Ordering number:EN2086B

PNP/NPN Epitaxial Planar Silicon Transistors

2SB1204/2SD1804

High-Current Switching Applications

Applications

· Relay drivers, high-speed inverters, converters, and other general high-current switching applications.

Features

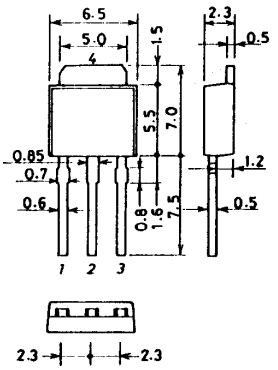
· Low collector-to-emitter saturation voltage.
· High current and high f_T.
· Excellent linearity of h_{FE}.
· Fast switching time.
· Small and slim package making it easy to make 2SB1204/2SD1804-applied sets smaller.

Package Dimensions

unit:mm

2045B

[2SB1204/2SD1804]



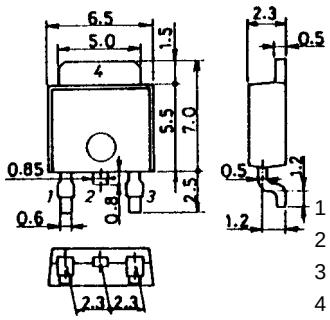
1 : Base
2 : Collector
3 : Emitter
4 : Collector

SANYO : TP

unit:mm

2044B

[2SB1204/2SD1804]



1 : Base
2 : Collector
3 : Emitter
4 : Collector

SANYO : TP-FA

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( ) : 2SB1204

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}		(–)6	V
Collector Current	I_C		(–)8	A
Collector Current (Pulse)	I_{CP}		(–)12	A
Collector Dissipation	P_C		1	W
		Tc=25˚C	20	W
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

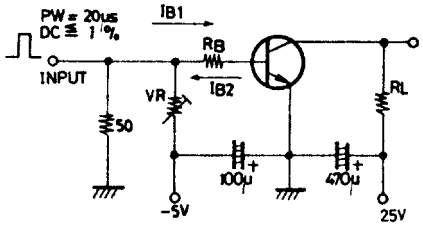
Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)40V, I_E=0			(–)1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)1	μA
DC Current Gain	$h_{FE}1$	V_{CE}=(–)2V, I_C=(–)0.5A	70*		400*	
	$h_{FE}2$	V_{CE}=(–)2V, I_C=(–)6A	35			
Gain-Bandwidth Product	f_T	V_{CE}=(–)5V, I_C=(–)1A		(130)		MHz
				180		MHz
Output Capacitance	C_{ob}	V_{CB}=(–)10V, f=1MHz		(95)65		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)4A, I_B=(–)0.2A		200	400	mV
				(–250)	(–500)	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)4A, I_B=(–)0.2A		(–)0.95	(–)1.3	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	(–)6			V
Turn-ON Time	t_{on}	See specified Test Circuit		(50)		ns
Storage Time	t_{stg}	See specified Test Circuit		(450)		ns
				500		ns
Fall Time	t_f	See specified Test Circuit		20		ns

* : The 2SB1204/2SD1804 are classified by 0.5A h_{FE} as follows :

