# RF MODULATOR

# MAIN FEATURES :

- **Broadband frequency: DC-11 GHz**

- **LNA embedded to boost signal from Waveform Generator**

- **No loss in the DC-6 GHz range**

- **Insertion Loss <7dB in the 6-11 GHz band**

- **Configurable pulse rise/fall timings**

- **Rise and Fall time down to 20ns**

- **High isolation**

- **High Pulse-Repetition Frequency**

- **Compact design**

- **2.92mm connectors**

- **USB Powered (USB to Micro-USB cable included)**

*The RF Switch Modulator provides a modulated signal with controlled rise and fall time.*

| | Min | Max | Unit |
|---|---|---|---|
| Frequency | DC | 11 | GHz |
| Input Power | | 10 | dBm |
| Insertion Low DC-6GHz | No Loss | | |
| 6-11 GHz | | 7 | dB |
| Isolation on/off | 56 | | dB |
| Pulse Repetition Frequency | DC | 12 | MHz |
| Rise/Fall Time | 5/10 | | ns |

*This wideband signal can be used for different applications*

➤ *High Power Pulsed Load pull measurements*

➤ *Pulsed measurements using a Vector Network analyzer*

# Application example 1

## LDMOS Load-Pull Characterization

AMCAD SW1401A RF Modulator has been developed to provide pulse generation to systems lacking this capability or requiring control of the pulse's rise and fall time, which is useful for LDMOS technology characterization.

This RF Modulator is focused on the DC 6GHz range, offering no loss in this band, and allows going up to 11GHz.

**IVCAD ™ module MT930C** offers a modern and efficient methodology for VNA-based load-pull measurement to characterize a component.

