



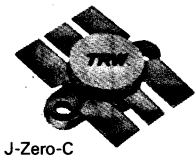
MILITARY COMMUNICATIONS HF/VHF/UHF

PRODUCT SUMMARY

PART NUMBER	APPLICATION	FREQUENCY	POWER OR GAIN (dB)	SUPPLY VOLTAGE (V)	PACKAGE	PAGE
JO 2015A	MILITARY	400 MHz	70 W	28	J-ZERO	C2
JO 2058	MILITARY	450 MHz	100 Pulse	28	HLP 12	C6
PT 9700	MILITARY	400 MHz	1.5 W	28	SOE 280	C10
PT 9701B	MILITARY	400 MHz	5 W	28	SOE 280	C12
PT 9702B	MILITARY	400 MHz	20 W	28	SOE 280	C14
PT 9703B	MILITARY	400 MHz	10 W	28	SOE 280	C13
PT 9704A/B	MILITARY	400 MHz	30 W	28	SOE 280	C15
PT 9730	MILITARY	175 MHz	4 W	28	SOE 380	C19
PT 9731	MILITARY	175 MHz	25 W	28	SOE 380	C23
PT 9732	MILITARY	175 MHz	8 W	28	SOE 380	C21
PT 9733	MILITARY	175 MHz	50 W	28	SOE 380	C24
PT 9734	MILITARY	175 MHz	15 W	28	SOE 380	C22
TP 9386	MILITARY	175 MHz	150 W	28	J-ZERO	C27
TPM 401	MILITARY	400 MHz	1 W	20	SOE 280	C31
TPM 405	MILITARY	400 MHz	5 W	24	SOE 280	C35
TPM 425	MILITARY	400 MHz	25 W	24	SOE 280	C39
TPM 4040	MILITARY	400 MHz	40 W	28	MRP 7	C41
TPM 4130	MILITARY	400 MHz	130 W	28	MRP 7	C45

UHF Power Transistor

- 70 W
- 28 V
- 225-400 MHz
- ∞ VSWR
- Broadband



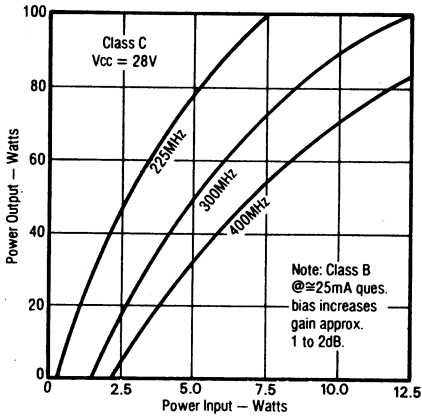
The JO 2015 A is an internally matched NPN silicon UHF power transistor. Its multicell design allows optimum heat dissipation and operating efficiency. A slotted-grid finger structure assures uniform current injection. Ruggedability and

long-term reliability is guaranteed by unique, diffused silicon ballasting resistors coupled with TRW's refractory-gold-passivated metalization system.

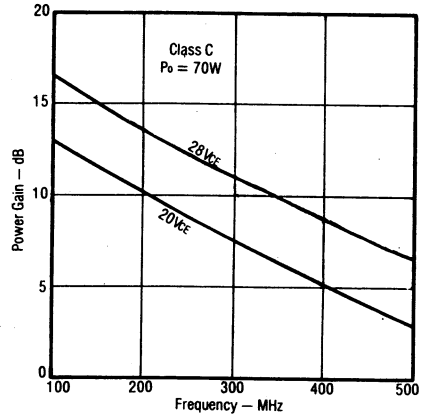
Electrical Characteristics (25 °C)