70	Q	140	100	R	200	140	S	280	200	T	400

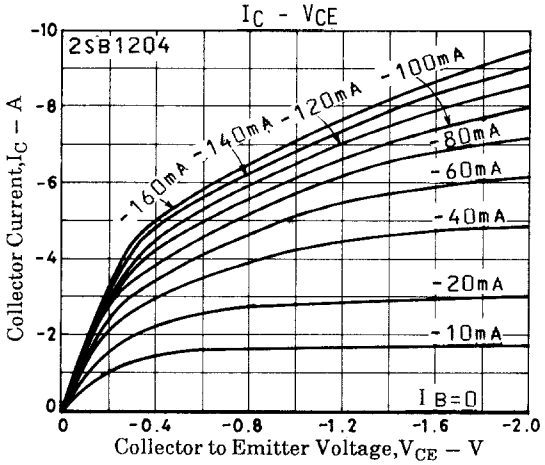
Switching Time Test Circuit

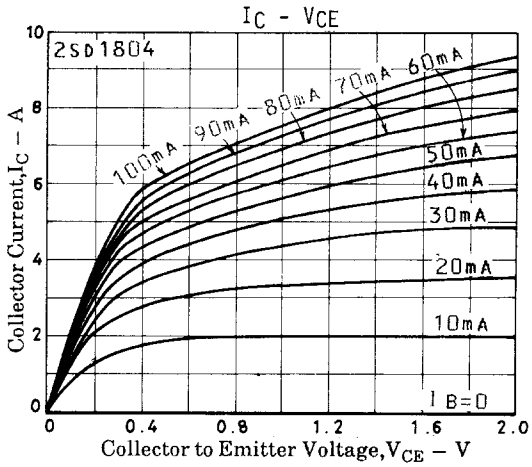


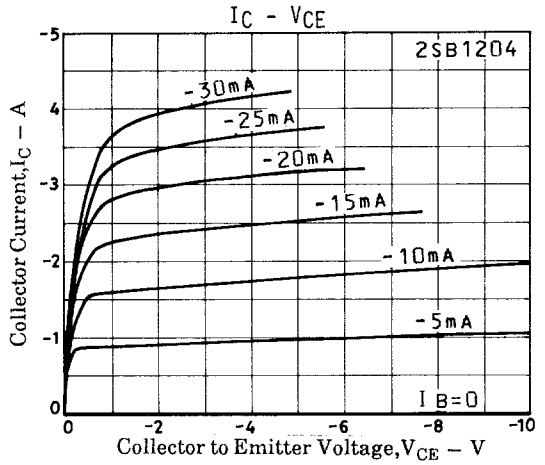
I_C=10 I_{B1}=–10 I_{B2}=4A

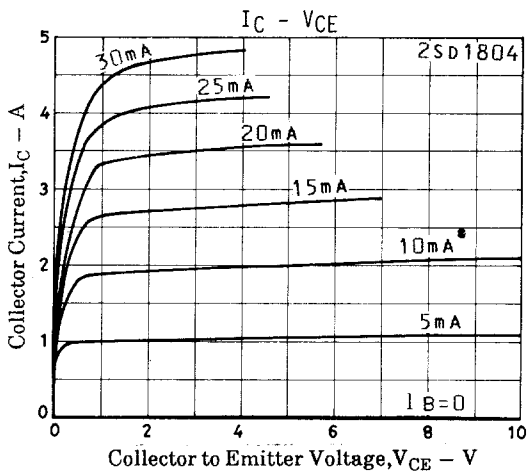
(For PNP, the polarity is reversed.)

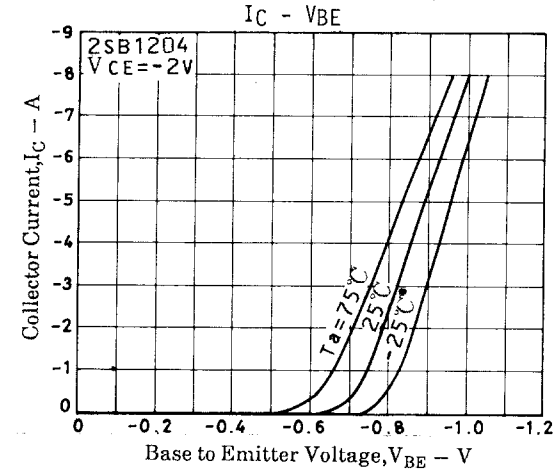
Unit (resistance : Ω, capacitance : F)

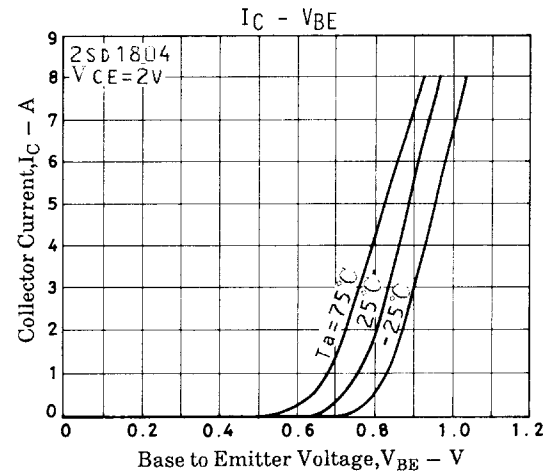

IC - VCE
2SB1204
-160mA
-140mA
-120mA
-100mA
-80mA
-60mA
-40mA
-20mA
-10mA
IB=0
Collector Current,IC – A
Collector to Emitter Voltage,VCE – V

