Ordering number:EN3217

PNP/NPN Epitaxial Planar Silicon Transistors

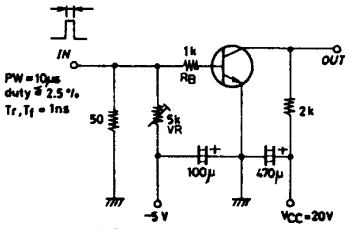
2SA1331/2SC3361

High-Speed Switching Applications

Features

- Fast switching speed.
- High breakdown voltage.
- Small-sized package permitting the 2SA1331/ 2SC3361-applied sets to be made small and slim.

Switching Time Test Circuit



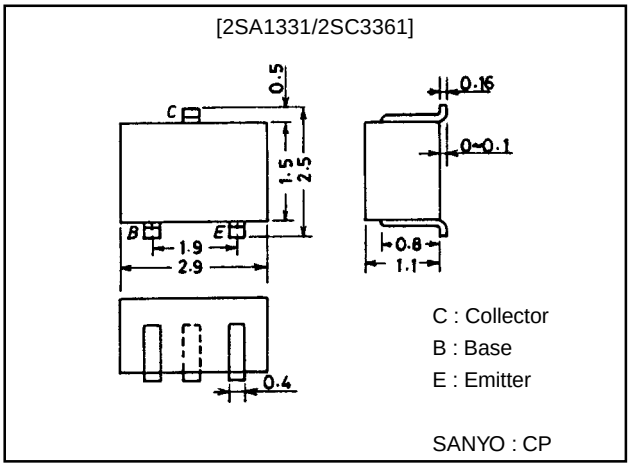
$10I_{B1} = -10I_{B2} = I_C = 10mA$
(For PNP, the polarity is reversed)
Unit (resistance : Ω, capacitance : F)

( ) : 2SA1331

Package Dimensions

unit:mm

2018A



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}		(–)5	V
Collector Current	I_C		(–)150	mA
Collector Current (Pulse)	I_{CP}		(–)400	mA
Base Current	I_B		(–)40	mA
Collector Dissipation	P_C		150	mW
Junction Temperature	Tj		125	˚C
Storage Temperature	Tstg		–55 to +125	˚C

Electrical Characteristics at Ta = 25˚C

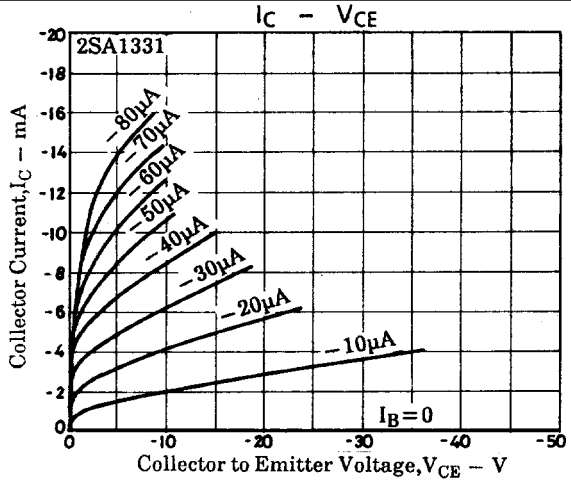
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)40V, I_E=0			(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(–)6V, I_C=(–)1mA	90*		400*	
Gain-Bandwidth Product	f_T	V_{CE}=(–)6V, I_C=(–)1mA		100		MHz
Common Base Output Capacitance	C_{ob}	V_{CB}=(–)6V, f=1MHz		(3.5) 2.7		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)10mA, I_B=(–)1mA		(–)0.1	(–)0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)10mA, I_B=(–)1mA		(–)0.75	(–)1.1	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 Voltage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)5			V
Delay Time	t_d	See specified Test Circuit		40		ns
Rise Time	t_r	See specified Test Circuit		(120) 80		ns
Storage Time	t_{stg}	See specified Test Circuit		(190) 230		ns
Fall Time	t_f	See specified Test Circuit		(200) 160		ns

