

Ordering number:2047A

PNP/NPN Epitaxial Planar Silicon Transistors



# 2SB1167/2SD1724

## 100V/3A Switching Applications

### Features

- Relay drivers, high-speed inverters, converters.

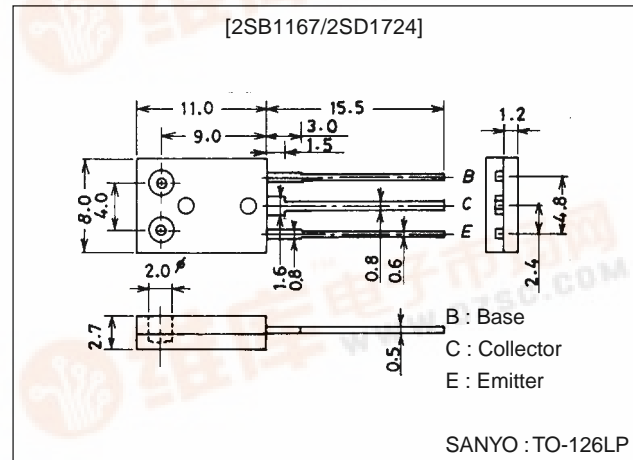
### Features

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

### Package Dimensions

unit:mm

2043A



( ) : 2SB1167

### Specifications

#### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	$V_{CB0}$		(-120	V
Collector-to-Emitter Voltage	$V_{CEO}$		(-100	V
Emitter-to-Base Voltage	$V_{EBO}$		(-6	V
Collector Current	$I_C$		(-3	A
Collector Current (Pulse)	$I_{CP}$		(-6	A
Collector Dissipation	$P_C$		1.2	W
		$T_c=25^\circ\text{C}$	20	W
Junction Temperature	$T_j$		150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

#### Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = (-)100\text{V}, I_E = 0$			(-1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = (-)4\text{V}, I_C = 0$			(-1	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE} = (-)5\text{V}, I_C = (-)0.5\text{A}$	70*		400*	
	$h_{FE2}$	$V_{CE} = (-)5\text{V}, I_C = (-)2\text{A}$	40			
Gain-Bandwidth Product	$f_T$	$V_{CE} = (-)10\text{V}, I_C = (-)0.5\text{A}$		(130)		MHz
				180		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = (-)10\text{V}, f = 1\text{MHz}$		25(40)		pF

\* : The 2SB1167/2SD1724 are classified by 0.5A  $h_{FE}$  as follows :

