MOTOROLA

2N5086 (SILICON)
2N5087

CASE 29 (1)
(TO-92)

PNP silicon annular transistors designed for low-level, low-noise amplifier applications.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector-Base Voltage	V_{CB}	50	Vdc
Emitter-Base Voltage	V_{EB}	3.0	Vdc
Collector Current – Continuous Peak	I_C	50 100	mAdc
Total Device Dissipation @ T_A = 25°C	P_D	310	mW
Derate above 25°C		2.81	mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +135	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	θ_{JA}	0.357	°C/mW

ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise noted

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)		BV_{CEO}	50	-	-	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		BV_{CBO}	50	-	-	Vdc
Collector Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)		I_{CBO}	-	-	10	nAdc
(V_{CB} = 35 Vdc, I_E = 0)			-	-	50	
Emitter Cutoff Current (V_{BE} = 3.0 Vdc, I_C = 0)		I_{EBO}	-	-	50	nAdc
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				-
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc)	2N5086		150	-	500	
	2N5087		250	-	800	
(I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc)	2N5086		150	-	-	
	2N5087		250	-	-	
(I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	2N5086		150	-	-	
	2N5087		250	-	-	
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 1.0 mAdc)		$V_{CE(sat)}$	-	-	0.3	Vdc
Base-Emitter On Voltage (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc		$V_{BE(on)}$	-	-	0.85	Vdc
DYNAMIC CHARACTERISTICS						
Current-Gain – Bandwidth Product (I_C = 500 μAdc, V_{CE} = 5.0 Vdc, f = 20 MHz)	2N5086	f_T	40	120	-	MHz
	2N5087		40	150	-	
Output Capacitance (V_{CB} = 5.0 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	-	-	4.0	pF
Small-Signal Current Gain (I_C = 1.0 mAdc, V_{CE} = 5.0 Vdc, f = 1.0 kHz)	2N5086	h_{fe}	150	-	600	-
	2N5087		250	-	900	
Noise Figure		NF				dB
(I_C = 20 μAdc, V_{CE} = 5.0 Vdc, R_S = 10 k ohms, f = 10 Hz to 15.7 kHz)	2N5086		-	-	3.0	
	2N5087		-	-	2.0	
(I_C = 100 μAdc, V_{CE} = 5.0 Vdc, R_S = 3.0 k ohms, f = 1.0 kHz)	2N5086		-	1.2	3.0	
	2N5087		-	1.0	2.0	

NOISE FIGURE

V_{CE} = 5.0 Vdc, T_A = 25

FIGURE 1 – FREQUENCY EFFECTS

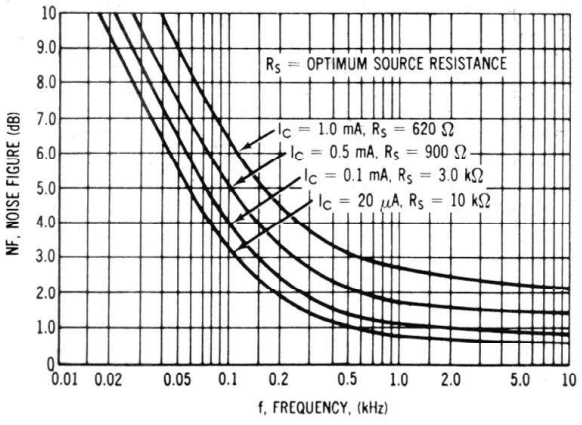
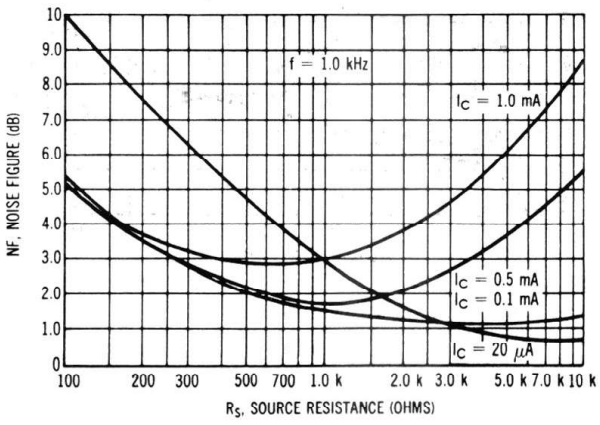


FIGURE 2 – SOURCE RESISTANCE EFFECTS



h PARAMETERS

V_{CE} = 10 Vdc, f = 1.0 kHz, T_A = 25°C
(For Figures 3, 4, 5, 6, 8)

This group of graphs illustrates the relationship of the "h" parameters for this series of transistors. To obtain these curves, 4 units were selected and identified by number — the same units were used to develop curves on each graph.

