

NPN Transistors

2SC3356-HF

■ Features

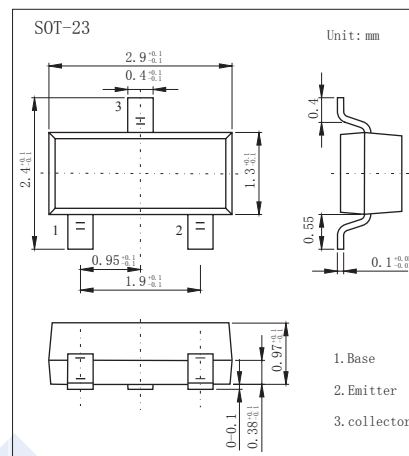
- Low noise and high gain.

NF = 1.1 dB Typ., $G_a = 11$ dB Typ. @ $V_{CE} = 10$ V, $I_C = 7$ mA, $f = 1.0$ GHz

- High power gain.

MAG = 13 dB Typ. @ $V_{CE} = 10$ V, $I_C = 20$ mA, $f = 1.0$ GHz

- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish



■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector to base voltage	V_{CBO}	20	V
Collector to emitter voltage	V_{CEO}	12	V
Emitter to base voltage	V_{EBO}	3.0	V
Collector current (DC)	I_C	100	mA
Total power dissipation	P_{tot}	200	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-65 to +150	$^\circ\text{C}$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V_{CBO}	$I_C = 100 \mu\text{A}$, $I_E = 0$	20			V
Collector- emitter breakdown voltage	V_{CEO}	$I_C = 1$ mA, $I_B = 0$	12			
Emitter - base breakdown voltage	V_{EBO}	$I_E = 100 \mu\text{A}$, $I_C = 0$	3			
Collector-base cut-off current	I_{CBO}	$V_{CB} = 10$ V, $I_E = 0$			1	μA
Emitter cut-off current	I_{EBO}	$V_{EB} = 3$ V, $I_C = 0$			1	
Collector-emitter saturation voltage *	$V_{CE(sat)}$	$I_C = 50$ mA, $I_B = 5$ mA			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}	$V_{CE} = 10$ V, $I_C = 20$ mA	50		400	
Insertion power gain	$ S_{21e} ^2$	$V_{CE} = 10$ V, $I_C = 20$ mA, $f = 1$ GHz		11.5		dB
Noise figure	NF	$V_{CE} = 10$ V, $I_C = 7$ mA, $f = 1$ GHz		1.1	2	
Reverse transfer capacitance	C_{re}	$V_{CB} = 10$ V, $I_E = 0$, $f = 1$ MHz		0.55	1	pF
Transition frequency	f_T	$V_{CE} = 10$ V, $I_C = 20$ mA		7		GHz

*. Pulse measurement: $PW \leq 350 \mu\text{s}$, Duty Cycle $\leq 2\%$.