With the Arbitrary Waveform/Function Generator's help, the SW1401A RF Modulator converts a CW RF signal into a Pulsed RF signal with the desired shape.
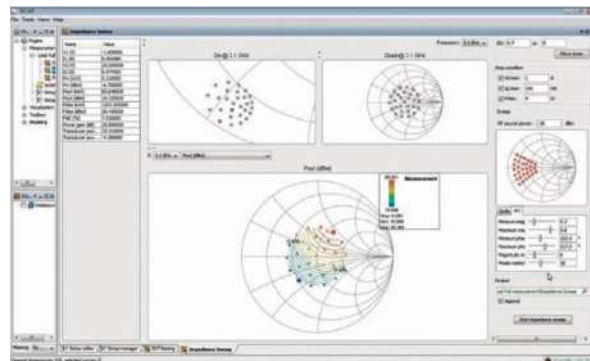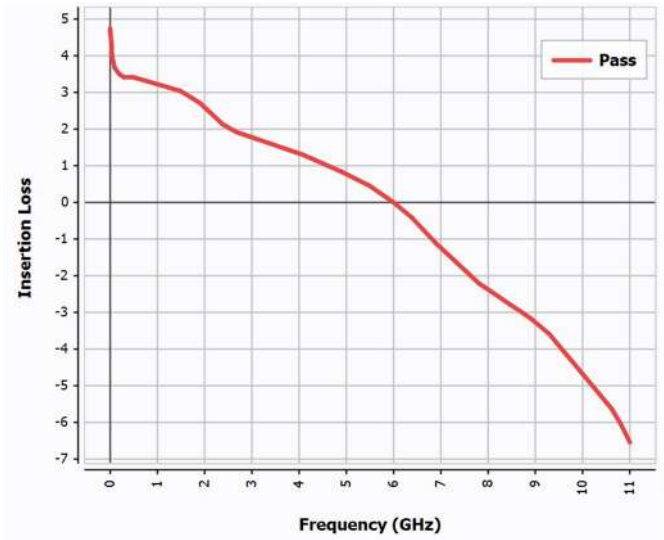
Modulated signal can be as much a square pulse with straight edges up to a pulse with long smooth slopes, specially adapted to LDMOS technology as it avoids current and power rushes.
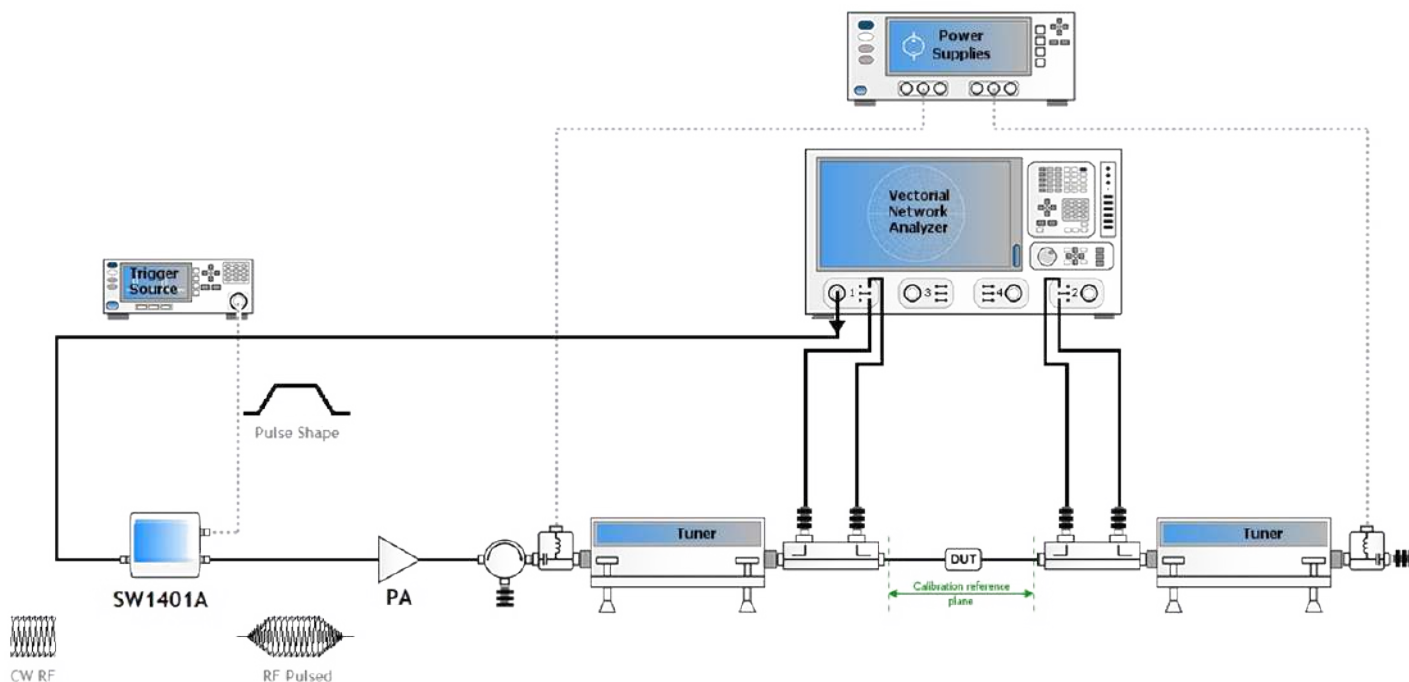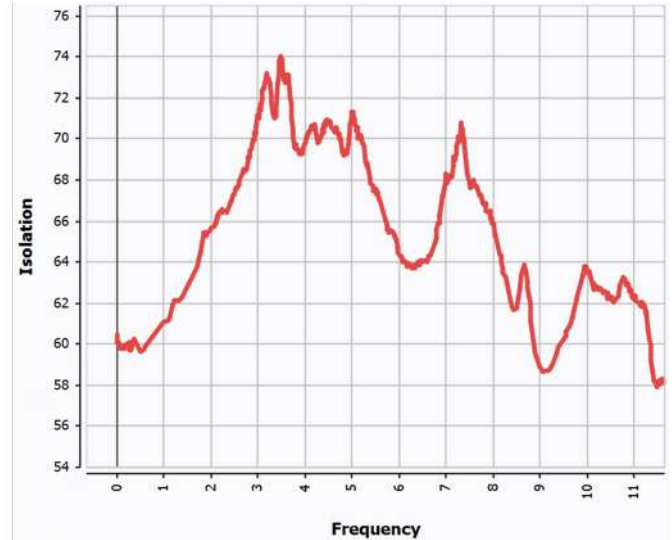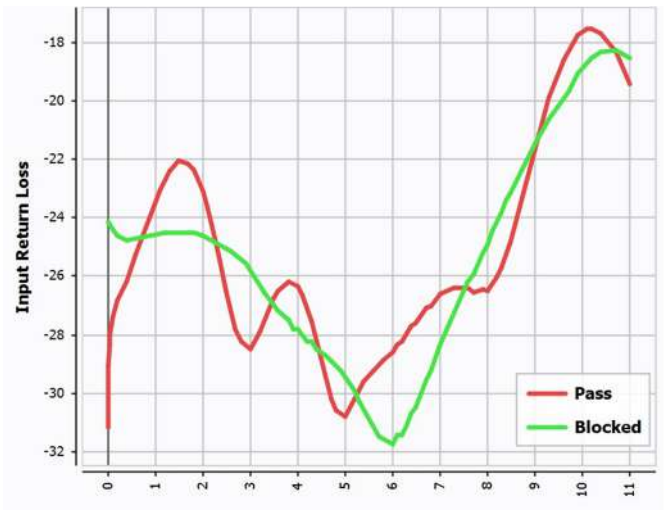
*Load-Pull setup with SW1401A*

