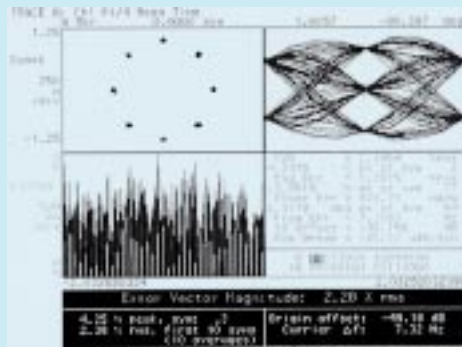


# Power Amplifiers

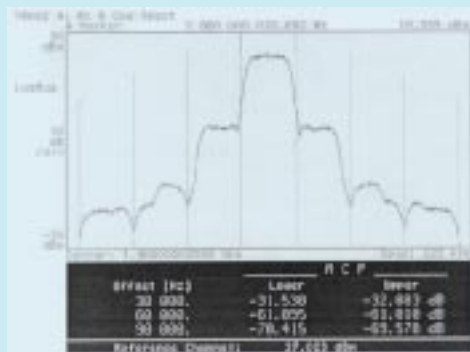


## SA1070 TDMA 8-Watt 1.93 GHz to 1.99 GHz Linear Power Amplifier Module

- **40 dB Gain**
- **P1dB: +39 dBm**
- **OIP3: +49 dBm**



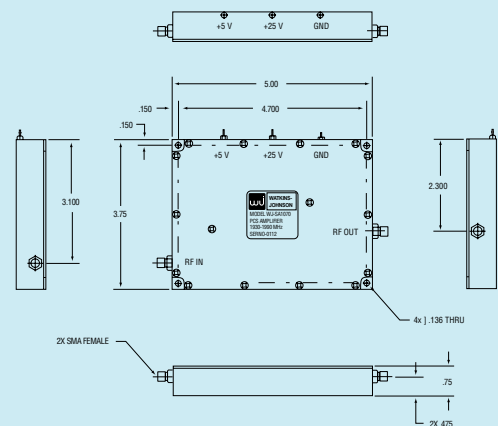
Output modulation characteristics with a +37 dBm (5-watt) NADC  $\pi/4$  DQPSK output. This HP 89441A display includes a constellation diagram, the samplings of vector error, and the EVM (error vector magnitude) calculations from averaged samplings of the signal.



Amplifier output spectrum with a +37 dBm (5-watt) NADC  $\pi/4$  DQPSK output. The first and second adjacent channels are at 30 kHz and 60 kHz offsets. The first adjacent channels of our measurements do not overlap with the primary channel.

Watkins-Johnson's SA1070 Power Amplifier provides exceptional linearity and low vector error for TDMA digital modulation applications. Utilizing WJ's GaAs amplifiers driving bipolar transistors in the class A output stage, the SA1070 achieves a very high output third-order intercept point combined with superior efficiency.

### OUTLINE DRAWING



The Wireless Edge™

# Power Amplifiers

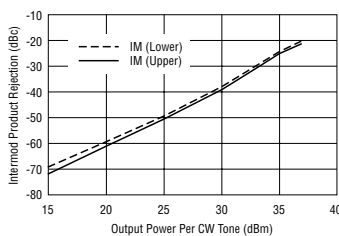
## SA1070

### TDMA 8-Watt 1.93 GHz to 1.99 GHz Linear Amplifier Power Module

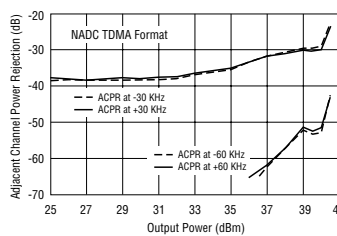
#### Specifications

Parameters	Typical Level	Specified Limits
Frequency		1.930 -1.990 GHz
P <sub>out</sub> at 1 dB Gain Compression (Min.)	+39 dBm	+38 dBm
Gain (-30° < T < +70°C)		
Minimum Gain		39.0 dB
Maximum Gain		41.0 dB
Gain Variation <sup>1</sup> vs. Frequency over 1.930 to 1.990 GHz at fixed temperature (-30° < T < +70°C) (Max.)		±0.75 dB
NADC Parameters (with P <sub>out</sub> ≥ 39 dBm, -30° < T < +70°C)		
Output Power	+39 dBm	+39 dBm
ACP (30 kHz offset)	-29 dBc	-25 dBc
ACP (60 kHz offset)	-57 dBc	-45 dBc
Error Vector Magnitude	2.9%	4.0%
Magnitude Error	1.7%	2.5%
Phase Error	1.3 degrees	1.7 degrees
3rd Order Two-Tone Output Intercept Point, measured with +25 dBm per tone, T = 25°C (Min.)	+49 dBm	
Spurious 10 kHz to 10 GHz (with a +40 dBm output at 1,960 MHz) <sup>2</sup> (Min.)	<-70 dBm	<-50 dBm
Harmonic Output (with +40 dBm TDMA output at the fundamental) (Max.)		
2nd harmonic	-17 dBm	-13 dBm
3rd harmonic	-17 dBm	-13 dBm
Noise Figure (Max.)	5.0 dB	6.0 dB
Input and Output Impedance		50 Ohm
Return Loss, 1.930 to 1.990 GHz (Min.)		
Input	22 dB	17 dB
Output	18 dB	15 dB
Load Mismatch Sustainable without Damage <sup>3</sup> (Pin ≤ -5 dBm Vsupply ≤ +25.0 Vdc)		3.0:1
Stability, no spurious output above -50 dBm		Unconditionally stable for all loads
Supply Voltages		+5 and +25 Vdc
Maximum Supply without Damage		
+25 Volt Supply		+26.5 Vdc
+5 Volt Supply		+7 Vdc
Maximum DC Current		
+25 Vdc Supply	1850 mA	2000 mA
+5 Vdc Supply	505 mA	560 mA
Weight: 390 grams (13.8 oz.)		
DC Power Dissipation (Max.)		
+25 Vdc Supply		50 Watts
+5 Vdc Supply		2.8 Watts
Baseplate Temperature Range <sup>4</sup>	-30 to +70°C	
Size (Refer to interface control drawing WJ-299010SK)	0.75" (H) 3.75" (W) 5.00" (L)	
RF Connectors	SMA Female	

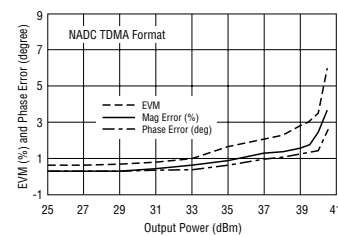
**Intermodulation Suppression vs. Output Power Per Tone**



**ACP Rejection vs. Output Power**



**EVM vs. Output Power**



Note: 1. Gain variation is relative to gain at 1.960 GHz (center frequency). 2. Spurious search excludes 1,930 MHz to 1,990 MHz and harmonics of the primary signal. 3. This is to be a temporary condition-not a normal mode of operation. 4. Applies to all specified parameters unless otherwise noted.

Notes: TDMA spectral regrowth is measured with a spread spectrum input from a Marconi 2051 Signal Generator selecting the "Digital/Cellular/NADC" modulation system that produces π/4 DQPSK modulation with 24.30 kHz symbol rate and Root Nyquist filtering with alpha = 0.35. This unit is to be mounted on a ground plane and thermal heat sink, with a maximum heat sink temperature of +85°C.

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