



# Application Note

## AP603 450-800 MHz Reference Design – Compact Design



### Summary

The AP603 is a high dynamic range power amplifier in a lead-free/RoHS-compliant 5x6mm power DFN SMT package. On the product's datasheet, the amplifier is shown as having an operational frequency range between 800 – 2400 MHz. This application note examines the performance of the AP603 tuned for 450-800 MHz, one of the bands for public safety applications.

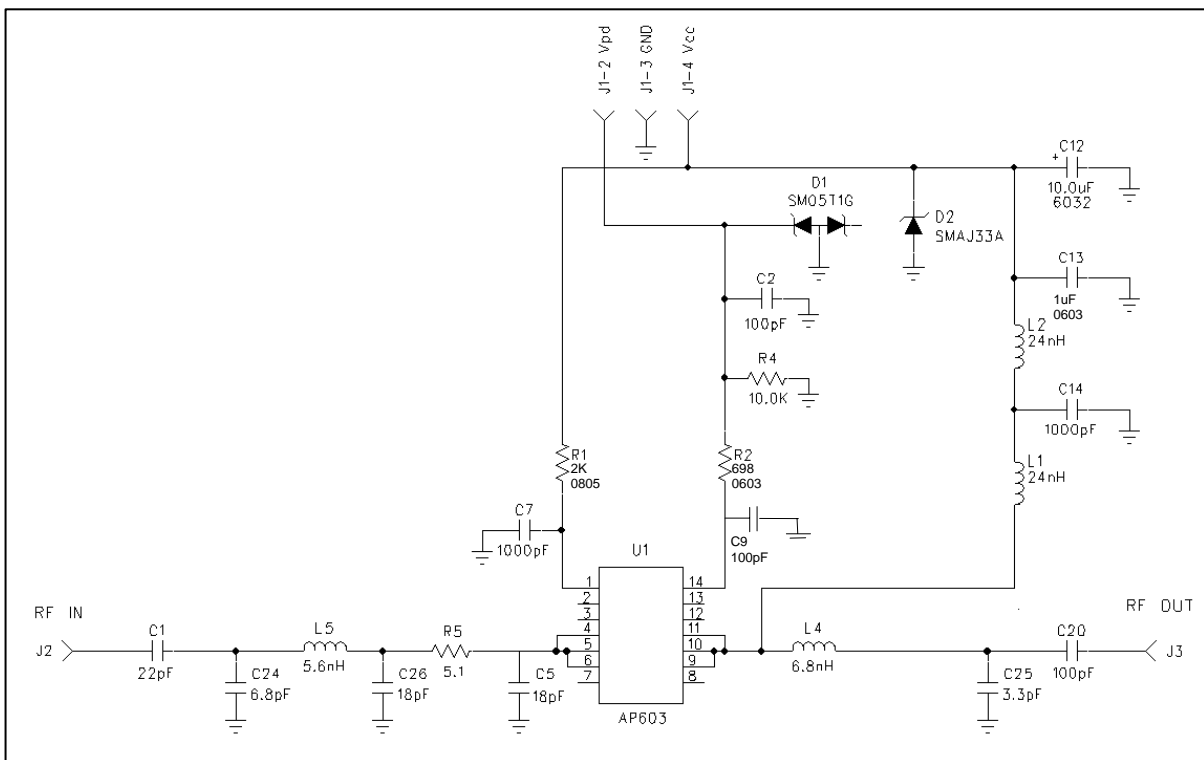
The circuit has been updated to make it compact using the same evaluation board. Reduced the bias lines by moving them closer to the device. Using inductor instead of quarter-wavelength bias line provides the same performance as earlier. Removed the C10 and C11 capacitors from Vpd line for adjusting the time constant as specified by customer. Also, the input and output blocking capacitors were moved next to the matching components.

The compact circuit provides the same performance in this frequency range, the amplifier has 16 dB gain, good gain flatness, +39 dBm P1dB, and IMD3 greater than -41dBc at average output power of 27 dBm.