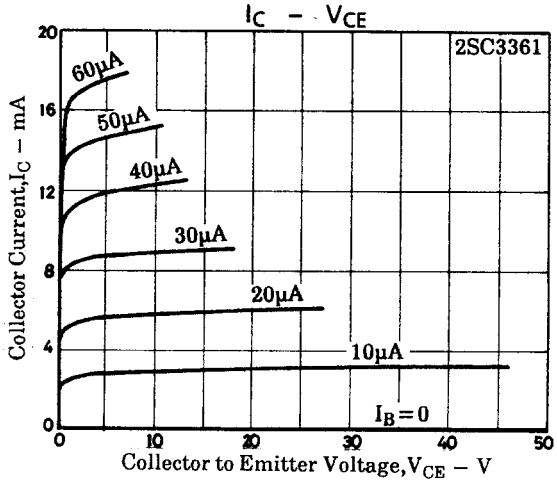
* : The 2SA1331/2SC3361 are classified by 1mA h_{FE} as follows :

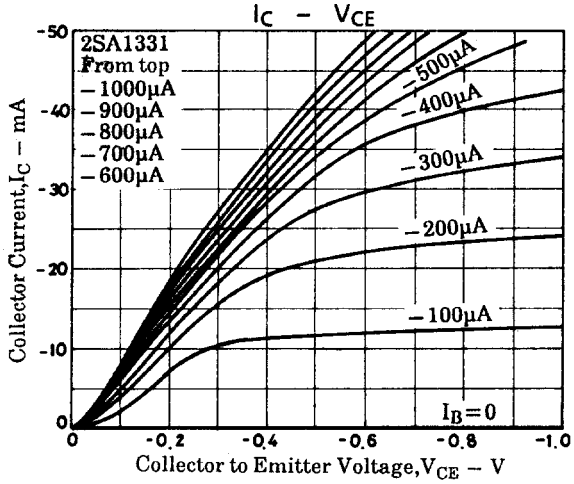
90	4	180	135	5	270	200	6	400

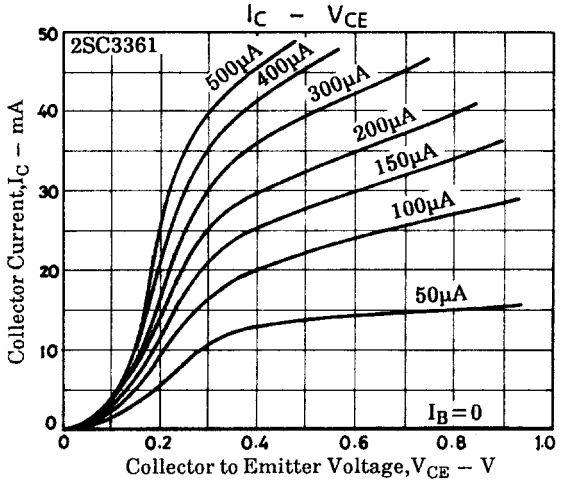
Marking 2SA1331 : O, 2SC3361 : S
h_{FE} rank : 4, 5, 6

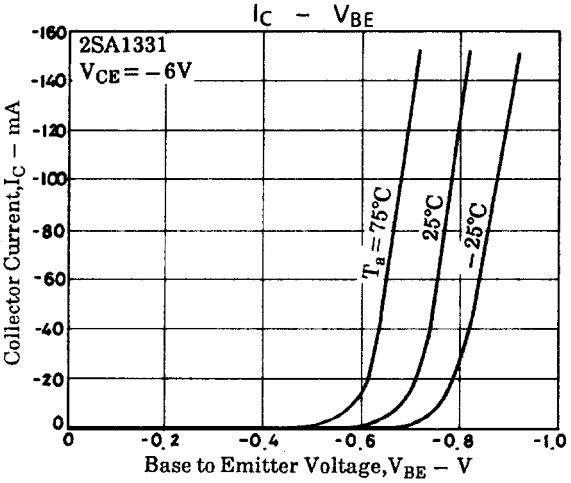
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

