



# 2SB1168/2SD1725

## Large Current Switching Applications

An ON Semiconductor Company

### Features

- Relay drivers, high-speed inverters, converters.

### Features

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

### Specifications

() : 2SB1168

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

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	$P_C$		1.2	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*	
	$h_{FE2}$	$V_{CE}=(-)5\text{V}, I_C=(-)3\text{A}$	40			
Gain-Bandwidth Product	$f_T$	$V_{CE}=(-)10\text{V}, I_C=(-)0.5\text{A}$		(130)		MHz
				180		MHz

\* : The 2SB1168/2SD1725 are classified by 0.5A  $h_{FE}$  as follows :

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Rank	Q	R	S	T
$h_{FE}$	70 to 140	100 to 200	140 to 280	200 to 400

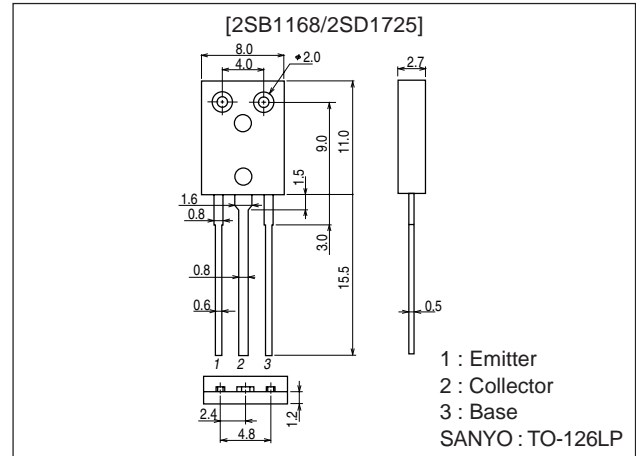
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### Package Dimensions

