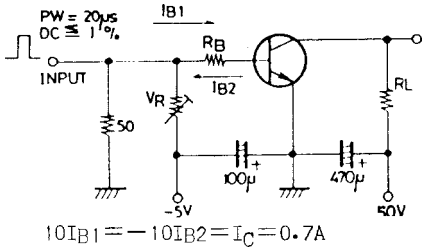
* : The 2SA1417/2SC3647 are classified by 100mA h_{FE} as follows :

100	R	200	140	S	280	200	T	400

Marking 2SA1417 : AC
2SC3647 : CC

h_{FE} rank : R, S, T

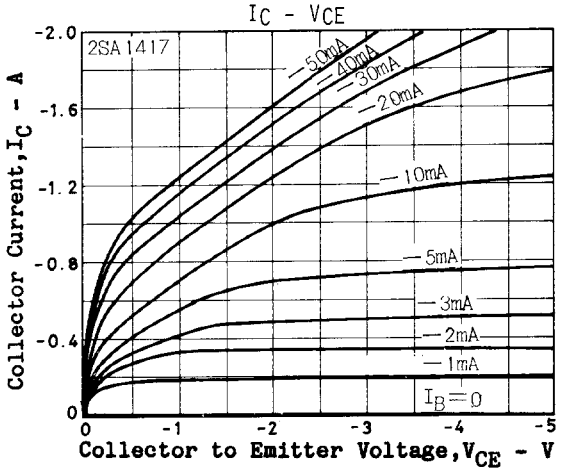
Switching Time Test Circuit

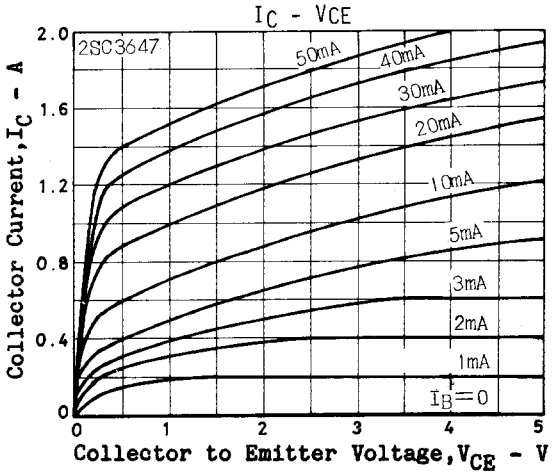


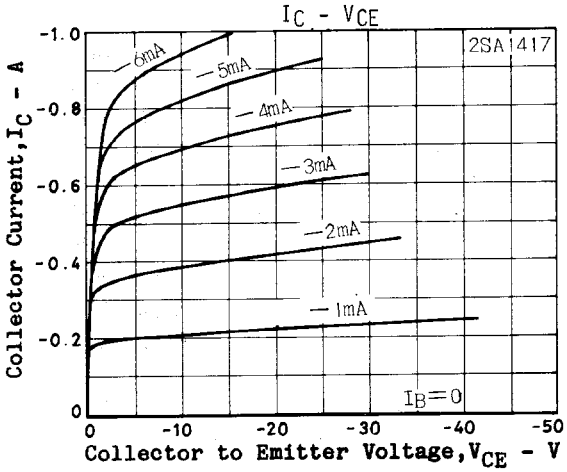
$10I_{B1} = -10I_{B2} = I_C = 0.7A$

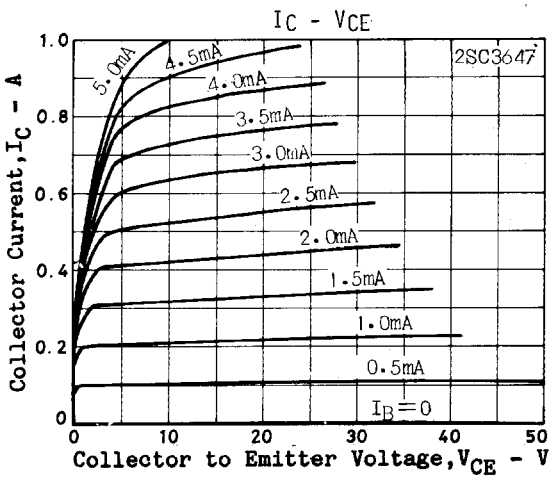
(For PNP, the polarity is reversed)

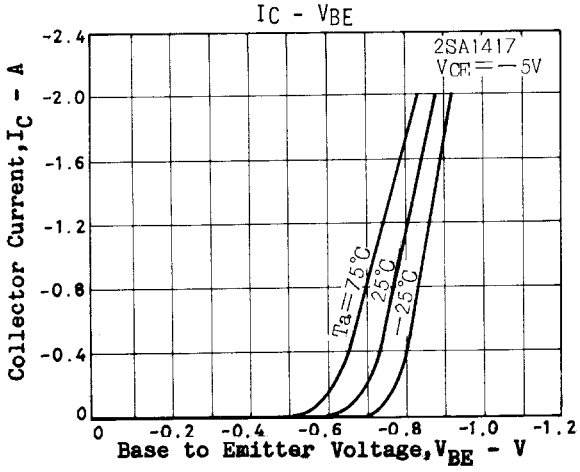
Unit (resistance : Ω, capacitance : F)

