

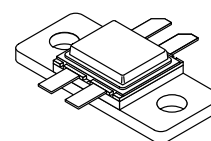
The RF Line UHF Power Transistor

Designed primarily for wideband, large-signal output and driver amplifier stages in the 500 to 1000 MHz frequency range.

- Designed for Class AB Linear Power Amplifiers
- Specified 28 Volt, 1000 MHz Characteristics:
Output Power — 50 Watts
Power Gain — 7 dB (Min), Class AB
- Built-In Matching Network for Broadband Operation
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors
- Hermetic Package for Military/Space Applications

MRA0510-50H

7.0 dB, 500 – 1000 MHz
50 W
BROADBAND
UHF POWER TRANSISTOR



CASE 391-03, STYLE 1
(HLP-42)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	4	Vdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	125 0.715	Watts W/ $^\circ\text{C}$
Operating Junction Temperature	T_J	200	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, RF, Junction to Case ($T_C = 70^\circ\text{C}$)	$R_{\theta JC}$	1.4	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS (1)

Collector-Emitter Breakdown Voltage ($I_C = 25\text{ mA}$, $V_{BE} = 0$)	$V_{(BR)CES}$	60	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 25\text{ mA}$, $I_E = 0$)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 5\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	4	—	—	Vdc
Collector-Emitter Breakdown Voltage ($I_C = 25\text{ mA}$, $R_{BE} = 1\ \Omega$)	$V_{(BR)CER}$	50	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 30\text{ V}$, $I_E = 0$)	I_{CBO}	—	—	25	mAdc

(1) Each transistor chip measured separately.

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS (1)					
DC Current Gain ($I_C = 1\text{ A}$, $V_{CE} = 5\text{ V}$)	h_{FE}	20	–	80	–
DYNAMIC CHARACTERISTICS (1)					
Output Capacitance ($V_{CB} = 28\text{ V}$, $I_E = 0$, $f = 1\text{ MHz}$)	C_{ob}	–	–	24	pF
FUNCTIONAL TESTS (2)					
Common–Emitter Amplifier Power Gain ($V_{CE} = 28\text{ V}$, $P_{out} = 50\text{ W}$, $f = 1\text{ GHz}$, $I_{CQ} = 2 \times 120\text{ mA}$)	G_{PE1}	7	–	–	dB
Load Mismatch ($V_{CE} = 28\text{ V}$, $I_{CQ} = 2 \times 120\text{ mA}$, $P_{out} = 50\text{ W}$, $f = 1\text{ GHz}$, Load VSWR = 5:1, All Phase Angles)	ψ	No Degradation in Output Power			
Broadband Power Gain ($V_{CE} = 28\text{ V}$, $P_{out} = 45\text{ W}$, $f = 500\text{ MHz}$ and 1 GHz , $I_{CQ} = 2 \times 120\text{ mA}$)	G_{PE2}	6.5	–	–	dB

- (1) Each transistor chip measured separately.
- (2) Both transistor chips operating in push–pull amplifier.

