Ordering number:EN2540A

PNP/NPN Epitaxial Planar Silicon Transistors

2SB1216/2SD1816

High-Current Switching Applications

Applications

· Suitable for relay drivers, high-speed inverters, converters, and other general high-current switching applications.

Features

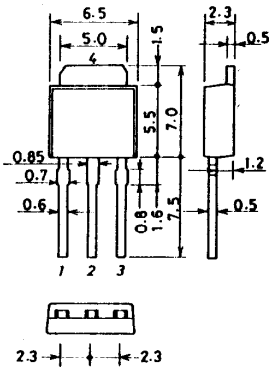
· Low collector-to-emitter saturation voltage.
· Good linearity of h_{FE}.
· Small and slim package facilitating compactness of sets.
· High f_T.
· Fast switching time.

Package Dimensions

unit:mm

2045B

[2SB1216/2SD1816]



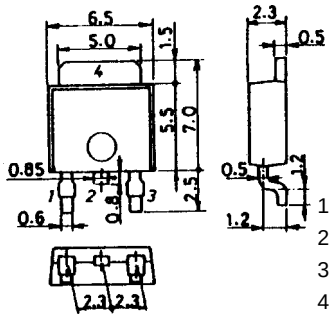
1 : Base
2 : Collector
3 : Emitter
4 : Collector

SANYO : TP

unit:mm

2044B

[2SB1216/2SD1816]



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

SANYO : TP-FA

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TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

( ) : 2SB1216

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

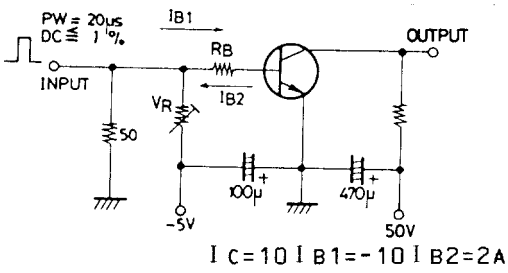
Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)100V, 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}=(–)5V, I_C=(–)0.5A	70*		400*	
	$h_{FE}2$	V_{CE}=(–)5V, I_C=(–)3A	40			
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)0.5A		(130)		MHz
				180		MHz
Output Capacitance	C_{ob}	V_{CB}=(–)10V, f=1MHz		(65)40		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=(–)2A, I_B=(–)0.2A		150	400	mV
				(–200)	(–500)	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)2A, I_B=(–)0.2A		(–)0.9	(–)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 Voltage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)6			V
Turn-ON Time	t_{on}	See specified Test Circuit		100		ns
Storage Time	t_{stg}	See specified Test Circuit		(800)		ns
				900		ns
Fall Time	t_f	See specified Test Circuit		50		ns

* : The 2SB1216/2SD1816 are classified by 0.5A h_{FE} as follows :

