

Introduction

This application note describes the SPICE transistor model for the bipolar devices that comprise the HFA3134, Ultra High Frequency Transistor Array. This array is fabricated with Intersil's complementary bipolar UHF1X process and contains a pair of h_{fe} and V_{BE} matched transistors. These transistors exhibit peak f_T 's of 9.5GHz, as illustrated by the included performance curves.

Model Description

While this model was developed for the PSPICE™ simulator from MicroSim Corporation, it may be adaptable to other simulators. The performance curves included in this document were generated using PSPICE. A cdsSPICE compatible version of the model is available upon request.

The PSPICE model contains parameters for a UHF1X NPN transistor of the geometry utilized on the HFA3134. Parameters not listed in the model should be allowed to default.

The model emulates typical rather than worst case, packaged devices, at an ambient temperature of 25°C.

Parameters Not Modeled

Some effects haven't been included in this model. The major exclusions are listed below:

- Temperature Effects
- Breakdown Effects
- Noise Effects

Future releases of this model may include some of these effects.

PSPICE Listing

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*HFA3134 PSPICE MODEL

*REV: 5-98

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***** UHF1XN - LE = 1.3 WE = 64*****

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* ----- BJT MODEL -----

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.model HFA3134 NPN

+	(IS = 1.98E - 16	VAF = 2.00E + 01	BF = 1.20E + 02	IKF = 2.10E + 00
+	ISE = 7.70E - 15	NE = 2.00E + 00	VAR = 2.64E + 00	BR = 1.78E + 01
+	IKR = 6.10E - 03	ISC = 2.26E - 16	NC = 1.57E + 00	NK = 3.00E + 00
+	CJC = 6.00E - 13	MJC = 3.80E - 01	VJC = 6.00E - 01	CJE = 7.00E - 13
+	MJE = 5.10E - 01	VJE = 8.72E - 01	XCJC = 9.00E - 01	CJS = 1.39E - 13
+	VJS = 7.50E - 01	MJS = 0.00E + 00	FC = 5.00E - 01	TR = 2.50E - 09
+	TF = 1.30E - 11	ITF = 2.80E - 01	XTF = 2.01E + 01	VTF = 2.37E + 00
+	PTF = 3.70E + 01	RC = 5.25E + 00	RE = 8.70E - 01	RB = 1.29E + 01
+	RBM = 6.47E + 00	KF = 0.00E + 00	AF = 1.00E + 00)	

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Model Performance

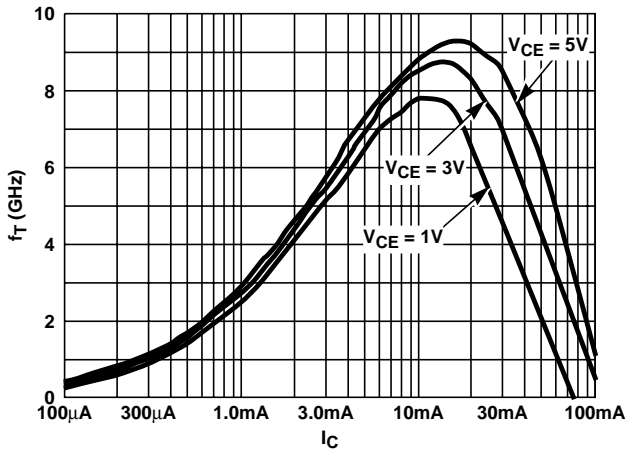


FIGURE 1. NPN f_T vs I_C

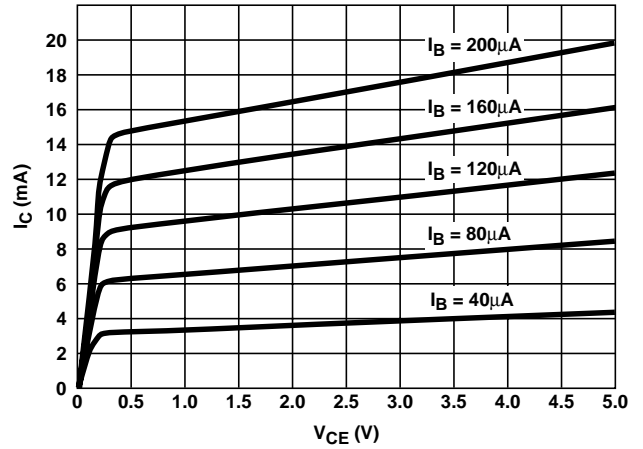


FIGURE 2. NPN I_C vs V_{CE}

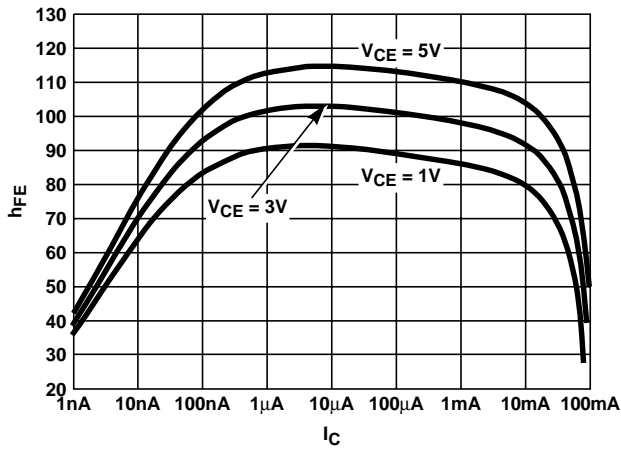


FIGURE 3. NPN h_{FE} vs I_C

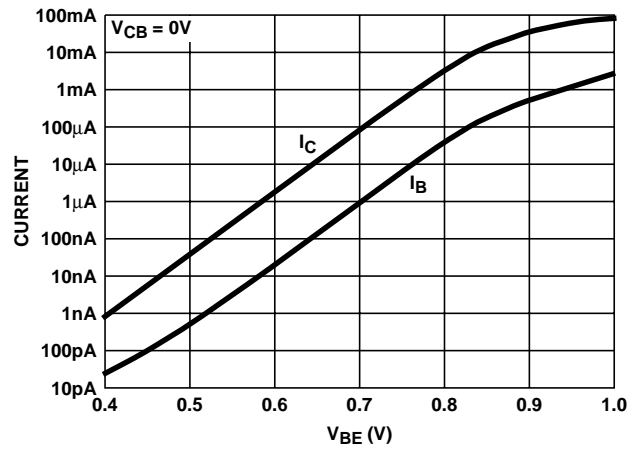


FIGURE 4. NPN I_C AND I_B vs V_{BE}

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