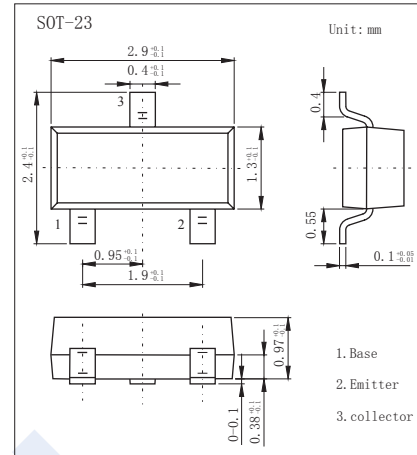


## NPN Transistors

### 2SC4168

#### ■ Features

- Fast switching speed.
- High gain-bandwidth product.
- Low saturation voltage.
- Complementary to 2SA1607.



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

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	$V_{CB0}$	40	V
Collector - Emitter Voltage	$V_{CE0}$	20	
Emitter - Base Voltage	$V_{EB0}$	5	
Collector Current - Continuous	$I_C$	150	mA
Peak Collector Current	$I_{CP}$	300	
Collector Power Dissipation	$P_C$	200	mW
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to 150	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{CB0}$	$I_C = 100 \mu\text{A}$ , $I_E = 0$	40			V
Collector-emitter breakdown voltage	$V_{CE0}$	$I_C = 1 \text{ mA}$ , $R_{BE} = \infty$	20			
Emitter - base breakdown voltage	$V_{EB0}$	$I_E = 100 \mu\text{A}$ , $I_C = 0$	5			
Collector-base cut-off current	$I_{CBO}$	$V_{CB} = 30 \text{ V}$ , $I_E = 0$			0.1	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 4 \text{ V}$ , $I_C = 0$			0.1	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10 \text{ mA}$ , $I_B = 1 \text{ mA}$		0.08	0.2	V
Base - emitter saturation voltage	$V_{BE(sat)}$	$I_C = 10 \text{ mA}$ , $I_B = 1 \text{ mA}$		0.72	1	
DC current gain	$h_{FE}$	$V_{CE} = 1 \text{ V}$ , $I_C = 10 \text{ mA}$	60		270	
Delay time	$t_d$	See specified Test Circuit		11	20	ns
Rise time	$t_r$			10	20	
Storage time	$t_s$			70	180	
Fall time	$t_f$			15	25	
Collector output capacitance	$C_{ob}$	$V_{CB} = 10 \text{ V}$ , $f = 1 \text{ MHz}$		2.6		pF
Transition frequency	$f_T$	$V_{CE} = 10 \text{ V}$ , $I_C = 10 \text{ mA}$		700		MHz

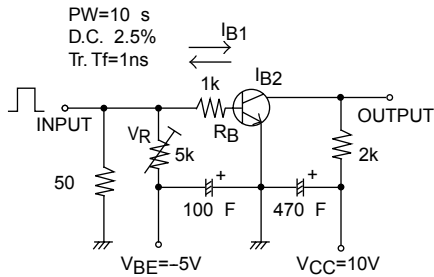
#### ■ Classification of $h_{FE}$

Marking	GT3	GT4	GT5
Range	60-120	90-180	135-270

# NPN Transistors

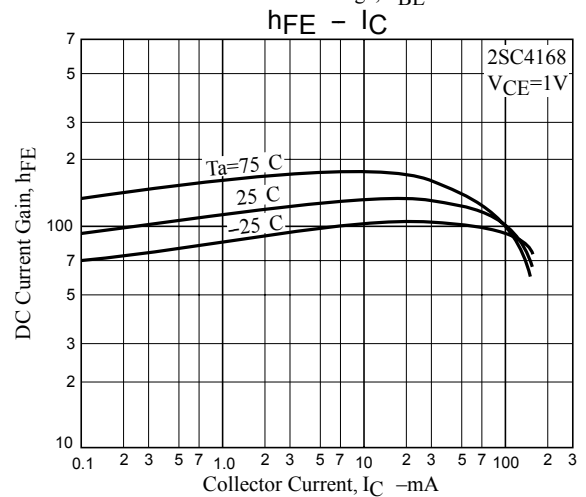
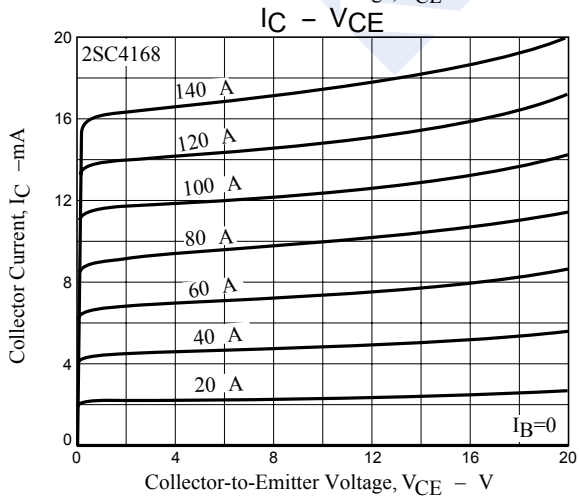
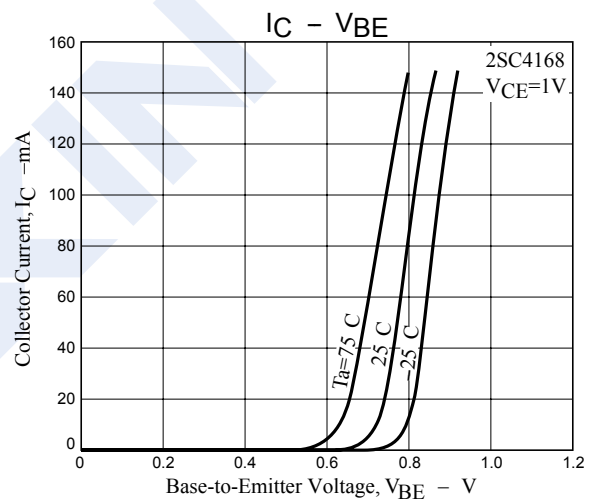
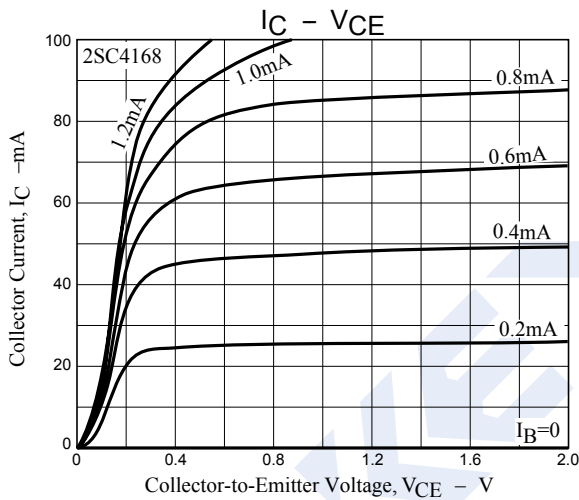
## 2SC4168

### Switching Time Test Circuit



$5I_{B1} = -I_{B2} = I_C = 50mA$   
 For PNP, the polarity is reversed.

### Typical Characteristics



## NPN Transistors

### 2SC4168

■ Typical Characteristics

