

# DR-VE-10-MO Preliminary specification

## SPECIFICATION

The DR-VE-10-MO is a non-inverting VERSatile RF amplifier module designed for analog, pulse and digital applications up to 10 GHz. The driver features:

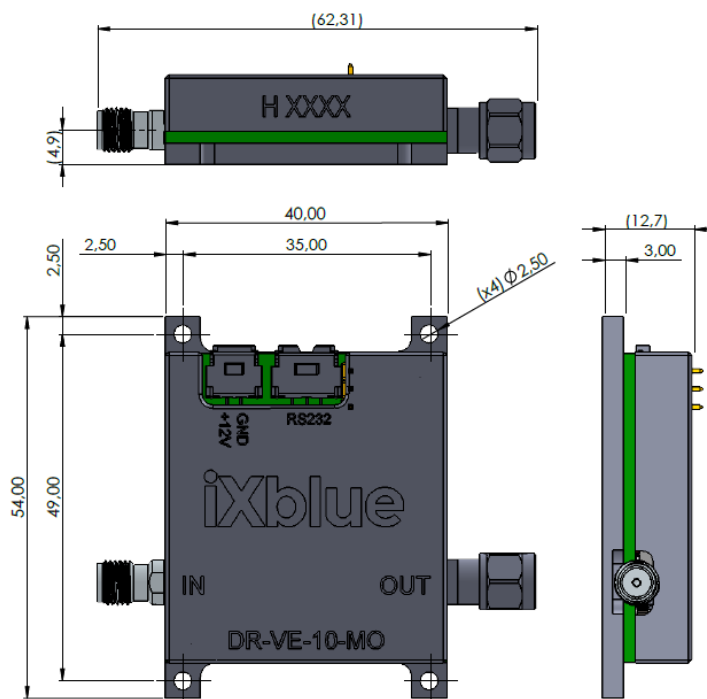
- Digital application up to 14 Gb/s (DC-block modifiés), output voltage up to 8 Vpp in standard mode, 11.5 Vpp in high output mode (Modif Résistances Carte Alim).
- Pulse application from 70 ps to 200 ns, Linear pulse amplification
- Analog application up to 21 dBm ( $f < 10$  GHz).

The following table is a summary of both specifications and measurements. All specifications given at 25°C.

| Parameter                                | Symbol     | Unit     | Min  | Typ      | Max       | Conditions   |
|--|------------|----------|------|----------|-----------|--|
| Impedance                                | $Z_0$      | Ohm      | -    | 50       |           | -  |
| Low Frequency 3dB Point                  | $f_{LOW}$  | kHz      | -    | 30       | 50        | -  |
| High Frequency 3dB Point                 | $f_{HIGH}$ | GHz      | 11   | 12       | -         | -  |
| Small Signal Gain                        | $S_{21}$   | dB       | 28   | 30       | -         | -  |
| Gain ripple                              | -          | dB       | -    | -        | $\pm 1.5$ | $f < 12$ GHz   |
| Input Return Loss                        | $S_{11}$   | dB       | -    | -        | -10       | $f < 20$ GHz   |
| Output Return Loss                       | $S_{22}$   | dB       | -    | -        | -10       | $f < 19$ GHz   |
| Isolation                                | $S_{12}$   | dB       | -    | -        | -60       | $f < 20$ GHz   |
| <b>ANALOG MODE</b>                       |            |          |      |          |           |  |
| Output Power 1 dB Compression            | $P_{1dB}$  | dBm      | -    | 21<br>19 |           | 0 - 10 GHz<br>10 - 16 GHz  |
| Saturated Output Power                   | $P_{sat}$  | dBm      | -    | -        | 23        | $f < 10$ GHz   |
| Input power                              | $P_{in}$   | dBm      | -    | -        | 0         | -  |
| Noise Figure                             | NF         | dB       | 2    | -        | 4         | 2 - 10 GHz   |
| Delay Time                               | $t_d$      | ps       | -    | 450      | -         | -  |
| <b>PULSE MODE</b>                        |            |          |      |          |           |  |
| Pulse Width                              | PW         | s        | 70 p | -        | 200 n     | Positive and Negative behavior                                   |
| Pulse Repetition Frequency               | PRF        | Hz       | 10   | -        | 1 G       | Depending on duty cycle  |
| Input Pulse Amplitude                    | $V_{in}$   | $V_{pp}$ | -    | 0.18     | 0.35      | $V_{in} < 0.15 V_{pp}$ for linear operation                      |
| Rise / Fall Time                         | $t_r/t_f$  | ps       | -    | 24/24    | 28/28     | 20%...80%  |
| Output Pulse Amplitude (user adjustable) | $V_{out}$  | $V_{pp}$ | -    | -        | 8         | $V_{in} \sim 0.2 V_{pp}$   |
| <b>DIGITAL MODE</b>                      |            |          |      |          |           |  |
| Data Rate                                | -          | Gb/s     | 0.1  | -        | 10<br>14  | Standard<br>DC-block modifiés                                    |
| Input Eye Amplitude                      | $V_{in}$   | $V_{pp}$ | -    | 0.2      | 1         | <b><math>V_{in} &lt; 0.12 V_{pp}</math> for linear operation</b> |
| Output Eye Amplitude (user adjustable)   | $V_{out}$  | $V_{pp}$ | 2.5  | 6        | 8         | $V_{in} \sim 0.2 V_{pp}$   |