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

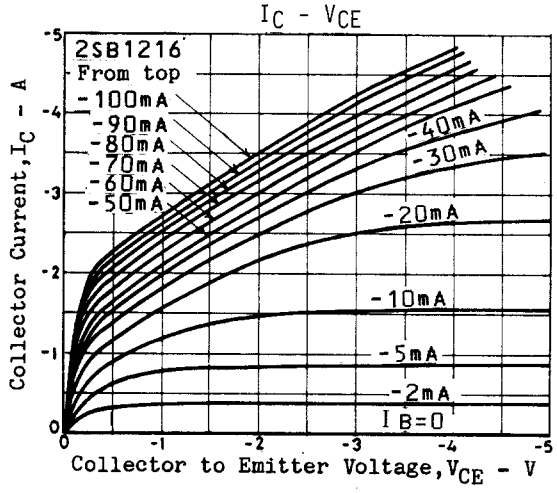
Switching Time Test Circuit

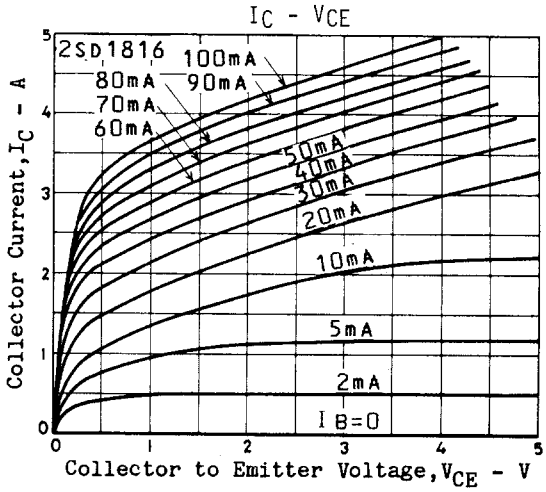


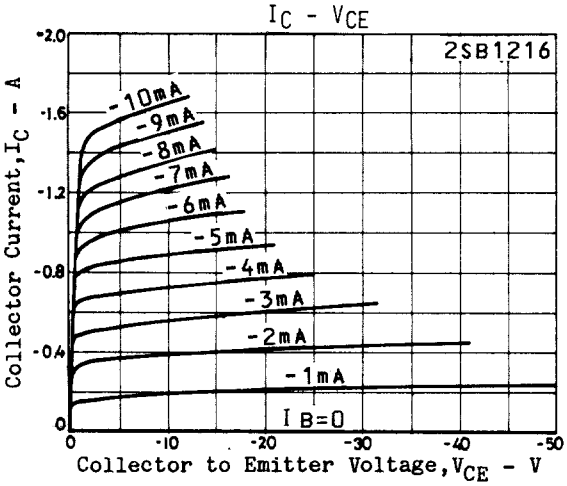
IC=10IB1=-10IB2=2A

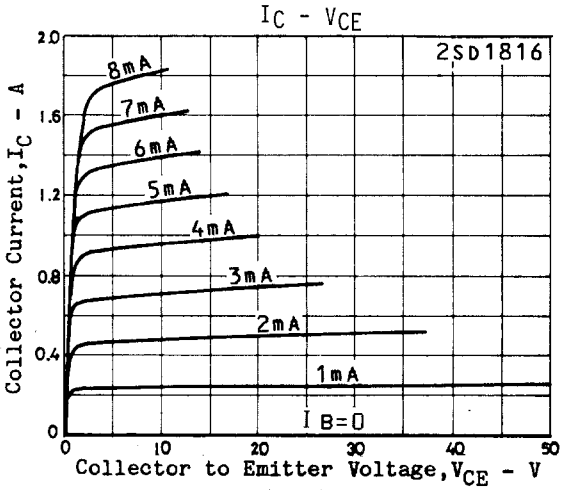
(For PNP, minus sign is omitted.)

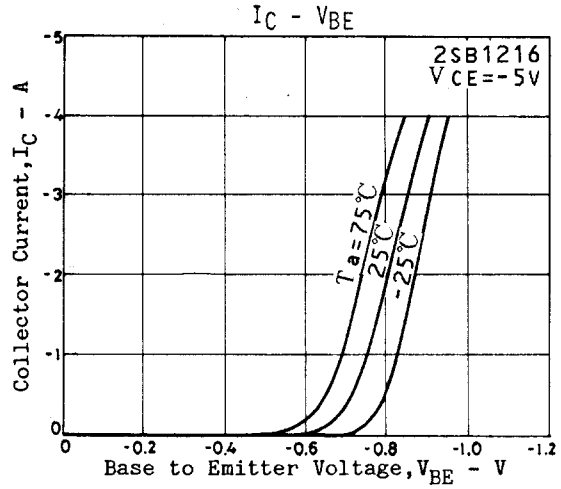
Unit (resistance : Ω, capacitance : F)

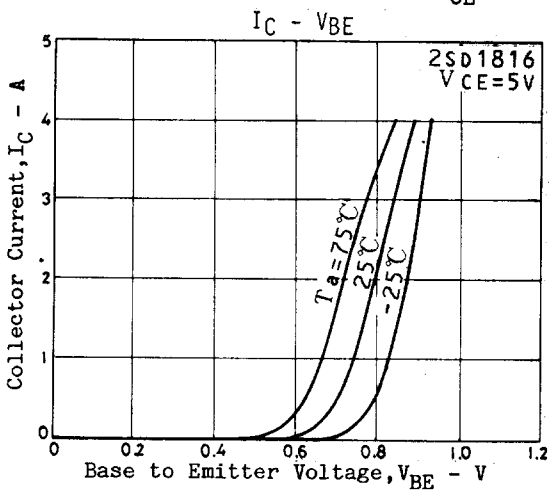

IC - VCE
2SB1216
From top
-100mA
-90mA
-80mA
-70mA
-60mA
-50mA
-40mA
-30mA
-20mA
-10mA
-5mA
-2mA
I B=0
Collector Current, IC - A
Collector to Emitter Voltage, VCE - V

