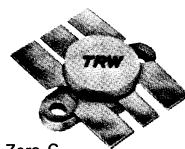


VHF Power Transistors

The JO 1006 is an internally matched NPN silicon VHF transistor. Its computerized thermal, multicell design provides optimum heat dissipation and operating efficiency. Ruggedability and long-term reliability is guaranteed by unique, diffused silicon ballasting resistors coupled with TRW's refractory-gold-passivated metalization system.

100 - 180 MHz
100 W

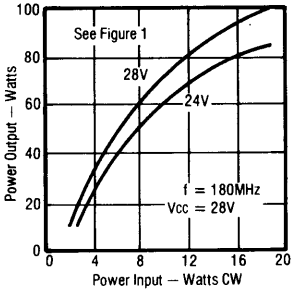


J-Zero-C

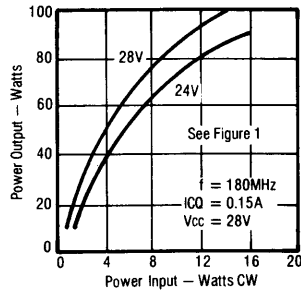
Electrical Characteristics ($T_{\text{flange}} = 25^{\circ}\text{C}$)

	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
DC Test	BV_{EBO}	Emitter - Base Breakdown	$I_E = 5 \text{ mA}$ $I_C = 0$	4			V
	BV_{CES}	Collector - Emitter Breakdown	$I_C = 100 \text{ mA}$ $V_{BE} = 0$	60			V
	BV_{CEO}	Collector - Emitter Breakdown	$I_C = 50 \text{ mA}$ $I_B = 0$	35			V
	I_{CES}	Collector - Emitter Cutoff Current	$V_{CE} = 25 \text{ V}$			10	mA
	H_{FE}	D.C Current Gain	$I_C = 1 \text{ A}$ $V_{CE} = 10 \text{ V}$	20		150	—
RF Test	P_{GAIN}	Power Gain	$V_{CE} = 28 \text{ V}$ $F = 175 \text{ MHz}$ $P_{\text{in}} = 20 \text{ W}$	100			W
	η	Collector Efficiency	$V_{CE} = 28 \text{ V}$ $F = 175 \text{ MHz}$ $P_{\text{out}} = 100 \text{ W}$		60		%
	VSWR	Mismatch Tolerance	All Phase Angles $V_{CE} = 28 \text{ V}$ $F = 175 \text{ MHz}$ $P_{\text{out}} = 100 \text{ W}$		$\infty : 1$		
	P_{SAT}	Saturated Power Output	$V_{CE} = 28 \text{ V}$ $F = 175 \text{ MHz}$	125			W
	C_{OB}	Collector - Base Capacitance	$V_{CB} = 28 \text{ V}$ $F = 1 \text{ MHz}$ $I_E = 0$			200	pF
Operating	I_C	Continuous Collector Current				12	A
	θ_{j-C}	Thermal Resistance	$T_C = 25^{\circ}\text{C}$			0.88	$^{\circ}\text{C/W}$
	T_{STG}	Storage Temperature and Junction Temperature		-65°		200	$^{\circ}\text{C}$
	P_D	Power Dissipation	$T_C = 25^{\circ}\text{C}$	150			W

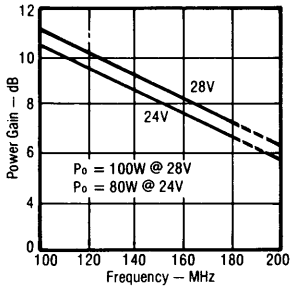
**Class C Narrowband
Power Input vs Power Output**



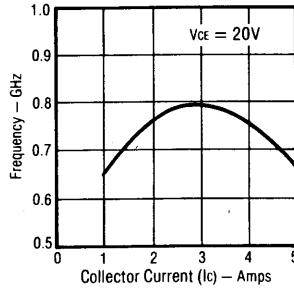
**Class B Narrowband
Power Input vs Power Output**



