MOTOROLA
SEMICONDUCTOR TECHNICAL DATA

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The RF MOSFET Line

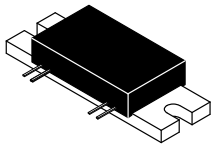
RF Power Field Effect Amplifiers

N–Channel Enhancement–Mode Lateral MOSFETs

MHW1810-1
MHW1810-2

- Specified 26 Volts, 1805–1880 MHz, Class AB Characteristics
  Output Power = 16 Watts CW Typ
  Power Gain = 26 dB Typ @ 10 Watts (MHW1810–1)
  Power Gain = 34 dB Typ @ 10 Watts (MHW1810–2)
  Efficiency = 34% Min @ 10 Watts
- 50 Ω Input/Output System
- Designed for GSM Linearity Requirements

10 W, 1805 – 1880 MHz
RF POWER AMPLIFIER



CASE 301AW–02, STYLE 1

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
DC Supply Voltage		V_S	28	Vdc
DC Bias Voltage		V_{bias}	28	Vdc
RF Input Power	MHW1810–1 MHW1810–2	P_{in}	21 16	dBm
RF Output Power		P_{out}	20	W
Operating Case Temperature Range		T_C	– 10 to +90	°C
Storage Temperature Range		T_{stg}	– 30 to +100	°C

ELECTRICAL CHARACTERISTICS (T_C = +25°C, V_S = 26 Vdc; V_{bias} = 5 Vdc; 50 Ω system, unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Frequency Range		BW	1805	—	1880	MHz
Quiescent Current (P_{in} = 0 mW)		I_{DQ}	100	—	150	mA
Bias Current		I_{bias}	—	—	2	mA
Output Power at 1 dB Compression		P_{1dB}	10	14	—	W
Power Gain (P_{out} = 10 W) (P_{out} = 10 W)	MHW1810–1 MHW1810–2	G_P	24 32	26 34	28 36	dB
Efficiency (P_{out} = 10 W)		η	34	—	—	%
Input VSWR (P_{out} = 10 W)		$VSWR_{in}$	—	—	1.8:1	—
Harmonics at $2f_0$ (P_{out} = 10 W)		H_2	—	—	– 35	dBc
Harmonics at $3f_0$ (P_{out} = 10 W)		H_3	—	—	– 45	dBc
Reverse IMD; P_{out} = 10 W; Preverse = –40 dBc (F1 = F0 ±200 kHz @ –40 dBc)		IMD_r	—	—	– 50	dBc
Load Mismatch Stress Load VSWR = 5:1, All Phase Angles		ψ	No Degradation in Output Power			
Stability (P_{out} = 10 mW to 10 W, $V_S \leq$ 26 Vdc) Load VSWR = 5:1, All Phase Angles		—	All Spurious Outputs More Than 60 dB Below Desired Signal			

NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

EXTREME CASE ELECTRICAL CHARACTERISTICS (T_C = –10 to +85°C, V_S = 23.5 to 26 Vdc, V_{bias} = 3 to 26 Vdc, 50 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	1805	—	1880	MHz
Quiescent Current (P_{in} = 0 mW)	I_{DQ}	100	—	160	mA
Bias Current	I_{bias}	—	—	2	mA
Output Power at 1 dB Compression	P_{1dB}	8	—	—	W
Power Gain Variation for a Given Part (P_{out} = 10 W)	G_P	—	5	6.5	dB
Efficiency (P_{out} = 10 W)	η	32	—	—	%
Input VSWR	$VSWR_{in}$	—	—	2:1	—
Harmonics at $2f_o$	H_2	—	—	– 35	dBc
Harmonics at $3f_o$	H_3	—	—	– 45	dBc
Reverse IMD; P_{out} = 10 W; Preverse = –40 dBc (F1 = F0 ±200 kHz @ –40 dBc)	IMD_r	—	—	– 50	dBc
Load Mismatch Stress Load VSWR = 5:1, All Phase Angles	ψ	No Degradation in Output Power			
Stability (P_{out} = 10 mW to 10 W, V_S ≤ 26 Vdc) Load VSWR = 5:1, All Phase Angles	—	All Spurious Outputs More Than 60 dB Below Desired Signal			