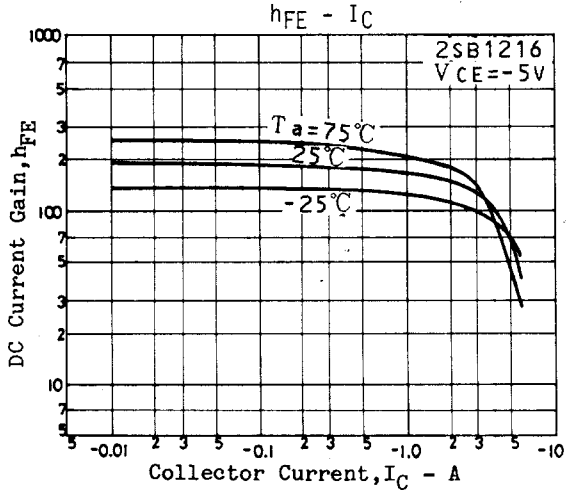

IC - VCE
2SD1816
100mA
90mA
80mA
70mA
60mA
50mA
40mA
30mA
20mA
10mA
5mA
2mA
I B=0
Collector Current, IC - A
Collector to Emitter Voltage, VCE - V

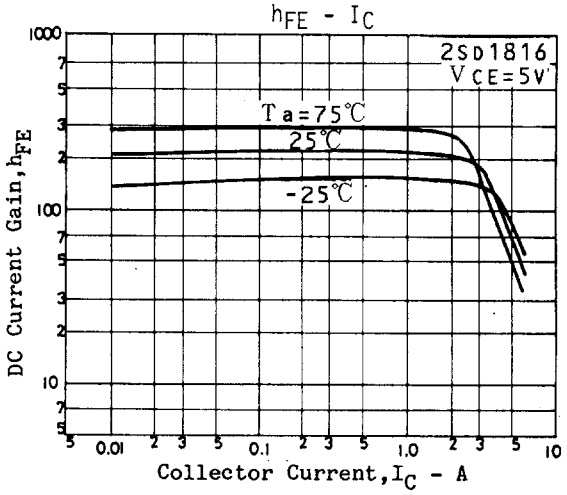

IC - VCE
2SB1216
-10mA
-9mA
-8mA
-7mA
-6mA
-5mA
-4mA
-3mA
-2mA
-1mA
I B=0
Collector Current, IC - A
Collector to Emitter Voltage, VCE - V

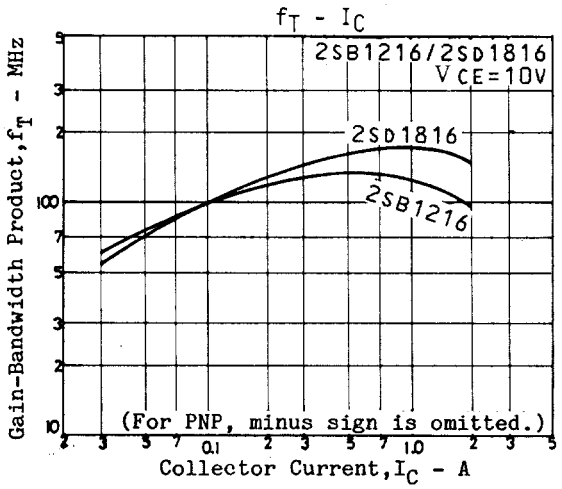

IC - VCE
2SD1816
8mA
7mA
6mA
5mA
4mA
3mA
2mA
1mA
I B=0
Collector Current, IC - A
Collector to Emitter Voltage, VCE - V

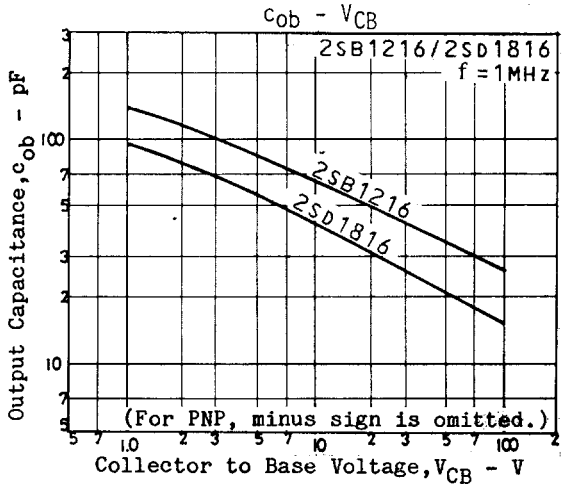

IC - VBE
2SB1216
VCE=-5V
Ta=75℃
25℃
-25℃
Collector Current, IC - A
Base to Emitter Voltage, VBE - V

