



# 7 GHz Wideband NPN Chip – 2SC3356

Silicon NPN Planar RF Transistor in bare die form

Rev 1.2  
14/11/19

## Description

NPN transistor in unencapsulated chip form. It is primarily intended for use in RF wideband amplifiers, such as in aerial amplifiers, radar systems, oscilloscopes, spectrum analyzers, etc. The transistor features low intermodulation distortion and high power gain; due to its very high transition frequency, it also has excellent wideband properties and low noise up to high frequencies. The device is a direct replacement for the obsolete NE85600 or NE85633 and is also functionally similar to BFR96. Closest available PNP complement is BFT92.

## Ordering Information

The following part suffixes apply:

- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

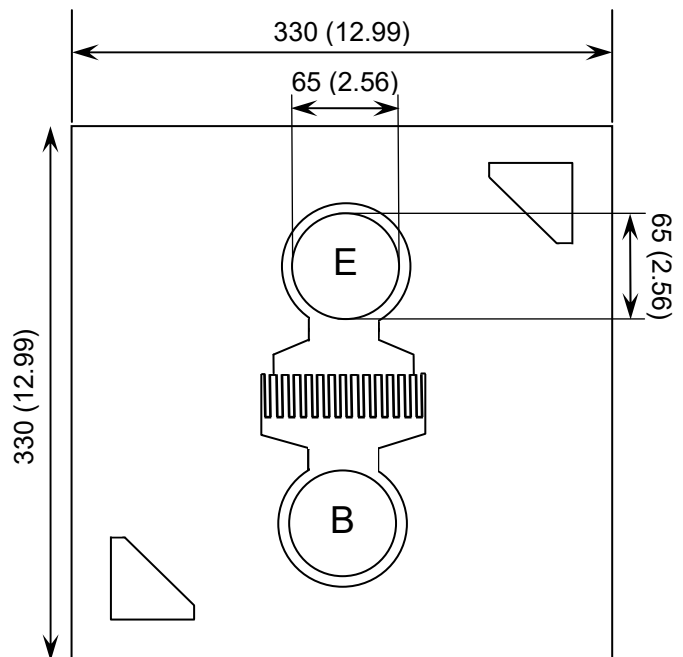
For further information on LAT process flows see below.

[www.siliconsupplies.com/quality/bare-die-lot-qualification](http://www.siliconsupplies.com/quality/bare-die-lot-qualification)

## Features:

- High Power Gain
- Low Noise
- Wide Transition Frequency

## Die Dimensions in $\mu\text{m}$ (mils)



E = EMITTER, B = BASE  
CHIP BACKSIDE IS COLLECTOR

## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – By specific request
- Unsawn Wafer – By specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

## Mechanical Specification

Die Size (Unsawn)	330 x 330 12.99 x 12.99	$\mu\text{m}$ mils
Base & Emitter Bond Pad Size	65 $\varnothing$ 2.56 $\varnothing$	$\mu\text{m}$ mils
Die Thickness	180 ( $\pm 10$ ) 7.09 ( $\pm 0.39$ )	$\mu\text{m}$ mils
Top Metal Composition	Al	
Back Metal Composition	Au 1 $\mu\text{m}$	





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Absolute Maximum Ratings  $T_A = 25^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
$V_{CBO}$	Collector-Base Voltage	Open Emitter	-	20	V
$V_{CEO}$	Collector-Emitter Voltage	Open Base	-	12	V
$V_{EBO}$	Emitter-Base Voltage	Open Collector	-	3	V
$I_C$	DC Collector Current	-	-	100	mA
$P_{tot}$	Total Power Dissipation	-	-	700	mW
$T_{stg}$	Storage Temperature	-	-65	150	$^\circ\text{C}$
$T_J$	Junction Temperature	-	-	175	$^\circ\text{C}$

Electrical Characteristics  $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	SYMBOL
$I_{CBO}$	Collector Cut-off Current	$I_E = 0 ; V_{CB} = 10\text{V}$	-	-	1	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current	$I_C = 0 ; V_{EB} = 1\text{V}$	-	-	1	$\mu\text{A}$
$h_{FE}$	DC Current Gain	$I_C = 20\text{mA}; V_{CE} = 10\text{V}$	50	185	300	-
$f_T$	Transition Frequency	$I_C = 20\text{mA}; V_{CE} = 10\text{V}$	-	7	-	GHz
$ S_{21e} ^2$	Insertion Power Gain	$I_C = 20\text{mA}; V_{CE} = 10\text{V}; f = 1\text{GHz}$	-	11.5	-	dB
NF	Noise Figure	$I_C = 7\text{mA}; V_{CE} = 10\text{V}; f = 1\text{GHz}$	-	1.1	2	dB
$C_{re}$	Feedback Capacitance	$I_E = 0; V_{CB} = 10\text{V}; f = 1\text{MHz}$	-	-	1	pF
$R_{TH (J-C)}$	Thermal Resistance (Junction to Case)	Assembled in Micro-X Package	-	85	-	$^\circ\text{C/W}$