	Symbol	Characteristics	Condition	Value
D C Tests	BV _{CBO}	Collector-Base Breakdown Voltage	I _C = 100 mA	65 Vdc Min
	BV _{EBO}	Emitter-Base Breakdown Voltage	I _E = 5.0 mA	3.5 Vdc Min
	BV _{CEO}	Collector-Emitter Breakdown Voltage	I _C = 50 mA	30 Vdc Min
	VSWR	Mismatch Tolerance	V _{CE} = 28 V, f = 400 MHz, P _o = 50 W	(All Angles) 10:1
	C _{ob}	Collector-Base Capacitance	V _{CB} = 28 V, f = 1 MHz	80 pF Max
	h _{FE}	DC Current Gain	V _{CE} = 10 V, I _C = 1 A	10-100
R F Tests	P _{gain}	Power Gain, CW Broadband	V _{CE} = 28 V, P _o = 50 W f = 225-400 MHz	10 dB Min
	P _{sat}	Saturated Power Output	V _{CE} = 28 V, f = 400 MHz	70 W Min
	η	Narrowband Collector Efficiency	V _{CE} = 28, f = 400 MHz, P _o = 50 W	55 % Min
Operating	T _{stg}	Max Storage Temperature		— 65 °C to + 200 °C
	θ _{JC}	Thermal Resistance	25 °C	1.25 °C/W
	I _C	Continuous Collector Current	V _{CE} = 10 V	10 A Max