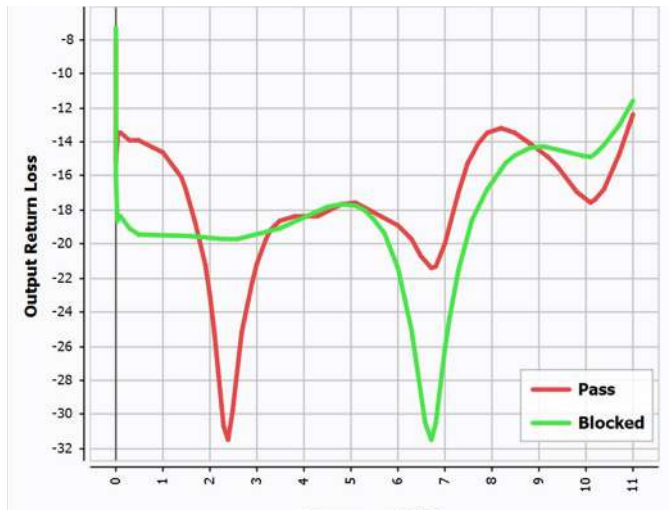# Measurement Example

### Insertion Loss vs. Frequency



### Isolation vs. Frequency



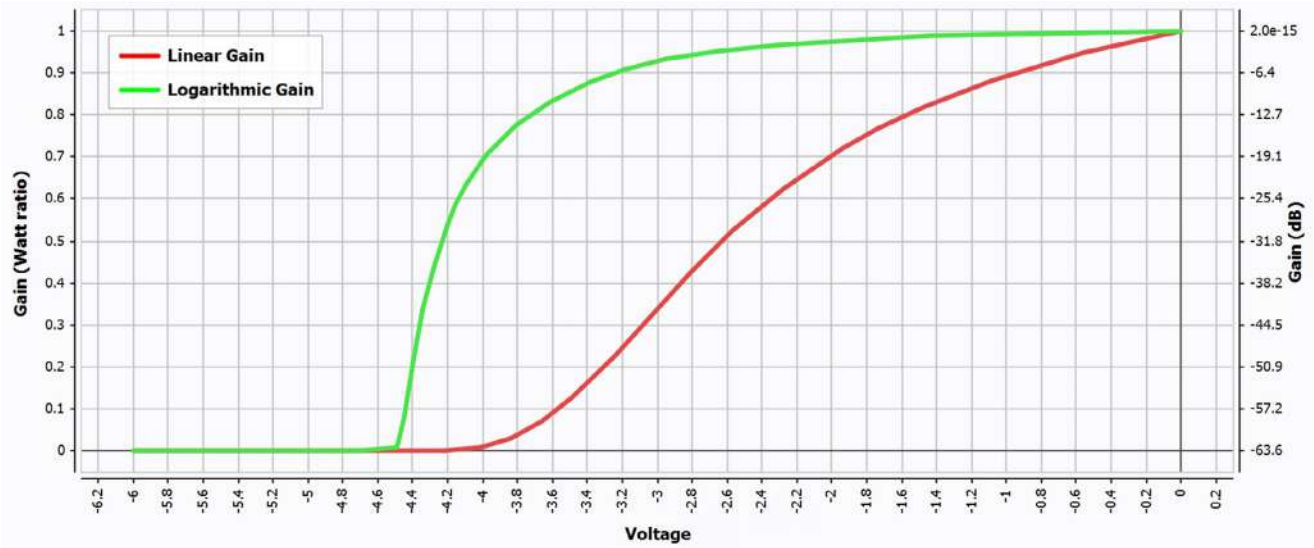### Input Return Loss



### Output Return Loss

# Measurement Example

*VIN (control) vs. Output Gain (Linear and Logarithmic)*

# Specifications Table

| | Symbol | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| **USB Power Supply** | | | | | |
| Voltage | $V_{CC}$ | 4.9 | 5 | 5.2 | V |
| Current | $I_{CC}$ | | 82 | 90 | mA |
| **Power** | | | | | |
| Input power[1] | $P_{IN}$ | | 10 | | dBm |
| Absolute Input power[1] | $P_{IN\_Abs}$ | | 27 | | dBm |
| **Insertion loss** 10MHz 6GHz 11GHz | IL | | -5 (gain) 0 7 | | dB dB dB |
| **Input Return loss** 10MHz to 6GHz 6GHz to 11GHz | $R_{LIN}$ | | | -22 -16 | dB dB |
| **Isolation ON/OFF** DC to 11GHz | | 56 | | | dB |
| **Linearity[2]** 2nd Harmonic 3rd Harmonic | | 40 65 | | | dBc dBc |
| **Timings** | | | | | |
| Pulse Repetition Frequency[3] | PRF | DC | | 12 | MHz |
| Rise time (10% to 90% RF LinMag) | $t_{RISE}$ | 5 | | | ns |
| Fall time (90% to 10% RF LinMag) | $t_{FALL}$ | 10 | | | ns |
| Delay (50% $V_{IN}$ to 10/90% RF LinMag) | $t_{ON}$ $t_{OFF}$ | | | 30 15 | ns ns |
| **Control** | | | | | |
| Voltage range | $V_{IN}$ | -5 | | 0 | V |
| Voltage fully OFF | $V_{INL}$ | -6 | -5 | -4.7 | V |
| Voltage fully ON | $V_{INH}$ | 0 | 0 | 0.3 | V |
| **Temperature** | | | | | |
| Operating T° | $T_{OP}$ | -40 | | 65 | °C |
| w/o case | | -40 | | 85 | °C |
| **Mechanics** | | | | | |
| Height | h | | 18.8 | | mm |
| Length | L | | 74 | | mm |
| Width | w | | 67 | | mm |