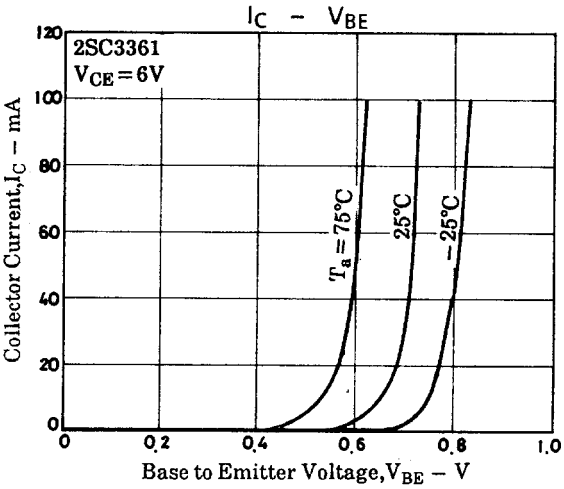

I_C – V_{CE}
2SA1331
−80μA
−70μA
−60μA
−50μA
−40μA
−30μA
−20μA
−10μA
I_B=0
Collector Current,I_C – mA
Collector to Emitter Voltage,V_{CE} – V

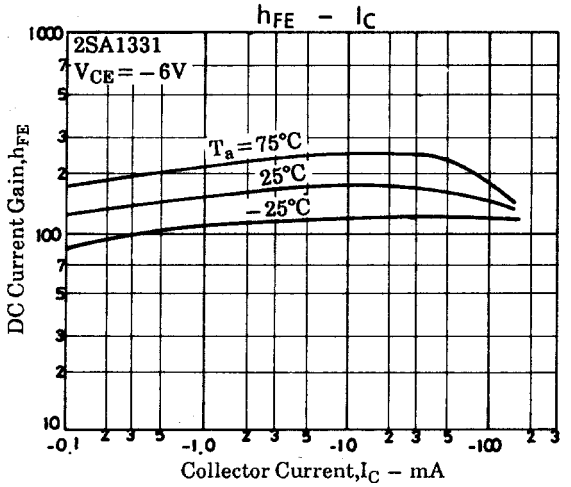

I_C – V_{CE}
2SC3361
60μA
50μA
40μA
30μA
20μA
10μA
I_B=0
Collector Current,I_C – mA
Collector to Emitter Voltage,V_{CE} – V

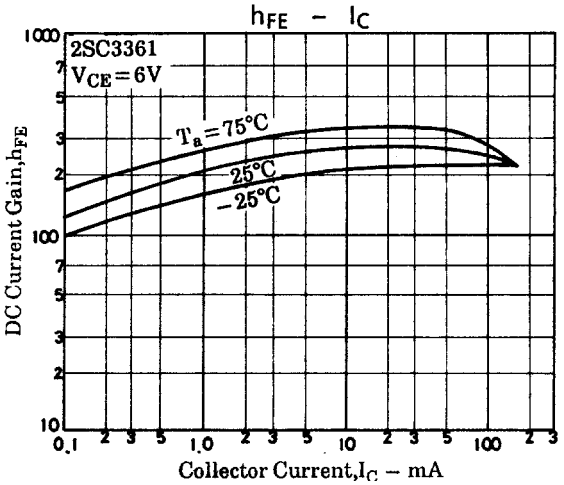

I_C – V_{CE}
2SA1331
From top
−1000μA
−900μA
−800μA
−700μA
−600μA
−500μA
−400μA
−300μA
−200μA
−100μA
I_B=0
Collector Current,I_C – mA
Collector to Emitter Voltage,V_{CE} – V

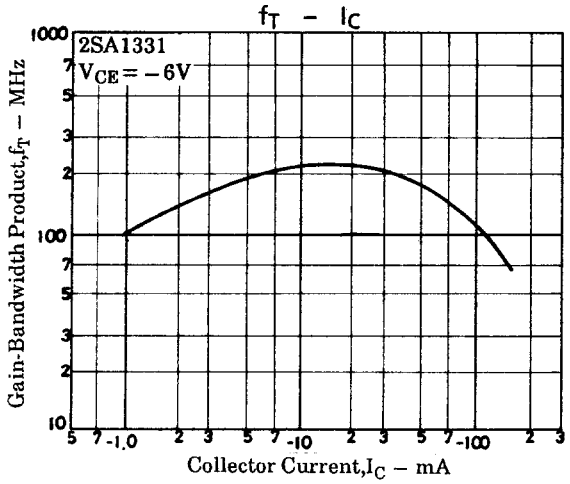

I_C – V_{CE}
2SC3361
500μA
400μA
300μA
200μA
150μA
100μA
50μA
I_B=0
Collector Current,I_C – mA
Collector to Emitter Voltage,V_{CE} – V