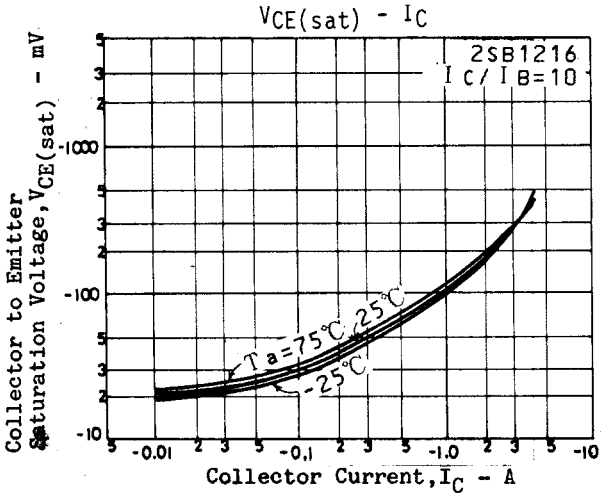

IC - VBE
2SD1816
VCE=5V
Ta=75℃
25℃
-25℃
Collector Current, IC - A
Base to Emitter Voltage, VBE - V

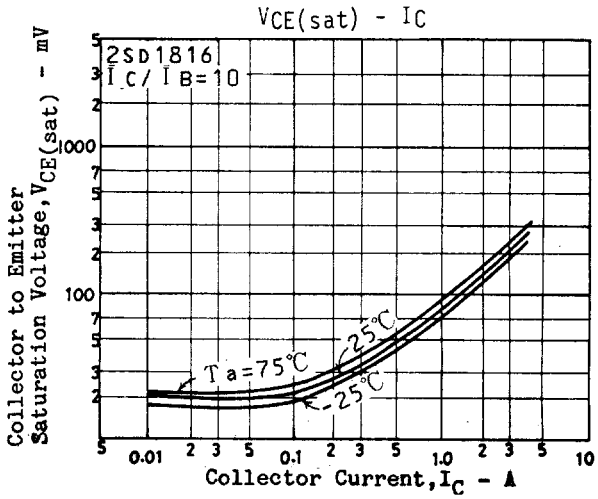

hFE - IC
2SB1216
VCE=-5V
Ta=75℃
25℃
-25℃
DC Current Gain, hFE
Collector Current, IC - A

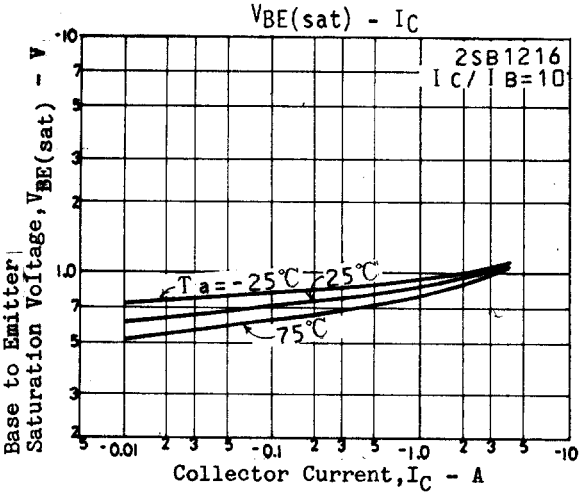

hFE - IC
2SD1816
VCE=5V
Ta=75℃
25℃
-25℃
DC Current Gain, hFE
Collector Current, IC - A