70	Q	140	100	R	200	140	S	280	200	T	400
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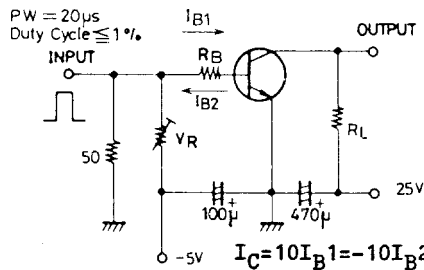
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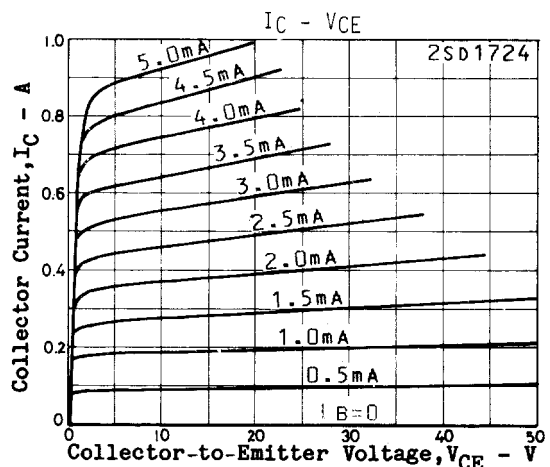
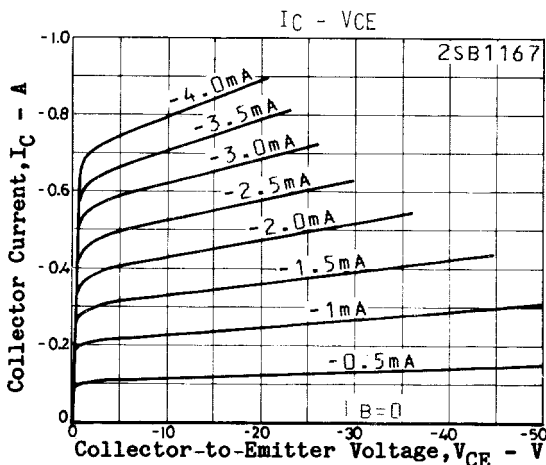
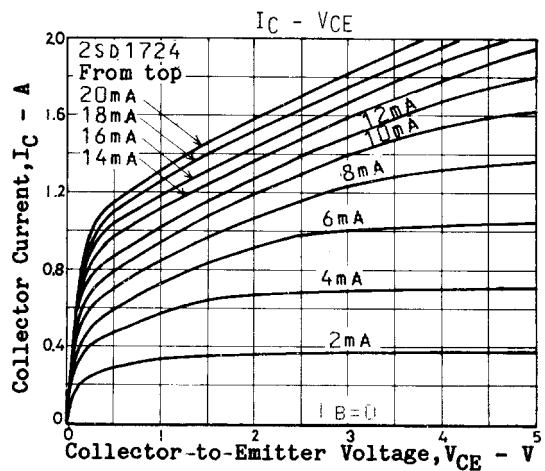
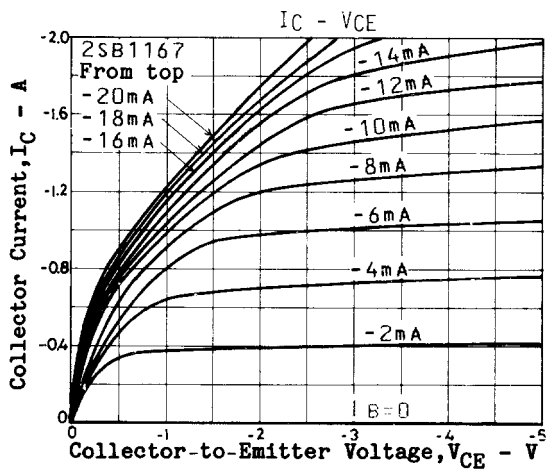
## 2SB1167/2SD1724

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)1.5A, I_B=(-)0.15A$		(-200)	(-500)	mV
				150	400	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)1.5A, I_B=(-)0.15A$		(-0.9)	(-1.2)	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu A, I_E=0$	(-120)			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1mA, R_{BE}=\infty$	(-100)			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu A, I_C=0$	(-6)			V
Turn-ON Time	$t_{on}$	See specified Test Circuit		(100)		ns
				100		ns
Storage Time	$t_{stg}$	See specified Test Circuit		900		ns
				(800)		ns
Fall Time	$t_f$	See specified Test Circuit		50(50)		ns

