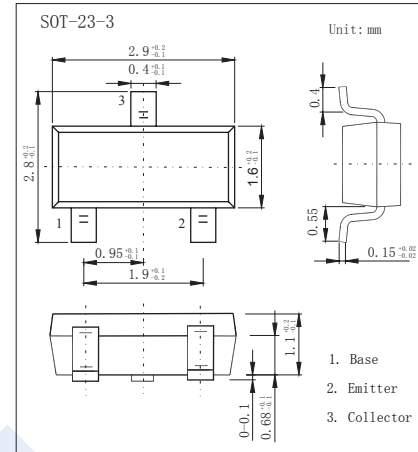


NPN Transistors

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■ Features

- Collector Current Capability $I_c=20\text{mA}$
- Collector Emitter Voltage $V_{CE0}=20\text{V}$



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

Parameter	Symbol	Rating	Unit
Collector - Base Voltage	V_{CB0}	30	V
Collector - Emitter Voltage	V_{CE0}	20	
Emitter - Base Voltage	V_{EB0}	4	
Collector Current - Continuous	I_c	20	mA
Collector Power Dissipation	P_c	150	mW
Junction Temperature	T_J	125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to 125	

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector- base breakdown voltage	V_{CB0}	$I_c = 100 \mu\text{A}, I_E = 0$	30			V
Collector- emitter breakdown voltage	V_{CE0}	$I_c = 1 \text{mA}, I_B = 0$	20			
Emitter - base breakdown voltage	V_{EB0}	$I_E = 100 \mu\text{A}, I_C = 0$	4			
Collector-base cut-off current	I_{CB0}	$V_{CB} = 25 \text{V}, I_E = 0$			100	nA
Emitter cut-off current	I_{EB0}	$V_{EB} = 3 \text{V}, I_C = 0$			100	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			0.3	V
Base - emitter saturation voltage	$V_{BE(sat)}$	$I_C = 10 \text{mA}, I_B = 1 \text{mA}$			1.2	
Base - emitter voltage	V_{BE}	$V_{CE} = 6 \text{V}, I_C = 1 \text{mA}$		0.72		
DC current gain	h_{FE}	$V_{CE} = 6 \text{V}, I_C = 1 \text{mA}$	40		180	
Noise Figure	NF	$V_{CE} = 6 \text{V}, I_E = -1 \text{mA}, R_G = 50 \Omega, f = 100 \text{MHz}$		3		dB
Collector output capacitance	C_{ob}	$V_{CB} = 6 \text{V}, I_E = 0, f = 1 \text{MHz}$		1		pF
Collector to base time constant	$C_{cb/b}$	$V_{CE} = 6 \text{V}, I_E = -1 \text{mA}, f = 31.9 \text{MHz}$		12		pS
Transition frequency	f_T	$V_{CE} = 6 \text{V}, I_E = -1 \text{mA}$	400	600		MHz