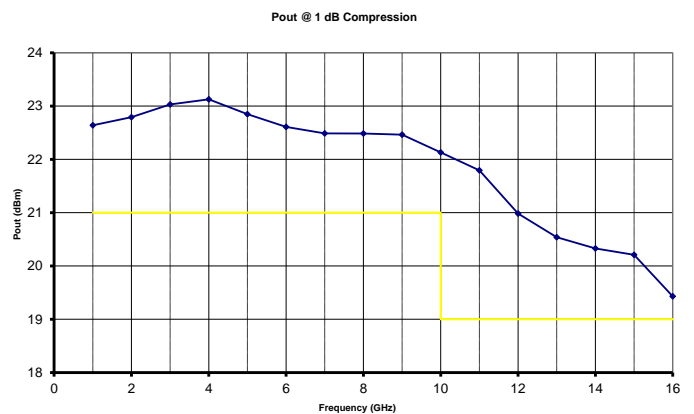
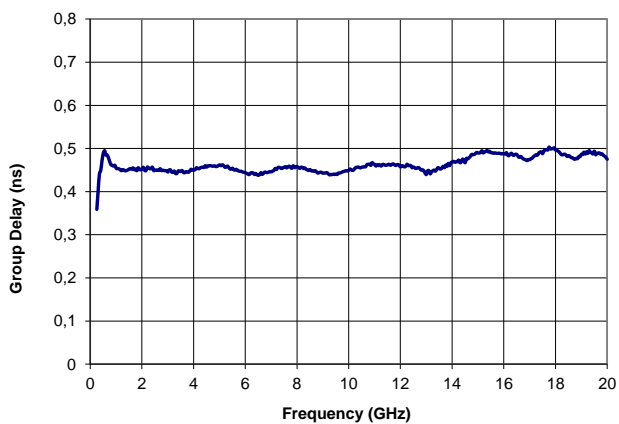
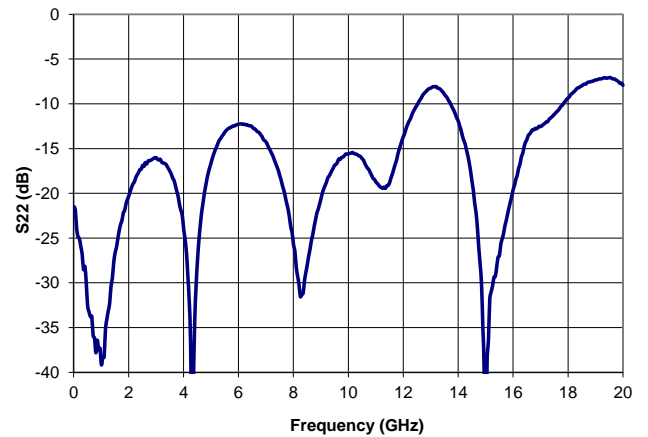
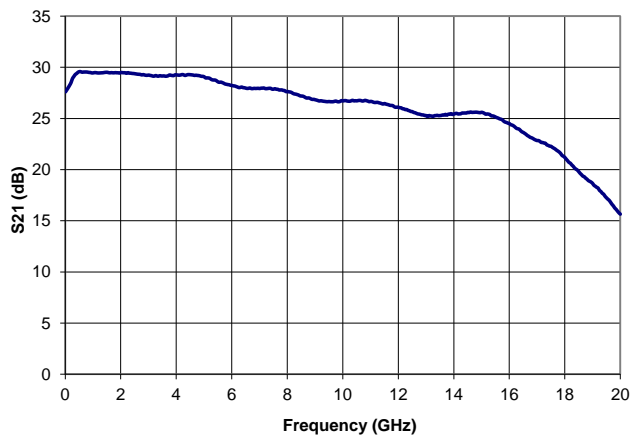
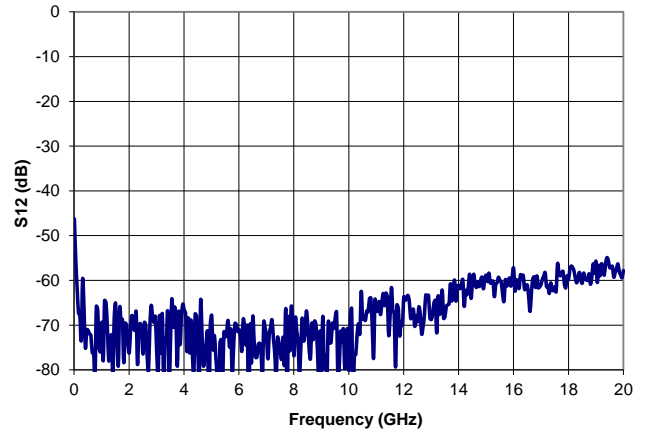
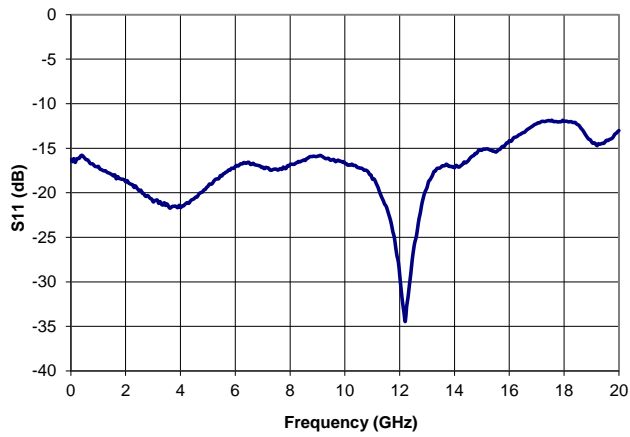
|                                   |              |          |                |       |       |                                  |
|-----------------------------------|--------------|----------|----------------|-------|-------|----------------------------------|
| Saturated Output Eye Amplitude    | $V_{outsAT}$ | $V_{pp}$ |                |       | 8.5   | $V_{in} \sim 0.25 V_{pp}$        |
| Eye Cross point (user adjustable) | $X_p$        | %        | 45             | 50    | 55    |                                  |
| Output Jitter, RMS value          | $J_{RMS}$    | ps       |                | 0.9   | 0.95  | calculated value; see note below |
| Rise Time / Fall Time             | $t_r/t_f$    | ps       |                | 20/20 | 22/22 | 20%...80%                        |
| Q Factor                          | Q            | -        | 25             | 30    | -     | $V_{out} \sim 6 V_{pp}$          |
| <b>Option "High Output"</b>       | -            | -        | -              | -     | -     |                                  |
| Saturated Output Eye Amplitude    | $V_{outsAT}$ | $V_{pp}$ | -              | -     | 11.5  | $V_{in} \sim 0.35 V_{pp}$        |
| Output Jitter, RMS value          | $J_{RMS}$    | ps       | -              | 1.1   | 1.15  | calculated value; see note below |
| Rise Time / Fall Time             | $t_r/t_f$    | ps       | -              | 20/20 | 22/22 | 20%...80%                        |
| Q Factor                          | Q            | -        | 20             | 25    |       | $V_{out} \sim 11 V_{pp}$         |
| <b>POWER SUPPLY</b>               |              |          |                |       |       |                                  |
| Driver Supply Voltage             | $V_{bias}$   | V        | -              | +12   | +12   | -                                |
| Driver Supply Current             | $I_{bias}$   | mA       | -              | -     | 450   | -                                |
| <b>OTHERS</b>                     |              |          |                |       |       |                                  |
| Input Connector                   | SMA Female   |          |                |       |       |                                  |
| Output Connector                  | SMA Male     |          |                |       |       |                                  |
| Dimensions                        | -            | mm       | 40 x 54 x 12.7 |       |       | excluding connectors             |
| Storage Temperature               | $T_{st}$     | ° C      | -20            |       | 70    | -                                |
| Operating Temperature             | $T_{op}$     | ° C      | 0              | 25    | 40    | -                                |
| Power Dissipation                 | $P_{diss}$   | W        |                | 3.6   | 5.4   | -                                |