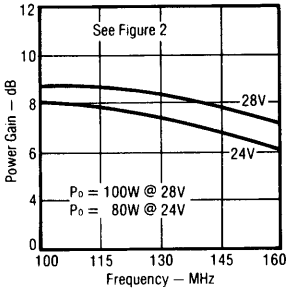
**Class C Narrowband
Power Gain vs Frequency**



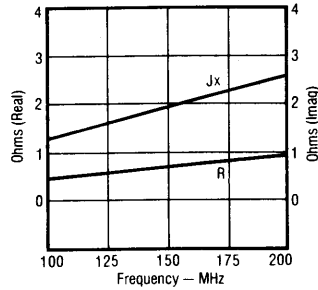
**Narrowband
f_t vs I_c**



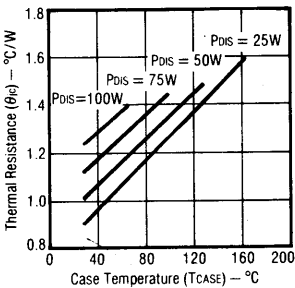
**Broadband
Power Gain vs Frequency**



**Series Input Impedance
vs Frequency**



θ_{jc} vs T_{CASE}



DC Safe Operating Area

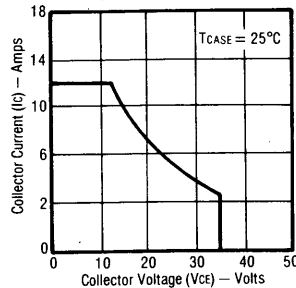
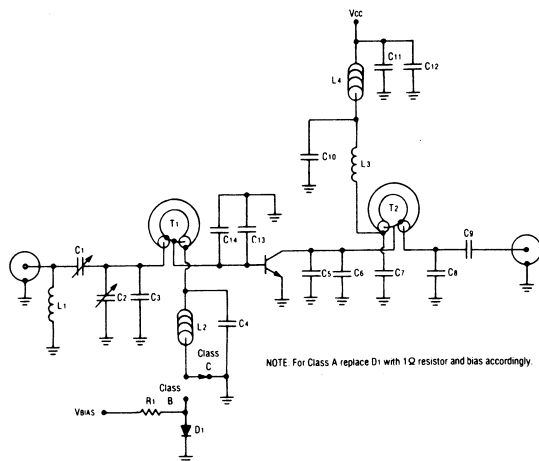


Figure 1. JO 1006 NARROWBAND TEST CIRCUIT (100-180 MHz)

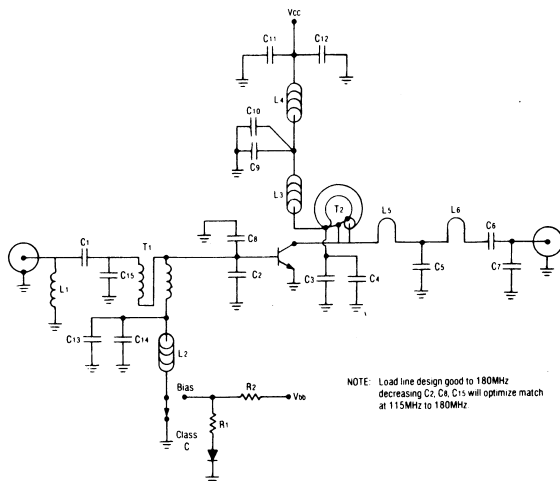


NOTE: For Class A replace D1 with 10Ω resistor and bias accordingly

C₁ 8-60 pF ARCO
 C₂ 3-35 pF ARCO
 C₃ 30 pF UNELCO
 C_{4,7,9,10,11} 1000 pF UNELCO
 C₅ 110 pF UNELCO
 C₆ 120 pF UNELCO
 C₈ 40 pF UNELCO
 C₁₂ 25 μF Electrolytic

C₁₃ 350 pF UNELCO
 C₁₄ 300 pF UNELCO
 D₁ DSR 5050
 L₁ 5 turns, 0.125" diameter # 22 AWG
 L_{2,4} 3 Ferrite beads
 R₁ 12 Ω
 T₁ 0.075" diameter semiridged 10 Ω co-ax
 T₂ 0.075" diameter semiridged 25 Ω co-ax