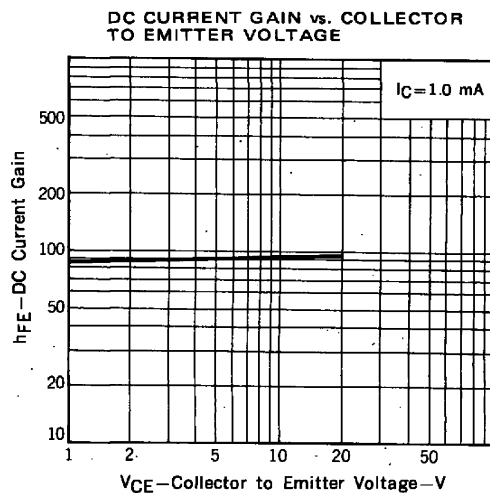
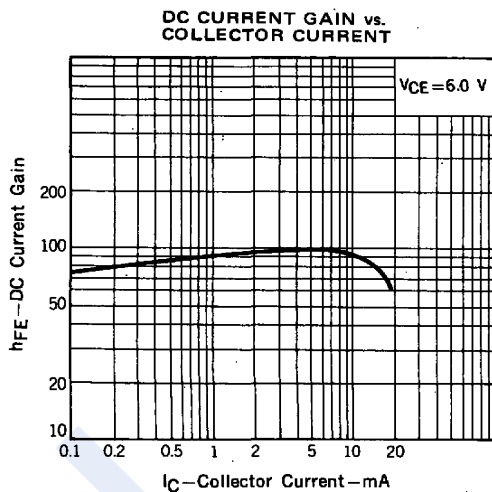
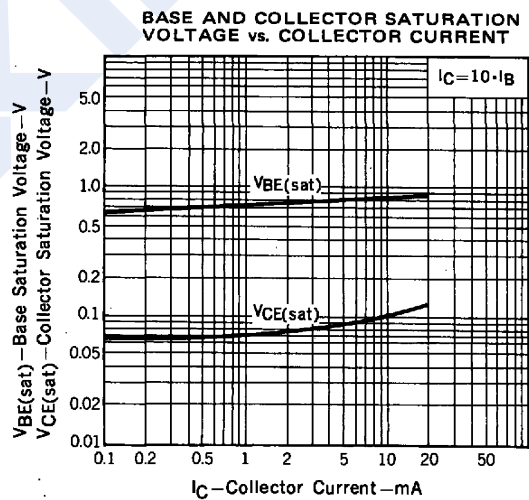
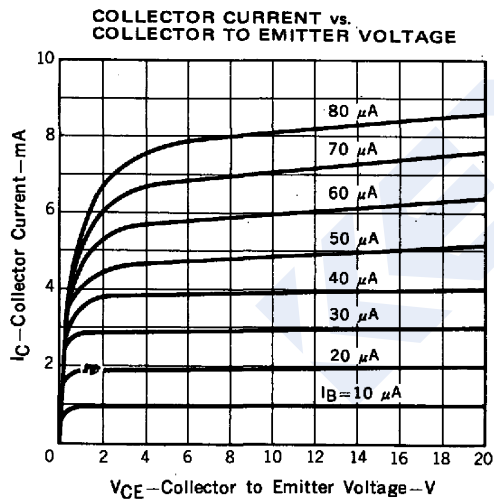
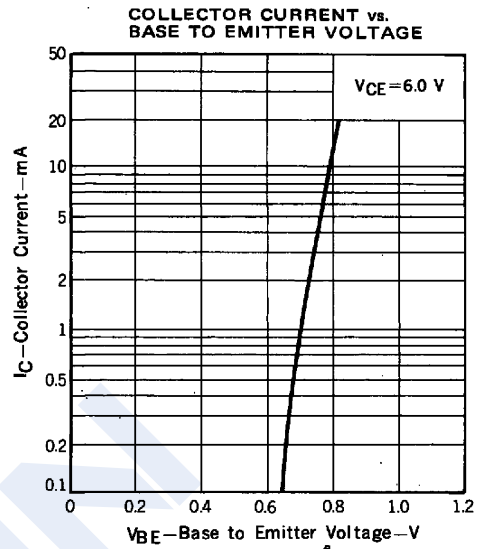
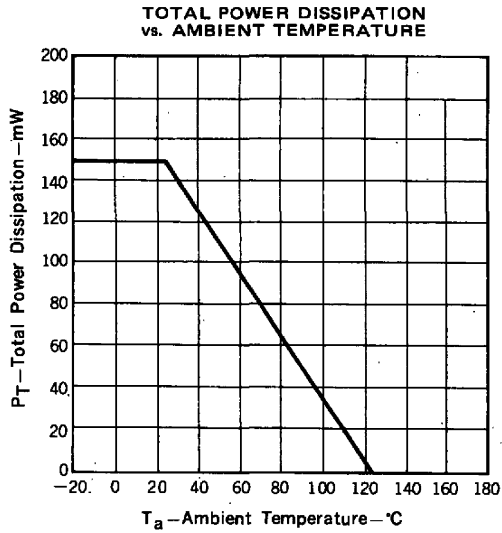
■ Classification of h_{fe}