## Typical Output Response:

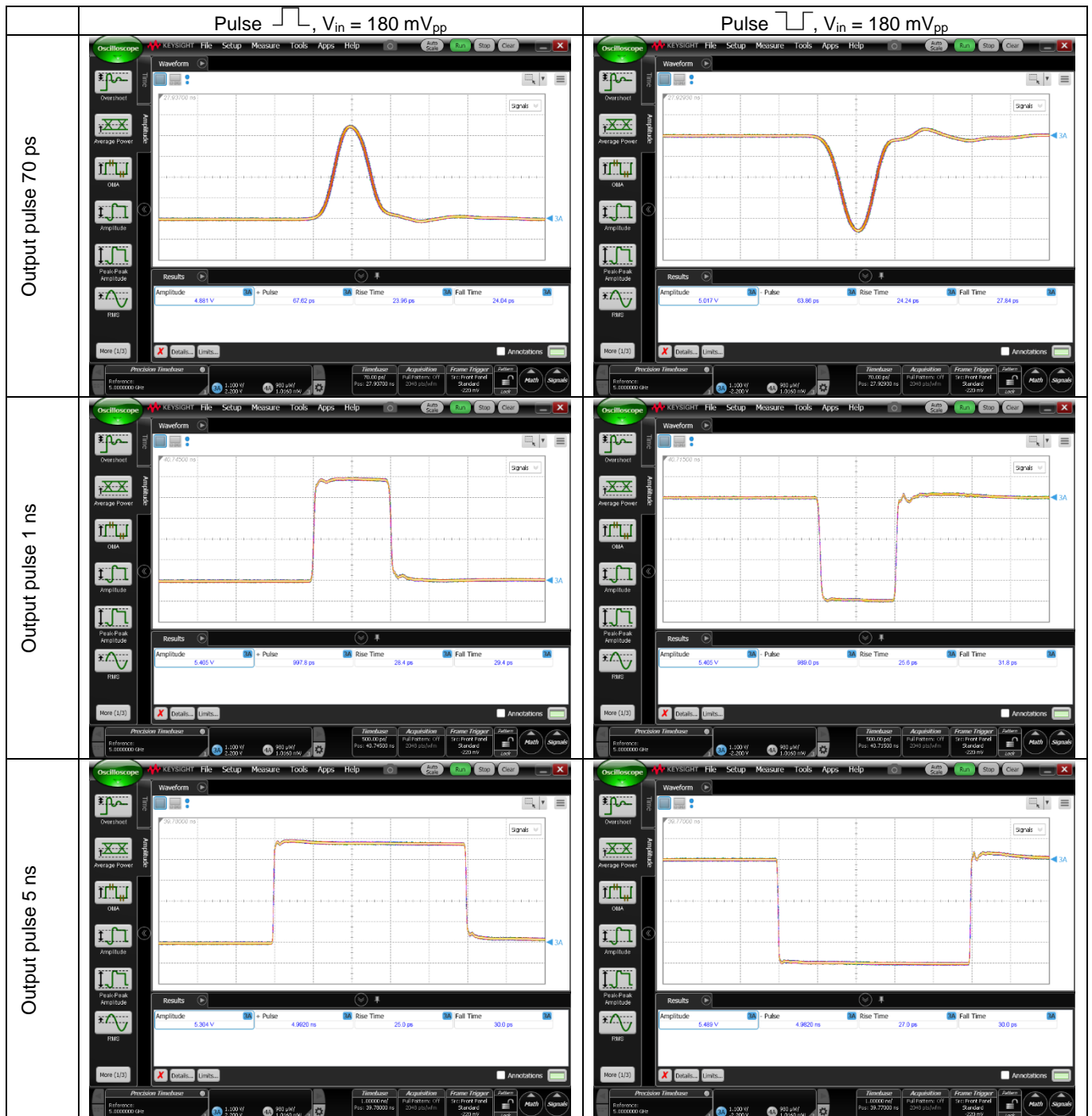
### S-parameters and P1dB measurement:

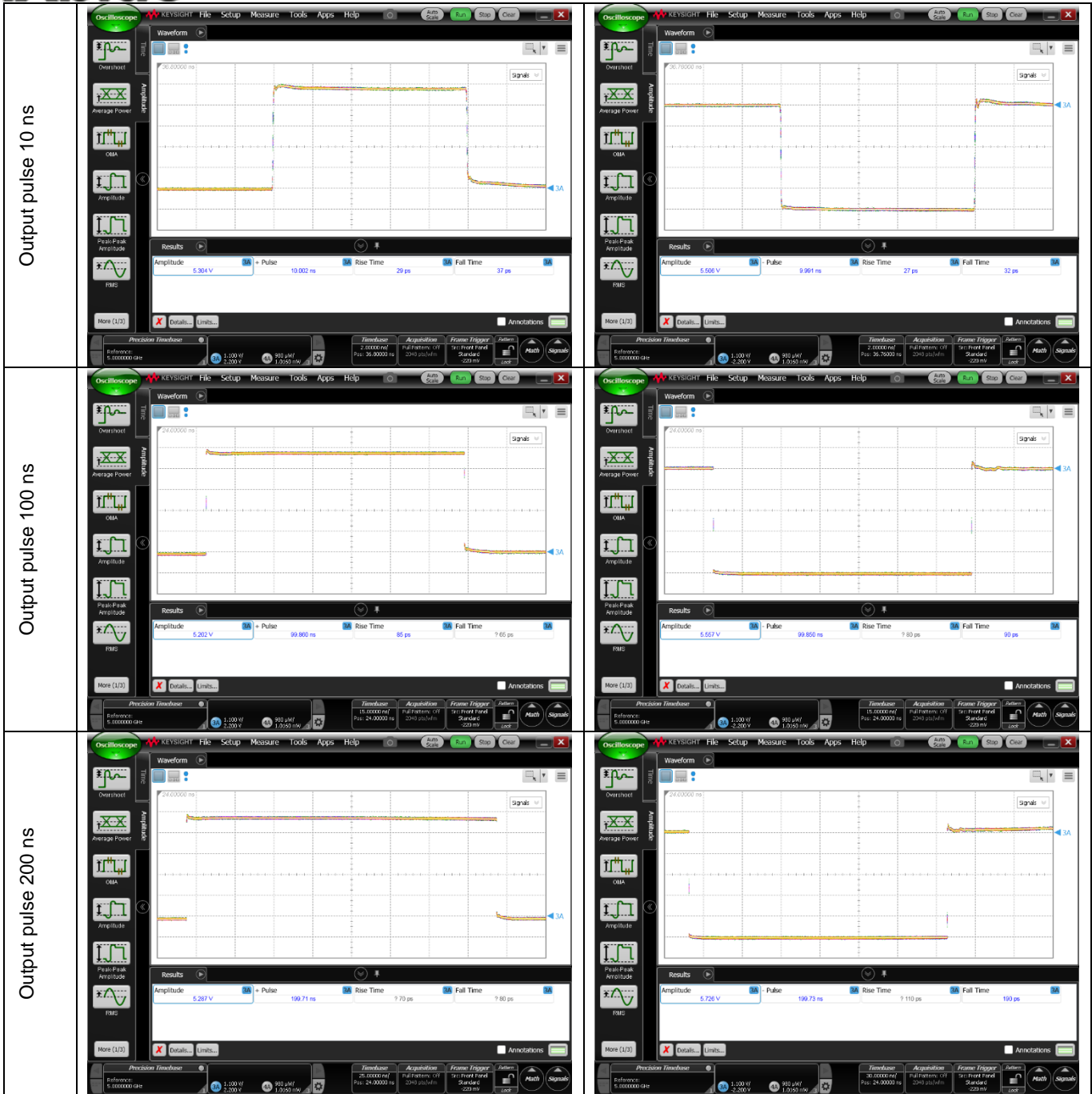
Test conditions: Output Amplitude = 70, Gain = 40, Crosspoint = 6, 12V, 300mA



