Ordering number:ENN1392B

PNP/NPN Epitaxial Planar Silicon Transistors

2SA1339/2SC3393

High-Speed Switching Applications

Features

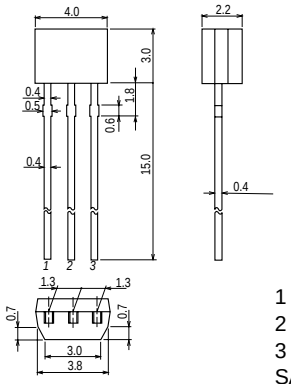
- Very small-sized package permitting sets to be small-sized, slim.
- High breakdown voltage : V_{CEO}=(–)50V.
- Complementary pair transistor having large current capacity and high f_T.
- Adoption of FBET process.

Package Dimensions

unit:mm

2033A

[2SA1339/2SC3393]



1 : Emitter
2 : Collector
3 : Base
SANYO : SPA

( ) : 2SA1339

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		(–)500	mA
Collector Current (Pulse)	I_{CP}		(–)800	mA
Collector Dissipation	P_C		300	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}=(–)4V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(–)5V, I_C=(–)10mA	100*		560*	
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)50mA		300 (200)		MHz
Common Base Output Capacitance	C_{ob}	V_{CB}=(–)10V, f=1MHz		3.7 (5.6)		pF

* : The 2SA1339/2SC3393 are classified by 10mA h_{FE} as follows :

Continued on next page.

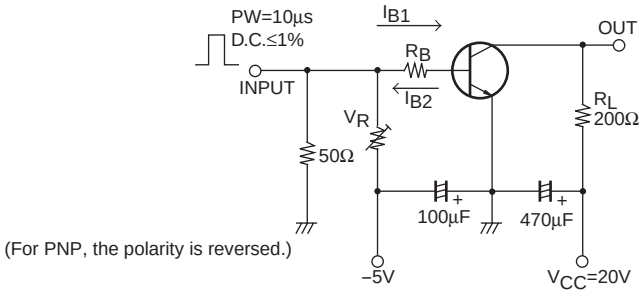
Rank	R	S	T	U
h_{FE}	100 to 200	140 to 280	200 to 400	280 to 560

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

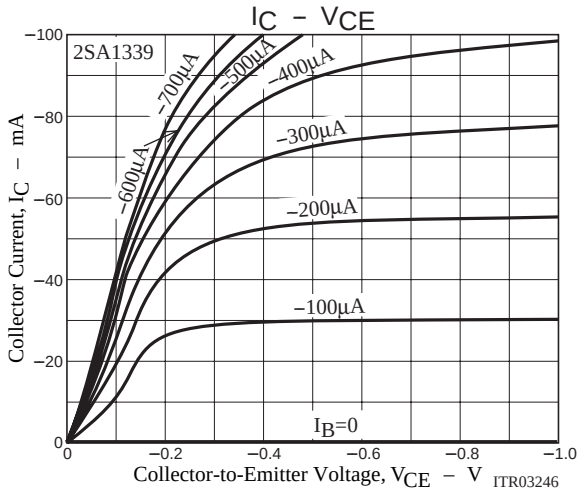
Continued from preceding page.

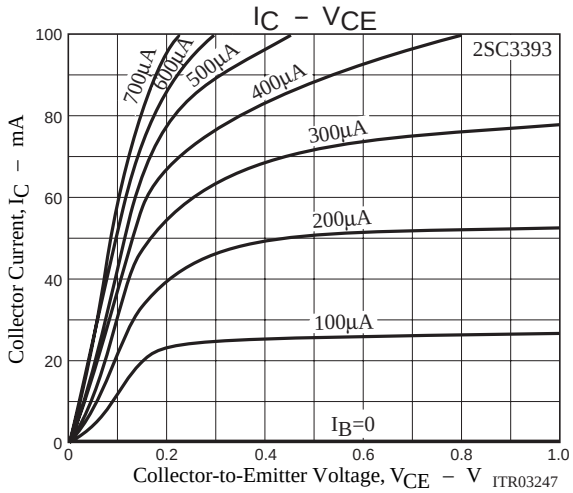
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)100mA, I_B=(–)10mA		0.1 (0.15)	0.3 (0.4)	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)100mA, I_B=(–)10mA		0.8	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–)60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)100μA, R_{BE}=∞	(–)50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=∞	(–)5			V
Turn-ON Time	t_{on}	V_{CC}=20V I_C=10I_{B1}=–10I_{B2}=100mA		70(70)		ns
Storage Time	t_{stg}			400 (400)		ns
Fall Time	t_f			70(50)		ns