| Weight | W | | 100 | | g |

[1] "Input power" is the power range for normal use in the linear zone while "Absolute Input power" is the power range without damaging the RF.
[2] Linearity is specified for PIN = -5 dBm, [3] Pulse-Repetition Frequency is specified in working area with no isolation deterioration.

## Mechanical Dimensions

- **Weight :** *100 g*
- **Dimension  :** *mm*
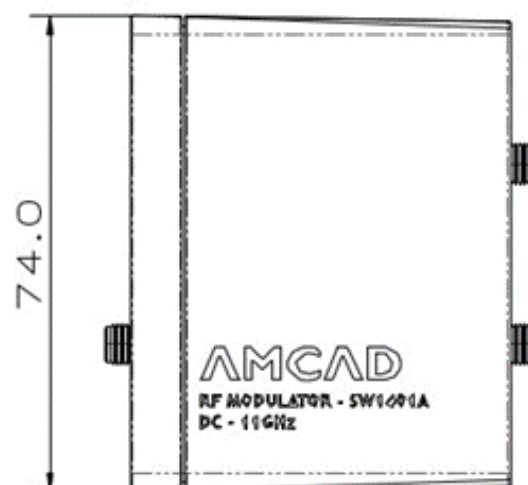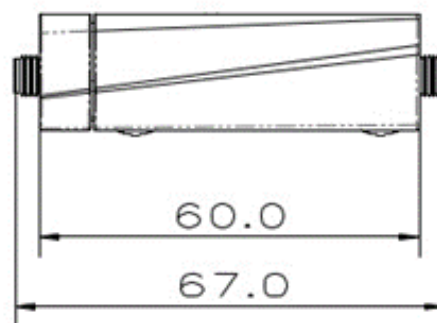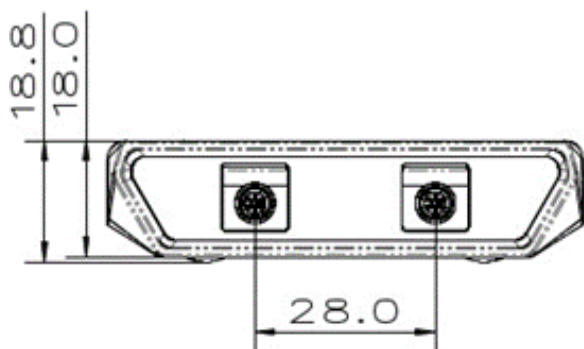
# Warranty

Any AMCAD product comes with a two-year parts and labor warranty, when returned to our workshops. A phone support service is also available for the same period.

At the end of the initial two-year period, a further contract can be subscribed, including:

- a preventive functional check and calibration of the modules (onsite or in our workshop)
- a further two-year warranty period

# Quality Regulations & Environment

AMCAD Systems and all modules are compliant to the applicable European directive and hold the CE mark.

- Products are designed and manufactured in France.
- Serial number-based life cycle management
- All products are 100% tested (test reports on demand)
- AMCAD only uses RoHS compliant components and does not use substances banned by the COSHH regulation.

- AMCAD complies with the relevant national regulations related to the safety and health of its employees against hazardous substances.
- As we are always seeking to improve our products, the information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice.

# CONTACT US

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