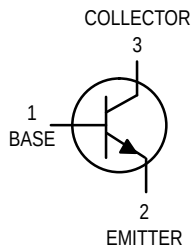
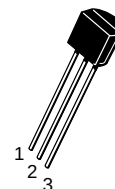


VHF Transistor

NPN Silicon



MPSH24



CASE 29-04, STYLE 2
TO-92 (TO-226AA)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	30	Vdc
Collector–Base Voltage	V_{CBO}	40	Vdc
Emitter–Base Voltage	V_{EBO}	4.0	Vdc
Collector Current – Continuous	I_C	50	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	350 2.8	mW mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to $+135$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	357	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 1.0$ mAdc, $I_B = 0$)	$V_{(BR)CEO}$	30	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 100$ μ Adc, $I_E = 0$)	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10$ μ Adc, $I_C = 0$)	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 15$ Vdc, $I_E = 0$)	I_{CBO}	—	—	50	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 8.0$ mAdc, $V_{CE} = 10$ Vdc)	h_{FE}	30	—	—	—
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SMALL-SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ($I_C = 8.0$ mAdc, $V_{CE} = 10$ Vdc, $f = 100$ MHz)	f_T	400	620	—	MHz
Collector–Base Capacitance ($V_{CB} = 10$ Vdc, $I_E = 0$, $f = 1.0$ MHz)	C_{cb}	—	0.25	0.36	pF
Conversion Gain (213 MHz to 45 MHz) ($I_C = 8.0$ mAdc, $V_{CC} = 20$ Vdc, Oscillator Injection = 150 mVrms) (60 MHz to 45 MHz) ($I_C = 8.0$ mAdc, $V_{CC} = 20$ Vdc, Oscillator Injection = 150 mVrms)	G_C	19 24	24 29	— —	dB

CONVERSION GAIN CHARACTERISTICS

(TEST CIRCUIT FIGURE 7)

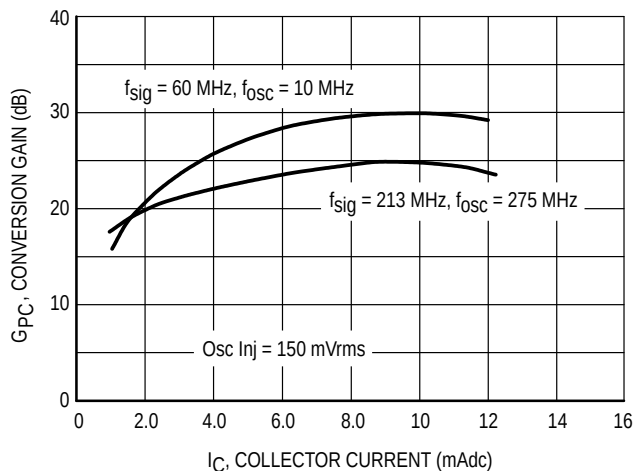
 $(V_{CC} = 20 \text{ Vdc}, R_S = R_L = 50 \text{ Ohms}, f_{if} = 44 \text{ MHz}, \text{B.W.} = 6.0 \text{ MHz})$ 

