

The RF Line

NPN SILICON RF POWER TRANSISTOR

...designed for 12.5 Volt UHF large-signal amplifier applications in industrial and commercial FM equipment operating to 520 MHz.

- Specified 12.5 Volt, 470 MHz Characteristics —
Output Power = 25 Watts
Minimum Gain = 4.0 dB
Efficiency = 65%
- Overlay Construction Provides Protection Against Device Damage Due to Load Mismatch
- Characterized With Series Equivalent Large-Signal Impedance Parameters

*MAXIMUM RATINGS

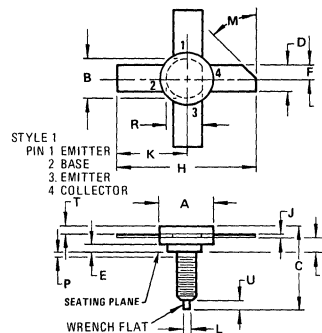
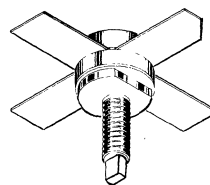
Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	18	Vdc
Collector-Base Voltage	V_{CBO}	36	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	6.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ (2) Derate above 25°C	P_D	60 0.343	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$
Stud Torque (1)	—	6.5	in. lb.

*Indicates JEDEC Registered Data

(1) For repeated assembly use 5 in. lb.

(2) This device is designed for RF operation. The total device dissipation rating applies only when the devices are operated as class B or C RF amplifiers.

25 W — 470 MHz RF POWER TRANSISTOR NPN SILICON



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	9.78	0.370	0.385
B	8.13	8.38	0.320	0.330
C	18.03	19.05	0.710	0.750
D	5.59	5.84	0.220	0.230
E	1.78	2.03	0.070	0.080
F	2.78	2.92	0.110	0.115
H	26.42	28.70	1.040	1.130
J	0.10	0.15	0.004	0.006
K	13.21	14.35	0.520	0.565
L	1.40	1.65	0.055	0.065
M	45° NOM		45° NOM	
P	—	1.27	—	0.050
R	7.59	7.80	0.299	0.307
S	4.01	4.52	0.158	0.178
T	2.16	2.41	0.085	0.095
U	2.54	3.30	0.100	0.130

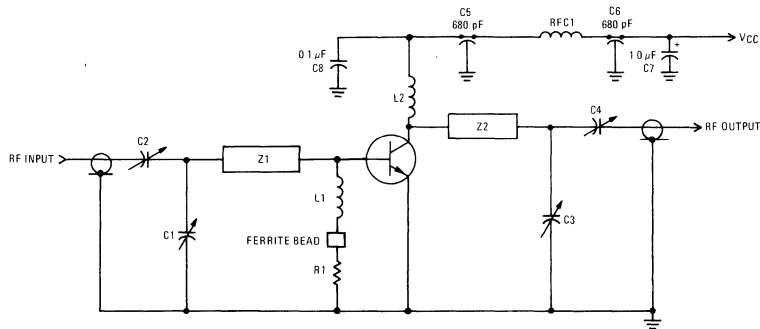
NOTE
CASE 145A-01 USE 8-32NC2A STUD
CASE 145A-01

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ($I_C = 50\text{ mAdc}$, $I_B = 0$)	BV_{CEO}	18	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 50\text{ mAdc}$, $V_{BE} = 0$)	BV_{CES}	36	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 50\text{ mAdc}$, $I_C = 0$)	BV_{EBO}	4.0	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 15\text{ Vdc}$, $V_{BE} = 0$, $T_C = 55^\circ\text{C}$)	I_{CES}	—	—	20	mAdc
ON CHARACTERISTICS					
DC Current Gain ($I_C = 1.0\text{ Adc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	20	—	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance ($V_{CB} = 12.5\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	55	70	pF
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain ($P_{out} = 25\text{ W}$, $V_{CC} = 12.5\text{ Vdc}$, $f = 470\text{ MHz}$)	G_{pE}	4.0	—	—	dB
Collector Efficiency ($P_{out} = 25\text{ W}$, $V_{CC} = 12.5\text{ Vdc}$, $f = 470\text{ MHz}$)	η	65	—	—	%

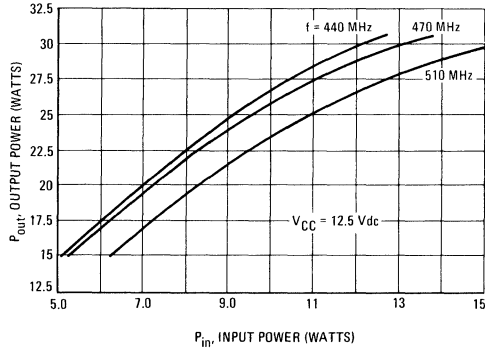
*Indicates JEDEC Registered Data

FIGURE 1 — 470 MHz TEST CIRCUIT SCHEMATIC



Note: Test circuit layout shown in Figure 6.