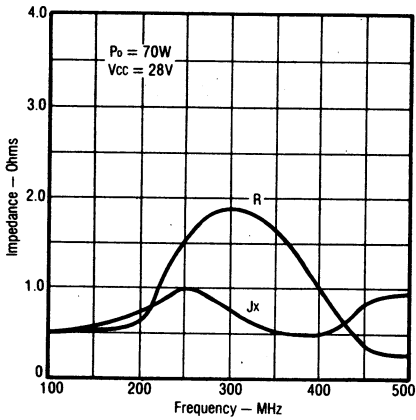
Power Output vs Power Input



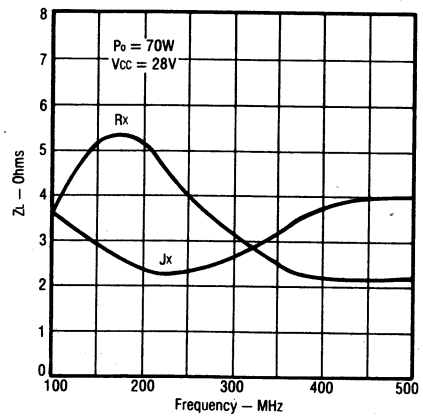
Power Gain vs Frequency



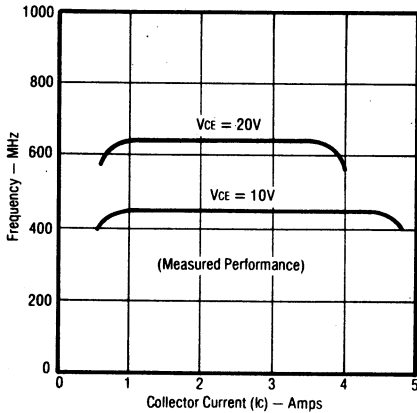
Series Input Impedance vs Frequency



Series Load Impedance vs Frequency



f_t vs I_C



Safe Operating Area

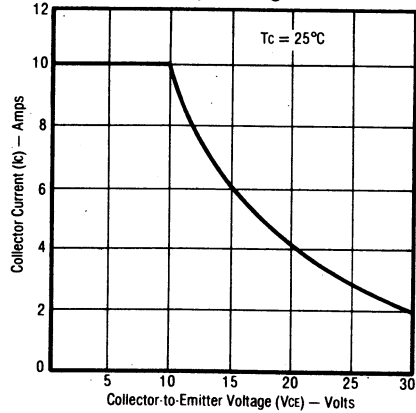
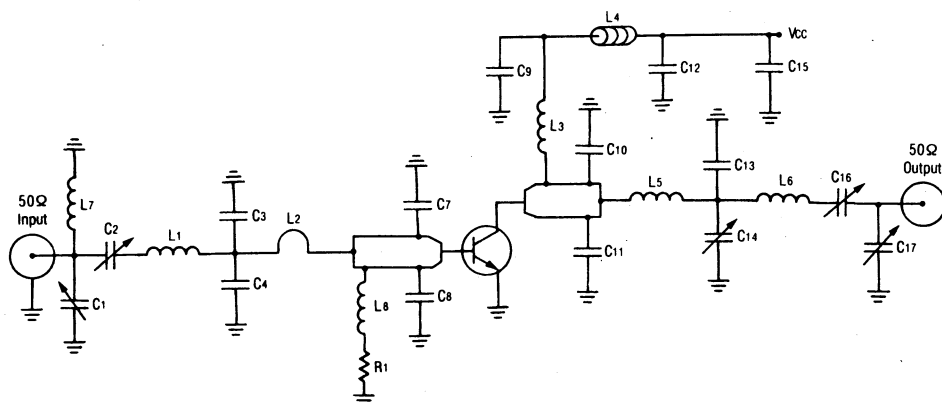


Figure 1. Narrowband Test Circuit



C1,2,14,17 1.5-20pF ARCO #402
 C3,4 10pF UNELCO
 C7,8 60pF UNELCO
 C10,11 40pF UNELCO
 C13 15pF UNELCO
 C9,12 1000pF UNELCO
 C15 5μF electrolytic
 C16 8-60pF ARCO #404

L1 2 turns #22AWG, 0.1" form
 L2 0.2" hairpin, 0.1" wide ribbon
 L3 #22AWG, 1" diameter
 L4 3 Ferrite beads on #22AWG
 L5 #22AWG, 0.25" hairpin
 L6 1 turn #22AWG, 0.1" form
 L7 6 turns #22AWG, 0.1" form
 L8 8 turns #22AWG, 0.1" form

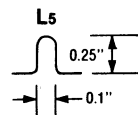
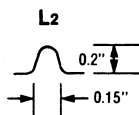
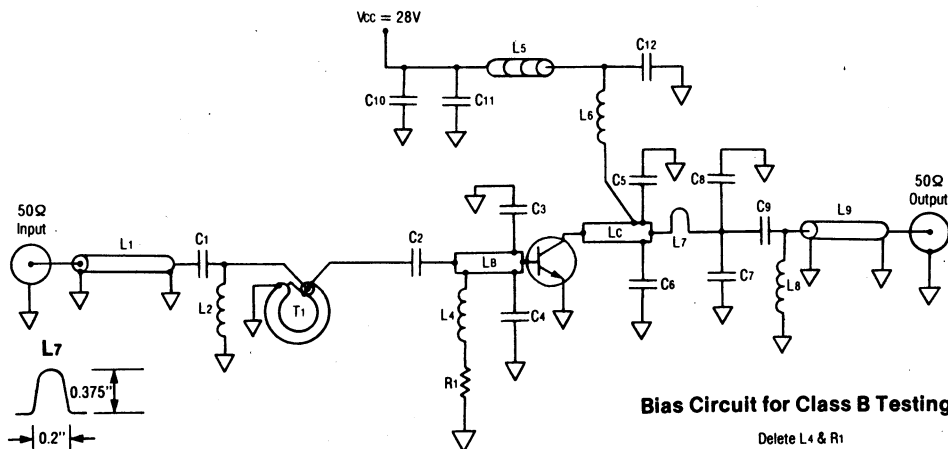


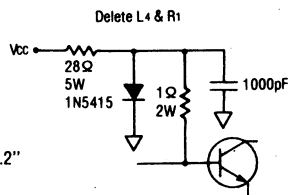
Figure 2. 70 Watt Broadband Test Circuit (225-400MHz)