Figure 1. Conversion Gain versus Collector Current

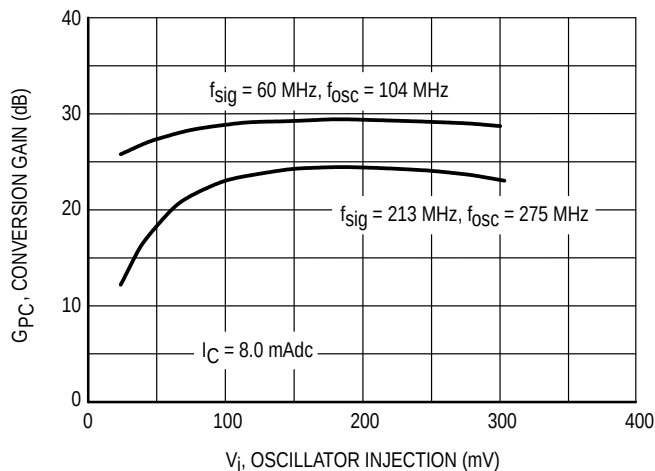


Figure 2. Conversion Gain versus Injection Level

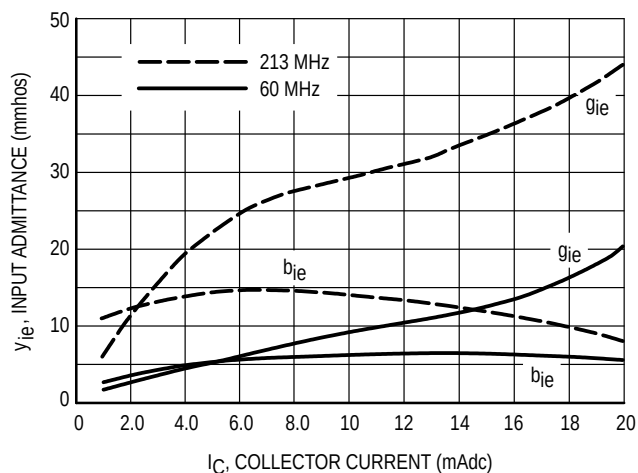
COMMON-EMITTER y PARAMETERS $(V_{CE} = 15 \text{ Vdc}, T_A = 25^\circ\text{C})$ 