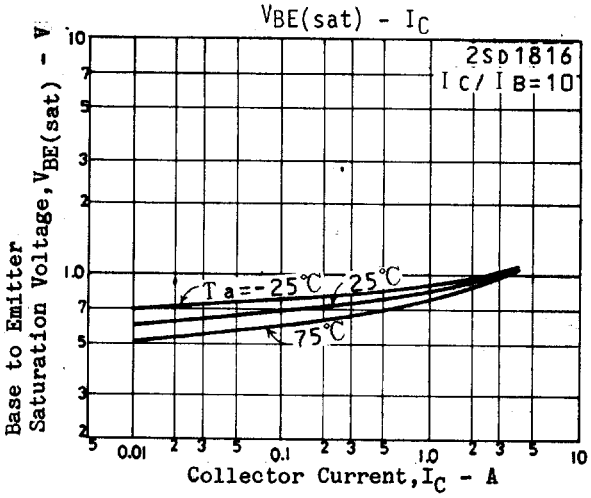

f_T - I_C
2SB1216/2SD1816
VCE=10V
2SD1816
2SB1216
(For PNP, minus sign is omitted.)
Gain-Bandwidth Product, f_T - MHz
Collector Current, I_C - A

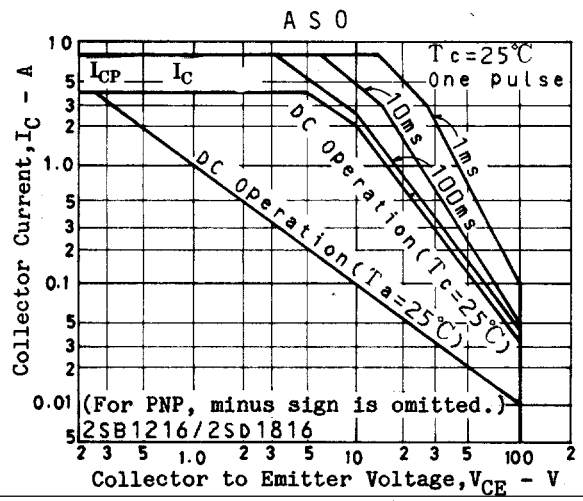

C_{ob} - V_{CB}
2SB1216/2SD1816
f=1MHz
2SB1216
2SD1816
(For PNP, minus sign is omitted.)
Output Capacitance, C_{ob} - pF
Collector to Base Voltage, V_{CB} - V

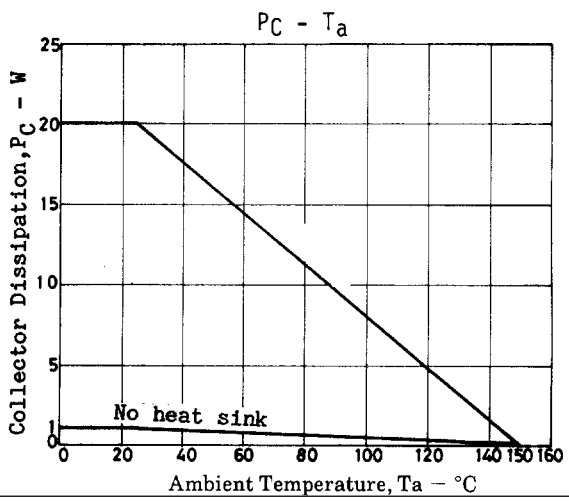

$V_{CE(sat)}$ - I_C
2SB1216
IC/IB=10
Ta=75℃
25℃
-25℃
Collector to Emitter Saturation Voltage, $V_{CE(sat)}$ - mV
Collector Current, I_C - A


$V_{CE(sat)}$ - I_C
2SD1816
IC/IB=10
Ta=75℃
25℃
-25℃
Collector to Emitter Saturation Voltage, $V_{CE(sat)}$ - mV
Collector Current, I_C - A


$V_{BE(sat)}$ - I_C
2SB1216
IC/IB=10
Ta=-25℃
25℃
75℃
Base to Emitter Saturation Voltage, $V_{BE(sat)}$ - V
Collector Current, I_C - A


$V_{BE(sat)}$ - I_C
2SD1816
IC/IB=10
Ta=-25℃
25℃
75℃
Base to Emitter Saturation Voltage, $V_{BE(sat)}$ - V
Collector Current, I_C - A


A S O
Tc=25℃
One pulse
I_{CP}
I_C
10ms
1ms
100ms
DC operation (Tc=25℃)
DC operation (Ta=25℃)
(For PNP, minus sign is omitted.)
2SB1216/2SD1816
Collector Current, I_C - A
Collector to Emitter Voltage, V_{CE} - V


P_C - T_a
No heat sink
Collector Dissipation, P_C - W
Ambient Temperature, Ta - °C

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