unit:mm

2043B

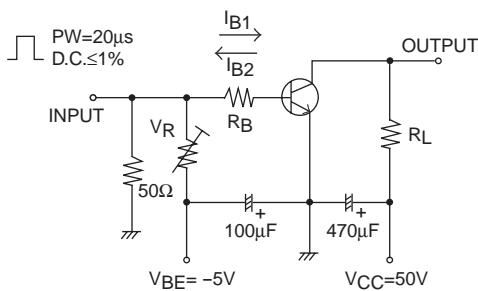


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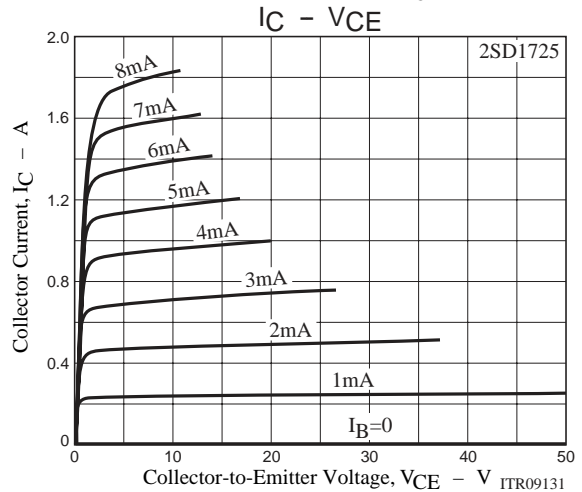
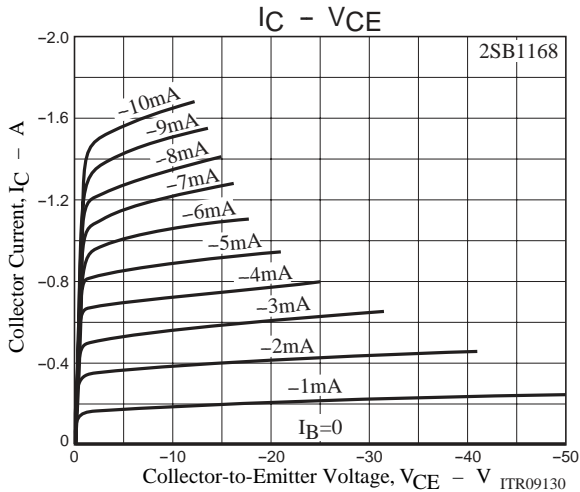
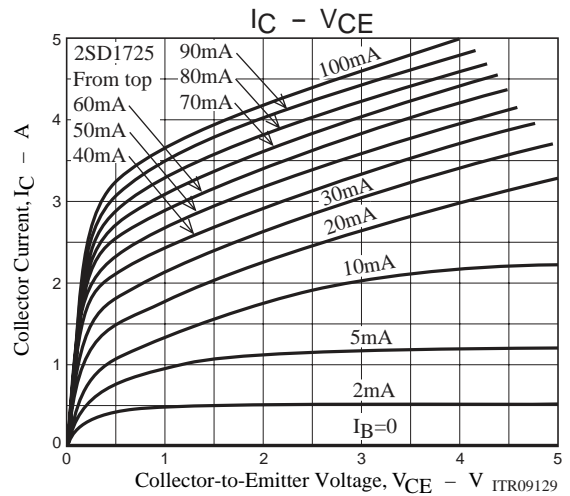
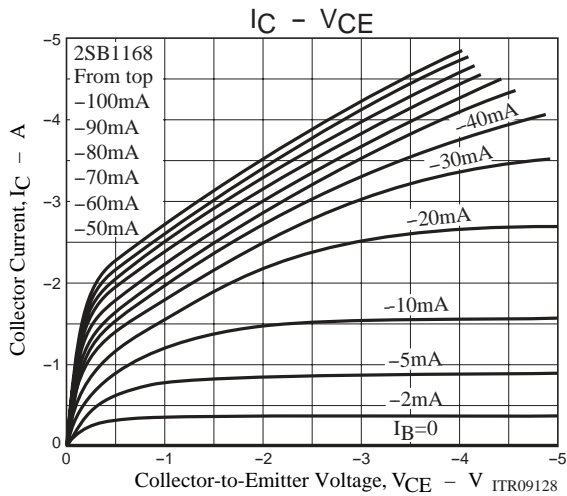
Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Output Capacitance	$C_{ob}$	$V_{CB}=(-)10V, f=1MHz$		40(65)		pF	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=(-)2A, I_B=(-)0.2A$		(-200)	(-500)	mV	
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=(-)2A, I_B=(-)0.2A$		150	400	mV	
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	$t_{stg}$				900		ns
					(800)		ns
Fall Time	$t_f$				50(50)		ns

