The RF Line

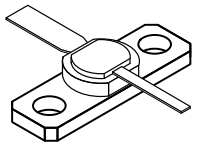
Microwave Power Transistors

MRW2001
MRW2005

Designed primarily for large–signal output and driver amplifier stages in the 1.0 to 2.3 GHz frequency range.

- Designed for Class B or C, Common Base Power Amplifiers
- Specified 28 Volt, 2.0 GHz Characteristics:
  Power Gain — 5.2 to 9.0 dB, Min
  Collector Efficiency — 40%, Min
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

5.2 – 9.0 dB
1.0 – 2.3 GHz
MICROWAVE
POWER TRANSISTORS



CASE 328A–03, STYLE 1
(GP–13)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Base Voltage	V_{CES}	50	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous MRW2001 MRW2005	I_C	 0.25 1.0	Adc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	–65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, RF, Junction to Case MRW2001 MRW2005	$R_{\theta JC}$	 25 8.5	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage		$V_{(BR)CES}$				Vdc
(I_C = 10 mA, V_{BE} = 0)	MRW2001		50	—	—	
(I_C = 40 mA, V_{BE} = 0)	MRW2005		50	—	—	

(continued)

ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS (continued)						
Emitter–Base Breakdown Voltage		$V_{(BR)EBO}$				Vdc
(I_E = 0.2 mA, I_C = 0)	MRW2001		3.5	—	—	
(I_E = 0.5 mA, I_C = 0)	MRW2005		3.5	—	—	
Collector Cutoff Current	MRW2001	I_{CBO}	—	—	0.5	mAdc
(V_{CB} = 28 V, I_E = 0)	MRW2005		—	—	0.5	
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				—
(I_C = 100 mA, V_{CE} = 5.0 V)	MRW2001		10	—	120	
(I_C = 200 mA, V_{CE} = 5.0 V)	MRW2005		10	—	100	
DYNAMIC CHARACTERISTICS						
Output Capacitance	MRW2001	C_{ob}	—	—	4.0	pF
(V_{CB} = 28 V, I_E = 0, f = 1.0 MHz)	MRW2005		—	—	7.0	
FUNCTIONAL TESTS						
Common–Base Amplifier Power Gain		G_{PB}	9.0	—	—	dB
(V_{CE} = 28 V, P_{out} = 1.0 W, f = 2.0 GHz)	MRW2001					
Common–Base Amplifier Power Gain		G_{PB}	8.0	—	—	dB
(V_{CE} = 28 V, P_{out} = 5.0 W, f = 2.0 GHz)	MRW2005					
Collector Efficiency		η	40	—	—	%
(V_{CE} = 28 V, P_{out} = 1.0 W, f = 2.0 GHz)	MRW2001					
(V_{CE} = 28 V, P_{out} = 5.0 W, f = 2.0 GHz)	MRW2005					
Load Mismatch		ψ	No Degradation in Output Power			
(V_{CE} = 28 V, f = 2.0 GHz, Load VSWR = ∞:1, All Phase Angles)						
P_{out} = 1.0 W	MRW2001					
P_{out} = 5.0 W	MRW2005					
Saturated Output Power						W
(V_{CE} = 28 V, f = 2.3 GHz)	MRW2001	$P_{sat}1$	—	1.0	—	
(V_{CE} = 28 V, f = 1.5 GHz)		$P_{sat}2$	—	1.2	—	
(V_{CE} = 28 V, f = 1.0 GHz)		$P_{sat}3$	—	1.3	—	
(V_{CE} = 28 V, f = 2.3 GHz)	MRW2005		—	5.0	—	
(V_{CE} = 28 V, f = 1.5 GHz)			—	6.5	—	
(V_{CE} = 28 V, f = 1.0 GHz)			—	7.5	—	