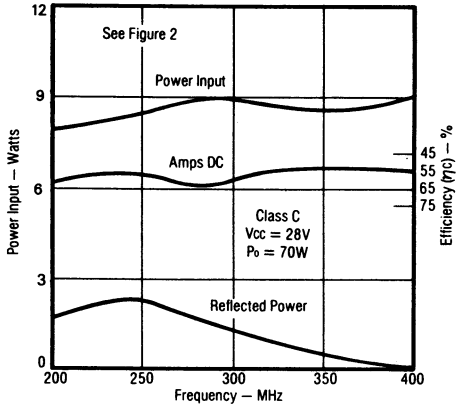
C1 20pF JFD
 C2 68pF JFD
 C3,4 60pF UNELCO
 C5,6 40pF UNELCO
 C7,9 15pF UNELCO
 C8 10pF UNELCO
 C10 5μF electrolytic
 C11,12 1000pF UNELCO
 L1,9 50Ω semirigid (length to suit circuit)

L2,4 4 turns #20AWG, 0.125" form
 L5 3 Ferrite beads
 L6 #20AWG, 1" diameter
 L7 3/8" hairpin
 L8 3 turns #20AWG, 0.125" form
 L9 Base Inductance Pad, 0.5" x 0.2"
 Lc Collector Inductance Pad, 0.5" x 0.2"
 R1 0.5Ω, 1W
 T1 1", 25Ω semirigid coax

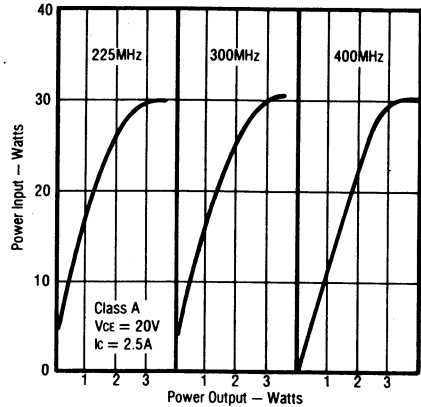
Bias Circuit for Class B Testing



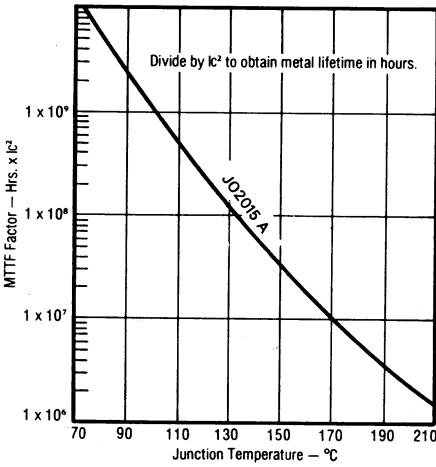
70W Broadband Performance



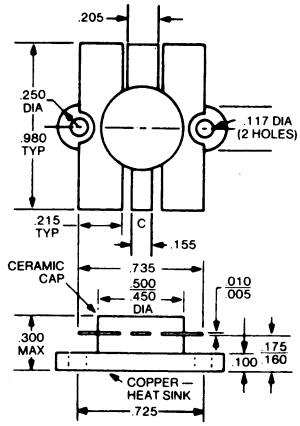
Typical Class A Linear Transfer Characteristics



MTTF Factor vs T_j

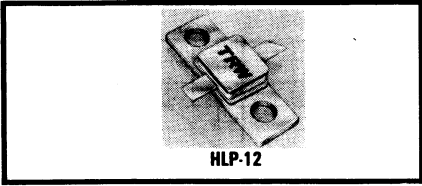


J-Zero-C Package Outline



High Power UHF Pulse Transistor

- 100 W (Pulse)
- 75 W (CW)
- Low θ_{jc}
- 0.88 °C/W



The JO 2058 Transistor is intended for use in military UHF CW and Pulse RF transmitters. The combination of all-gold metallization with state-of-

the-art die technology and an inorganic hermetic seal enables reliable operation in hostile environments. Common base mode operation utilizes

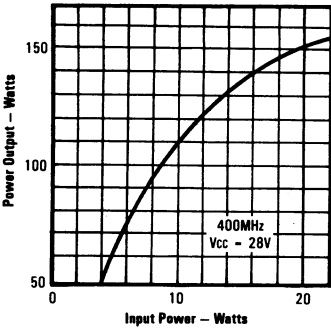
the multi-octave bandwidth capability of this device.