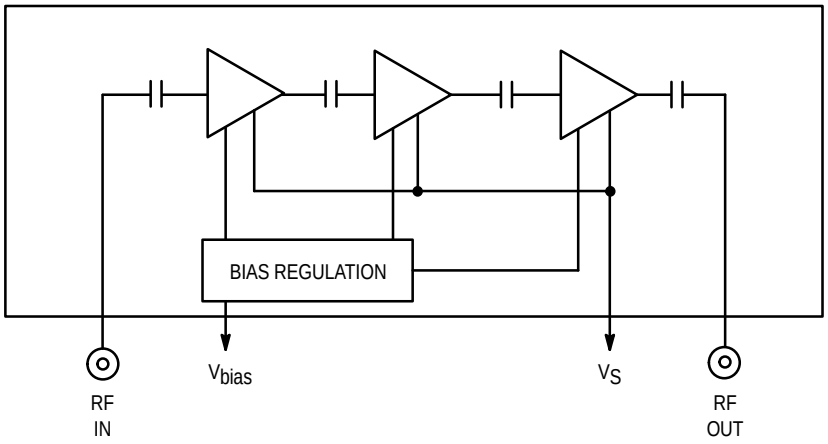


Figure 1. Internal Diagram

TYPICAL CHARACTERISTICS
MHW1810–1

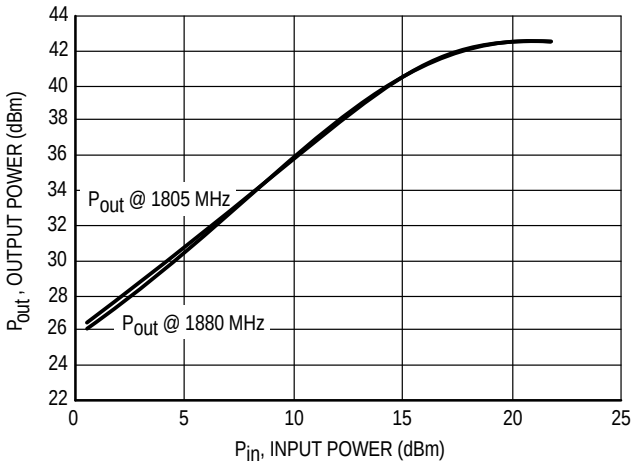


Figure 2. Output Power versus Input Power

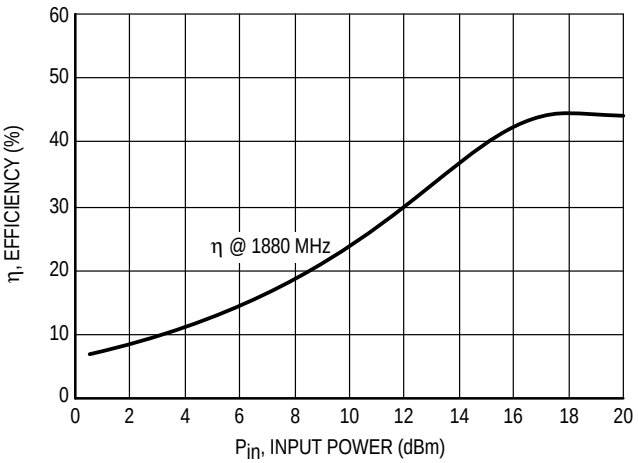


Figure 3. Efficiency versus Input Power

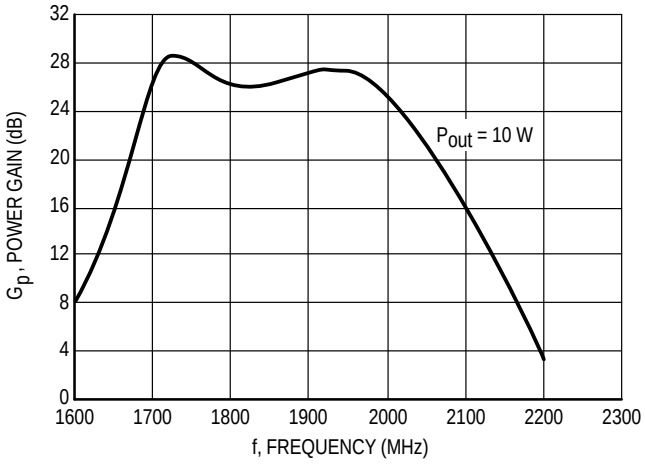


Figure 4. Power Gain versus Frequency

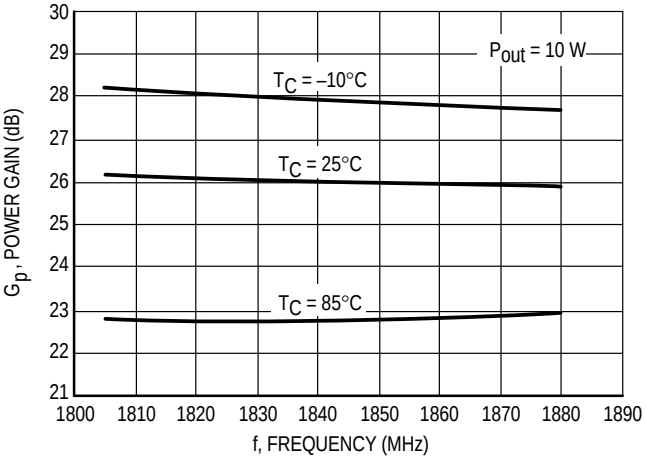


Figure 5. Gain versus Frequency

