Ordering number: EN2046A

SANYO No.2046A

2SB1165/2SD1722

PNP/NPN Epitaxial Planar Silicon Transistors

50V/5A Switching Applications

Applications

. Relay drivers, high-speed inverters, converters

Features

. Low collector-to-emitter saturation voltage
. High f_T
. Excellent linearity of h_{FE}
. Fast switching time

( ): 2SB1165

Absolute Maximum Ratings at Ta=25°C

				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		(-)5	A
Collector Current (Pulse)	I_{CP}		(-)8	A
Collector Dissipation	P_C		1.2	W
		Tc=25°C	20	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		-55 to +150	°C

Electrical Characteristics at Ta=25°C

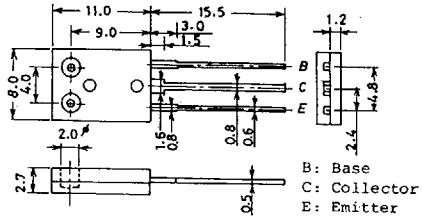
			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	V_{CB}=(-)40V,I_E=0			(-)1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(-)4V,I_C=0			(-)1	μA
DC Current Gain	$h_{FE}(1)$	V_{CE}=(-)2V,I_C=(-)0.5A	70*		400*	
	$h_{FE}(2)$	V_{CE}=(-)2V,I_C=(-)4A	35			
Gain-Bandwidth Product	f_T	V_{CE}=(-)5V,I_C=(-)1A		180		MHz
				(130)		MHz
Output Capacitance	Cob	V_{CB}=(-)10V,f=1MHz		40		pF
				(60)		pF
C-E Saturation Voltage	$V_{CE(sat)}$	I_C=(-)3A,I_B=(-)0.15A		220	400	mV
				(-280)	(-550)	mV

Continued on next page.

*: The 2SB1165/2SD1722 are classified by 0.5A h_{FE} as follows:

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

Package Dimensions 2043A
(unit:mm)



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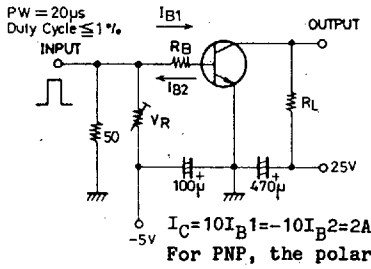
			min	typ	max	unit
B-E Saturation Voltage	$V_{BE(sat)}$	I_C=(-)3A, I_B=(-)0.15A		(-)0.95	(-)1.3	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	I_C=(-)10μA, I_E=0	(-)60			V
C-E Breakdown Voltage	$V_{(BR)CEO}$	I_C=(-)1mA, R_{BE}=∞	(-)50			V
E-B Breakdown Voltage	$V_{(BR)EBO}$	I_E=(-)10μA, I_C=0	(-)6			V
Turn-on Time	t_{on}	See specified Test Circuit.		50		ns
				(50)		ns
Storage Time	tstg	"		500		ns
				(450)		ns
Fall Time	t_f	"		20		ns
				(20)		ns