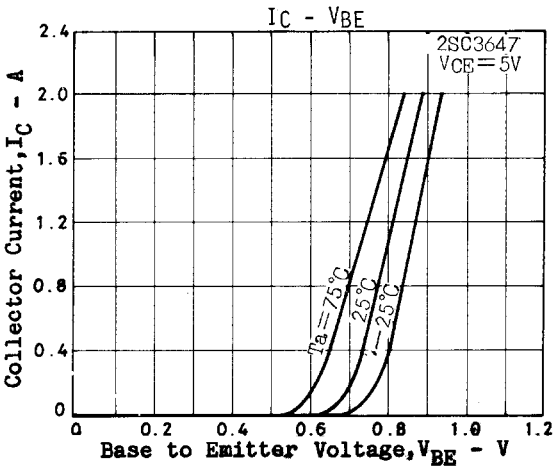


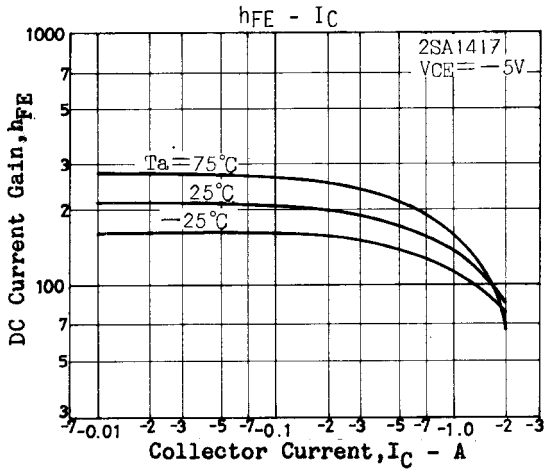


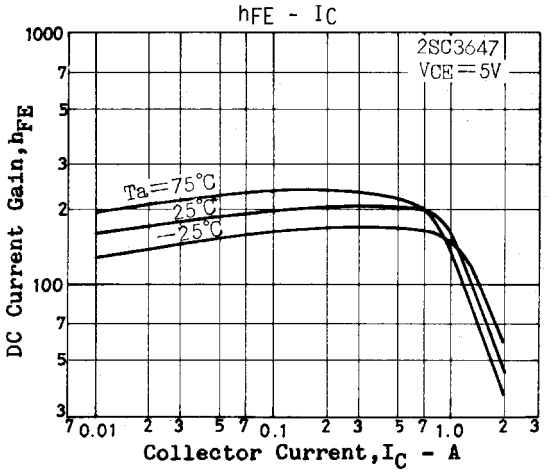


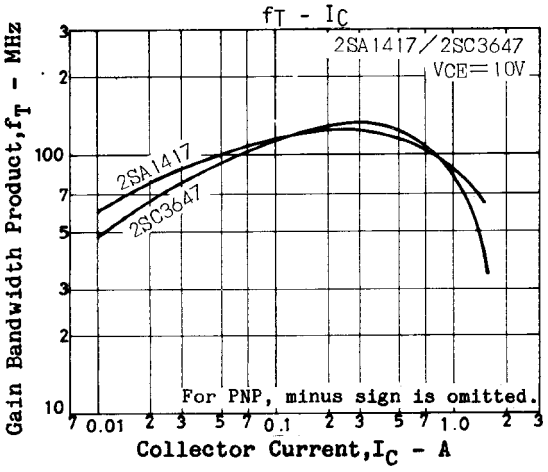


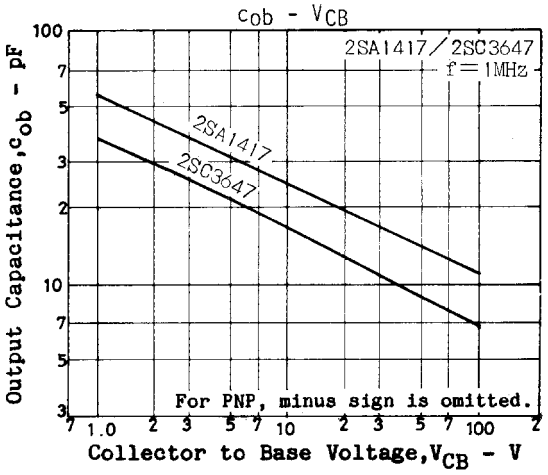


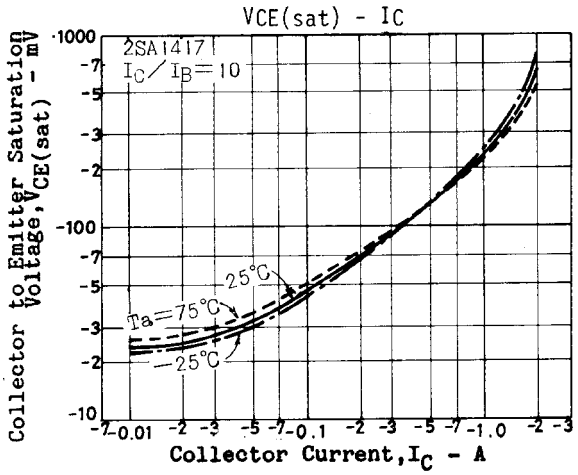


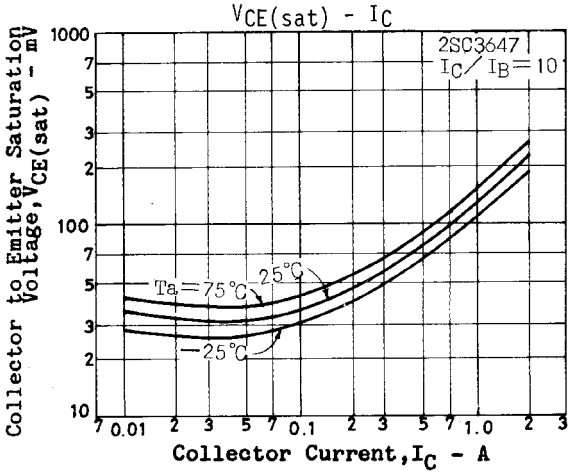

hFE - IC
2SA1417
VCE=−5V
Ta=75°C
25°C
−25°C
DC Current Gain, hFE
Collector Current, IC - A

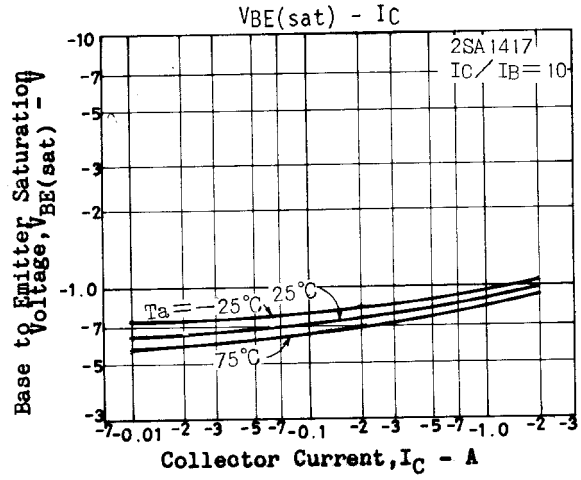

hFE - IC
2SC3647
VCE=5V
Ta=75°C
25°C
−25°C
DC Current Gain, hFE
Collector Current, IC - A

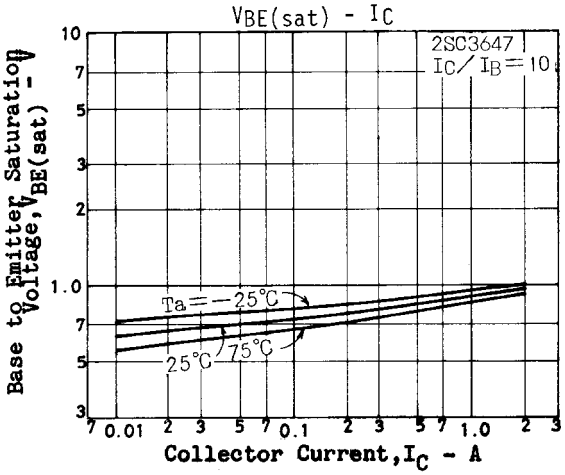

fT - IC
2SA1417/2SC3647
VCE=10V
2SA1417
2SC3647
For PNP, minus sign is omitted.
Gain Bandwidth Product, fT - MHz
Collector Current, IC - A


Cob - VCB
2SA1417/2SC3647
f=1MHz
2SA1417
2SC3647
For PNP, minus sign is omitted.
Output Capacitance, Cob - pF
Collector to Base Voltage, VCB - V


VCE(sat) - IC
2SA1417
IC/IB=10
Ta=75°C
25°C
−25°C
Collector to Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A


VCE(sat) - IC
2SC3647
IC/IB=10
Ta=75°C
25°C
−25°C
Collector to Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A


VBE(sat) - IC
2SA1417
IC/IB=10
Ta=−25°C
25°C
75°C
Base to Emitter Saturation Voltage, VBE(sat) - V
Collector Current, IC - A


VBE(sat) - IC
2SC3647
IC/IB=10
Ta=−25°C
25°C
75°C
Base to Emitter Saturation Voltage, VBE(sat) - V
Collector Current, IC - A