TYPICAL CHARACTERISTICS

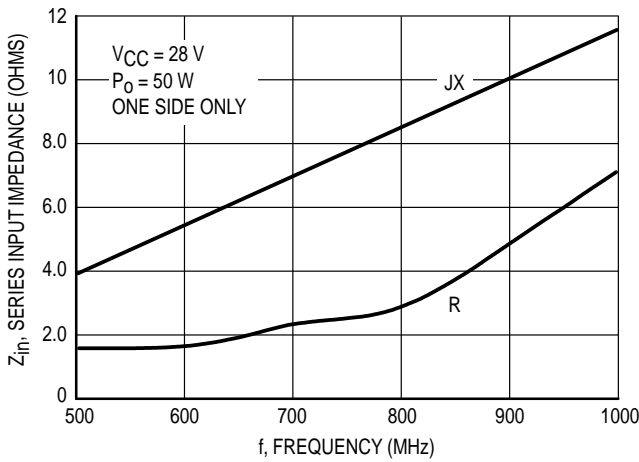


Figure 1. Input Impedance versus Frequency

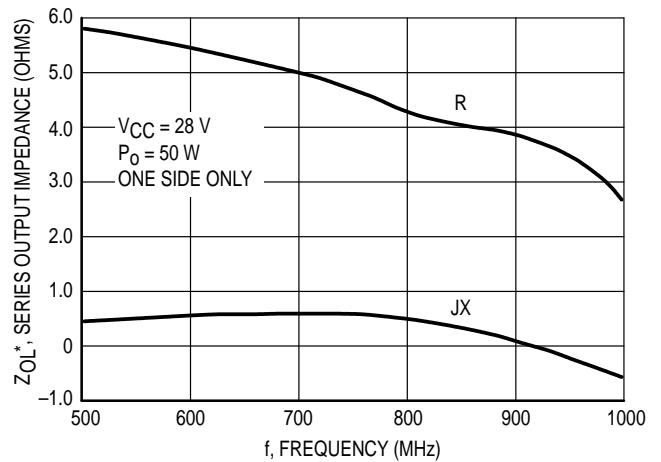
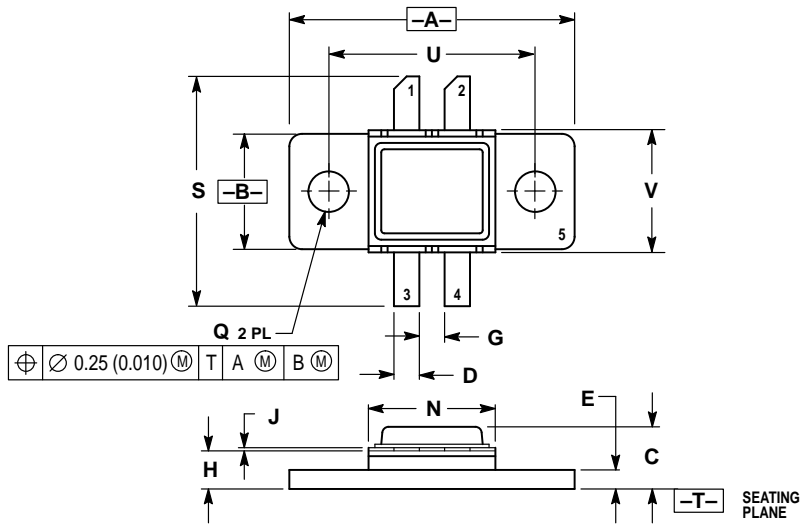


Figure 2. Output Impedance versus Frequency

PACKAGE DIMENSIONS




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.895	0.905	22.73	22.99
B	0.380	0.390	9.65	9.91
C	0.172	0.208	4.37	5.28
D	0.075	0.085	1.91	2.16
E	0.055	0.065	1.40	1.65
G	0.075	0.085	1.91	2.16
H	0.115	0.125	2.92	3.18
J	0.003	0.006	0.08	0.15
N	0.393	0.403	9.98	10.24
Q	0.123	0.133	3.13	3.38
S	0.705	0.745	17.91	18.92
U	0.650 BSC		16.51 BSC	
V	0.393	0.403	9.98	10.24

- STYLE 1:
 PIN 1. COLLECTOR
 2. COLLECTOR
 3. BASE
 4. BASE
 5. EMITTER

**CASE 391-03
 ISSUE C**

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

Mfax is a trademark of Motorola, Inc.

How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

JAPAN: Nippon Motorola Ltd.: SPD, Strategic Planning Office, 4-32-1,
Nishi-Gotanda, Shinagawa-ku, Tokyo 141, Japan. 81-3-5487-8488

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609
– US & Canada ONLY 1-800-774-1848
– <http://sps.motorola.com/mfax>

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

INTERNET: <http://motorola.com/sps>



MRA0510-50H/D