



# BC146

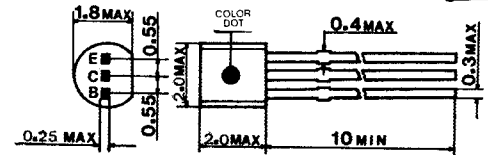
## MINIATURE NPN AF LOW NOISE SILICON PLANAR EPITAXIAL TRANSISTOR

### GENERAL DESCRIPTION

The BC 146 is a NPN silicon planar epitaxial transistor in miniature plastic package designed for hearing aids, watches, paging systems and other equipment where small size is of paramount importance. The BC 146 is complementary to PNP BC 200.

### MECHANICAL OUTLINE

MT-42



COLOR DOT  
R - RED  
Y - YELLOW  
G - GREEN

ALL DIMENSIONS IN mm

### ABSOLUTE MAXIMUM RATINGS

Collector-Base Voltage  
Collector-Emitter Voltage  
Emitter-Base Voltage  
Collector Current  
Total Power Dissipation at  $T_A \leq 45^\circ\text{C}$   
Junction Temperature  
Storage Temperature Range

$V_{CBO}$	20V
$V_{CEO}$	20V
$V_{EBO}$	4V
$I_C$	50mA
$P_{tot}$	50mW
$T_j$	125°C
$T_{stg}$	-65°C to +125°C

### THERMAL RESISTANCE

Junction to Ambient

$\theta_{ja}$

1.6°C/mW

### ELECTRICAL CHARACTERISTICS AT $T_A = 25^\circ\text{C}$

PARAMETER	SYMBOL	BC 146R			BC 146Y			BC 146G			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
Collector-Base Cutoff Current	$I_{CBO}$			100			100			100	nA	$V_{CB}=20V$ $I_E=0$
Collector-Emitter Knee Voltage	$V_{CEK}$		200			200			200		mV	$I_C=2mA$ $I_B=\text{value for which } I_C=2.2mA \text{ and } V_{CE}=1V$
Base-Emitter Voltage	$V_{BE}$		570			570			570		mV	$V_{CE}=0.5V$ $I_C=0.2mA$
Base-Emitter Voltage	$V_{BE}$		630			630			630		mV	$V_{CE}=1V$ $I_C=2mA$
DC Current Gain	$H_{FE}$	80	120	200	140	220	350	280	380	550		$V_{CE}=0.5V$ $I_C=0.2mA$
DC Current Gain	$H_{FE}$	100			140			280				$V_{CE}=1V$ $I_C=2mA$
Noise Figure	NF		1.5			1.5	4		1.5		dB	$V_{CE}=5V$ $I_C=0.2mA$ $R_g=2K\Omega$ $f=30Hz-15KHz$
Transition Frequency	$f_T$		80			110			150		MHz	$V_{CE}=5V$ $I_C=2mA$
Collector Capacitance	$C_{cb}$		2.5			2.5			2.5		pF	$V_{CB}=5V$ $I_E=0$ $f=1MHz$

### TYPICAL h-PARAMETERS AT $V_{CE}=0.5V$ , $I_C=0.2mA$ , $f=1KHz$

PARAMETER	SYMBOL	BC 146R	BC 146Y	BC146G	UNIT
Input Impedance	$h_{ie}$	20	30	45	$K\Omega$
Reverse Voltage Transfer Ratio	$h_{re}$	15	25	40	$\times 10^{-4}$
Small Signal Current Gain	$h_{fe}$	130	240	400	
Output Admittance	$h_{oe}$	15	20	35	$\mu S$

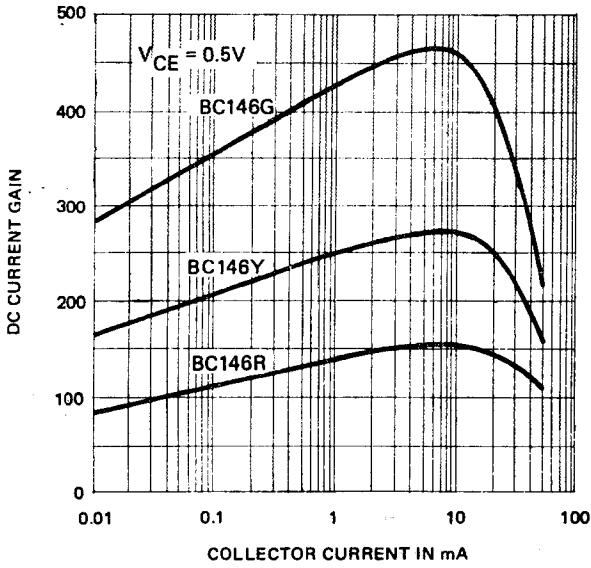
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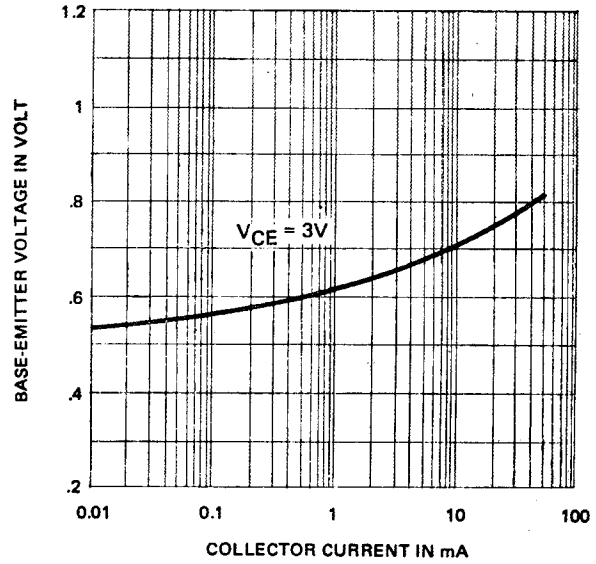
TYPICAL ELECTRICAL CHARACTERISTICS AT  $T_A = 25^\circ\text{C}$

BC 146

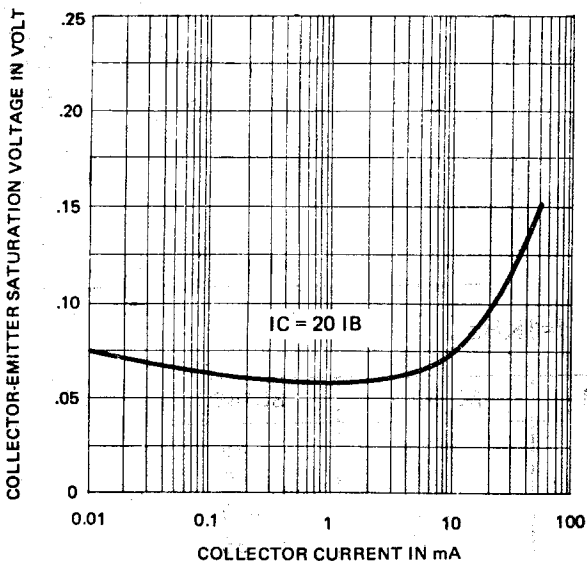
DC CURRENT GAIN VERSUS COLLECTOR CURRENT



BASE-EMITTER VOLTAGE VERSUS COLLECTOR CURRENT



COLLECTOR-EMITTER SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



WIDE BAND NOISE FIGURE

