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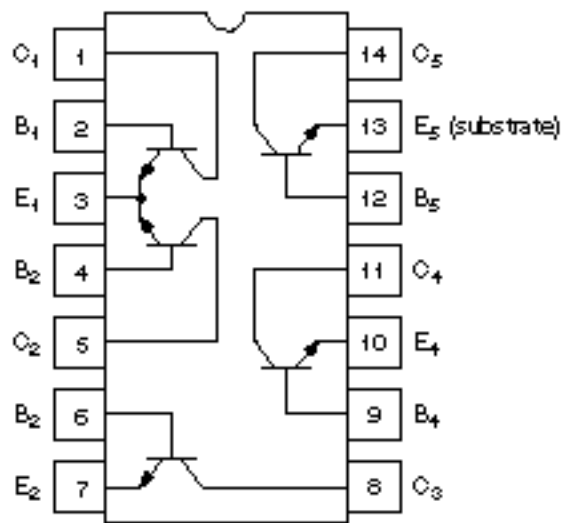
# HA1127, HA1127P, HA1127FP

5 Transistor Arrays

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## Pin Arrangement



(Top view)

Note: Use pin 13 as the lowest potential for this IC.

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# HA1127, HA1127P, HA1127FP

## Absolute Maximum Ratings (Ta = 25°C)

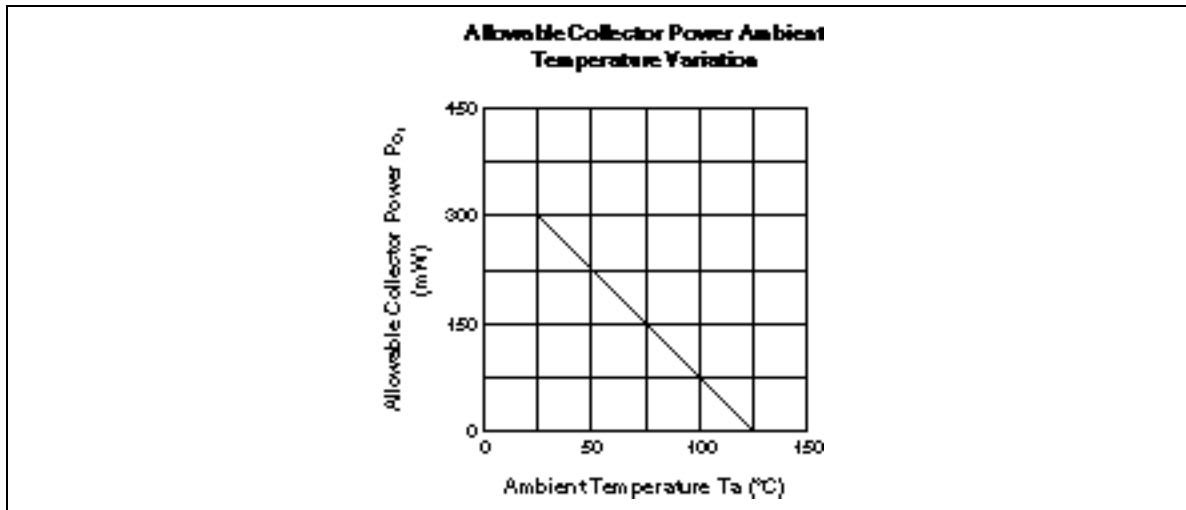
Item	Symbol	HA1127	Unit
Collector base voltage	$V_{CBO}$	20	V
Collector substrate voltage	$V_{CIO}$	20	V
Collector emitter voltage	$V_{CEO}$	15	V
Emitter-base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	50	mA
Allowable collector power	$P_C^{*1}$	300	mW
Allowable collector power	$P_C$	$750^{*2}$ $625^{*3}$	mW
Operating temperature	$T_{opr}$	-55 to +125	°C
Storage temperature	$T_{stg}$	-55 to +125	°C

Notes: 1. Allowable value per individual transistor. This is the allowable value up to  $T_a = 25^\circ\text{C}$ . Derate at 3 mW/°C above that temperature.

2. Allowable value for the whole package.

This is the allowable value up to  $T_a = 35^\circ\text{C}$  for the HA1127P. Derate at 8.3 mW/°C above that temperature.