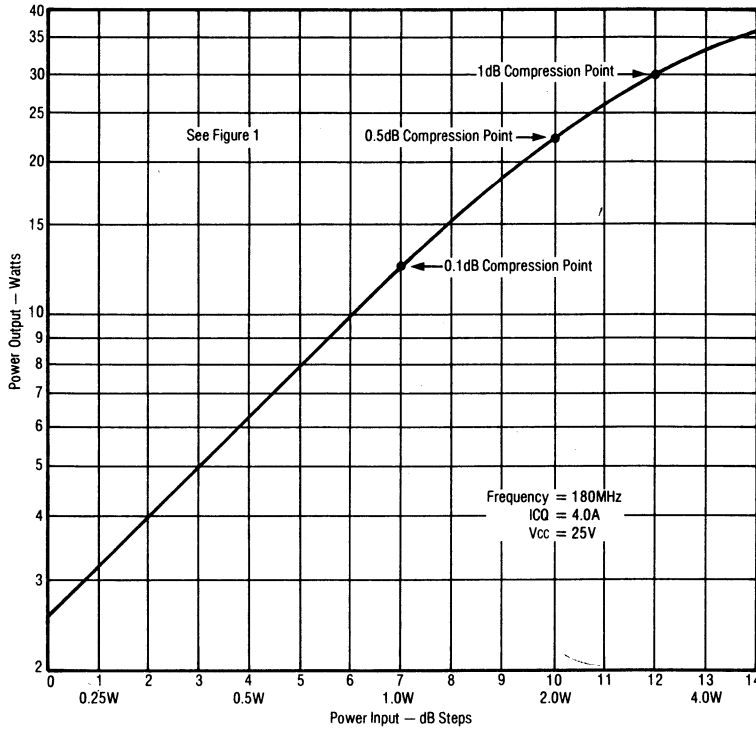
Figure 2. JO 1006 BROADBAND TEST CIRCUIT (100-160 MHz)

NOTE: Load line design good to 180MHz
decreasing C7, C8, C11 will optimize match
at 115MHz to 180MHz

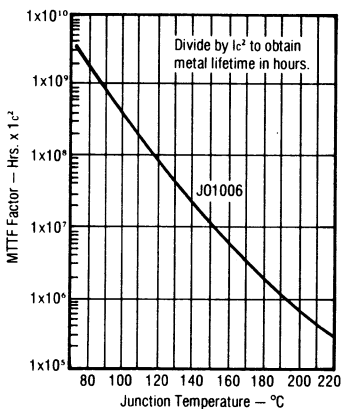
C₁ 50 pF UNELCO
 C₂ 350 pF UNELCO
 C_{3,6,9,12,14} 1000 pF UNELCO
 C_{4,10,13} 0.1 μF disc
 C_{5,15} 30 pF UNELCO
 C₇ 0-18 pF # 402 ARCO
 C₈ 300 pF UNELCO
 C₁₁ 100 μF Electrolytic
 D₁ DSR 5050

L₁ 4 turns, 0.125" diameter # 22 AWG
 L_{2,3,4} 3 Ferrite Beads on # 22 AWG
 L₅ 0.08" wide ribbon, 0.25" long
 L₆ 0.08" wide ribbon, 0.125" long
 R₁ 1 Ω
 R₂ 50 Ω
 T₂ 1" long twisted pair # 22 AWG
 T₁ 0.075" diameter semiridged 25 Ω co-ax,
 2" long (Balun transformer)

**Class A Narrowband
Power Input vs Power Output**



**MTTF Factor
vs Junction Temperature**

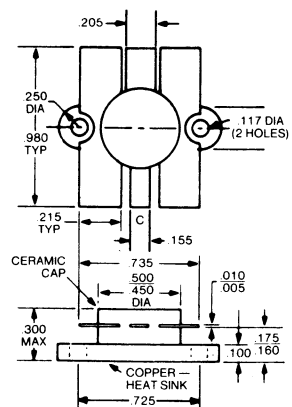


Where :

$$\begin{aligned} P_o &= 100 \text{ W} \\ \eta_{IC} &= 60 \% \\ G_T &= 7 \text{ dB} \\ T_{CASE} &= 45^\circ\text{C} \\ \theta_{JC} &= 1.25 \\ V_{CE} &= 28 \text{ V} \\ P_{DIS} &= 87 \text{ W} \\ T_j &= 150^\circ\text{C} \end{aligned}$$