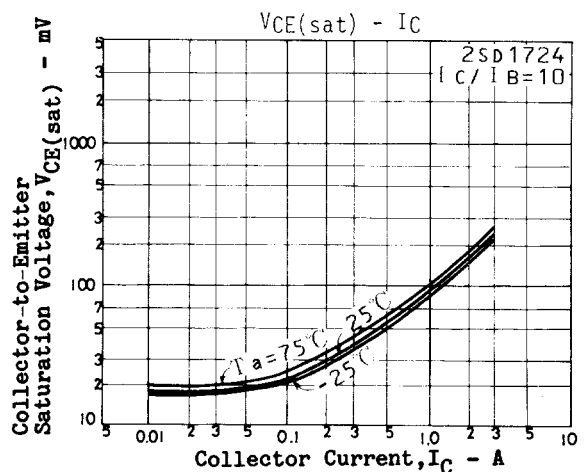
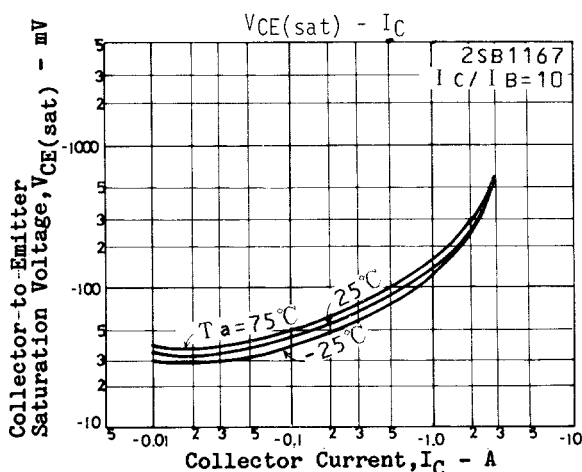
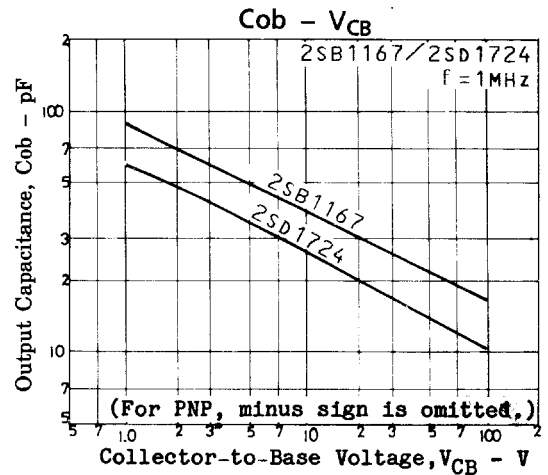
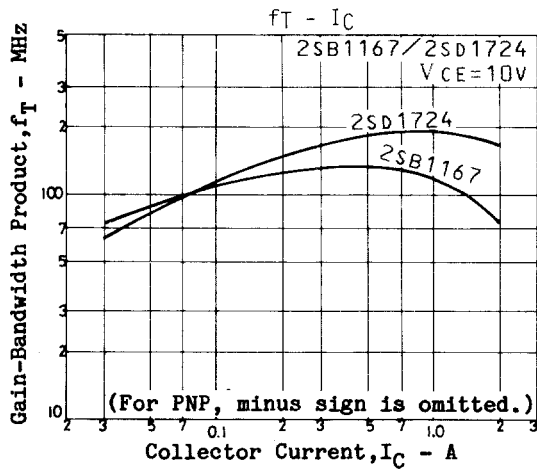
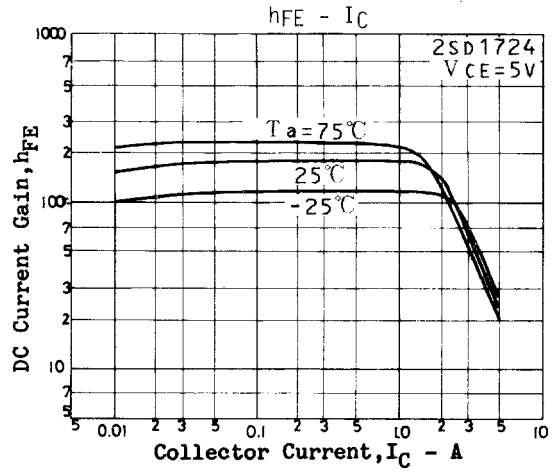
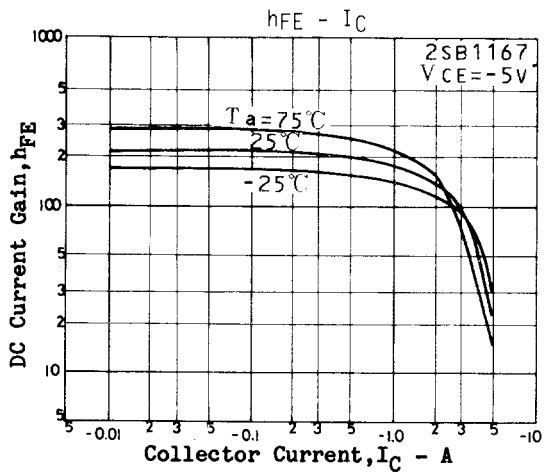
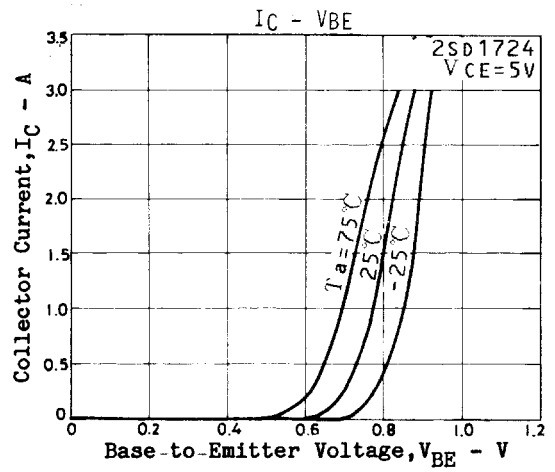
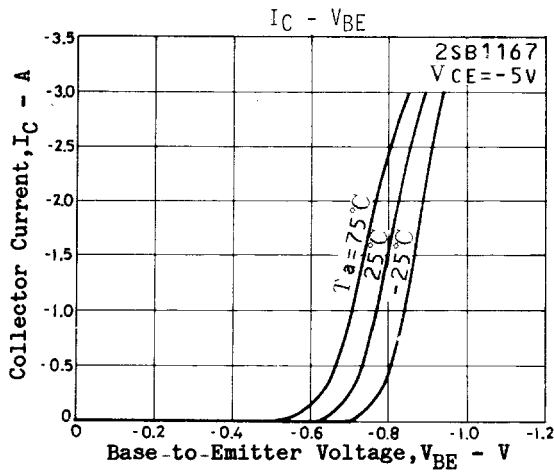
### Switching Time Test Circuit