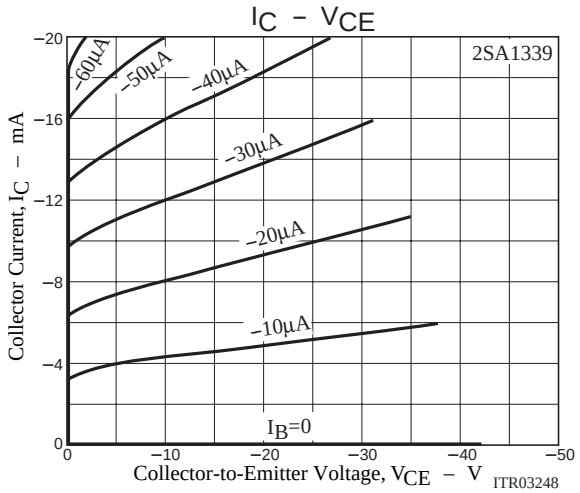
Switching Time Test Circuit

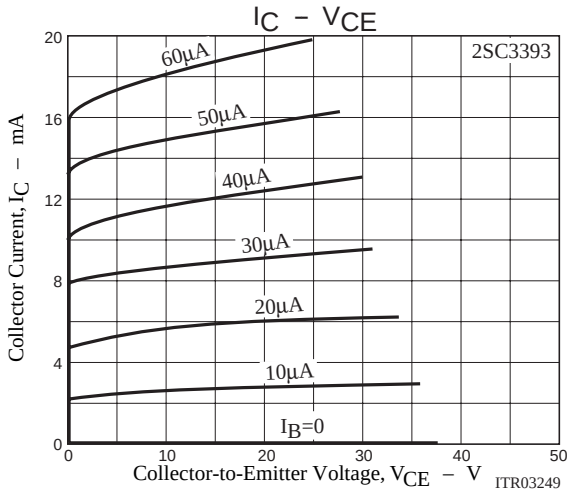


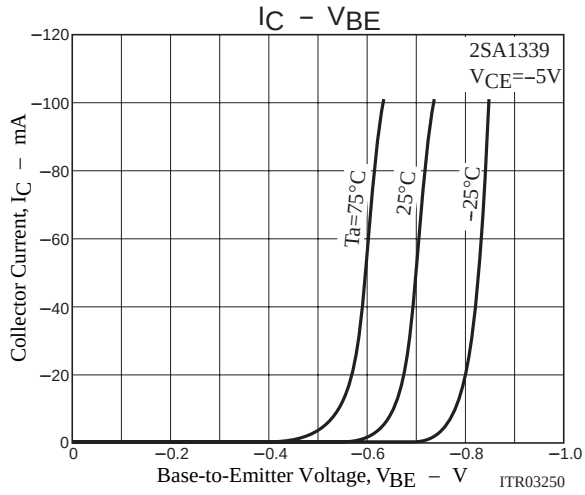
(For PNP, the polarity is reversed.)