3. See page 51.



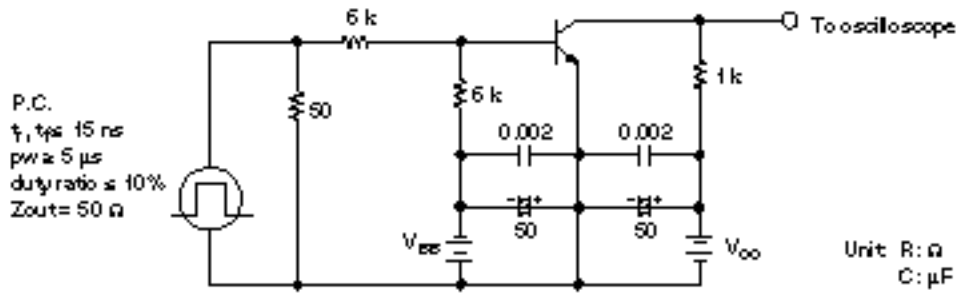
## HA1127, HA1127P, HA1127FP

### Electrical Characteristics (Ta = 25°C)

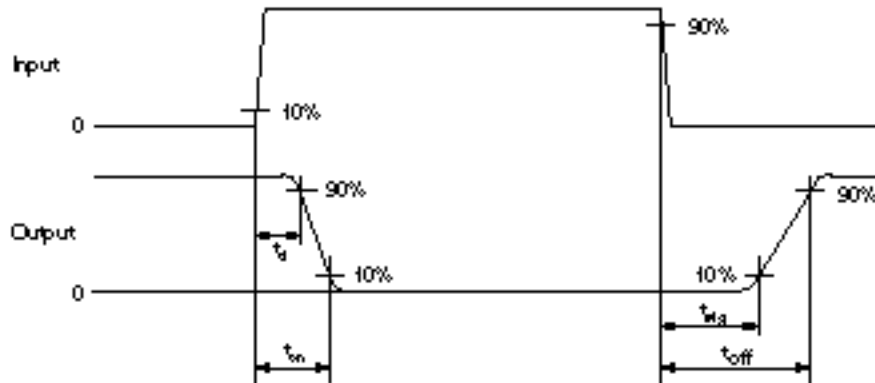
Item	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-base breakdown voltage	$V_{(BR)CBO}$	20	—	—	V	$I_C = 10 \mu A, I_E = 0$	
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	15	—	—	V	$I_C = 1 \text{ mA}, R_{BE} =$	
Collector-substrate breakdown voltage	$V_{(BR)C1O}$	20	—	—	V	$I_C = 10 \mu A, I_E = 0, I_B = 0$	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	—	—	V	$I_E = 10 \mu A, I_C = 0$	
Collector cutoff current	$I_{CBO}$	—	0.002	40	nA	$V_{CB} = 10 \text{ V}, I_E = 0$	
	$I_{CEO}$	—	—	0.5	$\mu A$	$V_{CE} = 10 \text{ V}, R_{BE} =$	
Collector-emitter saturation voltage	$V_{CE(sat)}$	—	0.17	—	V	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$	
Base-emitter voltage	$V_{BE}$	—	0.72	—	V	$V_{CE} = 3 \text{ V}$	$I_C = 1 \text{ mA}$
		—	0.80	—	V		$I_C = 10 \text{ mA}$
DC current amplification ratio	$h_{FE}$	40	140	—		$V_{EE} = 3 \text{ V}$	$I_C = 1 \text{ mA}$
		—	120	—			$I_C = 10 \text{ mA}$
Gain-bandwidth product	$f_T$	—	460	—	MHz	$V_{CE} = 3 \text{ V}, I_C = 3 \text{ mA}$	
Collector output capacitance	$C_{ob}$	—	1.7	—	pF	$V_{CB} = 3 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	
Emitter input capacitance	$C_{in}$	—	2.0	—	pF	$V_{CB} = 3 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	
Switching time	$t_{on}$	—	35	—	ns	$V_{CC} = 10 \text{ V}, I_C = 10 \text{ mA}, I_{B1} = -10 \text{ mA}, I_{B2} = 10 \text{ mA}$	
	$t_{off}$	—	130	—	ns		
	$t_{stg}$	—	75	—	ns		