Electrical Characteristics (T_{case} = 25°C)

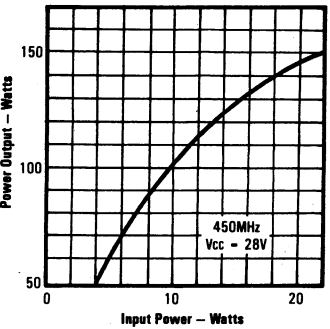
	Symbol	Characteristics	Test Conditions	Min.	Typ.	Max.	Unit
DC TEST	BVEBO	Emitter Base Voltage	Ic = 5mA	3.5			Volts
	BVCEO	Collector Emitter Voltage	Ic = 50mA	30			Volts
	BVCES	Collector Emitter Voltage	Ic = 50mA	60			Volts
	ICES	Collector Emitter Leakage	VCE = 50V			5	mA
RF TEST	POUT	Power Output (Pulse)	VCC = 28V, f = 450MHz, PW = 16W, 1msec. 10% Duty Cycle	100			Watts
	η	Efficiency (Pulse)	VCC = 28V, f = 450MHz, POUT = 100W, 1msec, 10% Duty Cycle	60			%
	VSWRL	Collector Load	VCC = 28V, f = 450MHz, POUT = 100W, 1msec. 10% Duty Cycle Phase angle varied > 360° during 3-second test.	3:1			—
MAX. RATINGS	θ_{jc}	Thermal Resistance	25°C Flange			0.88	°C/W
	Tj	Junction Temperature				200	°C
	Tstg	Storage Temperature		-65		200	°C
	Ic	Collector Current	25°C Flange			14	A
	Pd	Total Dissipation	25°C Flange			200	W

Typical Pulse Characteristics
(1 millisecond pulse-width, 10% duty cycle)

