2N6256

CASE 249-05, STYLE 1

UHF AMPLIFIER TRANSISTOR

NPN SILICON

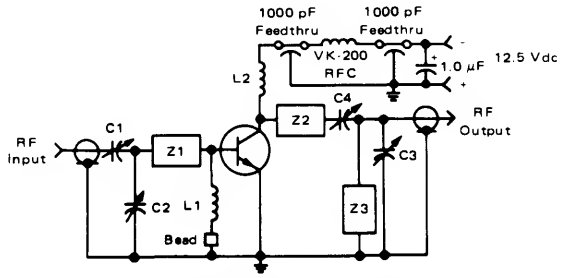
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	16	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	0.4	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	2.0 11.4	Watts mW/°C
Storage Temperature	T_{stg}	−65 to +200	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, I_B = 0)		$V_{(BR)CEO}$	16	—	—	Vdc
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, V_{BE} = 0)		$V_{(BR)CES}$	36	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 1.0 mAdc, I_C = 0)		$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)		I_{CBO}	—	—	0.5	mAdc
Collector Cutoff Current (V_{CE} = 15 Vdc, V_{BE} = 0, T_A = 125°C)		I_{CES}	—	—	5.0	mAdc
ON CHARACTERISTICS						
DC Current Gain (I_C = 50 mAdc, V_{CE} = 5.0 Vdc)		h_{FE}	20	80	200	—
SMALL SIGNAL CHARACTERISTICS						
Output Capacitance (V_{CB} = 12.5 Vdc, I_E = 0, f = 1.0 MHz)		C_{obo}	—	6.0	8.0	pF
FUNCTIONAL TEST						
Common-Emitter Amplifier Power Gain (P_{out} = 0.5 W, V_{CC} = 12.5 Vdc, f = 470 MHz)	(Figures 1, 6)	G_{PE}	7.0	9.0	—	dB
Collector Efficiency (P_{out} = 0.5 W, V_{CC} = 12.5 Vdc, f = 470 MHz)	(Figures 1, 6)	η	60	70	—	%

FIGURE 1 – 470 MHz TEST CIRCUIT SCHEMATIC



NOTE: Test Circuit Layout and Component Descriptions Shown in Figure 6.