Type	2SC2223-F12	2SC2223-F13	2SC2223-F14
Range	40-80	60-120	90-180
Marking	F12	F13	F14

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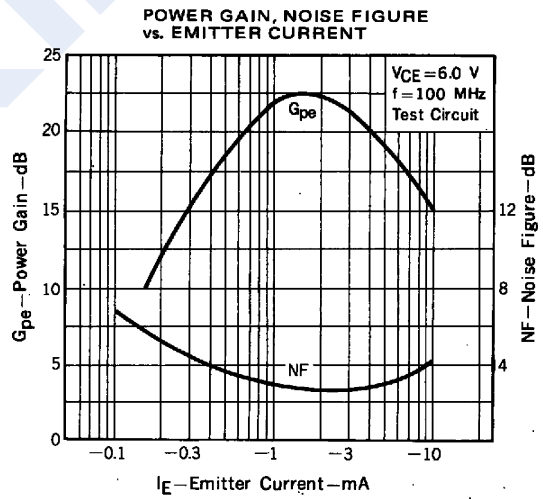
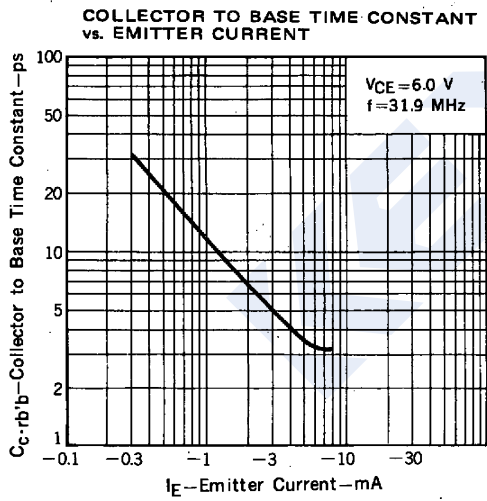
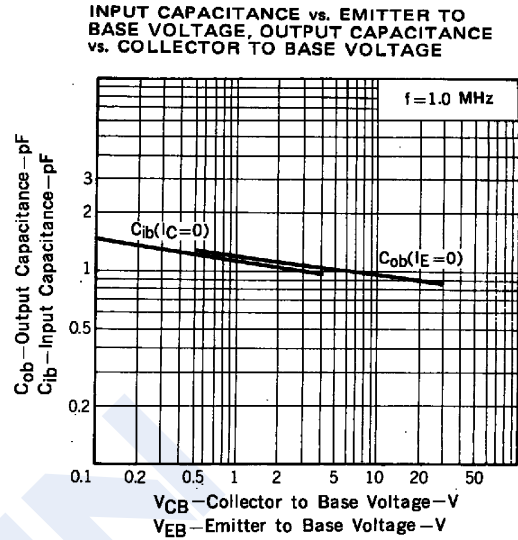
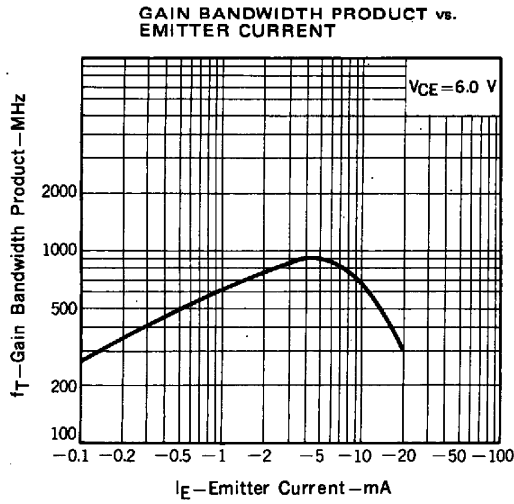
■ Typical Characteristics



NPN Transistors

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■ Typical Characteristics



100 MHz G_{pe} , NF TEST CIRCUIT