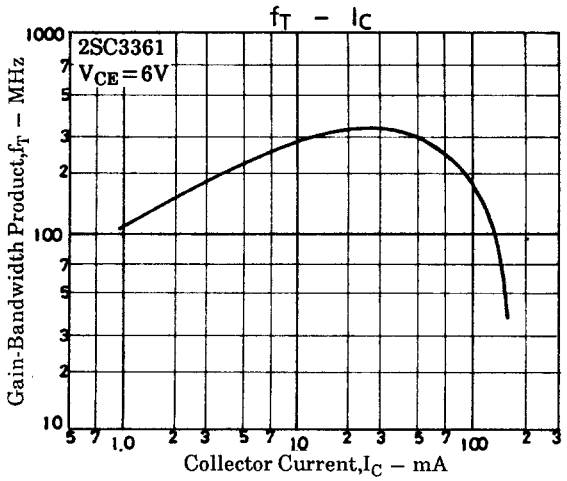

I_C – V_{BE}
2SA1331
V_{CE} = −6V
T_a=75°C
25°C
−25°C
Collector Current,I_C – mA
Base to Emitter Voltage,V_{BE} – V

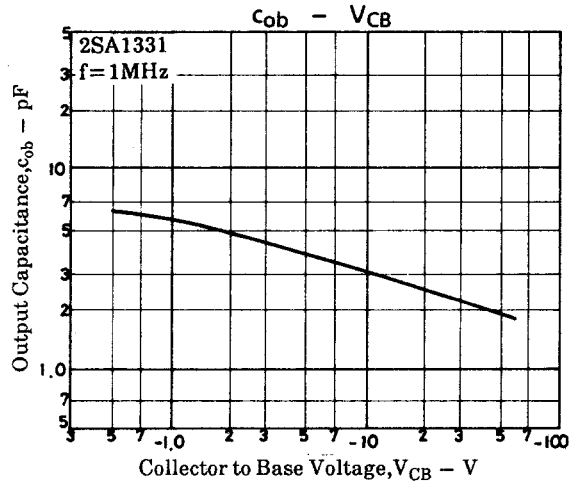

I_C – V_{BE}
2SC3361
V_{CE} = 6V
T_a=75°C
25°C
−25°C
Collector Current,I_C – mA
Base to Emitter Voltage,V_{BE} – V

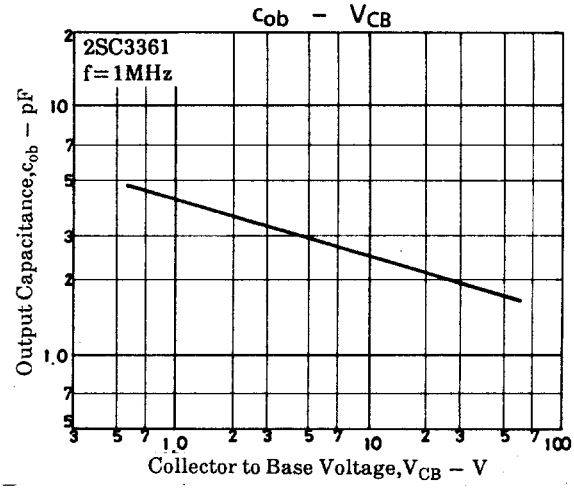

h_{FE} – I_C
2SA1331
V_{CE} = −6V
T_a=75°C
25°C
−25°C
DC Current Gain,h_{FE}
Collector Current,I_C – mA