Figure 3. Input Admittance

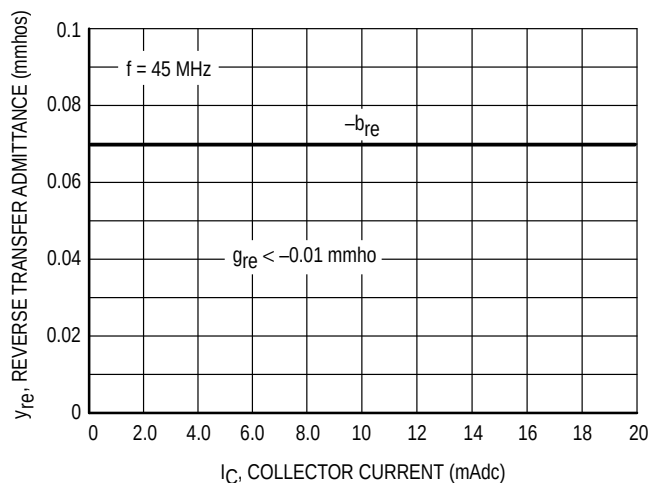


Figure 4. Reverse Transfer Admittance

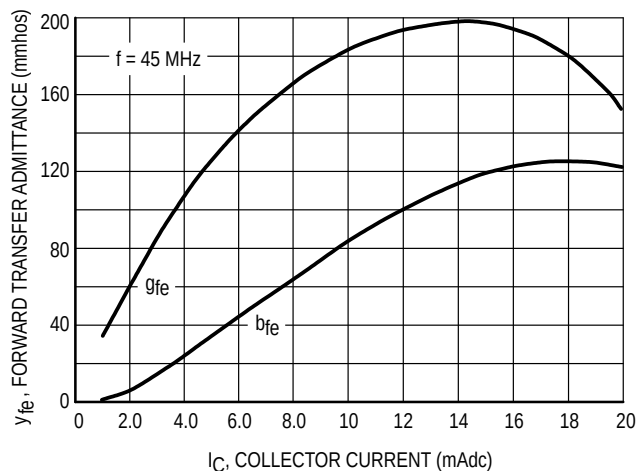


Figure 5. Forward Transfer Admittance

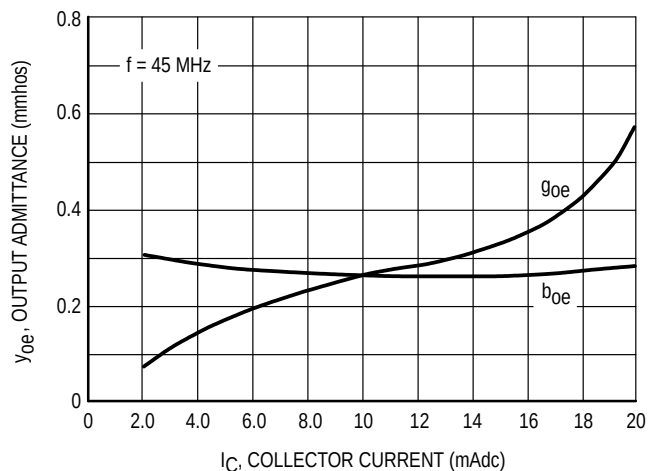


Figure 6. Output Admittance

f_{sig}	60 MHz	213 MHz
f_{osc}	105 MHz	258 MHz
C1	1.5–20 pF	1.5–20 pF
C2	8.0–60 pF	6.0–12 pF
C3	8.0–60 pF	1.5–20 pF
C4	3.0–35 pF	—
C5	1.5–20 pF	—
L1	5 Turns #26 Air, Tap 1 Turn	3 Turns #16 Air, Tap $\frac{1}{2}$ Turn
L2	10 Turns #26 Air	10 Turns #26 Arnold A1–10 Core
L3	Ohmite Z235	—

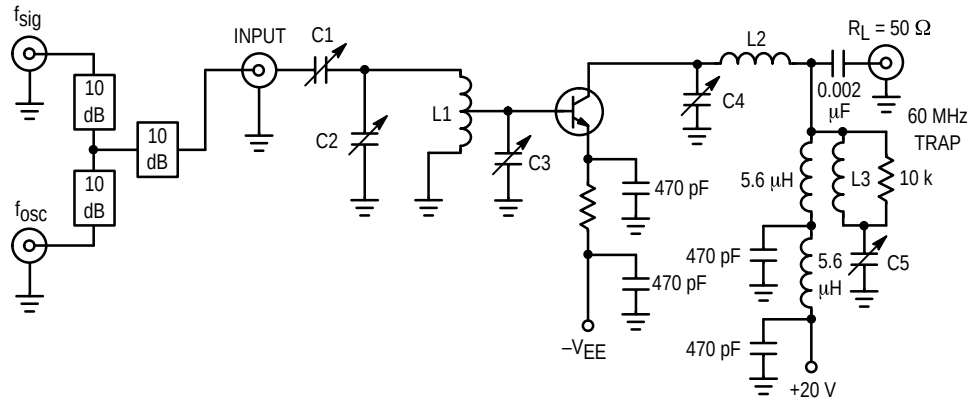
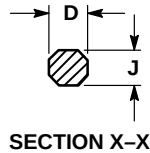
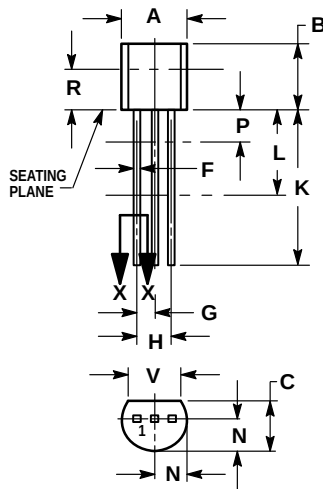


Figure 7. VHF Mixer Test Circuit
($f_{if} = 44 \text{ MHz}$, B.W. = 6.0 MHz)

PACKAGE DIMENSIONS



SECTION X-X

**CASE 029-04
(TO-226AA)
ISSUE AD**

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K. MINIMUM LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	—	12.70	—
L	0.250	—	6.35	—
N	0.080	0.105	2.04	2.66
P	—	0.100	—	2.54
R	0.115	—	2.93	—
V	0.135	—	3.43	—

STYLE 2:

- PIN 1. BASE
- EMITTER
- COLLECTOR

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