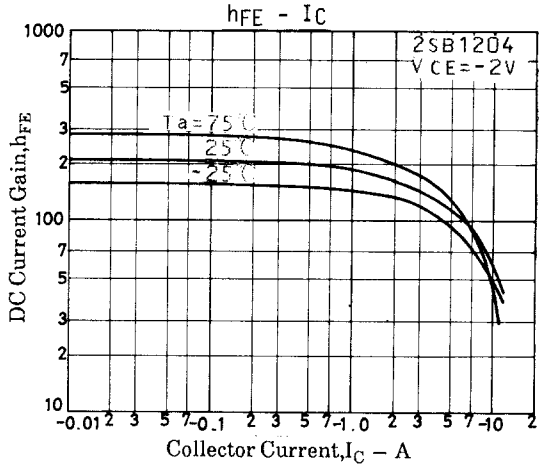

IC - VCE
2SD1804
100mA
90mA
80mA
70mA
60mA
50mA
40mA
30mA
20mA
10mA
IB=0
Collector Current,IC – A
Collector to Emitter Voltage,VCE – V

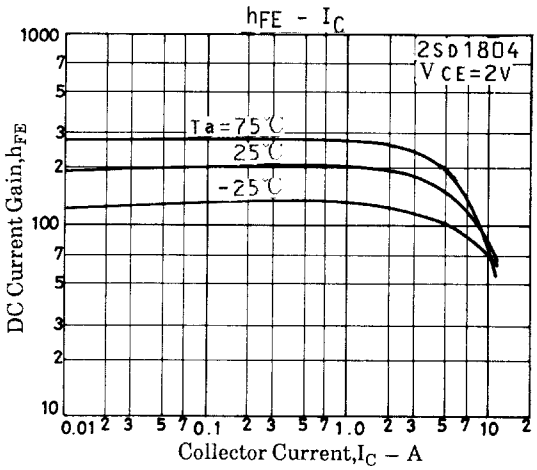

IC - VCE
2SB1204
-30mA
-25mA
-20mA
-15mA
-10mA
-5mA
IB=0
Collector Current,IC – A
Collector to Emitter Voltage,VCE – V

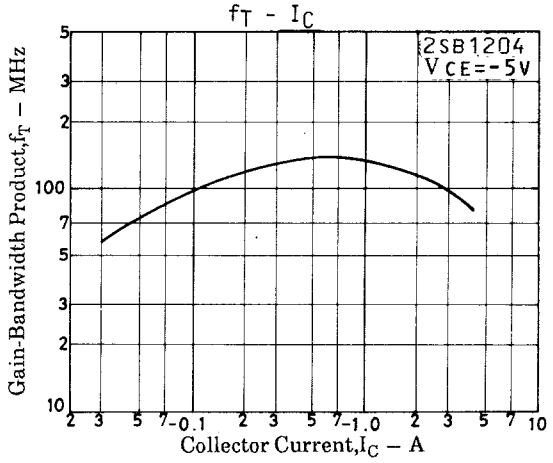

IC - VCE
2SD1804
30mA
25mA
20mA
15mA
10mA
5mA
IB=0
Collector Current,IC – A
Collector to Emitter Voltage,VCE – V

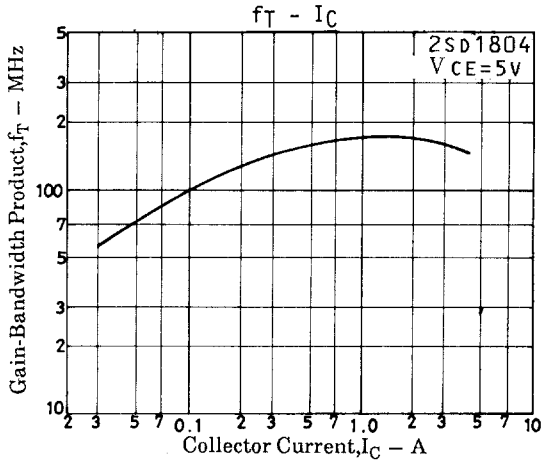

IC - VBE
2SB1204
VCE=-2V
Ta=75℃
25℃
-25℃
Collector Current,IC – A
Base to Emitter Voltage,VBE – V