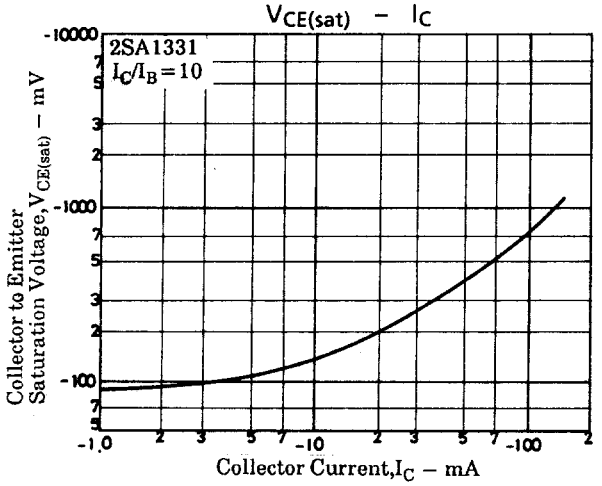

h_{FE} – I_C
2SC3361
V_{CE} = 6V
T_a=75°C
25°C
−25°C
DC Current Gain,h_{FE}
Collector Current,I_C – mA

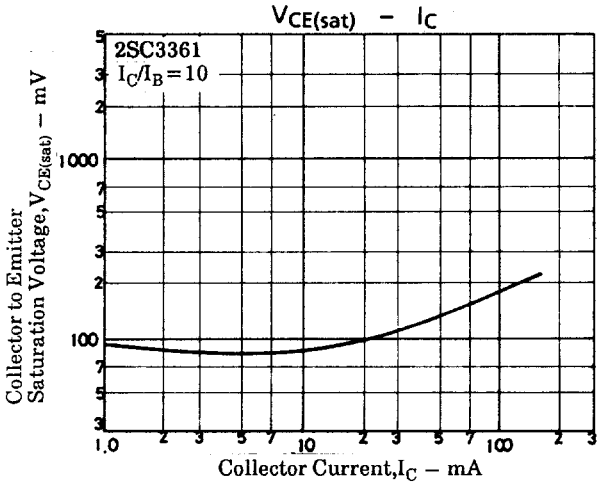

fT – IC
2SA1331
VCE = –6V
Gain-Bandwidth Product,fT – MHz
Collector Current,IC – mA

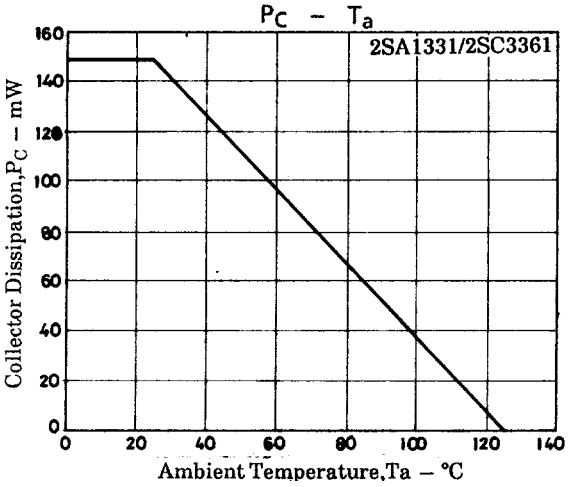

fT – IC
2SC3361
VCE=6V
Gain-Bandwidth Product,fT – MHz
Collector Current,IC – mA


Cob – VCB
2SA1331
f=1MHz
Output Capacitance,Cob – pF
Collector to Base Voltage,VCB – V


Cob – VCB
2SC3361
f=1MHz
Output Capacitance,Cob – pF
Collector to Base Voltage,VCB – V


VCE(sat) – IC
2SA1331
IC/IB=10
Collector to Emitter Saturation Voltage,VCE(sat) – mV
Collector Current,IC – mA


VCE(sat) – IC
2SC3361
IC/IB=10
Collector to Emitter Saturation Voltage,VCE(sat) – mV
Collector Current,IC – mA


PC – Ta
2SA1331/2SC3361
Collector Dissipation,PC – mW
Ambient Temperature,Ta – °C