## Switching Time Test Circuit

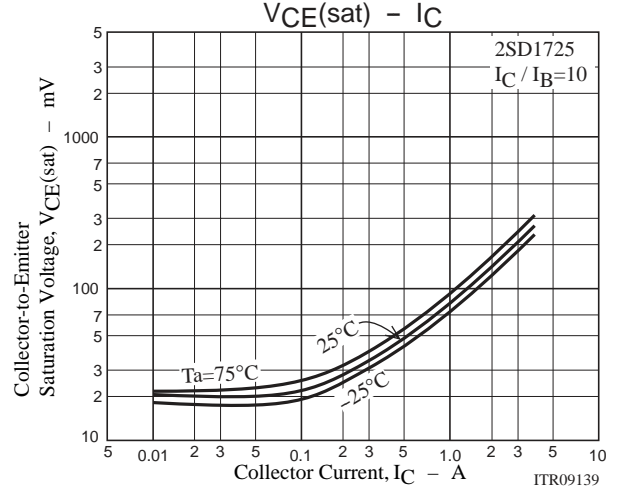
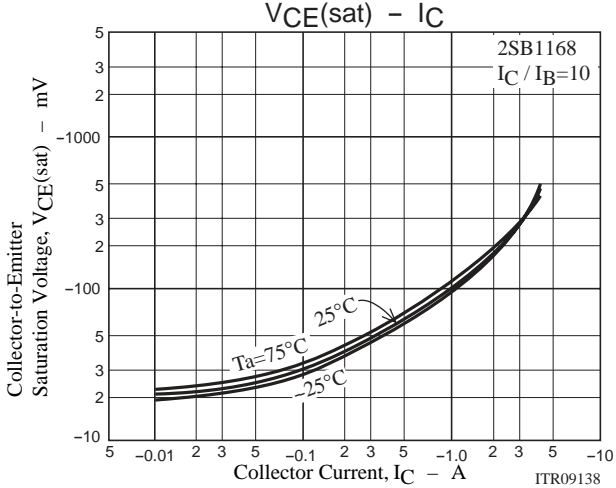
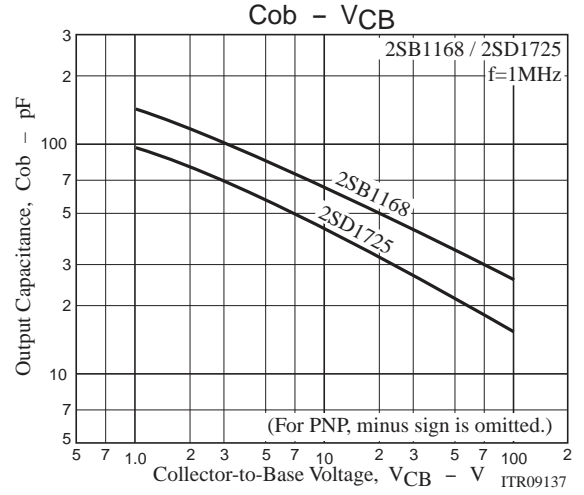
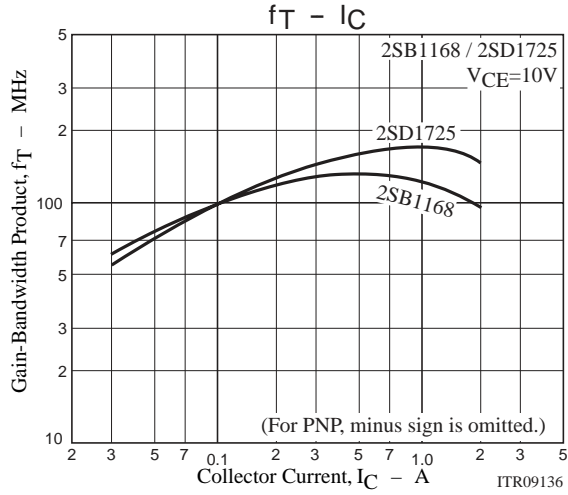