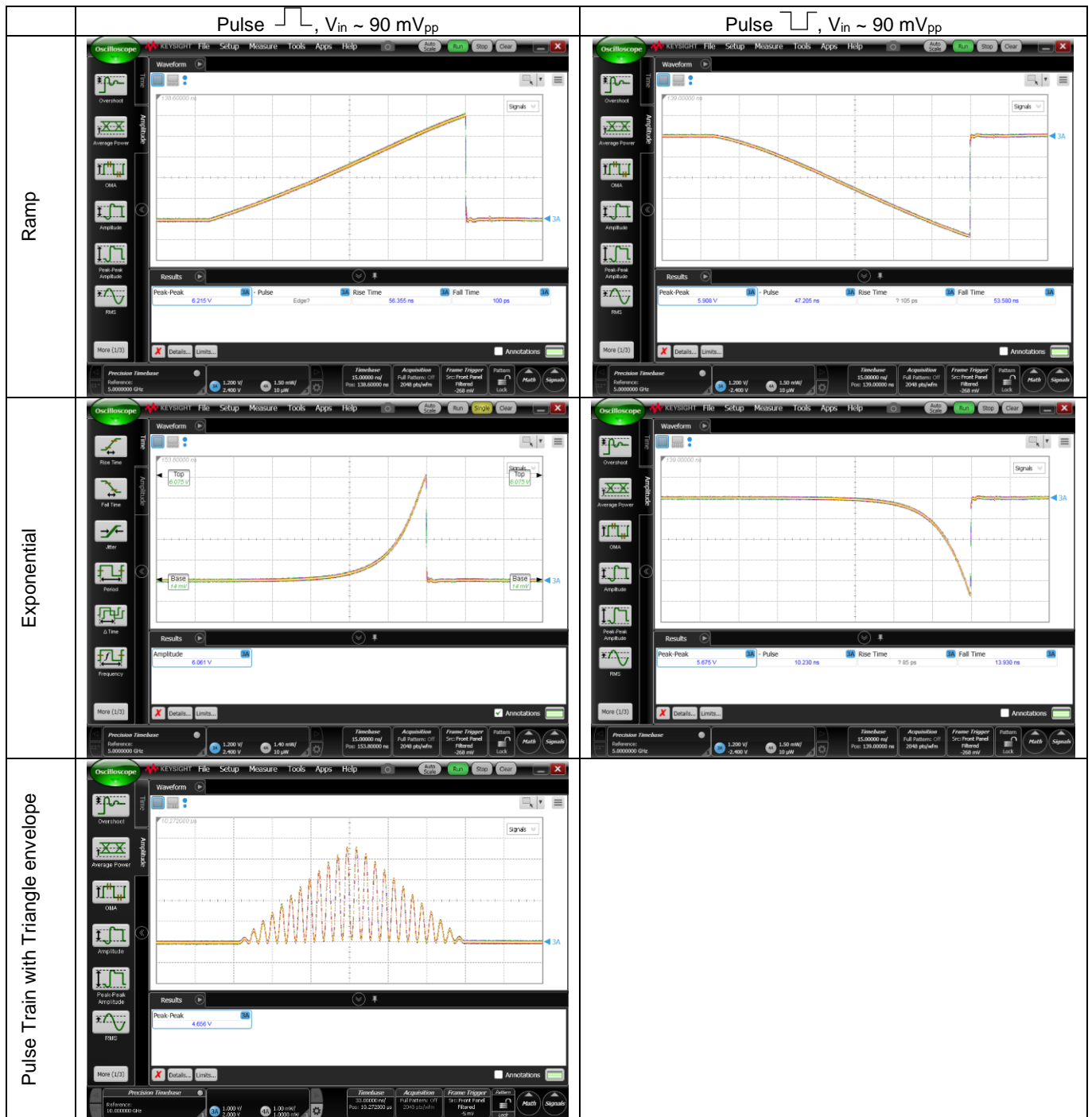
## Pulse measurement:

Test conditions: Depends on Pulse sign ( $\square$  or  $\sqcap$ )