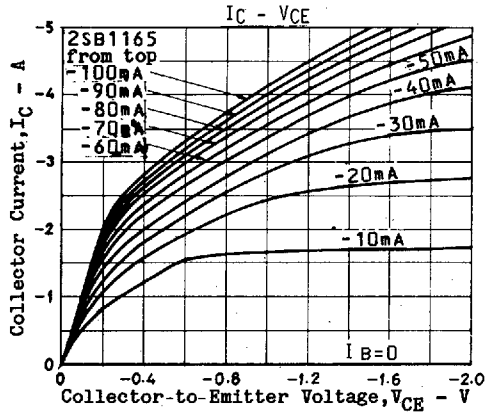
Switching Time Test Circuit

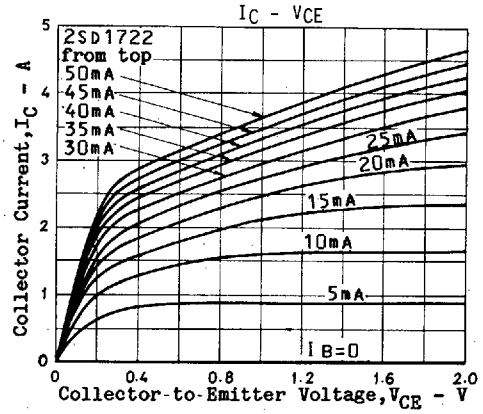


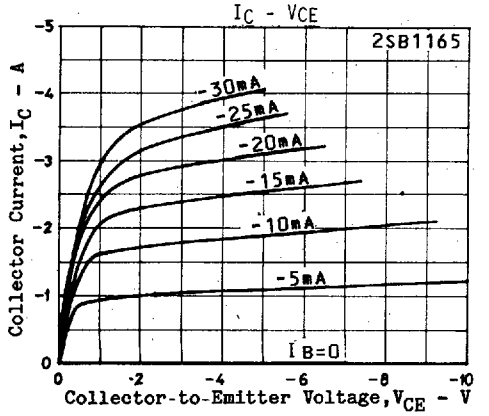
$I_C = 10I_{B1} = -10I_{B2} = 2A$

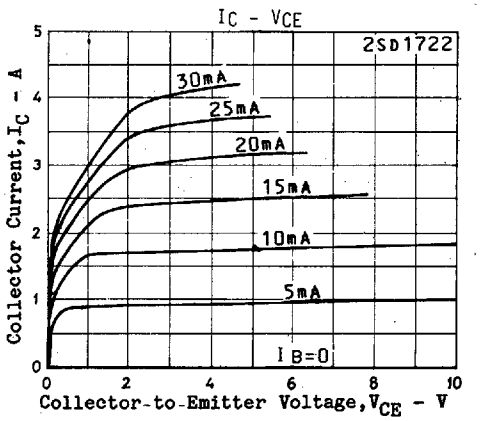
Unit (resistance : Ω, capacitance : F)

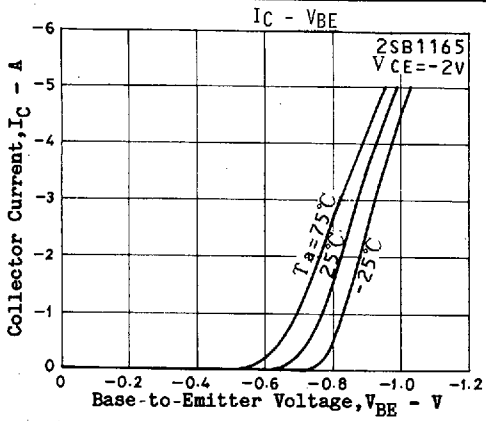
For PNP, the polarity is reversed.