### Typical Measured RF Performance

Frequency (MHz)	Units	450	550	650	750	800
Small Signal Gain	dB	16.2	16.0	15.7	15.9	16.2
Input Return Loss	dB	-7.9	-16.9	-16.4	-16.0	-15.4
Output Return Loss	dB	-9.6	-9.2	-10.3	-10.3	-8.1
IMD3 @ 24 dBm/tone ( $\Delta f=5\text{MHz}$ )	dBc	-41.6	-43.3	-45.3	-47.4	-47.1
Output P1dB	dBm	39.4	39.4	39.2	39.3	39.3
Quiescent Current, Icq	mA	172				
Vpd	V	+5				
Vcc, Vbias	V	+28				

### Board Schematic



Specifications and information are subject to change without notice.



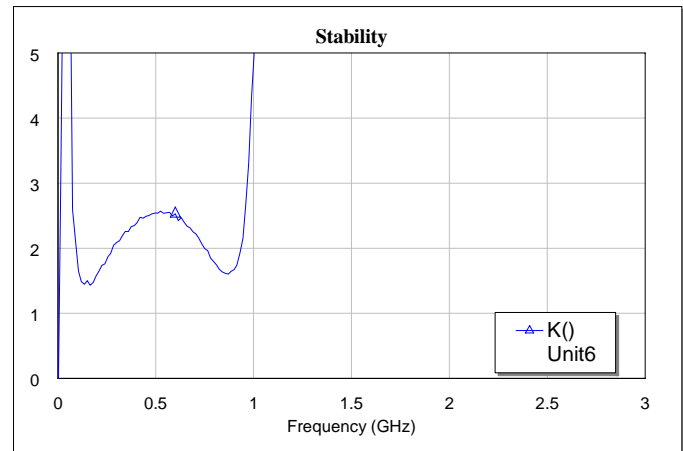
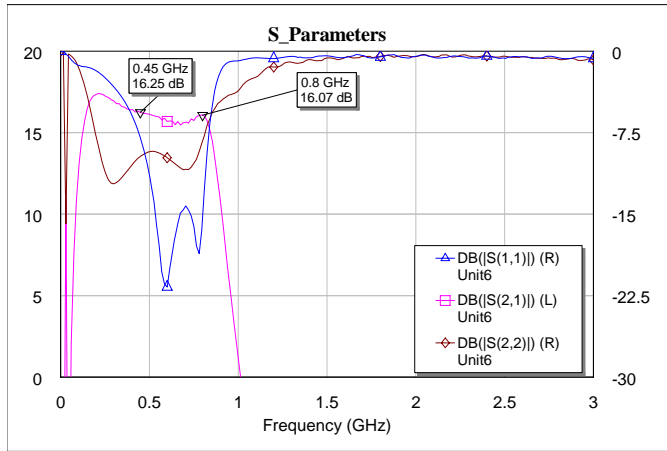


# Application Note

## AP603 450-800 MHz Reference Design – Compact Design



### Small Signal Performance



### BOM

Marking	Part Description
D1	DIODE. SI. ZENER. SOT23. SERIES
D2	DIODE. SI. ZENER. NONSTD. SERIES
L1, L2	IND. 24NH. 5PCT. 50V CER CORE. SMD. 0603 WIREWOUND
L4	IND. 6.8NH. 10PCT. MULTILAYER. SMD. 0603. 3750MHZ
L5	IND. 5.6NH. +/-0.3NH. MULTILAYER. SMD. 0603. 4350M
C12	CAP. 10.0UF. 10PCT. 35V. TANT. SMD. 6032
C13	CAP. 1UF. 10PCT. 50V. X7R. SMD. 0603
C14, C7	CAP. 1000 PF. 5 PCT. 50V. NPO/COG. SMD. 0603
C9, C2, C20	CAP. 100PF. 5PCT. 50V. COG. SMD. 0603
C1	CAP. 22PF. 5PCT. 50V. NPO/COG. SMD. 0603
C5, C26	CAP. 18PF. 5PCT. 50V. NPO/COG. SMD. 0603
C25	CAP. 3.3PF. +/-0.05PF. 50V. ACCU-P. SMD. 0603. ROH
C24	CAP. 6.8PF. +/-0.1PF. 50V. ACCU-P. SMD. 0603
R4	RES. 10.0K. 5PCT. 1/16W. CHIP. SMD. 0603
R1	RES. 2.0K. 1PCT. 1/10W. CHIP. SMD. 0805
R2	RES. 698. 1PCT. 1/16W. CHIP. SMD. 0603
R5	RES. 5.1. 5PCT. 1/16W. CHIP. SMD. 0603

Specifications and information are subject to change without notice.