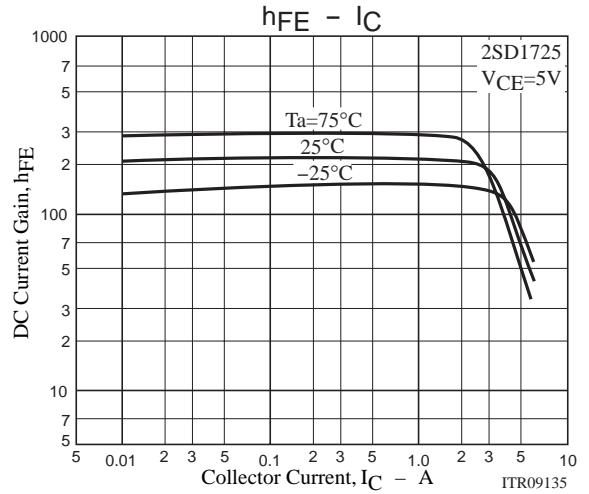
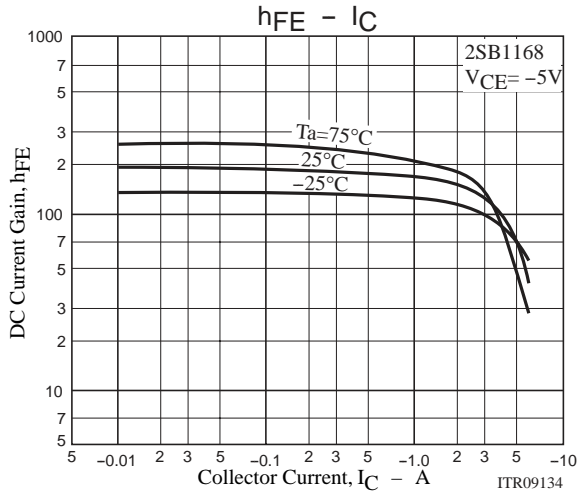
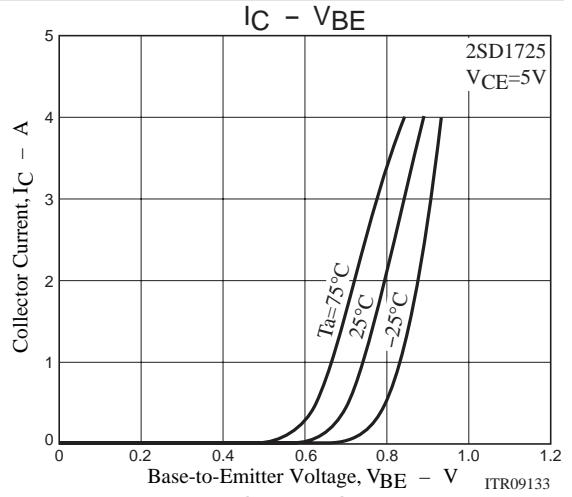
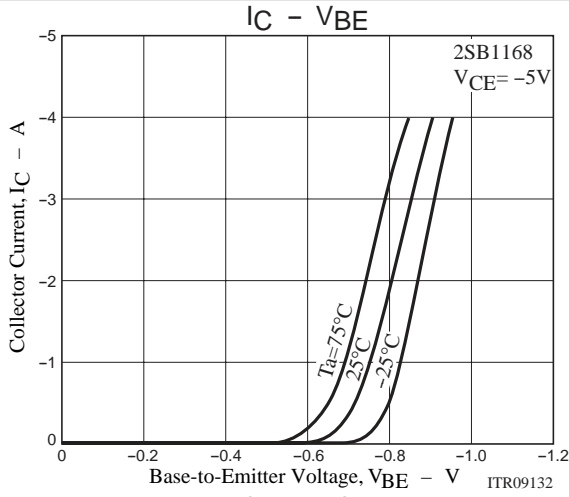