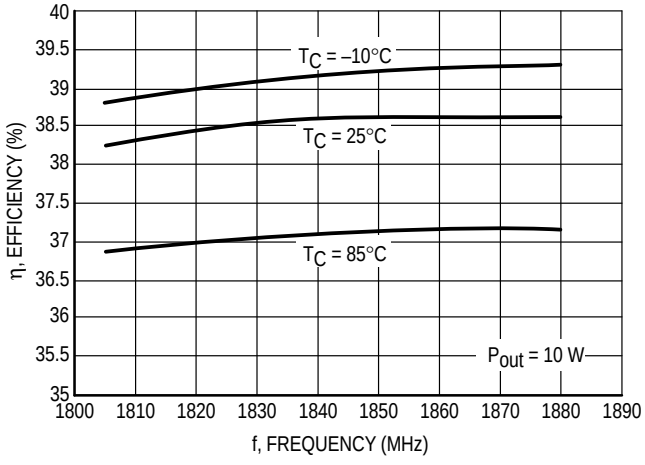


Figure 6. Efficiency versus Frequency

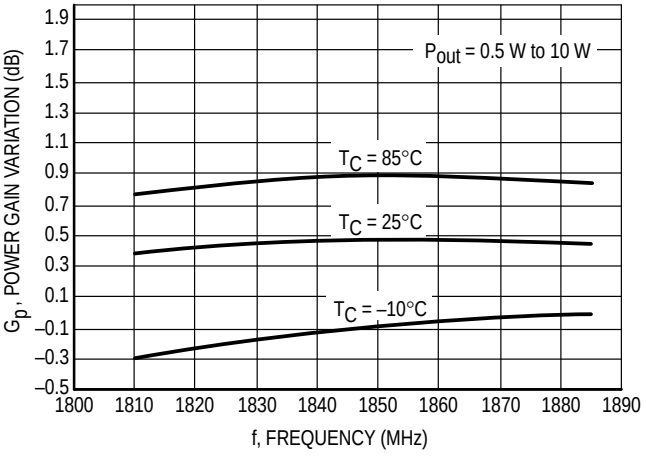


Figure 7. Power Gain Variation versus Frequency

TYPICAL CHARACTERISTICS
MHW1810–1

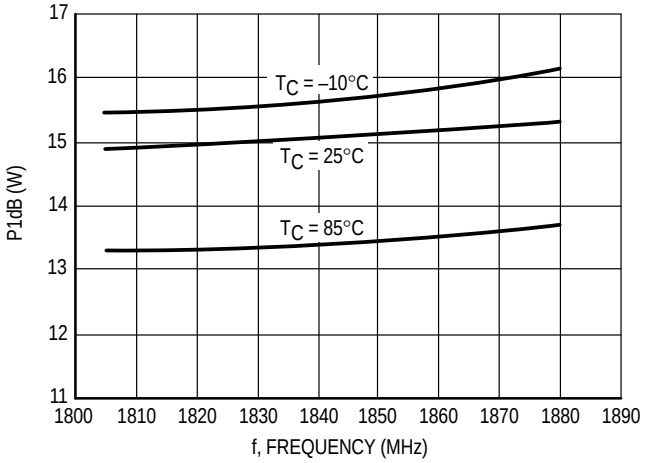


Figure 8. P1dB versus Frequency

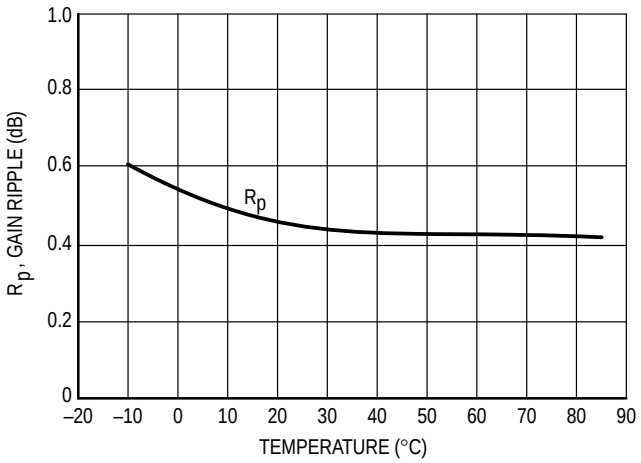


Figure 9. Gain Ripple versus Temperature

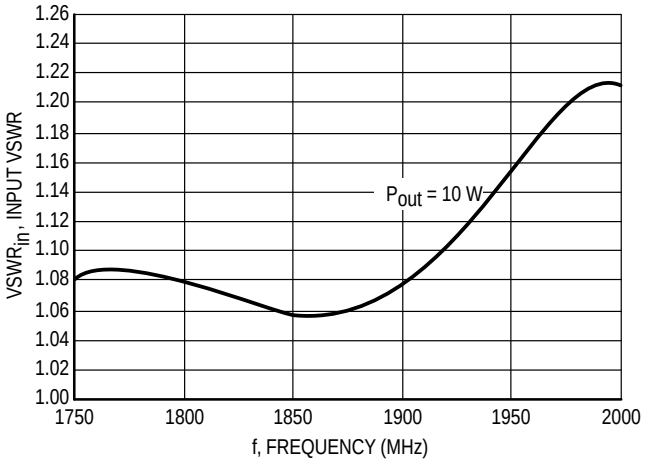


Figure 10. Input VSWR