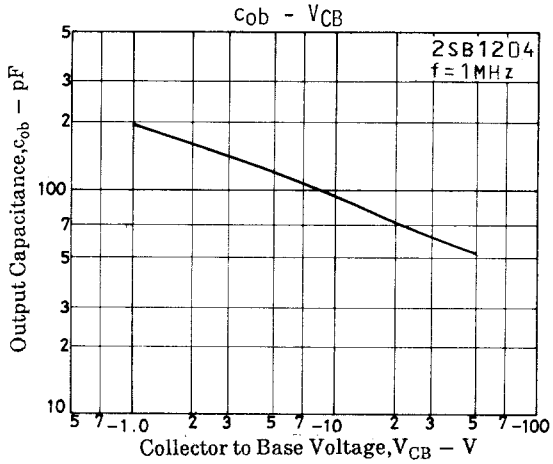

IC - VBE
2SD1804
VCE=2V
Ta=75℃
25℃
-25℃
Collector Current,IC – A
Base to Emitter Voltage,VBE – V

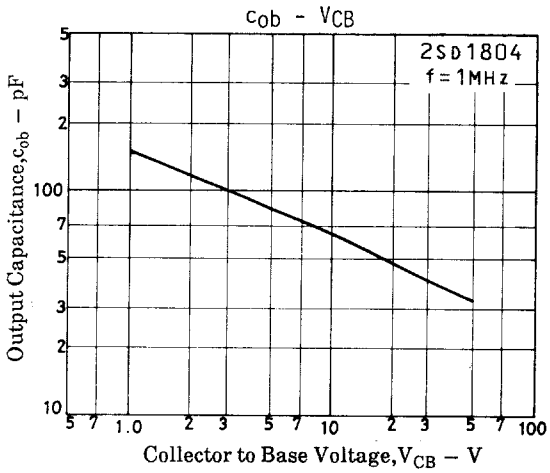

hFE - IC
2SB1204
VCE=-2V
Ta=75℃
25℃
-25℃
DC Current Gain,hFE
Collector Current,IC – A

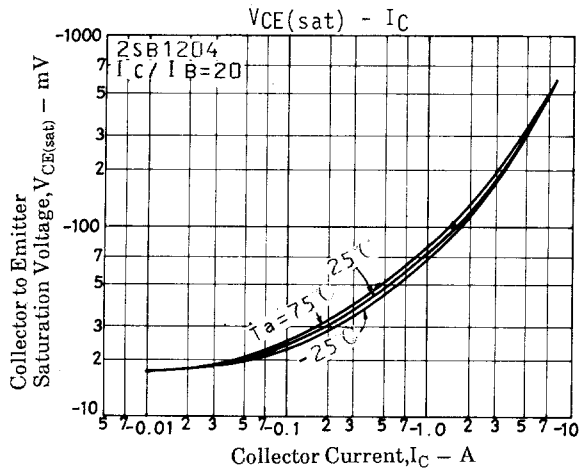

hFE - IC
2SD1804
VCE=2V
Ta=75℃
25℃
-25℃
DC Current Gain,hFE
Collector Current,IC – A