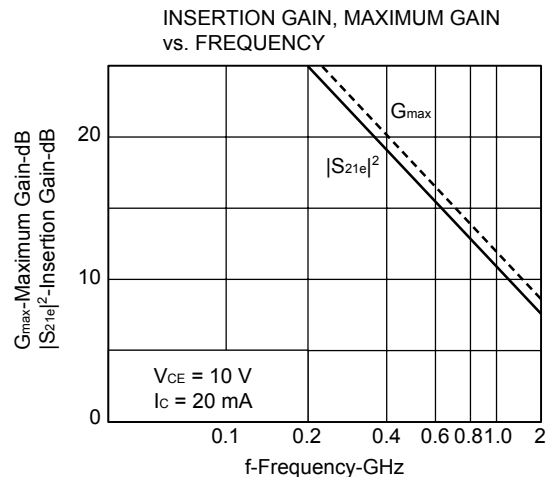
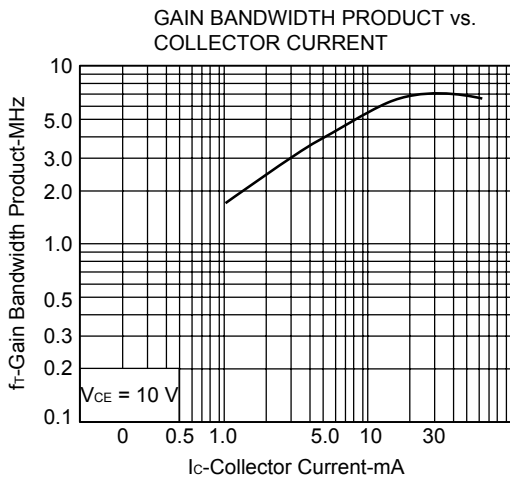
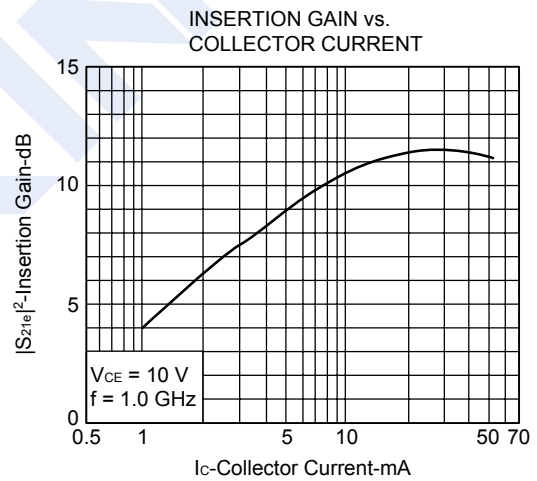
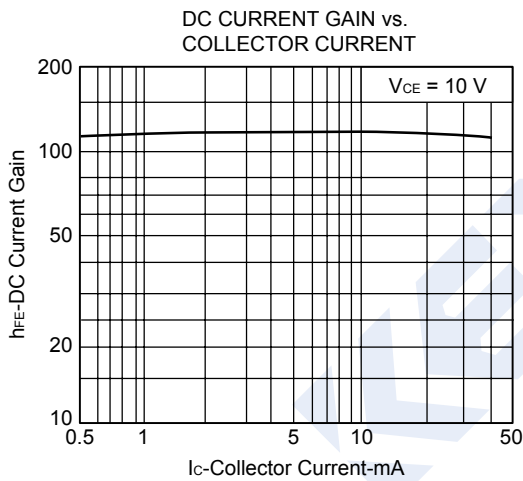
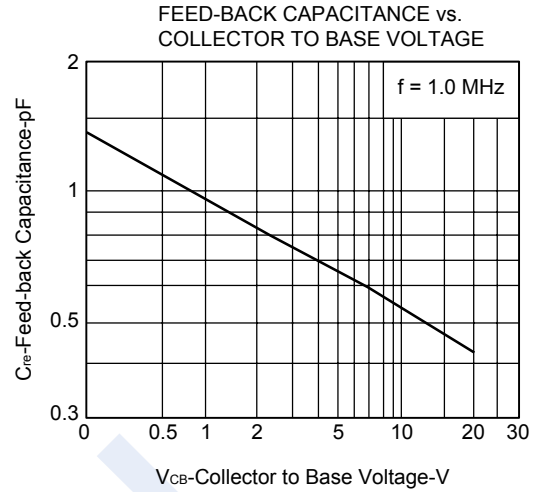
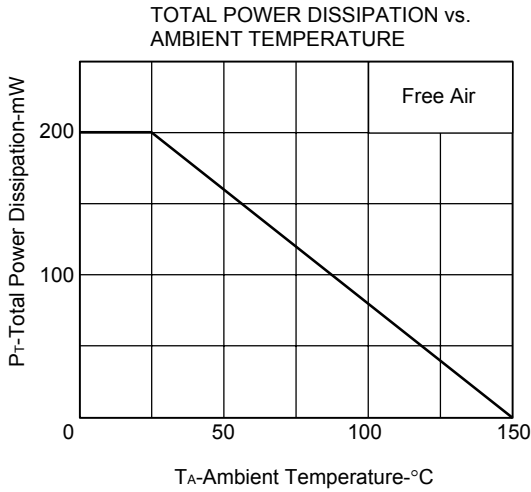
■ h_{FE} Classification

Type	2SC3356-R23-HF	2SC3356-R24-HF	2SC3356-R25-HF	2SC3356-R26-HF
Range	50-100	80-160	125-250	250-400
Marking	R23 _F	R24 _F	R25 _F	R26 _F