TYPICAL CHARACTERISTICS
MHW1810–2

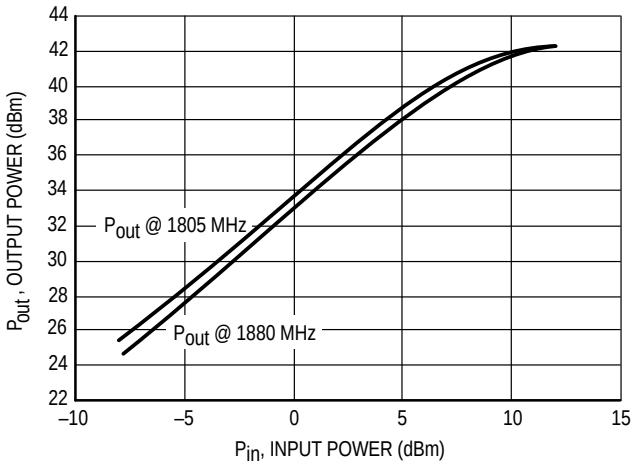


Figure 11. Output Power versus Input Power

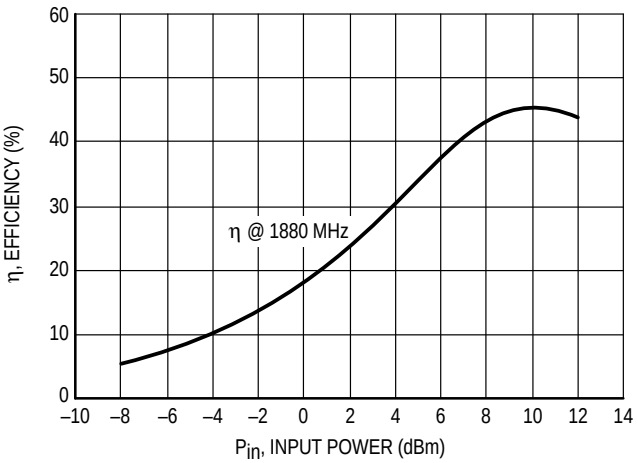


Figure 12. Efficiency versus Input Power

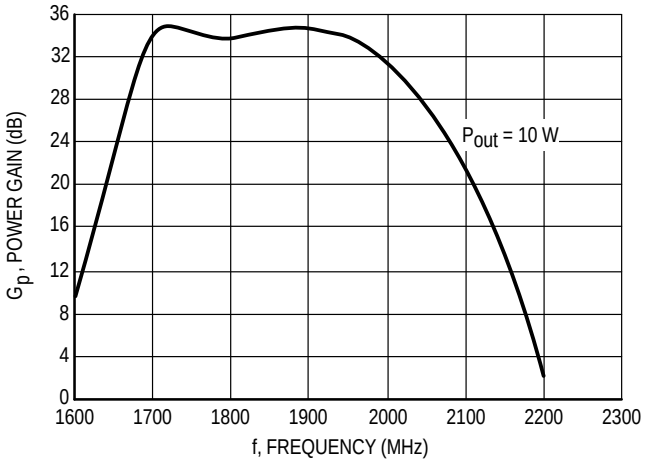


Figure 13. Power Gain versus Frequency

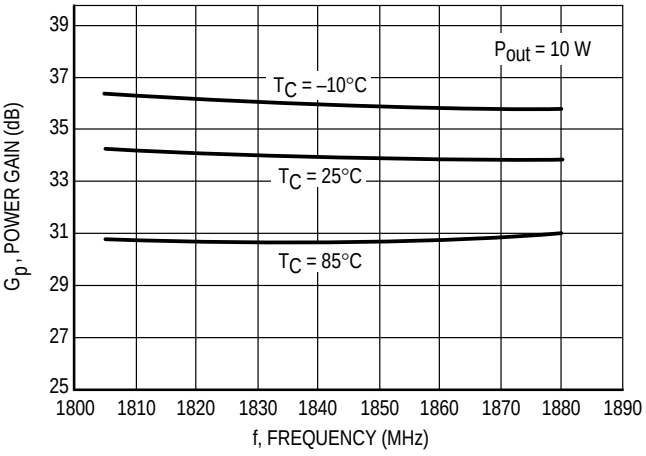


Figure 14. Gain versus Frequency

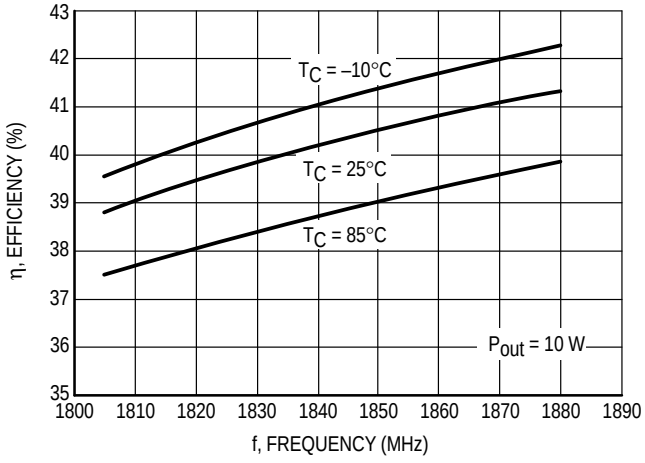


Figure 15. Efficiency versus Frequency