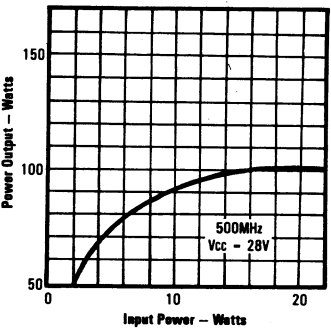
Power Transfer



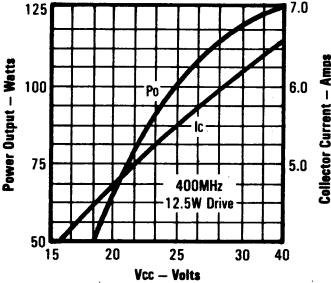
Power Transfer



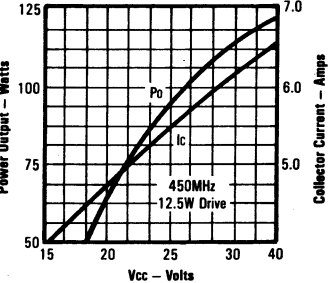
Power Transfer



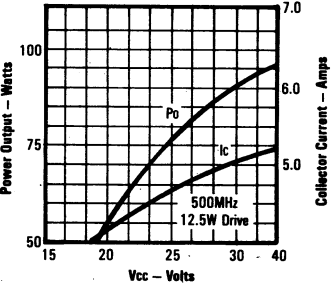
Drive Characteristics



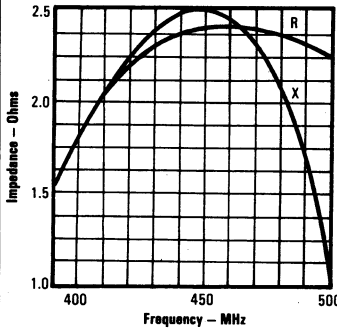
Drive Characteristics



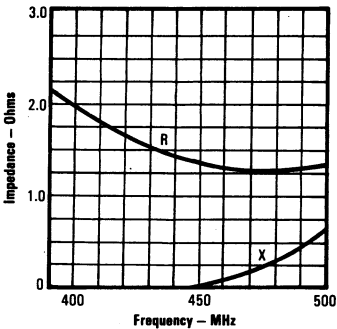
Drive Characteristics



Series Input Impedance

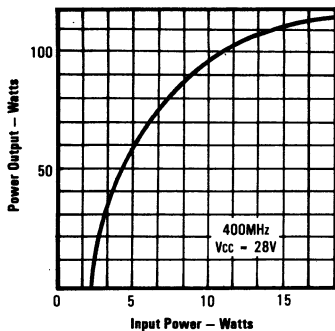


Series Load Impedance

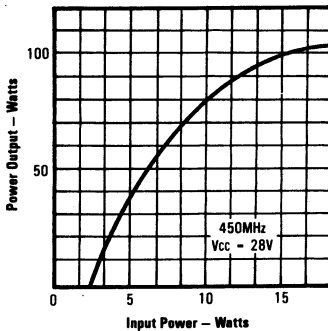


Typical CW (Class C) Characteristics

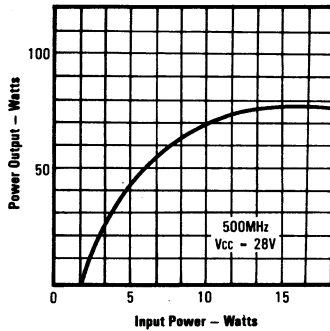
Power Transfer



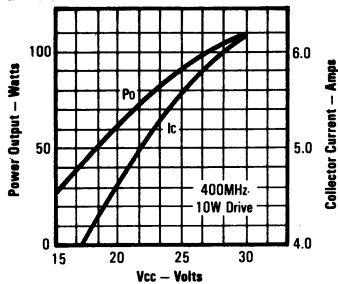
Power Transfer



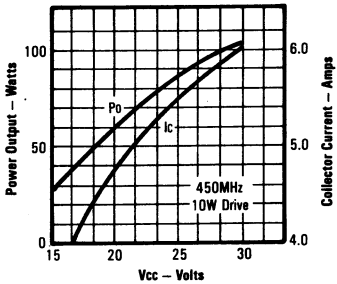
Power Transfer



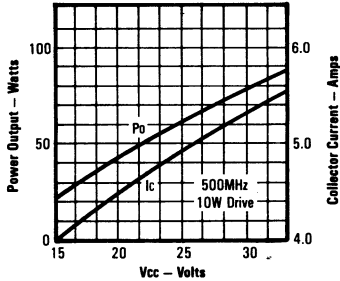
Drive Characteristics



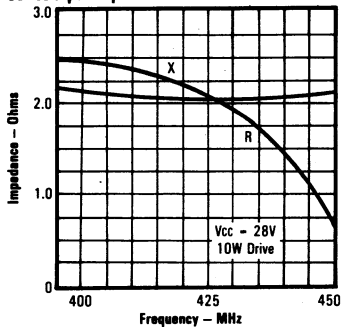
Drive Characteristics