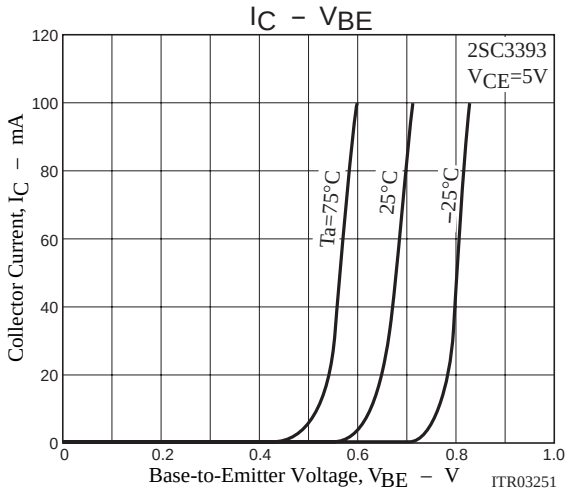


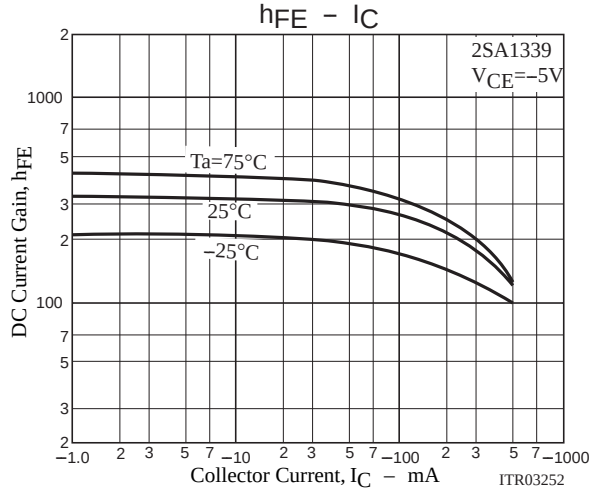


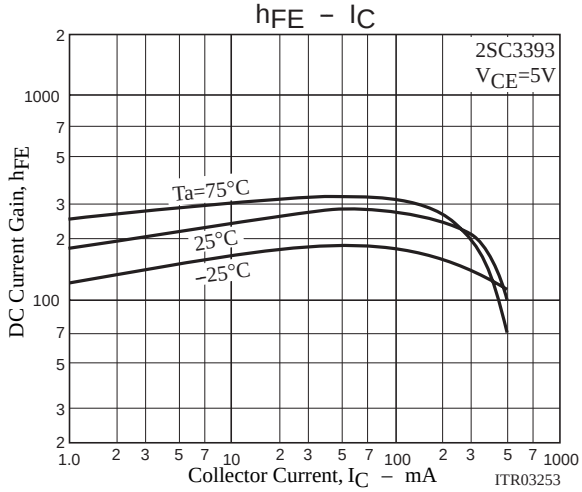


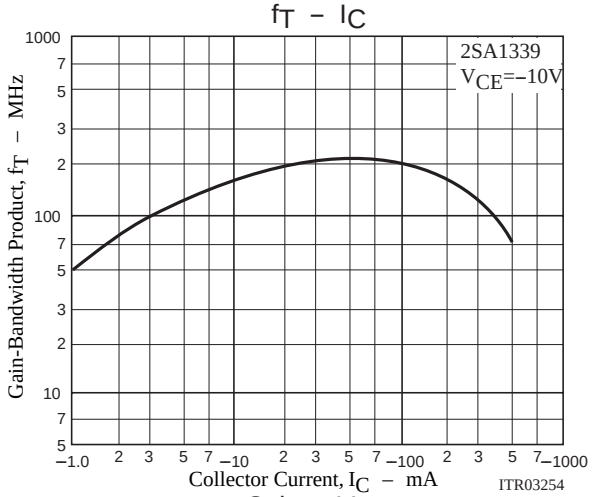


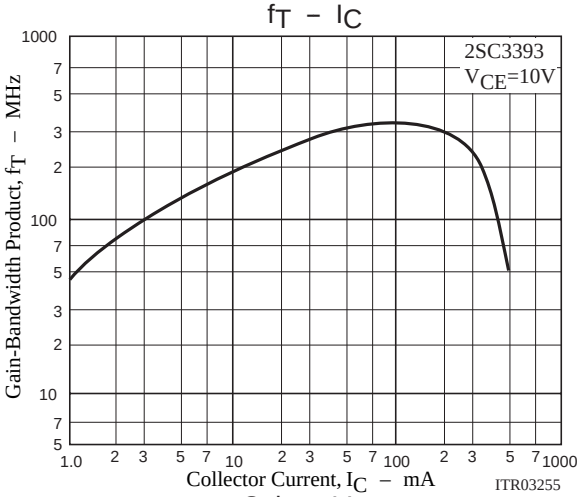

IC – VBE
2SA1339
VCE=–5V
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
ITR03250

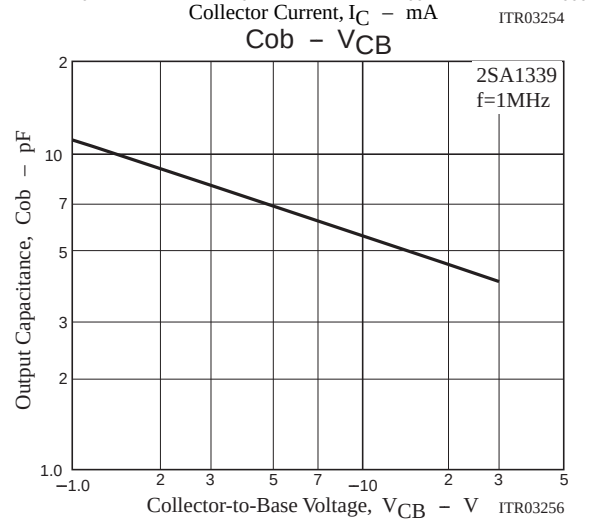

IC – VBE
2SC3393
VCE=5V
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
Base-to-Emitter Voltage, VBE – V
ITR03251