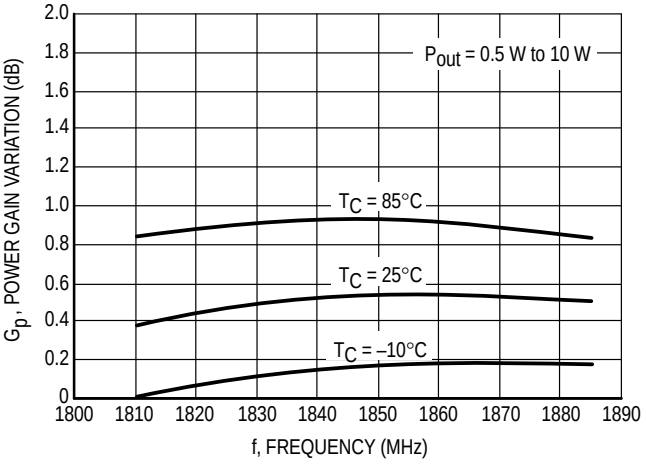


Figure 16. Power Gain Variation versus Frequency

TYPICAL CHARACTERISTICS
MHW1810–2

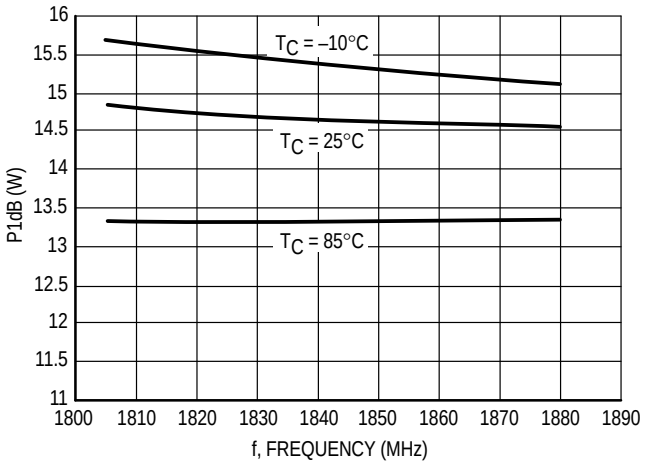


Figure 17. P1dB versus Frequency

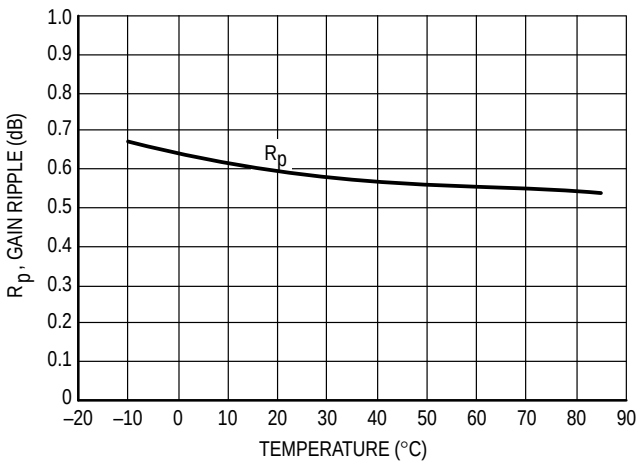


Figure 18. Gain Ripple versus Temperature

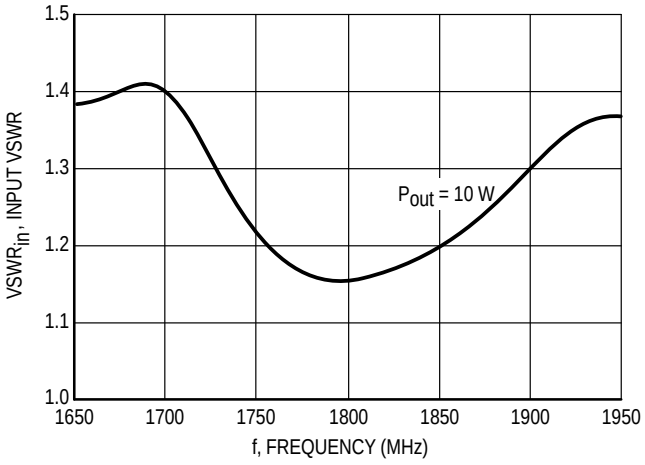
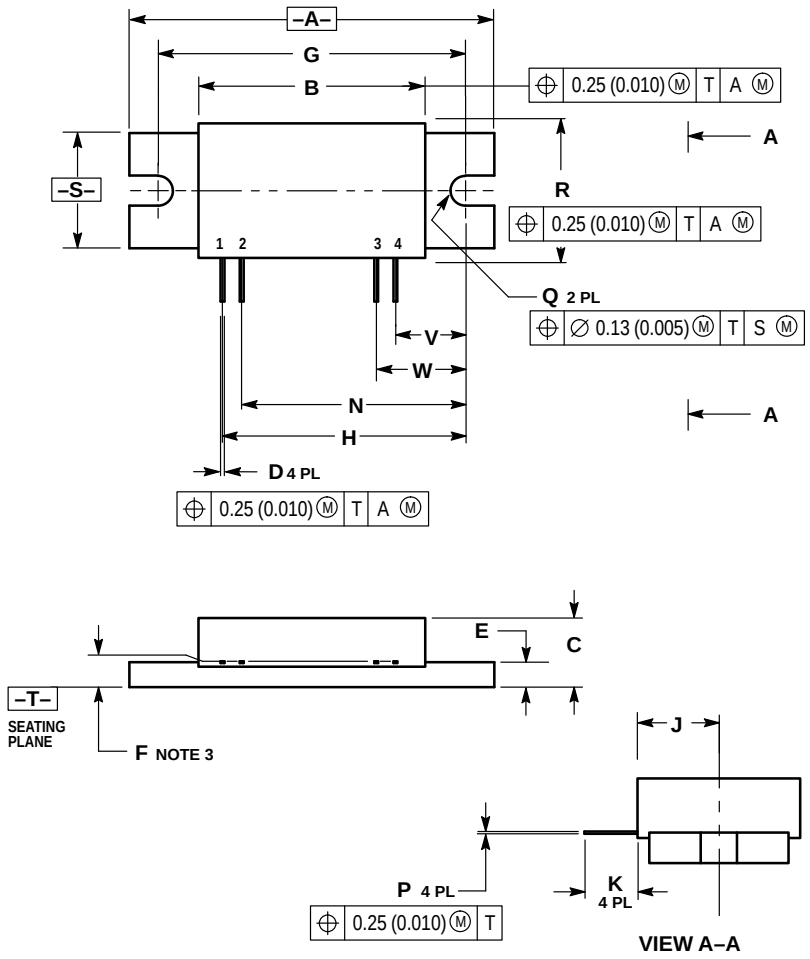


Figure 19. Input VSWR

