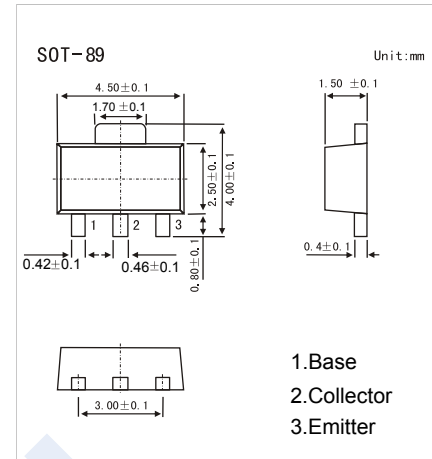


## PNP Transistors

### 2SA1415-HF

#### ■ Features

- Adoption of FBET Process
- High Breakdown Voltage ( $V_{CE0} = 160V$ )
- Excellent Linearity of  $h_{FE}$  and Small  $C_{ob}$
- Fast Switching Speed
- Complementary to 2SC3645-HF
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish



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

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	$V_{CBO}$	-180	V
Collector - Emitter Voltage	$V_{CEO}$	-160	
Emitter - Base Voltage	$V_{EBO}$	-5	
Collector Current - Continuous	$I_C$	-140	mA
Collector Current - Pulsed	$I_{CP}$	-200	
Collector Power Dissipation	$P_C$	500	mW
Junction Temperature	$T_J$	150	$^\circ C$
Storage Temperature range	$T_{stg}$	-55 to 150	

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

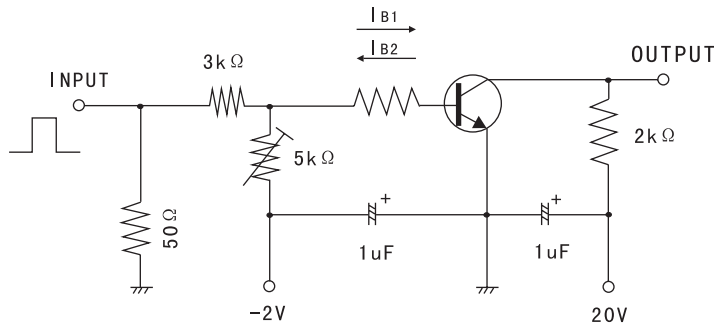
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-base breakdown voltage	$V_{CBO}$	$I_C = -100 \mu A, I_E = 0$	-180			V
Collector-emitter breakdown voltage	$V_{CEO}$	$I_C = -1 mA, I_B = 0$	-160			
Emitter - base breakdown voltage	$V_{EBO}$	$I_E = -100 \mu A, I_C = 0$	-5			
Collector-base cut-off current	$I_{CBO}$	$V_{CB} = -80 V, I_E = 0$			-0.1	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = -4 V, I_C = 0$			-0.1	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -50 mA, I_B = -5 mA$		-0.14	-0.4	V
Base - emitter saturation voltage	$V_{BE(sat)}$	$I_C = -50 mA, I_B = -5 mA$			-1.2	
DC current gain	$h_{FE}$	$V_{CE} = -5 V, I_C = -10 mA$	100		400	
Turn-on time	$t_{on}$	See Test Circuit.		0.1		$\mu s$
Storage time	$t_s$			0.15		
Fall time	$t_f$			0.1		
Output capacitance	$C_{ob}$	$V_{CB} = -10 V, I_E = 0, f = 1 MHz$		4		pF
Transition frequency	$f_T$	$V_{CE} = -10 V, I_E = -10 mA$		150		MHz

#### ■ Classification of $h_{fe}$

Type	2SA1415-R-HF	2SA1415-S-HF	2SA1415-T-HF
Range	100-200	140-280	200-400
Marking	AAR* <sub>F</sub>	AAS* <sub>F</sub>	AAT* <sub>F</sub>

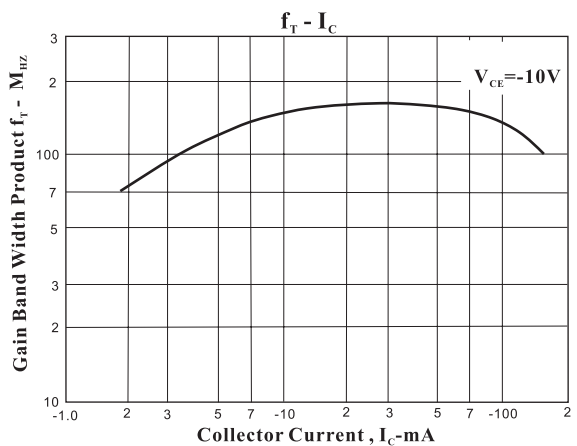
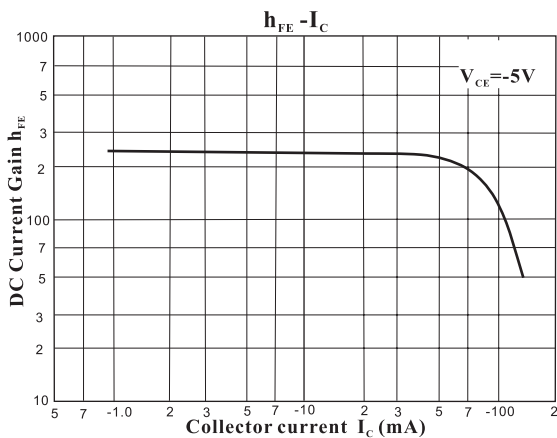
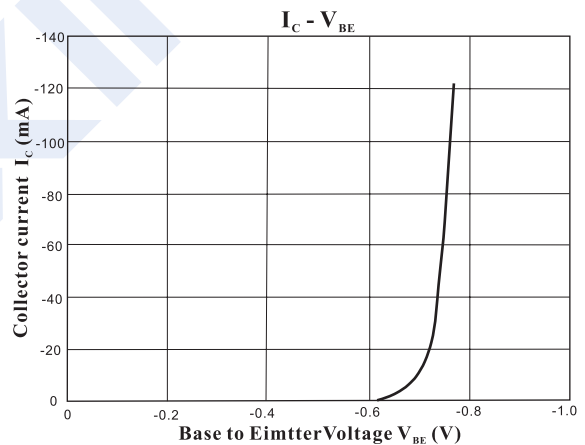
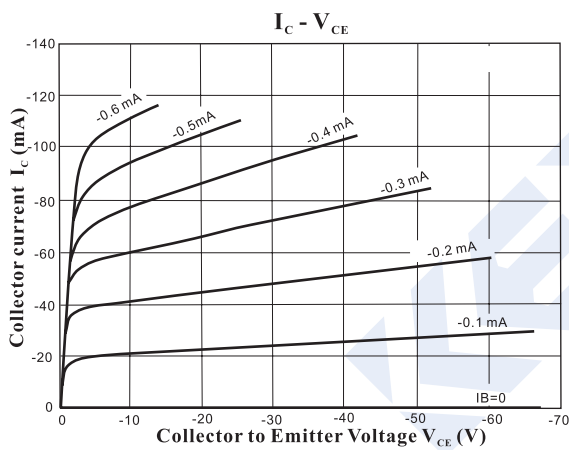
## PNP Transistors 2SA1415-HF

■ Test Circuit



$I_C = 10I_{B1} = -10I_{B2} = 10\text{mA}$   
(For PNP, the polarity is reversed.)

■ Typical Characteristics



### PNP Transistors

### 2SA1415-HF

■ Typical Characteristics