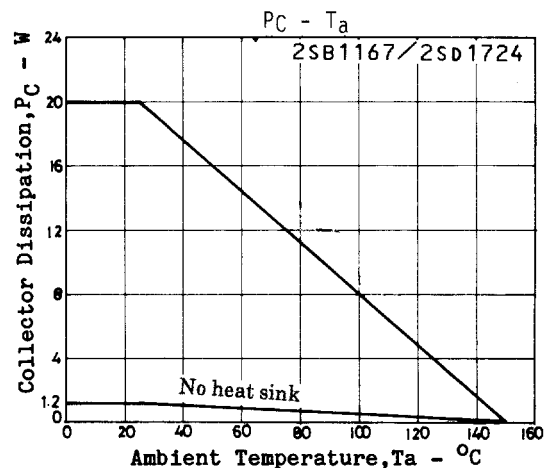
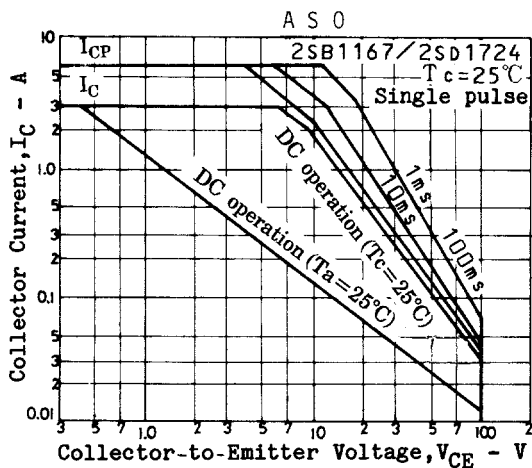
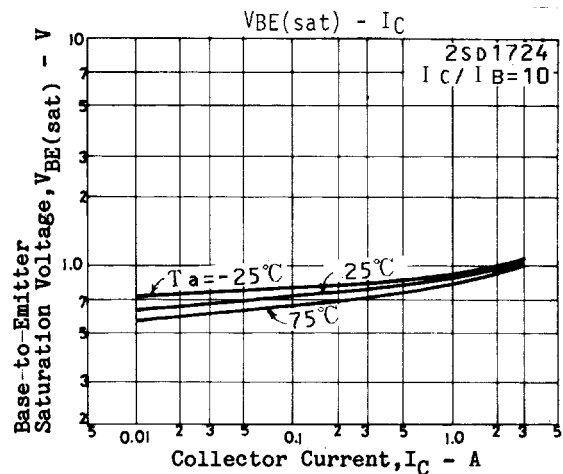
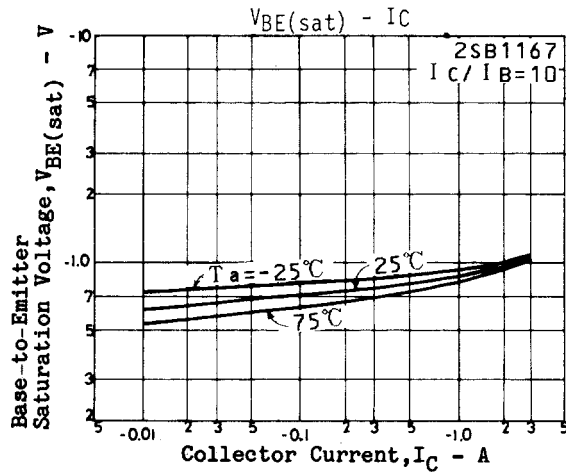
$I_C = 10I_{B1} = -10I_{B2} = 1.5A$   
**For PNP, the polarity is reversed.**  
 Unit (resistance :  $\Omega$ , capacitance : F)



# 2SB1167/2SD1724



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