

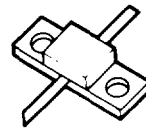
**MRAL1417**  
**Series**

**The RF Line**  
**Microwave Power Transistors**

... designed primarily for wideband, large-signal output and driver amplifier stages in the 1.4 to 1.7 GHz frequency range.

- Designed for Class C, Common Base Power Amplifiers
- Specified 22 Volt, 1.7 GHz Characteristics:
  - Output Power — 2 to 25 Watts
  - Power Gain — 7 to 8 dB Min
  - Collector Efficiency — 40 to 45%
- Built-In Matching Network for Broadband Operation
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors

**7 to 8 dB**  
**1.4-1.7 GHz**  
**2 TO 25 WATTS**  
**BROADBAND**  
**MICROWAVE POWER**  
**TRANSISTORS**



**CASE 394-01, STYLE 1**  
**(MRA .25)**

**MAXIMUM RATINGS**

Rating	Symbol	-2	-6	-11	-25	Unit
Collector-Base Voltage	$V_{CES}$	42				Vdc
Emitter-Base Voltage	$V_{EBO}$	3.5				Vdc
Collector Current — Continuous	$I_C$	0.5	1	4	8	Adc
Operating Junction Temperature	$T_J$	200				°C
Storage Temperature Range	$T_{stg}$	-65 to +150				°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max				Unit
Thermal Resistance, RF, Junction to Case	$R_{\theta JC}$	15	8	4.5	2.5	°C/W

**ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage ( $I_C = 20 \text{ mA}$ , $V_{BE} = 0$ ) ( $I_C = 40 \text{ mA}$ , $V_{BE} = 0$ ) ( $I_C = 80 \text{ mA}$ , $V_{BE} = 0$ ) ( $I_C = 160 \text{ mA}$ , $V_{BE} = 0$ )	MRAL1417-2 -6 -11 -25	$V_{(BR)CES}$	42 42 42 42	— — — —	— — — —	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 0.25 \text{ mA}$ , $I_C = 0$ ) ( $I_E = 0.5 \text{ mA}$ , $I_C = 0$ ) ( $I_E = 1 \text{ mA}$ , $I_C = 0$ ) ( $I_E = 2 \text{ mA}$ , $I_C = 0$ )	MRAL1417-2 -6 -11 -25	$V_{(BR)EBO}$	3.5 3.5 3.5 3.5	— — — —	— — — —	Vdc
Collector Cutoff Current ( $V_{CB} = 22 \text{ V}$ , $I_E = 0$ )	MRAL1417-2 -6 -11 -25	$I_{CBO}$	— — — —	— — — —	0.5 1 2 4	mAdc

(continued)

# MRAL1417 Series

## ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain	MRAL1417-2	h <sub>FE</sub>	10	—	100
(I <sub>C</sub> = 0.1 A, V <sub>CE</sub> = 5 V)					
(I <sub>C</sub> = 0.2 A, V <sub>CE</sub> = 5 V)					
(I <sub>C</sub> = 0.4 A, V <sub>CE</sub> = 5 V)					
(I <sub>C</sub> = 0.8 A, V <sub>CE</sub> = 5 V)					
<b>FUNCTIONAL TESTS</b>					
Common-Base Amplifier Power Gain	MRAL1417-2	G <sub>PB</sub>	8	—	—
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 2 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 6 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 11 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 25 W, f = 1.4 & 1.7 GHz)					
Collector Efficiency	MRAL1417-2	η <sub>c</sub>	45	—	—
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 2 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 6 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 11 W, f = 1.4 & 1.7 GHz)					
(V <sub>CE</sub> = 22 V, P <sub>out</sub> = 25 W, f = 1.4 & 1.7 GHz)					