# HA1127, HA1127P, HA1127FP

## Switching Time Test Circuit

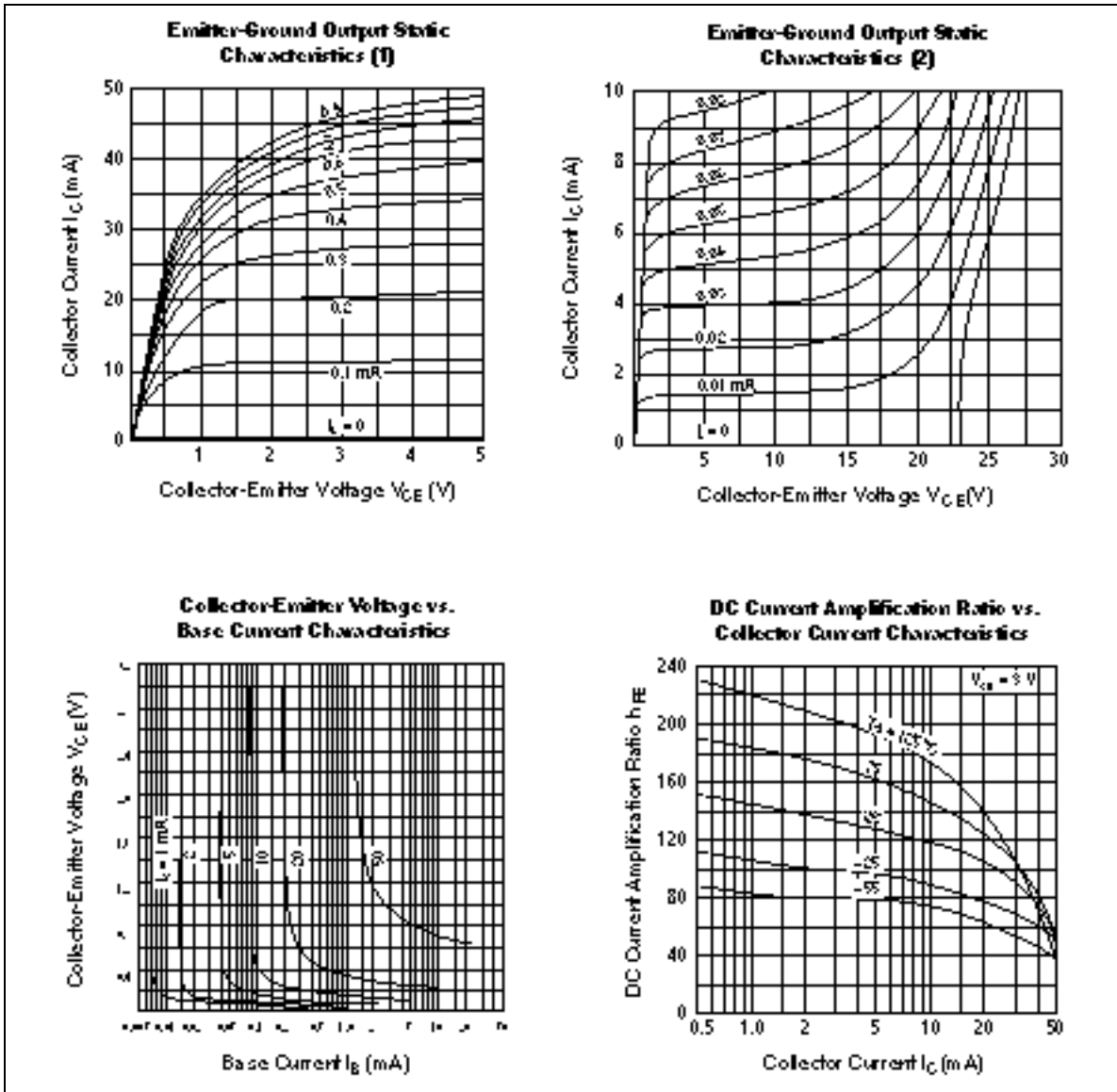


## Response Waveform

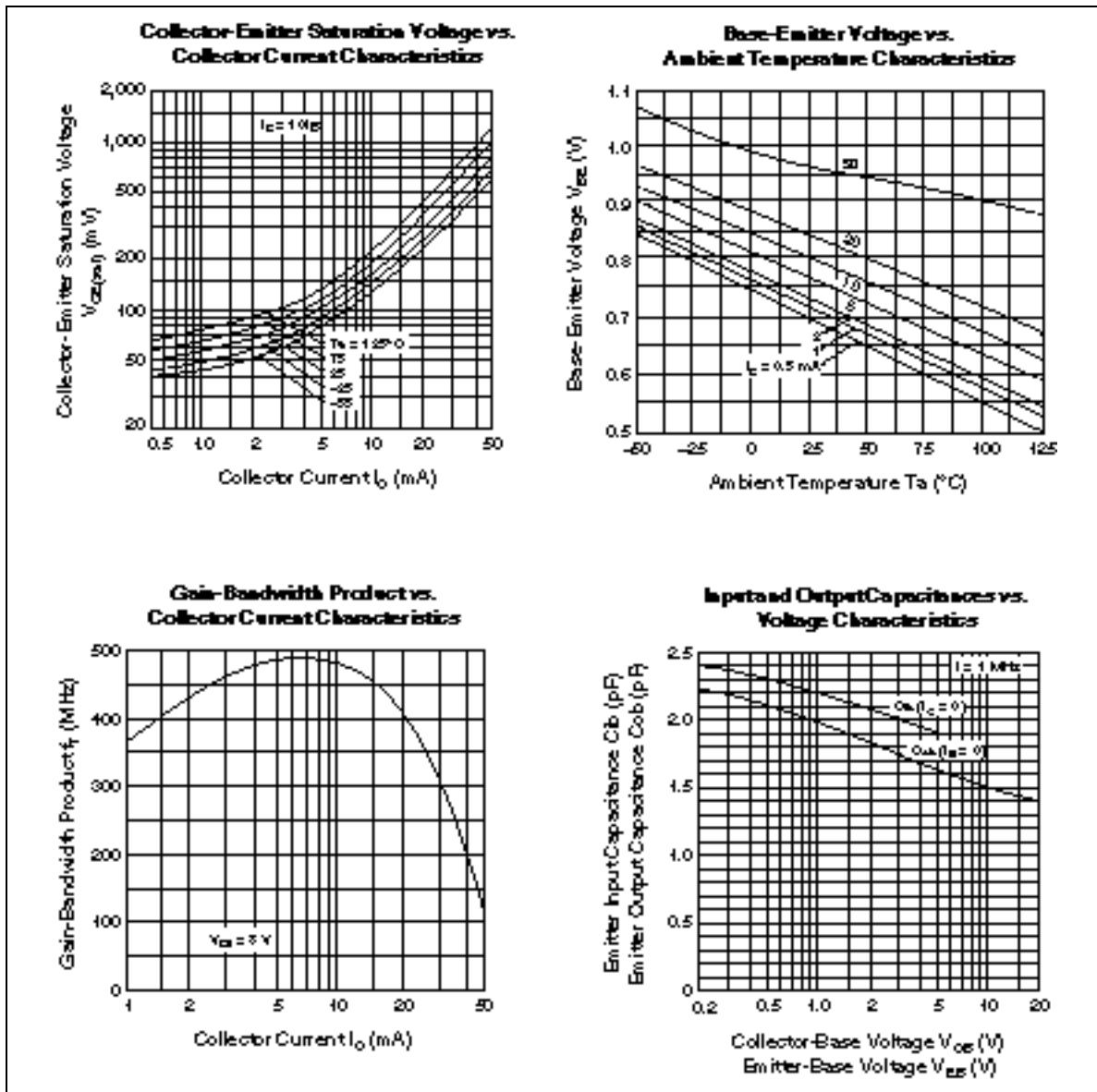


## Operating Conditions

Symbol	$I_b$	$I_{b1}$	$I_{b2}$	$V_{CC}$	$V_{EE}$	$V_{IN}$
Unit	mA	mA	mA	V	V	V
Bias	10	+1.0	-1.0	10.2	-6.0	+13.0



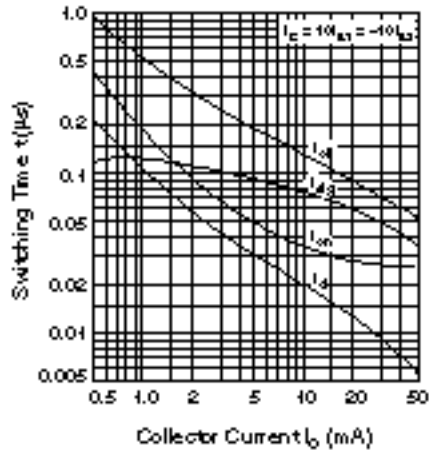