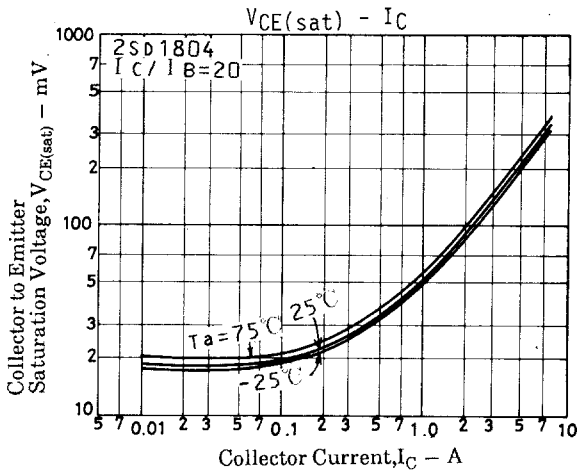

fT - IC
2SB1204
VCE=-5V
Gain-Bandwidth Product,fT – MHz
Collector Current,IC – A

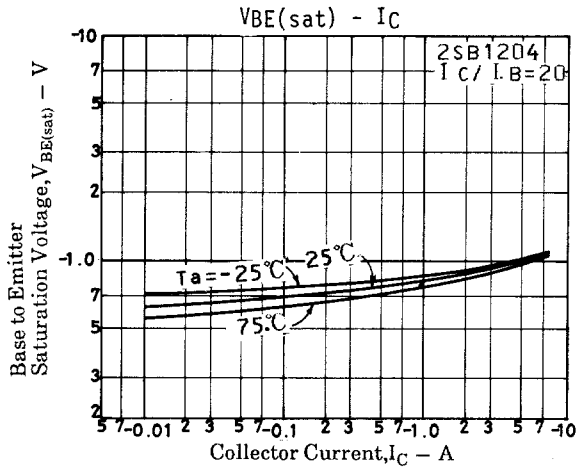

fT - IC
2SD1804
VCE=5V
Gain-Bandwidth Product,fT – MHz
Collector Current,IC – A

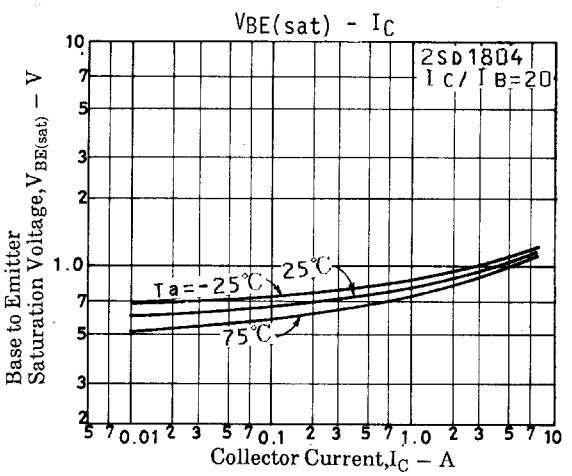

Cob - VCB
2SB1204
f=1MHz
Output Capacitance,Cob – pF
Collector to Base Voltage,VCB – V

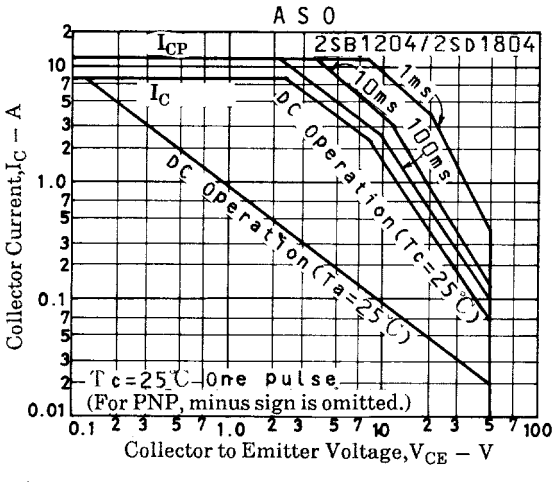

Cob - VCB
2SD1804
f=1MHz
Output Capacitance,Cob – pF
Collector to Base Voltage,VCB – V

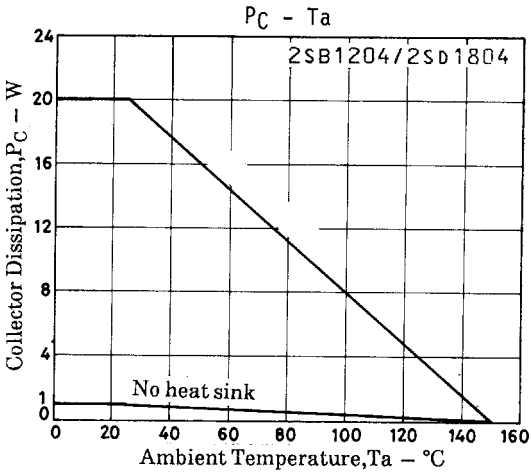

VCE(sat) - IC
2SB1204
IC/IB=20
Ta=75℃
25℃
-25℃
Collector to Emitter Saturation Voltage,VCE(sat) – mV
Collector Current,IC – A


VCE(sat) - IC
2SD1804
IC/IB=20
Ta=75℃
25℃
-25℃
Collector to Emitter Saturation Voltage,VCE(sat) – mV
Collector Current,IC – A


VBE(sat) - IC
2SB1204
IC/IB=20
Ta=-25℃
25℃
75℃
Base to Emitter Saturation Voltage,VBE(sat) – V
Collector Current,IC – A


VBE(sat) - IC
2SD1804
IC/IB=20
Ta=-25℃
25℃
75℃
Base to Emitter Saturation Voltage,VBE(sat) – V
Collector Current,IC – A





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