$$\begin{aligned} \text{MTTF Factor} &= (1 \times 10^7 \text{ hrs}) (\text{amp}^2) \\ \text{MTTF (hr)} &= \frac{(1 \times 10^7 \text{ hrs}) (\text{amp}^2)}{(5.95 \text{ amp})^2} \\ &= 2.8 \times 10^5 \text{ hrs} \\ &= 32 \text{ yrs} \end{aligned}$$

**J-Zero-C
Package Outline**



RF Power Transistors

The JO 3025, JO 3037 and JO 3055 are an internally matched NPN silicon UHF transistors they are inherently more reliable than conventional transistors.

They offer the greatest combination of gain, bandwidth and power output available in the industry.

25 WATTS

37 WATTS

55 WATTS

470 MHz - 12.5 V



J zéro CÉRAMIC

Electrical Characteristics ($T_{\text{flange}} = 25^{\circ}\text{C}$)

	SYMBOL	CHARACTERISTICS	TEST CONDITIONS	JO 3025	JO 3037	JO 3055	UNIT
D C Test	BV_{EBO}	Min Emitter - Base Breakdown Voltage	$I_E = 5 \text{ mA}$ $I_C = 0$	4	4	4.5	V
	BV_{CEO}	Min Collector - Emitter Breakdown Voltage	$I_C = 20 \text{ mA}$ $I_B = 0$	16	16	17	V
	BV_{CBO}	Min Collector - Base Breakdown Voltage	$I_C = 25 \text{ mA}$ $I_E = 0$	36	36	38	V
	I_{CBO}	Max Collector Cutoff Current	$V_{CB} = 20 \text{ V}$ $I_E = 0$	2	5	5	mA
	H_{FE}	Min D.C Current Gain	$V_{CE} = 5 \text{ V}$ $I_C = 1000 \text{ mA}$	20	20	20	—
R F Test	P_{GAIN}	Min Power Gain	$V_{CE} = 12.5 \text{ V}$ $F = 470 \text{ MHz}$ $P_{in} = 8 \text{ W}$ $P_{in} = 13 \text{ W}$ $P_{in} = 20 \text{ W}$	25	37	55	W
	η	Min Efficiency	$V_{CE} = 12.5 \text{ V}$ $F = 470 \text{ MHz}$ Rated Output Power	50	50	50	%
	Load VSWR	Mismatch Tolerance	$V_{CE} = 12.5 \text{ V}$ $F = 470 \text{ MHz}$ Rated Output Power	$\infty : 1$	$\infty : 1$	$\infty : 1$	
	Z_{in}	Typ Common Emitter Amplifier Input Impedance	$F = 470 \text{ MHz}$ $V_{CE} = 12.5 \text{ V}$ Rated Input Power	$1.9 + j 4$	$1.75 + j 5.1$	$2.2 + j 2.7$	Ω
	Z_{Load}	Typ Common Emitter Amplifier Load Impedance	$F = 470 \text{ MHz}$ $V_{CE} = 12.5 \text{ V}$ Rated Output Power	$2.5 - j 2.6$	$1.7 + j 4.5$	$1.4 - j 2.5$	Ω
	C_{OB}	Max Collector - Base Capacitance	$V_{CB} = 20 \text{ V}$ $F = 1 \text{ MHz}$	80	100	160	pF
Operating	I_C	Continuous Collector Current		5	5	10	A
	θ_{j-c}	Thermal Resistance	$T_C = 25^{\circ}\text{C}$	2.9	2.1	1.75	$^{\circ}\text{C/W}$
	T_{STG}	Storage Temperature and Junction Temperature		-65°C to $+200^{\circ}\text{C}$	-65°C to $+200^{\circ}\text{C}$	-65°C to $+200^{\circ}\text{C}$	$^{\circ}\text{C}$
	P_D	Power Dissipation	$T_C = 25^{\circ}\text{C}$	60	83	100	W

PACKAGE OUTLINE

J-Zero