TYPICAL CHARACTERISTICS

MRW2001

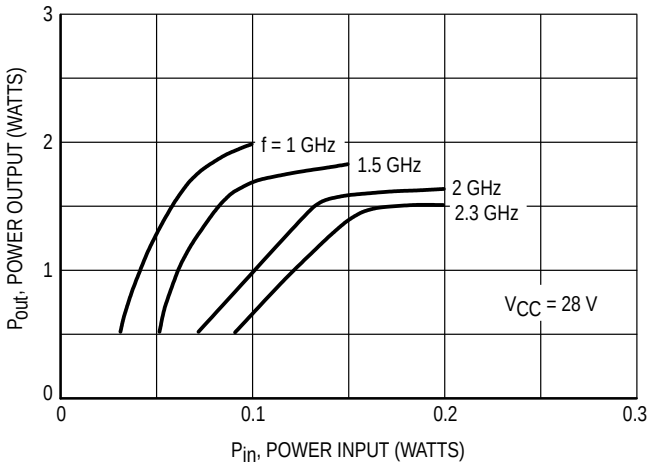


Figure 1. Output Power versus Input Power

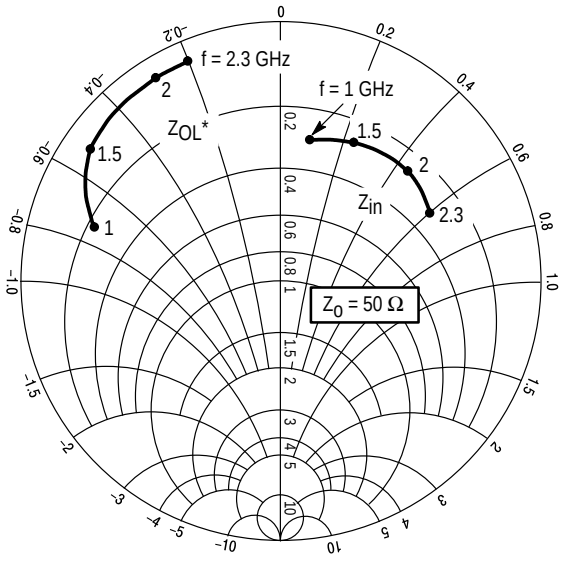


Figure 2. Series Equivalent Input/Output Impedance V_{CC} = 28 V

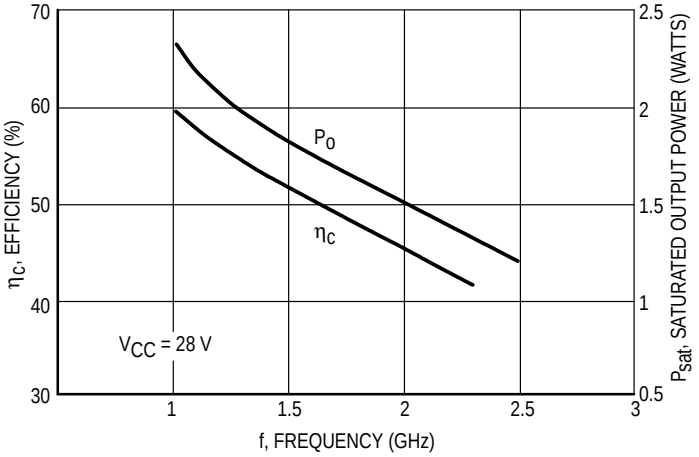


Figure 3. Power Output and Efficiency versus Frequency

TYPICAL CHARACTERISTICS

MRW2005

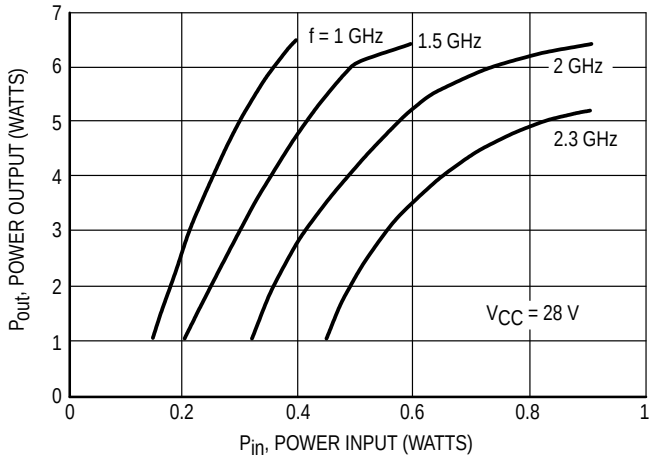


Figure 4. Output Power versus Input Power

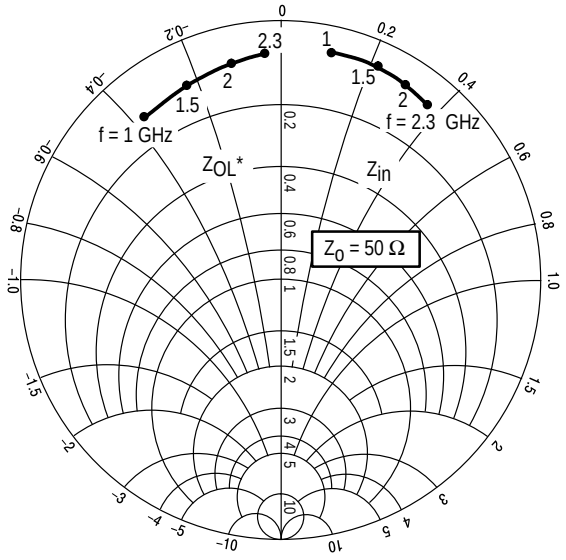


Figure 5. Series Equivalent Input/Output Impedance
V_{CC} = 28 V

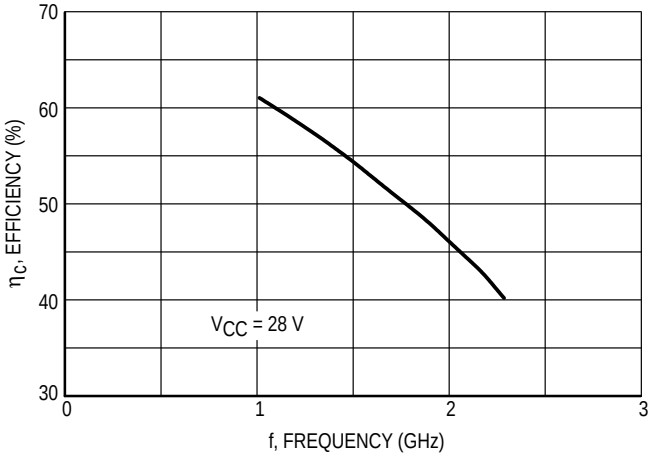


Figure 6. Power Output and Efficiency versus Frequency

The graph shown below displays MTTF in hours x ampere^2 emitter current for each of the “Super 2.0 GHz” devices. Life tests at elevated