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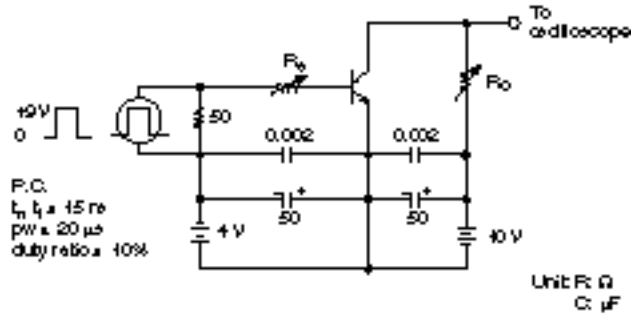
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# HA1127, HA1127P, HA1127FP

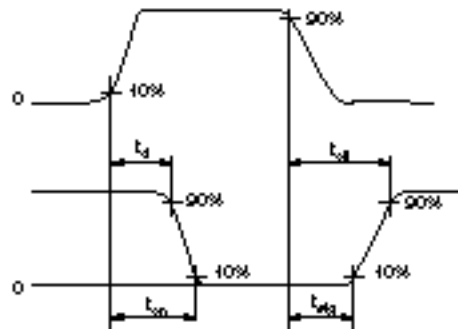
**Switching Time vs. Collector Current Characteristics**



**Switching Time Test Circuit**



**Response Waveforms**



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