FIGURE 3 — INPUT IMPEDANCE

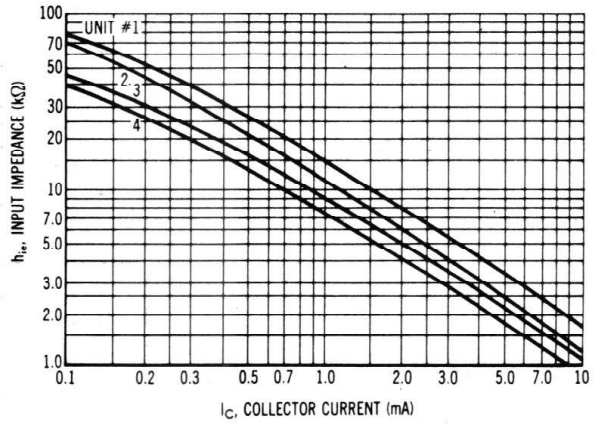


FIGURE 4 — VOLTAGE FEEDBACK RATIO

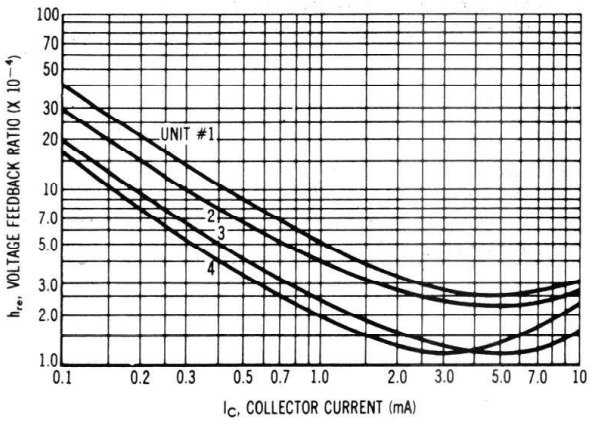


FIGURE 5 — CURRENT GAIN

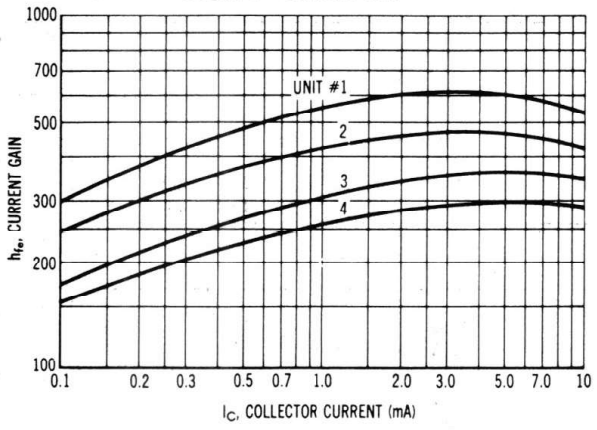


FIGURE 6 — OUTPUT ADMITTANCE

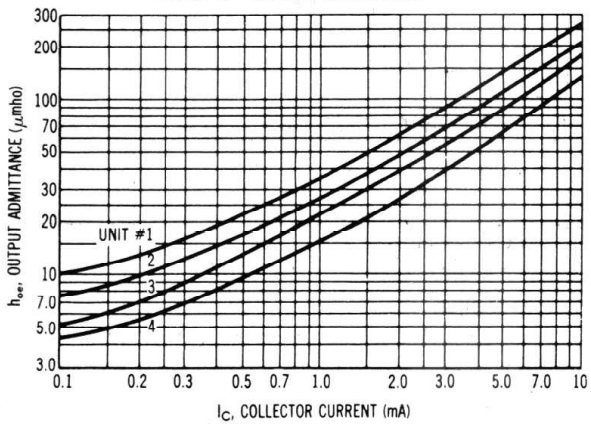


FIGURE 7 — EFFECT OF VOLTAGE

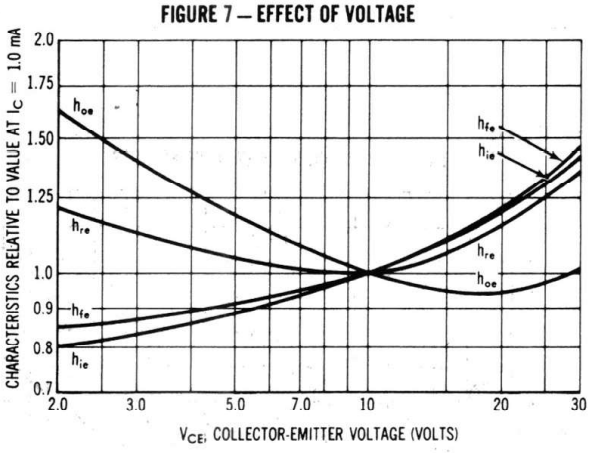