## Typical Characteristics

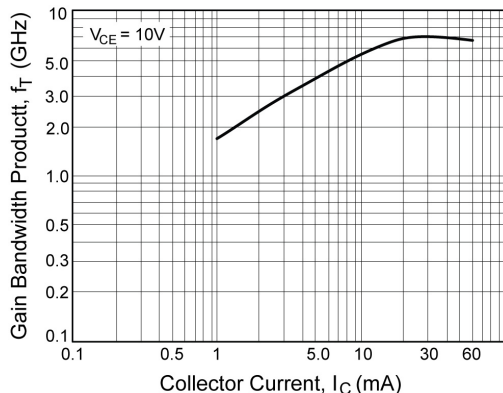


FIGURE 1. Gain Bandwidth Product versus Collector Current

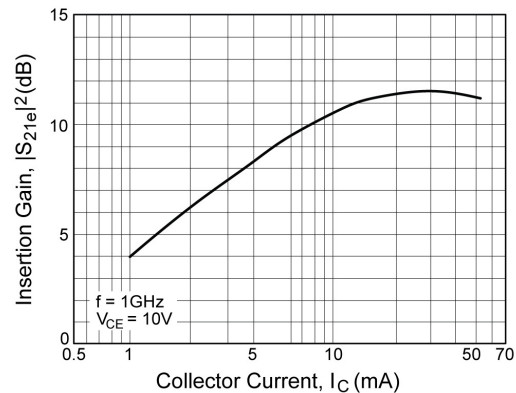


FIGURE 2. Insertion Power Gain versus Collector Current

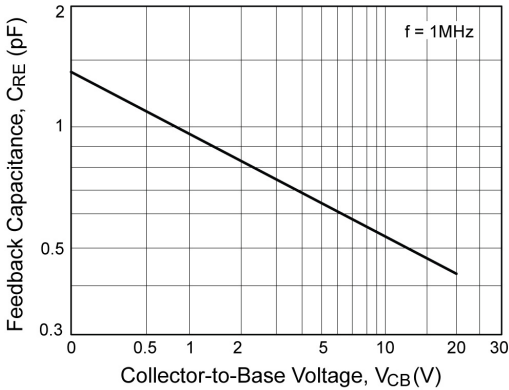




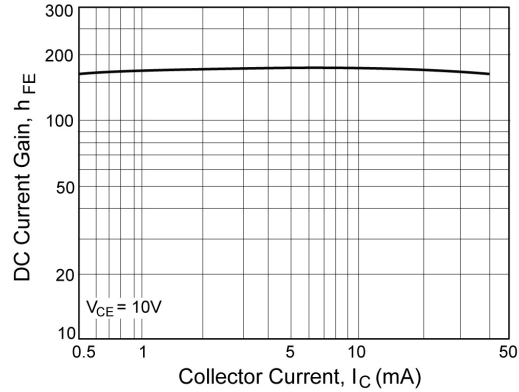
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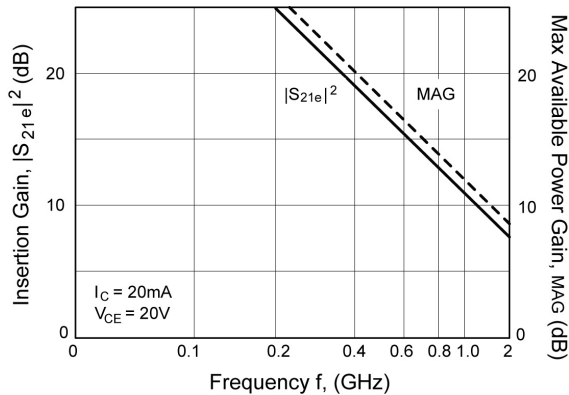
## Typical Characteristics continued



**FIGURE 3.** Feedback Capacitance versus Collector-Base Voltage



**FIGURE 4.** DC Current Gain versus Collector Current



**FIGURE 5.** Insertion Power Gain, MAG versus Frequency

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