$$I_C = 10I_{B1} = -10I_{B2} = 2A$$

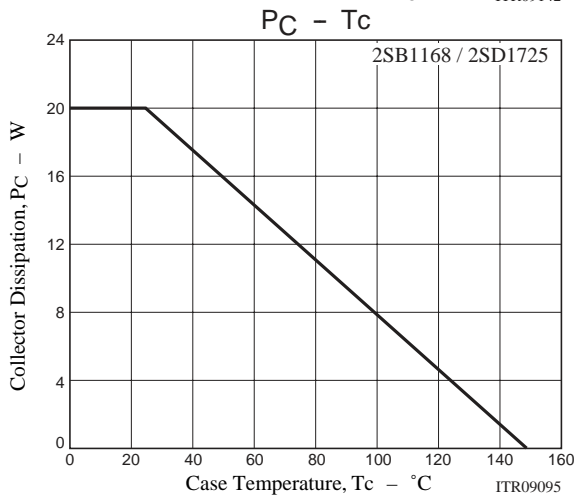
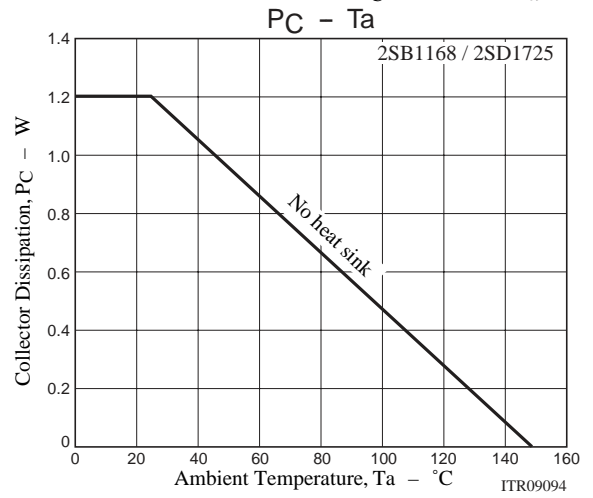
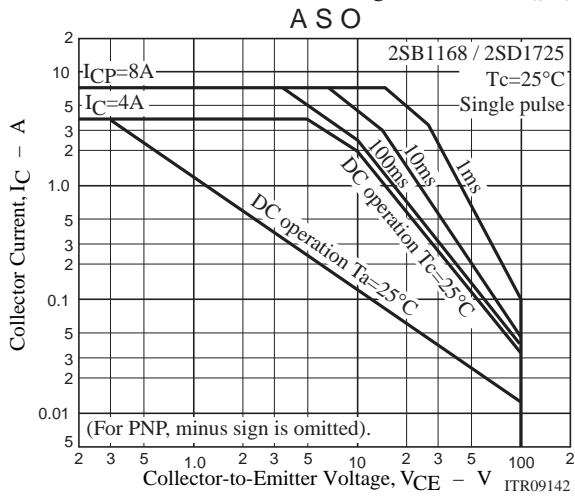
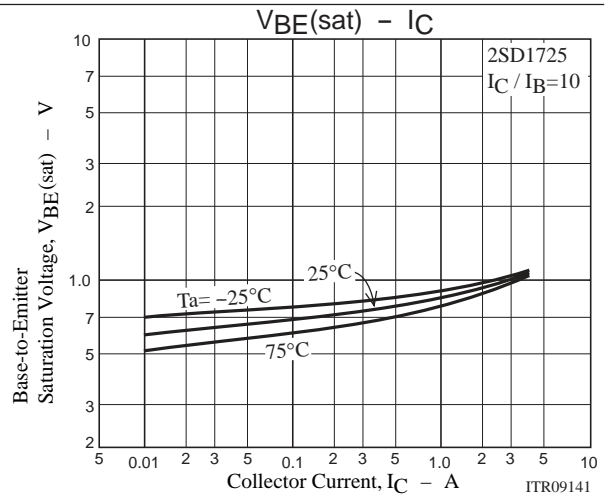
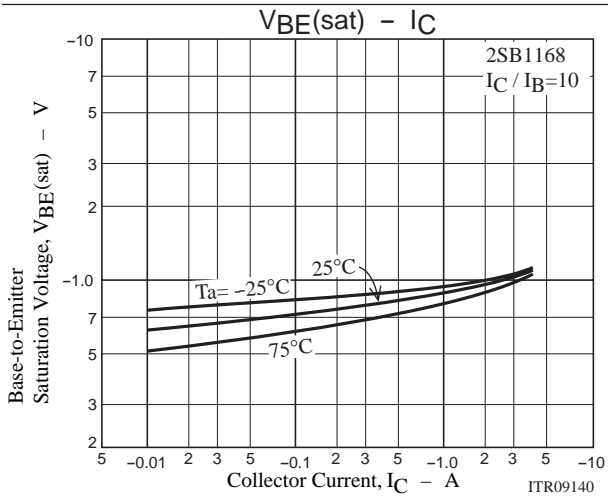
For PNP, the polarity is reversed.



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