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION F IS FROM THE BOTTOM OF HEATSINK TO THE TOP OF THE LEAD.
4. DIMENSION P TO BE MEASURED AS LEAD EXITS COVER.
5. FLANGE FLATNESS 0.038 (0.0015) MAXIMUM CONVEX, 0.063 (0.0025) MAXIMUM CONCAVE.
6. ADHESIVE MATERIAL SHALL BE INCLUDED IN THE DIMENSIONS LISTED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.890	1.910	48.01	48.51
B	1.170	1.190	29.72	30.22
C	0.350	0.376	8.89	9.55
D	0.018	0.022	0.46	0.55
E	0.115	0.135	2.92	3.42
F	0.170 BSC		4.31 BSC	
G	1.600 BSC		40.64 BSC	
H	1.265 BSC		32.13 BSC	
J	0.325	0.375	8.25	9.52
K	0.225	—	5.72	—
N	1.165 BSC		29.59 BSC	
P	0.010 REF		0.25 REF	
Q	0.150	0.160	3.81	4.06
R	0.685	0.705	17.40	17.90
S	0.598	0.612	15.18	15.54
V	0.365 BSC		9.27 BSC	
W	0.465 BSC		11.81 BSC	

STYLE 1:
PIN 1. RF IN
2. V BIAS
3. V SUPPLY
4. RF OUT

CASE 301AW–02
ISSUE B

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