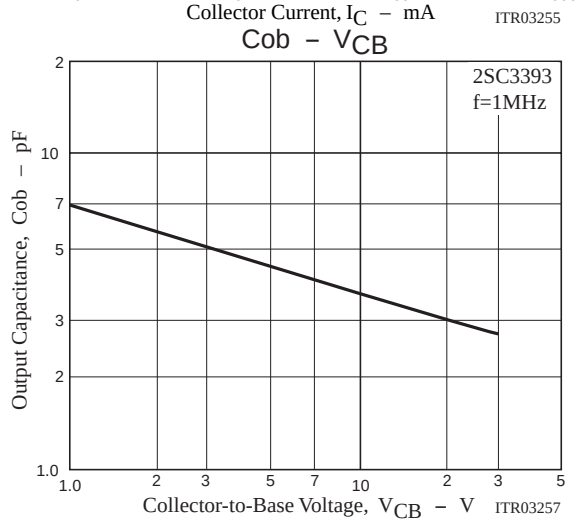

hFE – IC
2SA1339
VCE=–5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – mA
ITR03252

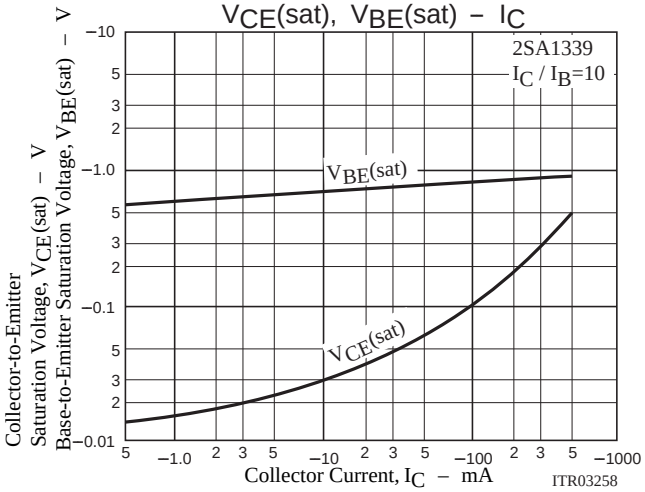

hFE – IC
2SC3393
VCE=5V
Ta=75°C
25°C
–25°C
DC Current Gain, hFE
Collector Current, IC – mA
ITR03253

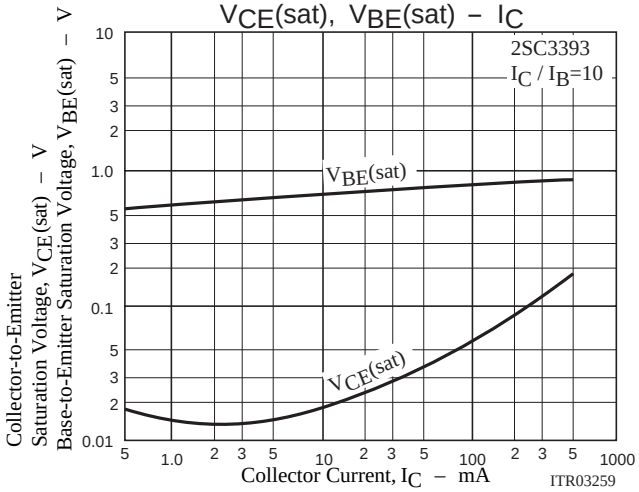

fT – IC
2SA1339
VCE=–10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR03254