temperatures have correlated to better than ±10% to the theoretical prediction for metal failure. Sample MTTF calculations based on operating conditions are included on the graph.

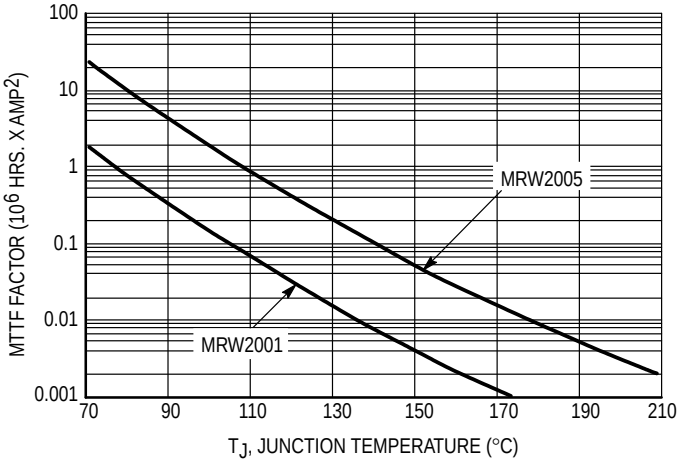
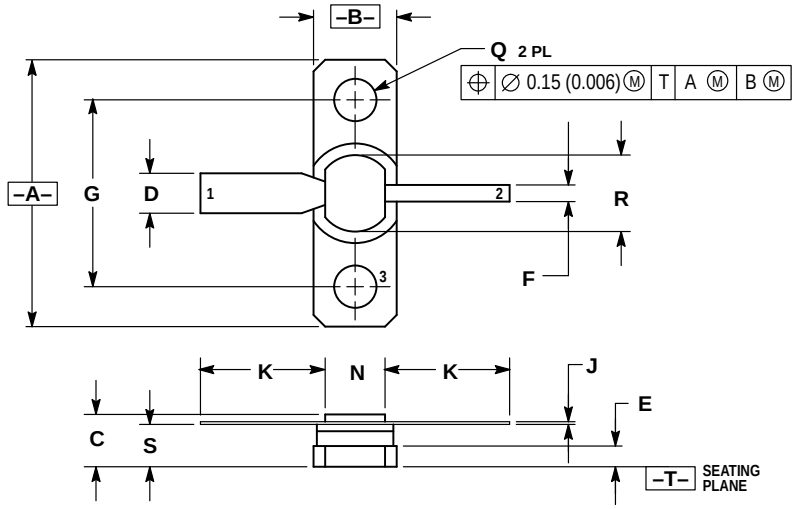


Figure 7. MTTF Factor

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.795	0.805	20.20	20.45
B	0.245	0.255	6.23	6.47
C	0.145	0.170	3.69	4.31
D	0.115	0.125	2.93	3.17
E	0.055	0.065	1.40	1.65
F	0.045	0.055	1.15	1.39
G	0.562 BSC		14.27 BSC	
J	0.003	0.006	0.08	0.15
K	0.260	0.375	6.60	9.52
N	0.175	0.185	4.45	4.69
Q	0.120	0.135	3.05	3.42
R	0.225	0.235	5.72	5.97
S	0.120	0.130	3.05	3.30

STYLE 1:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

CASE 328A–03
ISSUE D

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