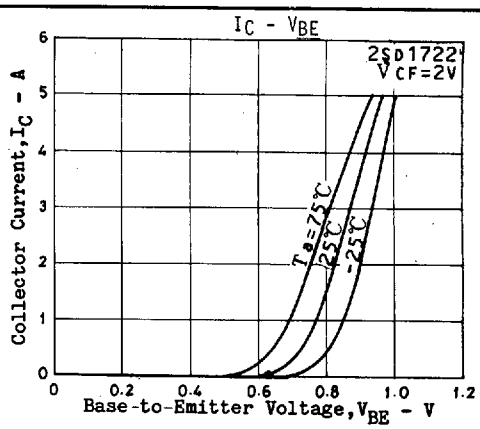


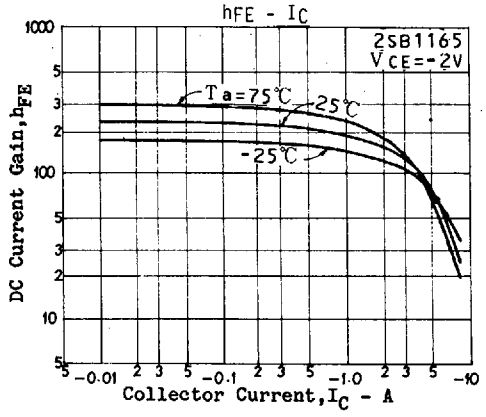


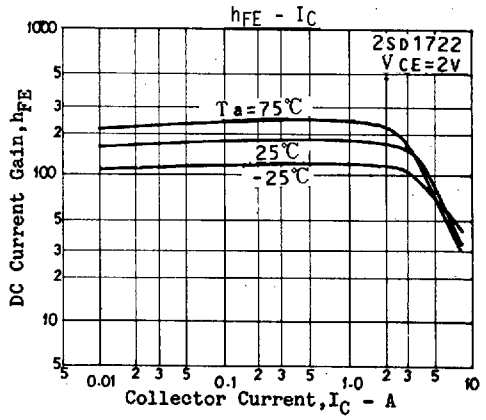


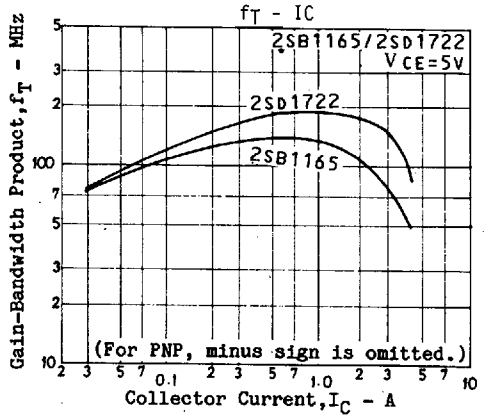


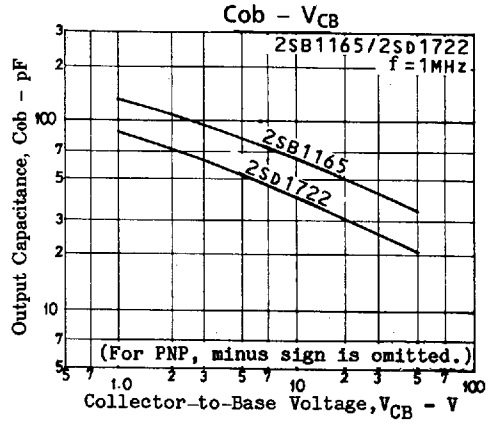

IC - VBE
2SB1165
VCE=-2V
Ta=75℃
25℃
-25℃
Collector Current, IC - A
Base-to-Emitter Voltage, VBE - V

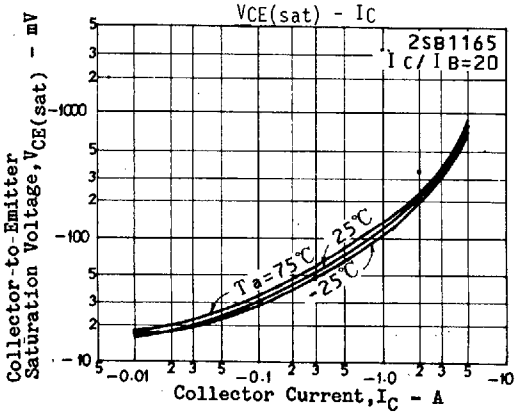

IC - VBE
2SD1722
VCE=2V
Ta=75℃
25℃
-25℃
Collector Current, IC - A
Base-to-Emitter Voltage, VBE - V

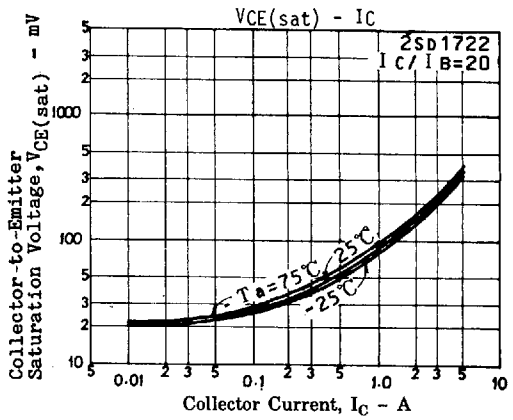

hFE - IC
2SB1165
VCE=-2V
Ta=75℃
25℃
-25℃
DC Current Gain, hFE
Collector Current, IC - A


hFE - IC
2SD1722
VCE=2V
Ta=75℃
25℃
-25℃
DC Current Gain, hFE
Collector Current, IC - A


fT - IC
2SB1165/2SD1722
VCE=5V
2SD1722
2SB1165
(For PNP, minus sign is omitted.)
Gain-Bandwidth Product, fT - MHz
Collector Current, IC - A


Cob - VCB
2SB1165/2SD1722
f=1MHz
2SB1165
2SD1722
(For PNP, minus sign is omitted.)
Output Capacitance, Cob - pF
Collector-to-Base Voltage, VCB - V


VCE(sat) - IC
2SB1165
IC/IB=20
Ta=75℃
25℃
-25℃
Collector-to-Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A


VCE(sat) - IC
2SD1722
IC/IB=20
Ta=75℃
25℃
-25℃
Collector-to-Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A