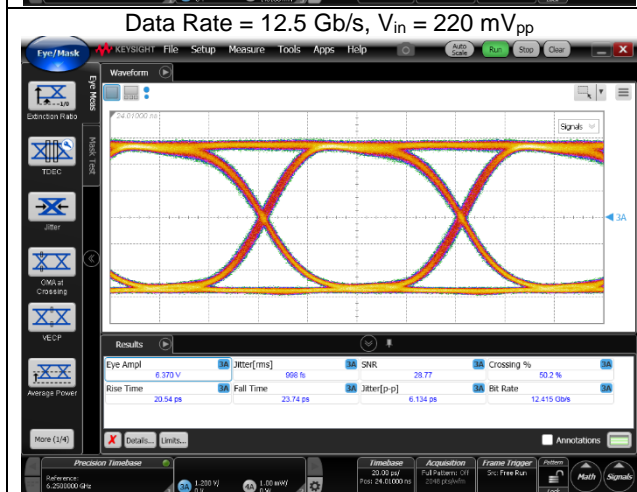
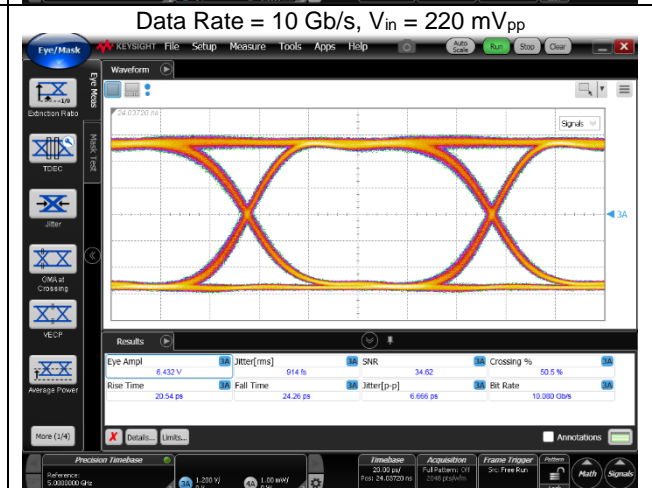
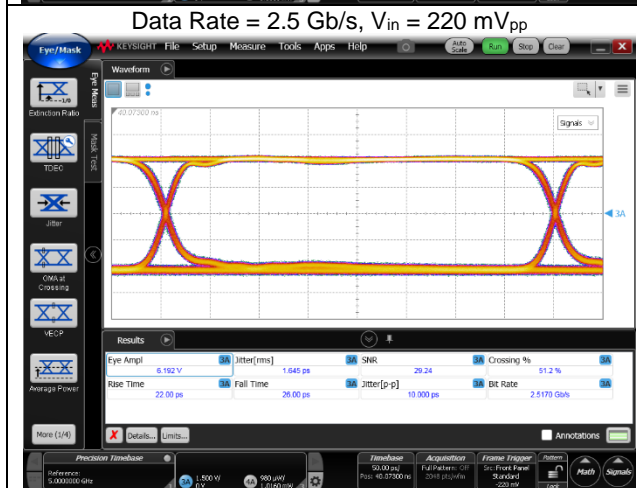
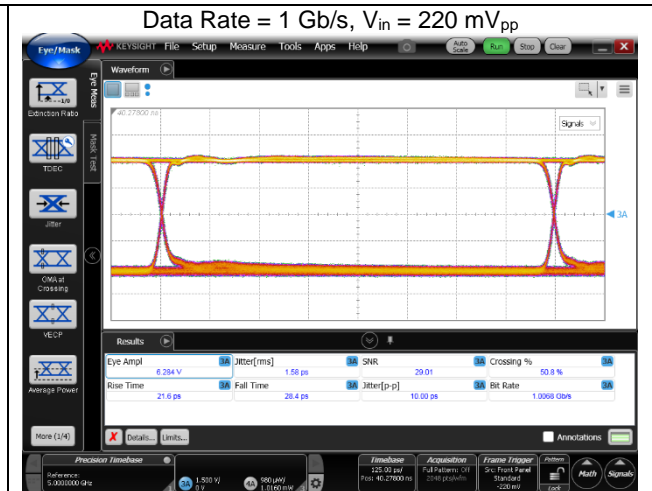
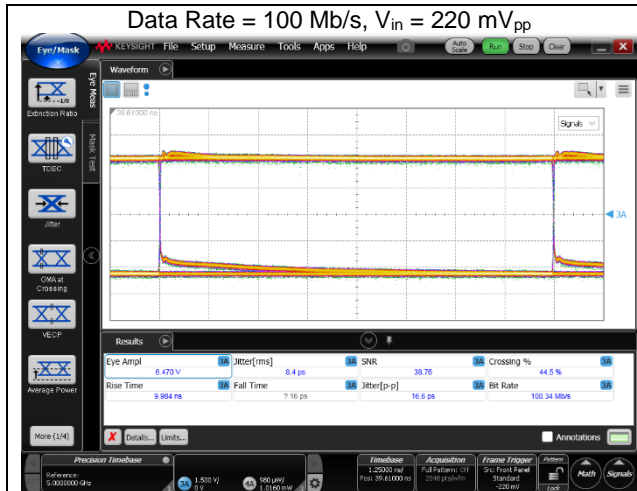
## Linear operation:



## Digital measurement:

Test conditions: Output Amplitude = 45, Gain = 30, Crosspoint = 55.