**FIGURE 2 —
OUTPUT POWER versus INPUT POWER**



**FIGURE 3 —
OUTPUT POWER versus FREQUENCY**

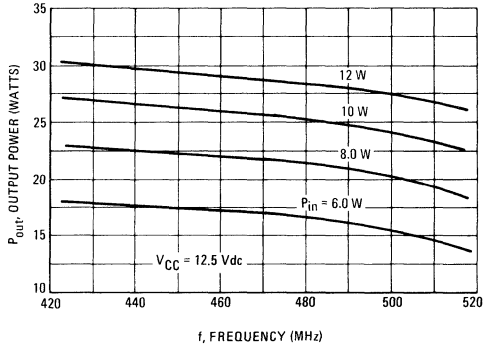


FIGURE 4 —
OUTPUT POWER versus SUPPLY
VOLTAGE

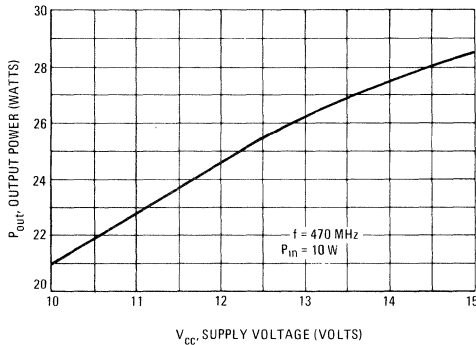


FIGURE 5 —
SERIES EQUIVALENT IMPEDANCE
PARAMETERS

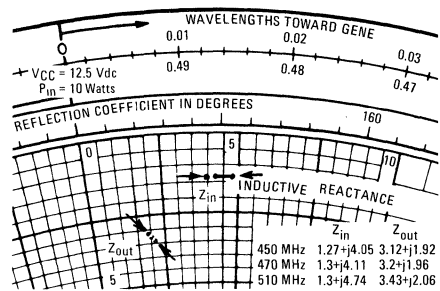
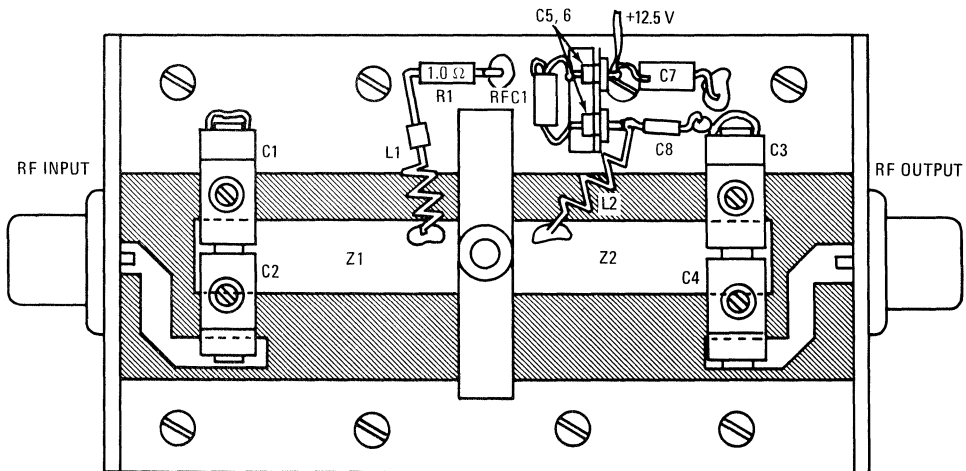


FIGURE 6 —
470 MHz TEST CIRCUIT LAYOUT
(1:1 Scaled Drawing)



- | | | | |
|-------------|---|-----------|---|
| C1, 2, 3, 4 | 1.0-25pF ARCO 421 OR EQUIVALENT
UHF COMPRESSION
MICAS | R1 | 1.0 OHM, 1/2 WATT
CONNECTORS ARE TYPE "N"
BOARD IS GLASS TEFLON
3" X 5" X 0.062" 1 oz. COPPER BOTH SIDES
SHOWN TO SCALE
CLADDING REMOVED IN DARK AREAS
MOUNTING PLATE IS 3" X 5" X 0.75" ALUMINUM |
| L1, L2 | 5 Turns #20 AWG 0.2 I.D.
FERRITE BEAD, FERROXCUBE 56-590-65-38
AS SHOWN ON L1 | Z1 and Z2 | BASE AND COLLECTOR
LINES ARE 0.5" X 1.75" |
| C5, 6 | 680 pF FT. CAPACITOR | | |
| C7 | 1.0 μ F, 35V TANTALUM CAPACITOR | | |
| RFC1 | CHOKE FERROXCUBE VK 200-20-48 | | |
| C8 | 0.1 μ F ERIE CK06 | | |

Note: Figure 6 is 1:1 scaled layout of test circuit shown in Figure 1. This layout may be transferred directly to glass teflon board for easy reproduction of the test circuit.