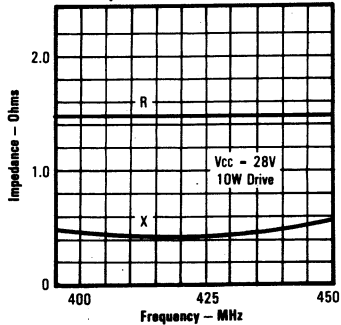
Drive Characteristics



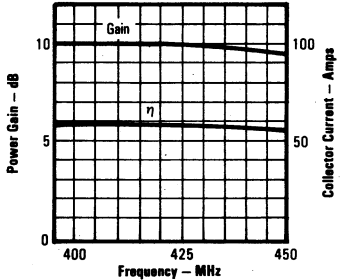
Series Input Impedance



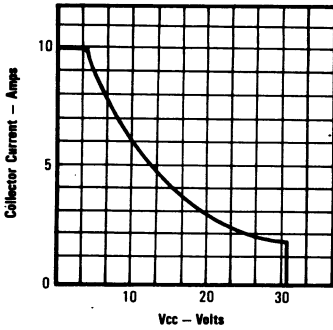
Series Load Impedance



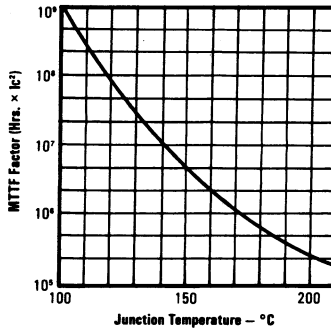
Gain and Efficiency



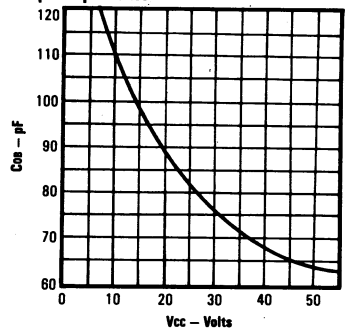
Safe Operating Area



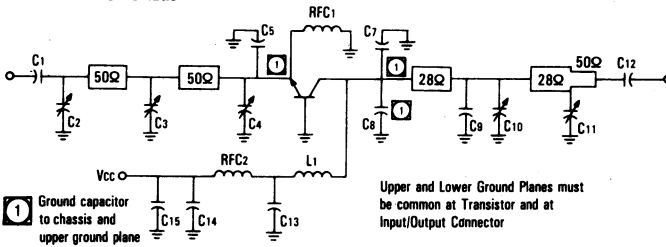
MTTF



Output Capacitance



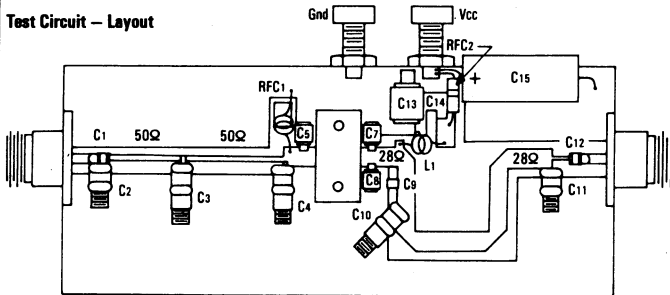
Test Circuit - Schematic



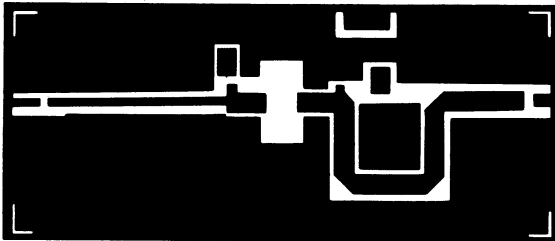
COMPONENTS LIST:

C1, 12	420pF	C14	470pF
C2, 11	0-10pF	C15	100μF 50VDC
C3, 4, 10	0-20pF	RFC1	13T, AWG. 20, 1/4" dia.
C6, 9	33pF	RFC2	3 ferrite beads on AWG. 20 wire.
C7, 8	35pF	L1	3T, #20 AWG., .125 dia.
C13	1000pF	CKT	Brd. Matl. 0.032 Teflon-Glass

Test Circuit - Layout



Test Circuit - Artwork



Circuit is reduced. Contact factory for actual size.