FIGURE 8 — DETERMINANT

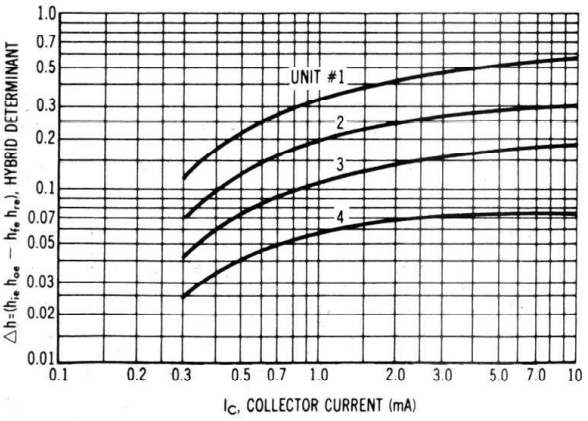


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FIGURE 9 — DC CURRENT-GAIN

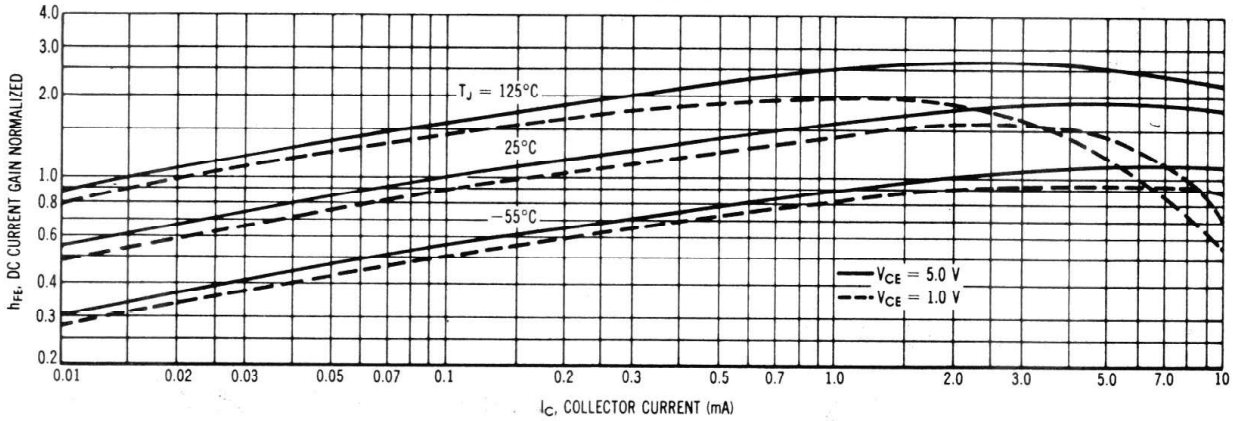

FIGURE 10 — COLLECTOR SATURATION REGION

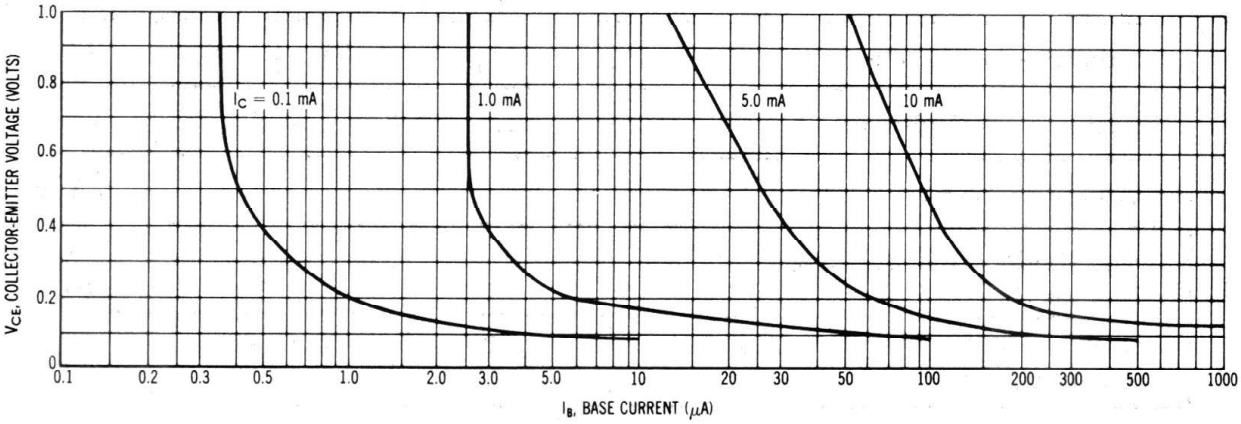

FIGURE 11 — CURRENT-GAIN — BANDWIDTH PRODUCT

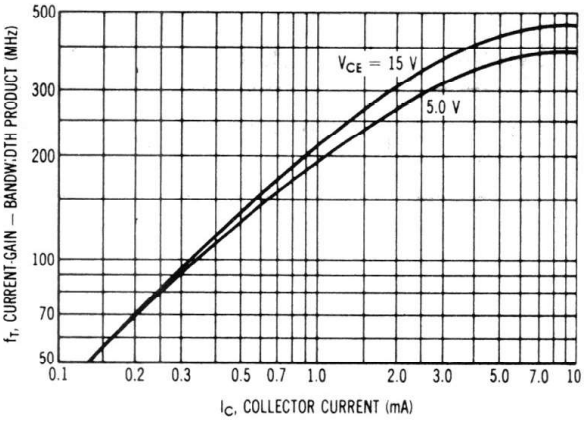

FIGURE 12 — CAPACITANCES