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■ Typical Characteristics

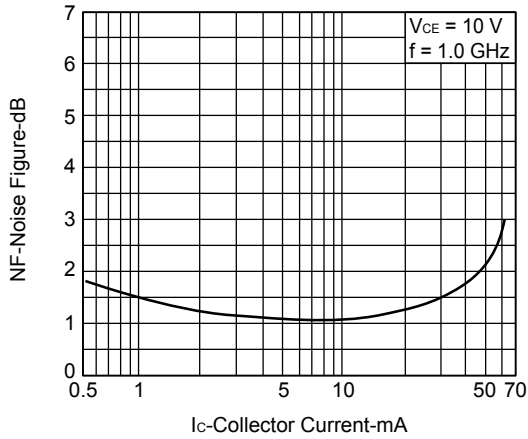


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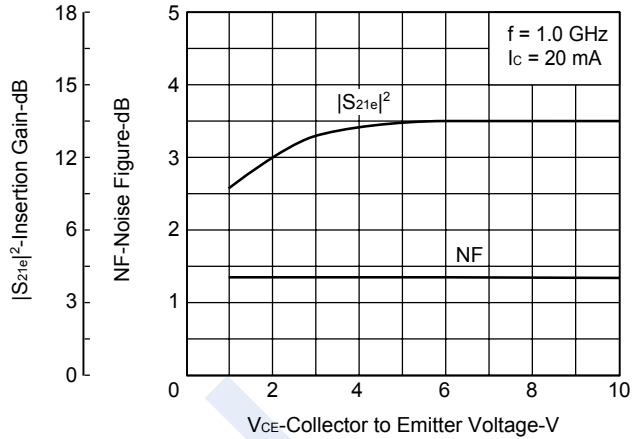
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■ Typical Characteristics

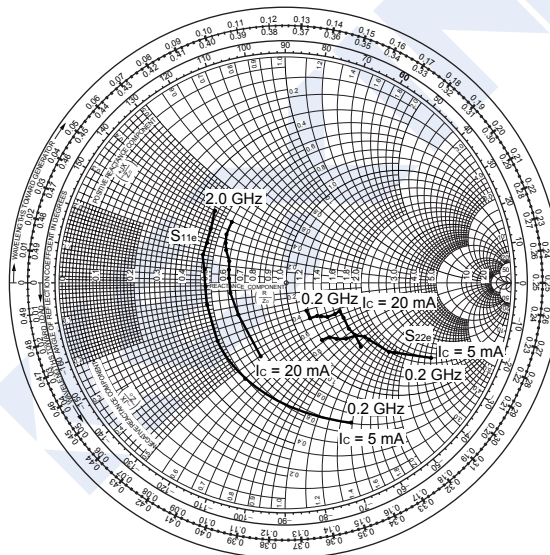
NOISE FIGURE vs. COLLECTOR CURRENT



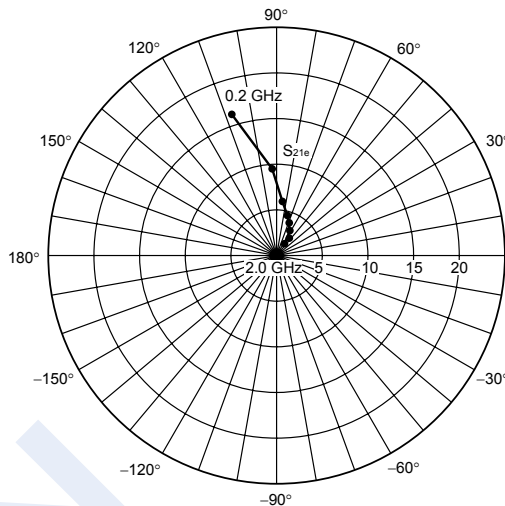
NOISE FIGURE, FORWARD INSERTION GAIN vs. COLLECTOR TO EMITTER VOLTAGE



S11e, S22e-FREQUENCY
CONDITION Vce = 10 V
200 MHz Step



S21e-FREQUENCY
CONDITION Vce = 10 V
Ic = 20 mA



S12e-FREQUENCY
CONDITION Vce = 10 V
Ic = 20 mA