Typical Output Power curves were measured in circuit shown in Figure 6

FIGURE 2 – OUTPUT POWER versus FREQUENCY

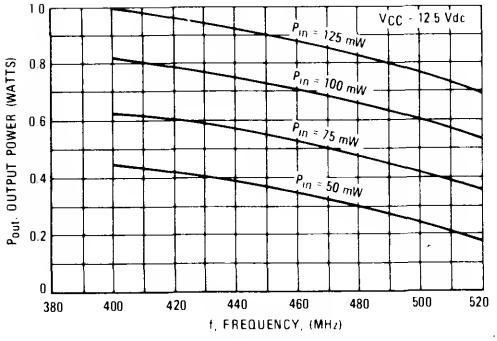


FIGURE 3 – OUTPUT POWER versus INPUT POWER

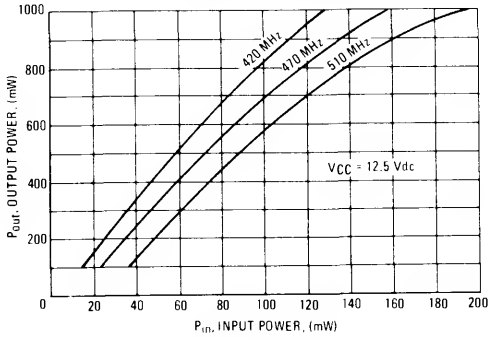


FIGURE 4 – OUTPUT POWER versus SUPPLY VOLTAGE

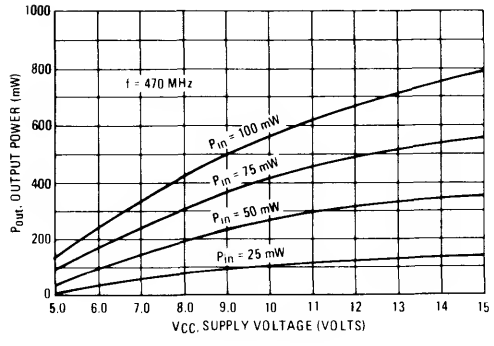


FIGURE 5 – SERIES EQUIVALENT INPUT and OUTPUT IMPEDANCE

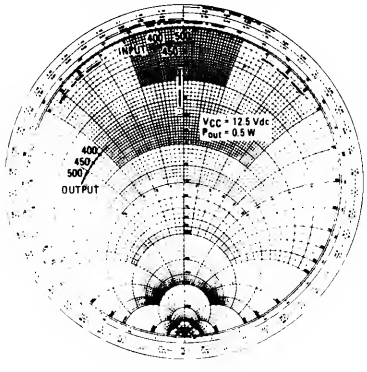
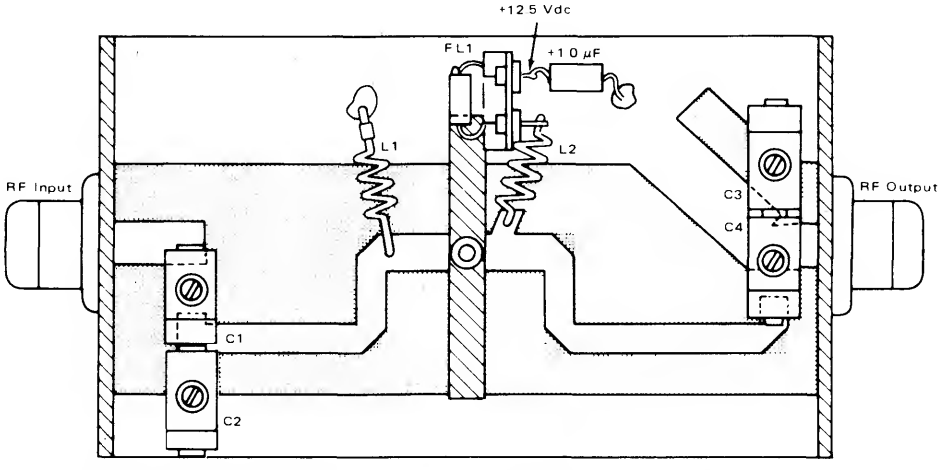


FIGURE 6 – 470 MHz TEST CIRCUIT LAYOUT
(See Figure 1 for Schematic Diagram)



C1,C2	1.0-25 pF ARCO 421 or Equivalent	FL1	DC Supply Filter	Connectors are Type "N"
C3, C4	1.0-25 pF ARCO 421 or Equivalent		2-1000 pF FT Capacitor	Board is Glass Teflon
L1, L2	7 Turns #22 AWG, 0.2" I.D		1-1.0 μF, 35 V Capacitor	3" x 5" x 0.060"
	Ferrite Bead FERROXCUBE 56-590-65-3B		1 Choke FERROXCUBE	Mounting Plate is 3" x 5" x 0.75"
	as shown on L1		VK-200-20-4B	

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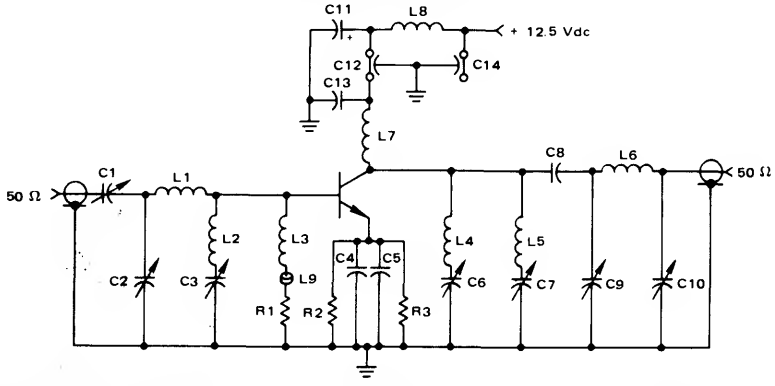
FIGURE 7 – 150 MHz to 450 MHz
TRIPLER USING 2N6256



C1,C2,C3,C9,C10	1-7 pF ARCO 400 or Equivalent	C13	0.1 μF Ceramic	L4	5 Turns 1/4" I.D.
C6,C7	1.5-20 pF ARCO 402 or Equivalent	R1	20 Ohm	L5	6 Turns 1/8" I.D.
C4,C5	470 pF ATC Type 100-B-420-m-ms	R2,R3	160 Ohm	L7	1 μH Molded Choke
C8	1000 pF UNDERWOOD Type J-101	L1	7 Turns 1/4" I.D.	L8	FERROXCUBE VK200-20/4B
C11	0.47 μF TANTALUM	L2	6-4 Turns 1/8" I.D.	L9	Ferrite Bead, FERROXCUBE 56-590-65/3B
C12,C14	470 pF Feedthru	L3	0.68 μH Molded Choke		

NOTE: All coils air core spece wound with #20 AWG Wire, unless otherwise specified.

Figure 7 shows the 2N6256 in a 150 MHz to 450 MHz tripler circuit. This circuit will typically produce 85 mW at 450 MHz with 30 mW at 150 MHz input (4.5 dB gain). Collector efficiency is 25% and all unwanted harmonics are at least 30 dB down from the 450 MHz output level.

It is important that each emitter lead be bypassed separately with a good hi-quality capacitor. The emitter resistor is likewise split in two with one-half on each emitter lead.

The input network is a modified "TEE" consisting of C1, C2, and L1, which matches the 50 Ohm input to the transistor impedance at 150 mc; this is roughly 18-j20 Ohms. The combination of L2 and C3 form a 450 MHz idler to provide a base return for third harmonic current. L4, C6 and L5, C7 are 150 MHz and 300 MHz output idlers respectively. The output matching section is a pi network made up of L6, C9 and C10. All coils are air core space-wound (turns one wire diameter apart) with #20 AWG wire.