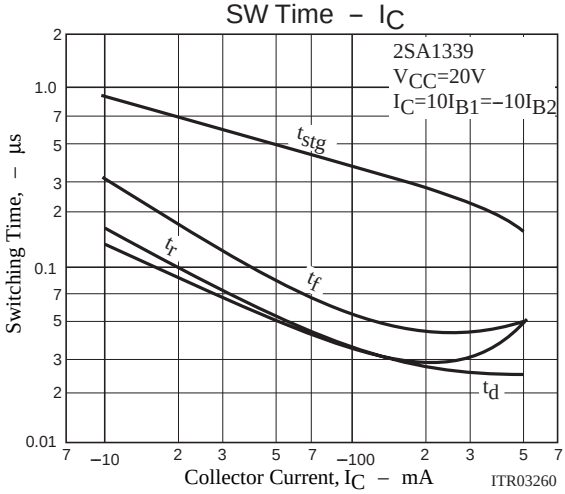

fT – IC
2SC3393
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR03255

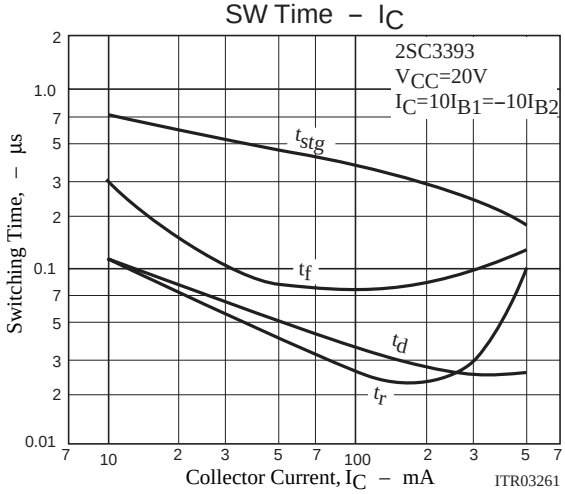

Cob – VCB
2SA1339
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR03256

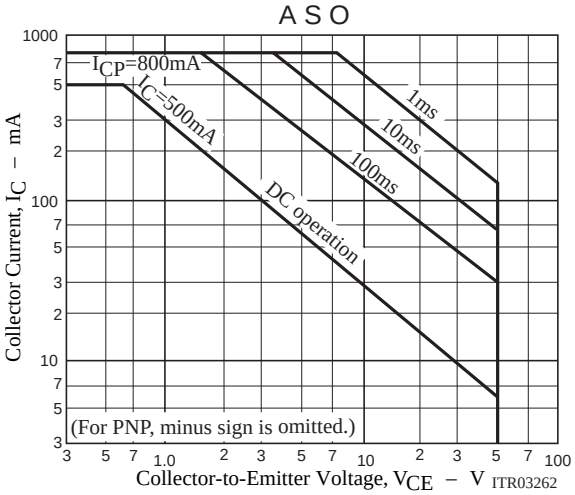

Cob – VCB
2SC3393
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR03257

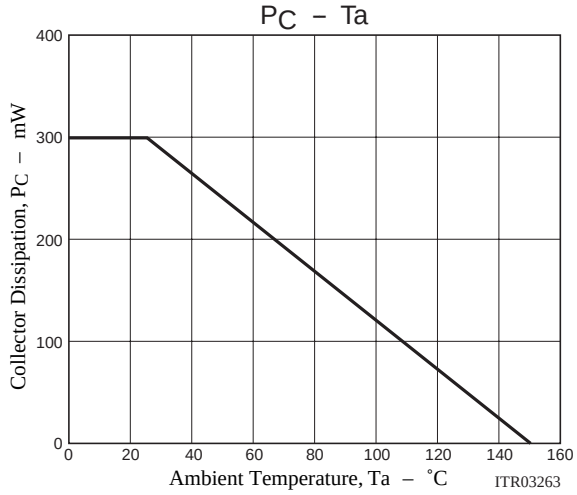

VCE(sat), VBE(sat) – IC
2SA1339
IC / IB=10
VBE(sat)
VCE(sat)
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
ITR03258


VCE(sat), VBE(sat) – IC
2SC3393
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
ITR03259


SW Time – IC
2SA1339
VCC=20V
IC=10IB1=–10IB2
tstg
tr
tf
td
Switching Time, – µs
Collector Current, IC – mA
ITR03260


SW Time – IC
2SC3393
VCC=20V
IC=10IB1=–10IB2
tstg
tf
td
tr
Switching Time, – µs
Collector Current, IC – mA
ITR03261


A S O
ICP=800mA
IC=500mA
1ms
10ms
100ms
DC operation
(For PNP, minus sign is omitted.)
Collector Current, IC – mA
Collector-to-Emitter Voltage, VCE – V
ITR03262


PC – Ta
Collector Dissipation, PC – mW
Ambient Temperature, Ta – °C
ITR03263