## TYPICAL CHARACTERISTICS

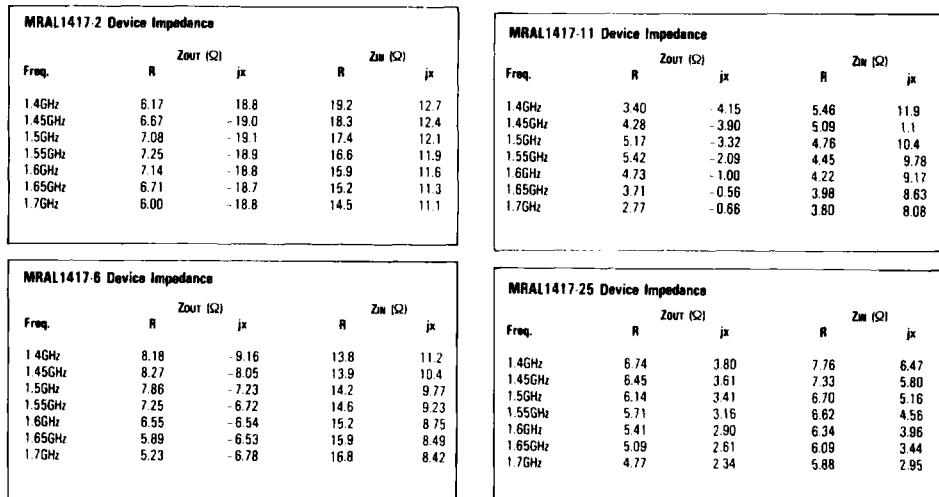
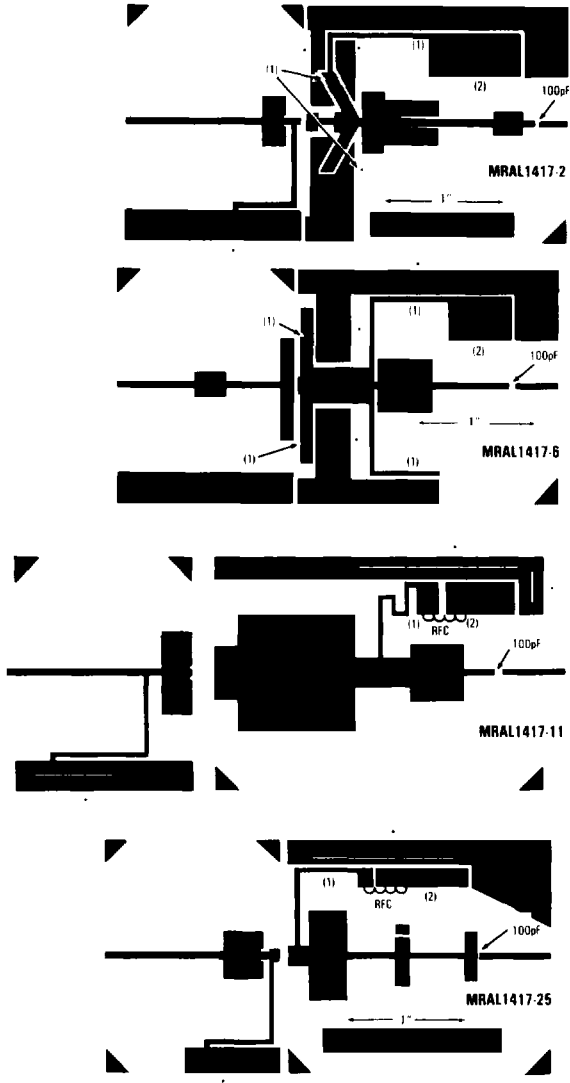


Figure 1. Z<sub>IN</sub> and Z<sub>OUT</sub> versus Frequency

# MRAL1417 Series



Board material: 1/8 mil dielectric thickness teflon fiberglass  
 \*Ground through to backside ground plane.  
 (1) Bypass 100pF chip capacitor.  
 (2) Vcc bypassed by 0.1µF chip and 5µF electrolytic

Figure 2. Test Circuit Boards (Not to Scale)