12V, 280mA



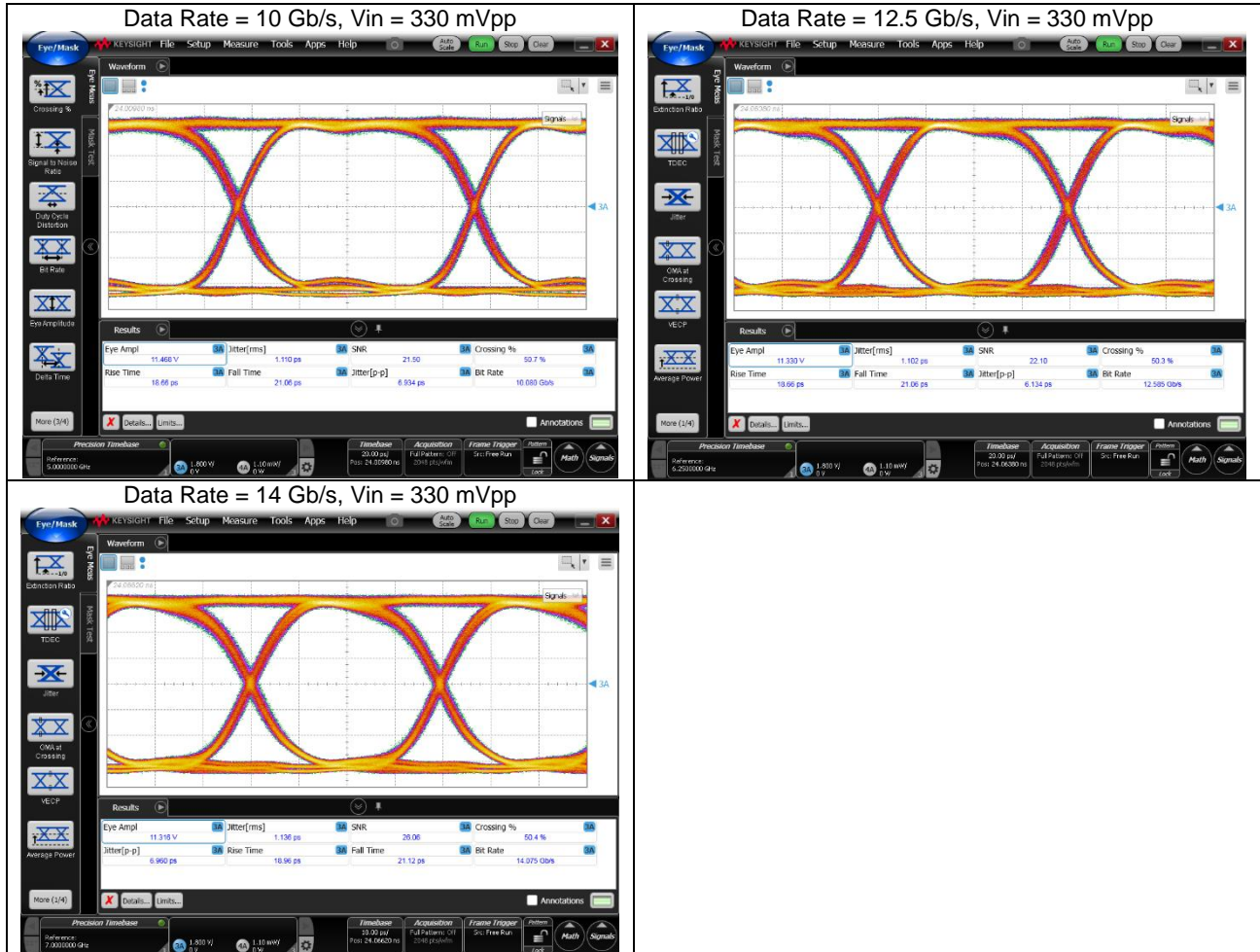


## High-output mode:

Test conditions: Output Amplitude = 65, Gain = 40, Crosspoint = 60.

12V, 350mA

$V_{in} = 330 \text{ mVpp}$





## Driver Control Application:

