Features

Supports the Onsemi ArrayC-60035-64P-PCB and ArrayJ-60035-64P-PCB 8x8 array of 6mm SiPMs

Signal connectors located on the back, array located on the front

- The board is smaller than the ArrayJ for 4-side tileable installation

Sums 64 SiPMs with adjustable gain

- Sum formed from four 4x4 quadrants
- Selectable polarity
- Selectable DC or AC coupling
- Low power consumption
- Resistor coupling or diode coupling (patented)

Four quadrant sum outputs on MMCX connectors

- Fixed gain
- DC coupled
- Vertical or horizontal connector options

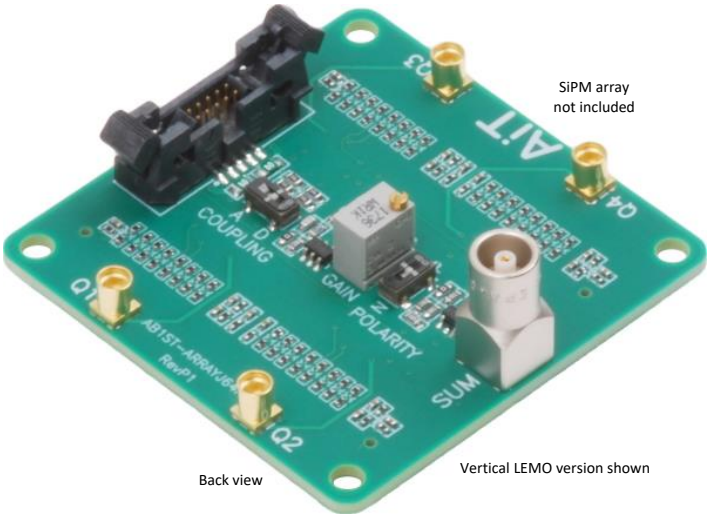
Main sum output on a coaxial connector

- MCX, SMA, SMB, or LEMO options
- Vertical or horizontal options

Precision temperature sensor

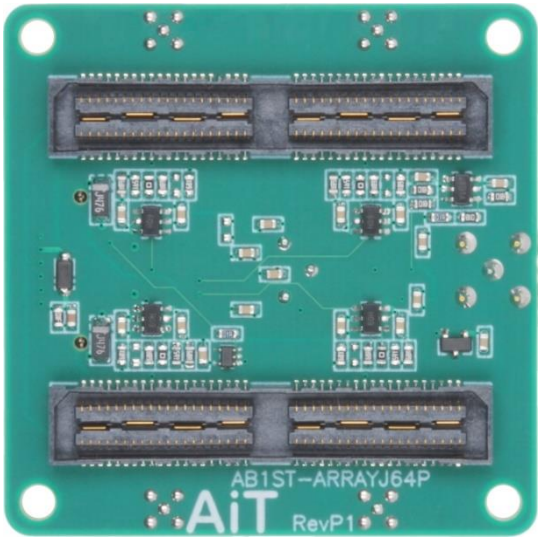
Mounting holes for #4 or M3 hardware

Fast output signals are not connected



Back view

Vertical LEMO version shown



Front view

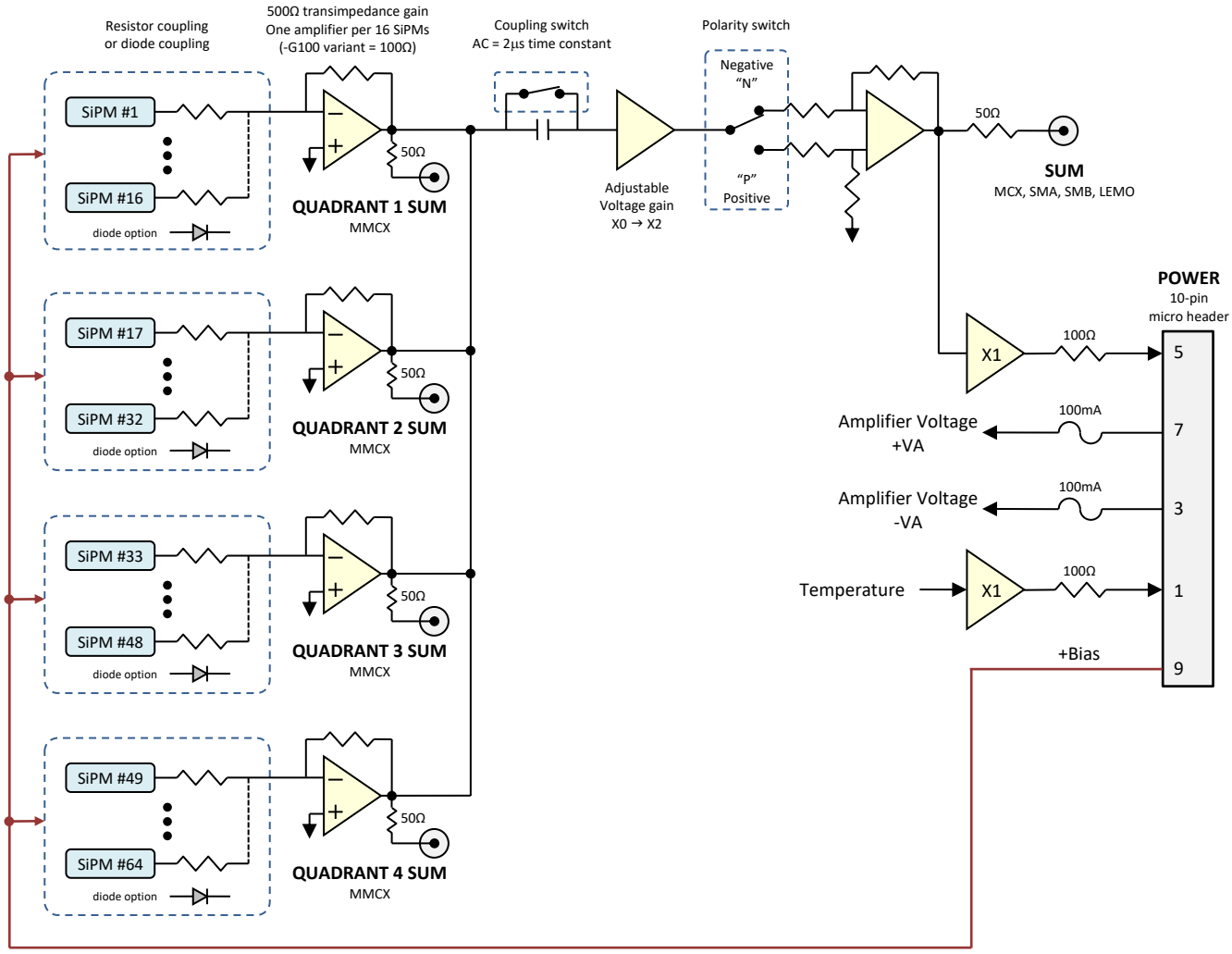
Part Number

AB1T *{D/R} {connector}* – ARRAYJ64P
{D/R}: Coupling type
- D = Diode coupling
- R = Resistor coupling

{connector}: Output connector type
- H = horizontal, V=Vertical
- M=MCX, A=SMA, B=SMB, L=LEMO

Example: AB1TRVL- ARRAYJ64P
- Resistor coupling, Vertical LEMO connector

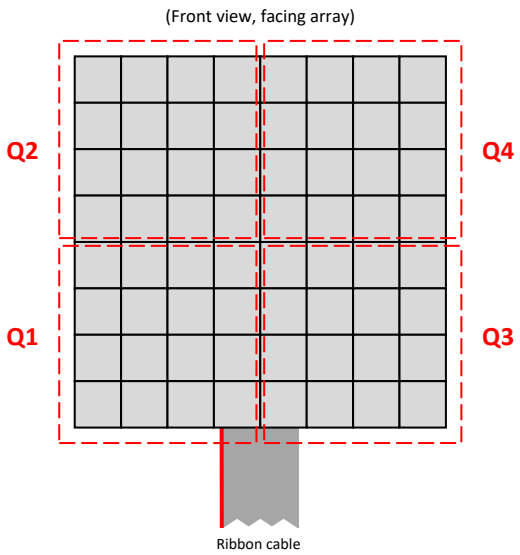
Architecture



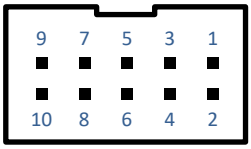
Specifications

Sum Output	
SiPM gain	500Ω, transimpedance -G100 variant: 100Ω
Output gain	Adjustable: x0 → x2 voltage gain 12-turn potentiometer
Coupling	DC or AC, switch selectable AC coupling time constant = 2µs
Polarity	Positive or negative, switch selectable
Output voltage	0 → ±1V
Output impedance	Coaxial connector: 50Ω Ribbon connector: 100Ω
Output current	50mA maximum
Connector	MCX, SMA, SMB, or LEMO Vertical or horizontal
Quadrant Output	
SiPM gain	500Ω, transimpedance
Output voltage	0 → -1V into 50Ω load
Output impedance	50Ω
Output current	50mA maximum
Connector	MMCX, Vertical or horizontal
Temperature Sensor	
Output voltage	500mV + 10mV per °C
Output current	10mA
Output impedance	100Ω
Accuracy	±0.5°C
Bias Voltage	+29V typical (refer to SiPM data)
Voltage clamp	+47V Zener diode 500mW maximum
Amplifier Voltage (±VA)	±2.8V → ±5.5V maximum
Current	±8mA typical at ±5.0V (Iq, no signal, no load)
Power Connector	Vertical 10-pin 2-row latch-eject header, 0.050” pin pitch
Mating assembly	Samtec FFSD-05-D-XX.XX-01-N (XX.XX = length in inches)

Channel Map



Power Connector

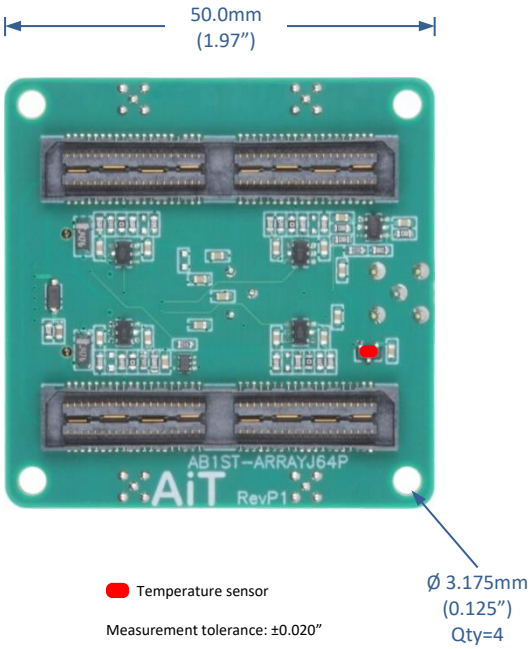


10-pin 0.050” vertical latch/eject header

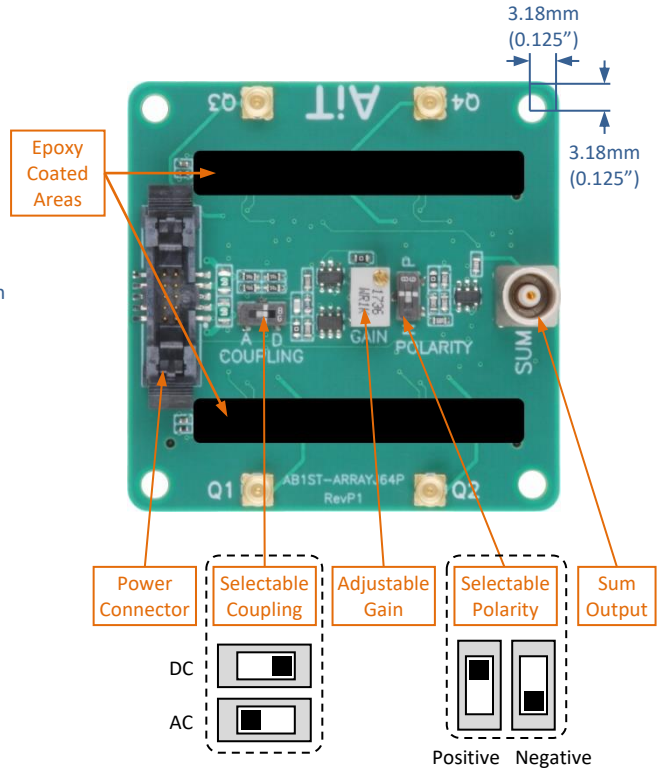
Pin	Function	Pin	Function
1	Temperature	2	Ground
3	-VA	4	Ground
5	Sum	6	Ground
7	+VA	8	Ground
9	+Bias	10	Ground

Mechanical

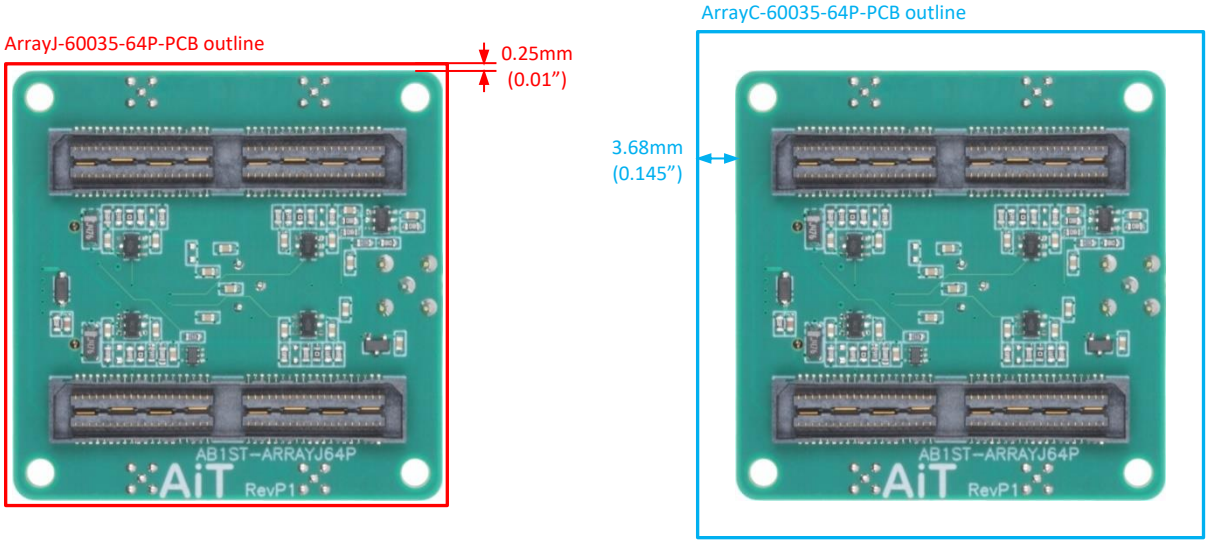
Front View



Back View



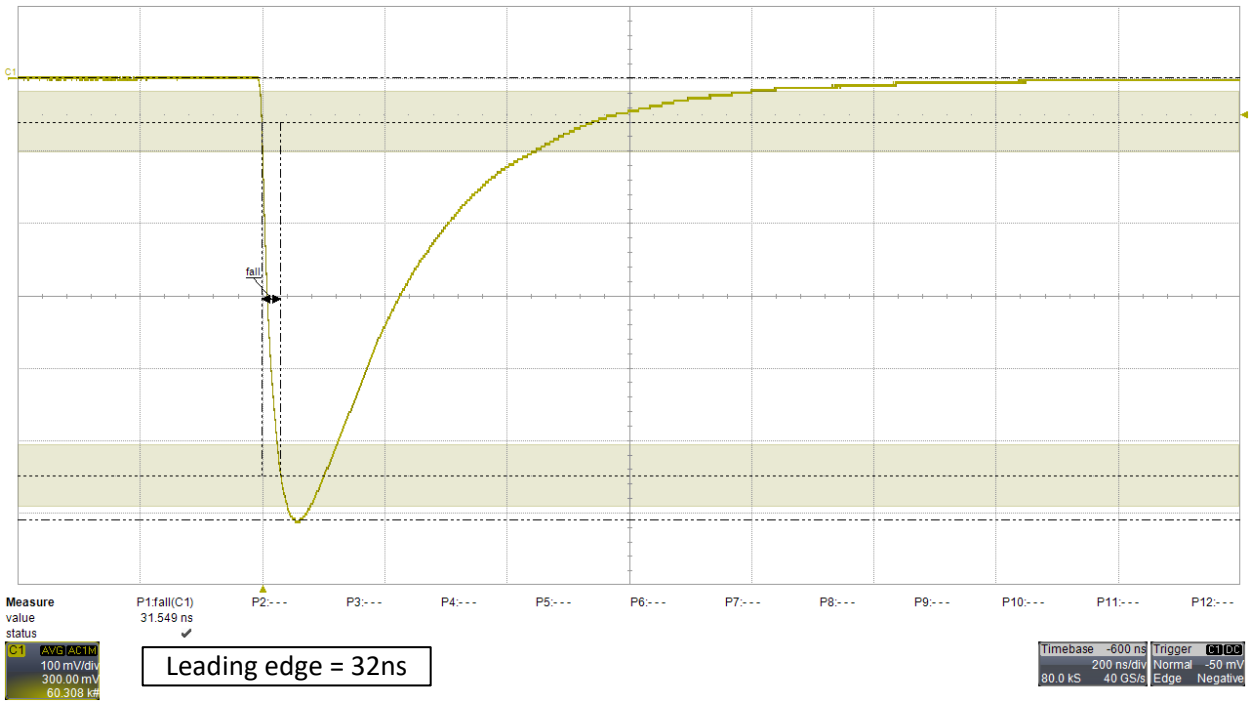
Array Location



Typical Signals: ArrayJ, Main Sum – Resistor Coupling

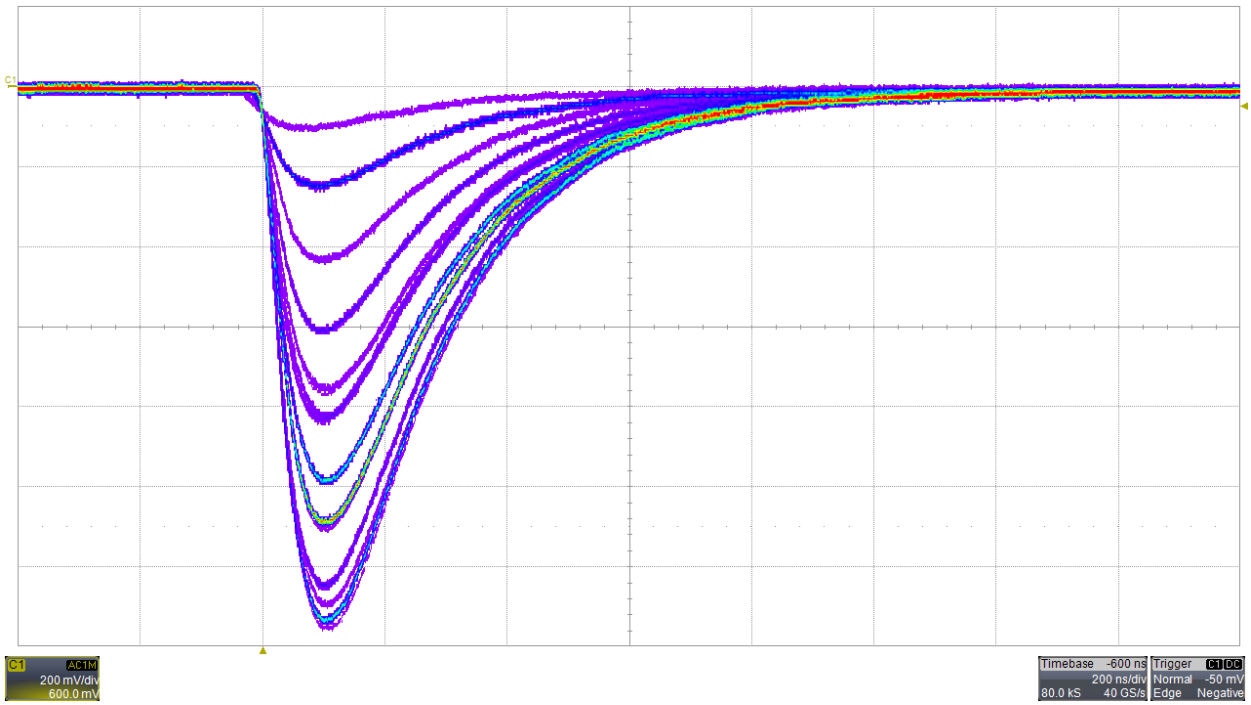
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling, quadrant signals disconnected

Source = Laser; Bias = +29V; averaged signal



Leading edge = 32ns

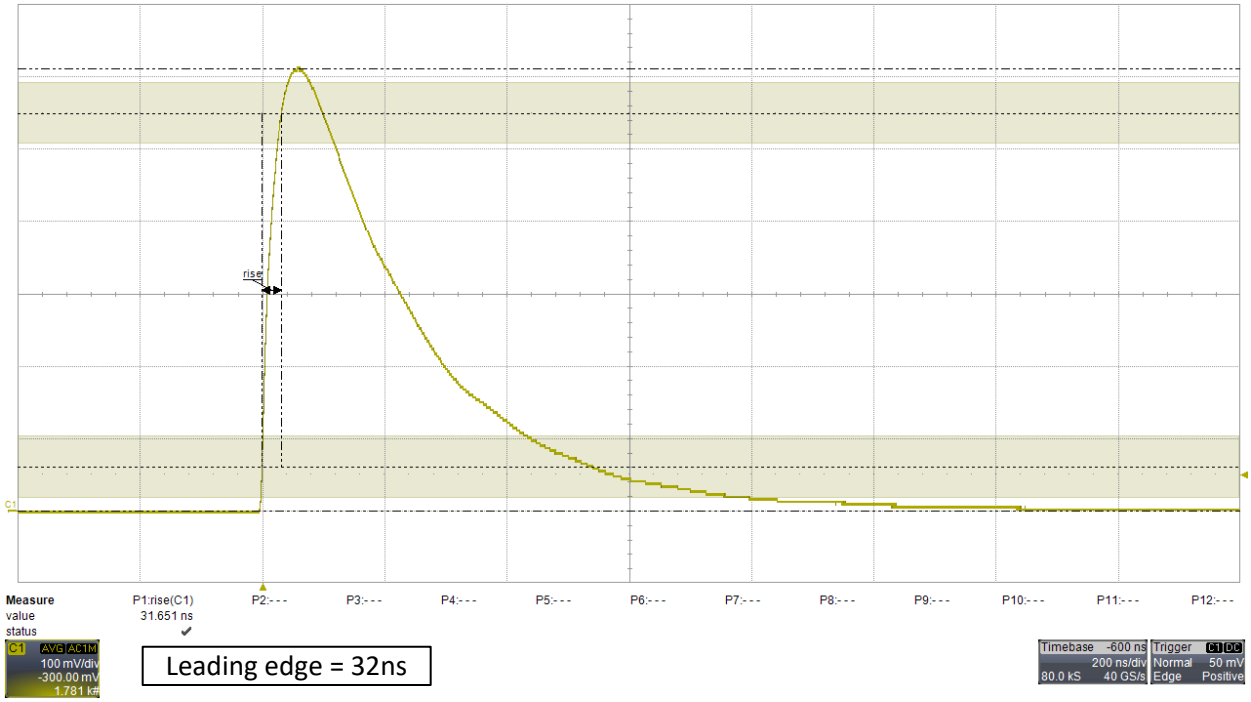
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayJ, Main Sum – Resistor Coupling (positive polarity)

Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal

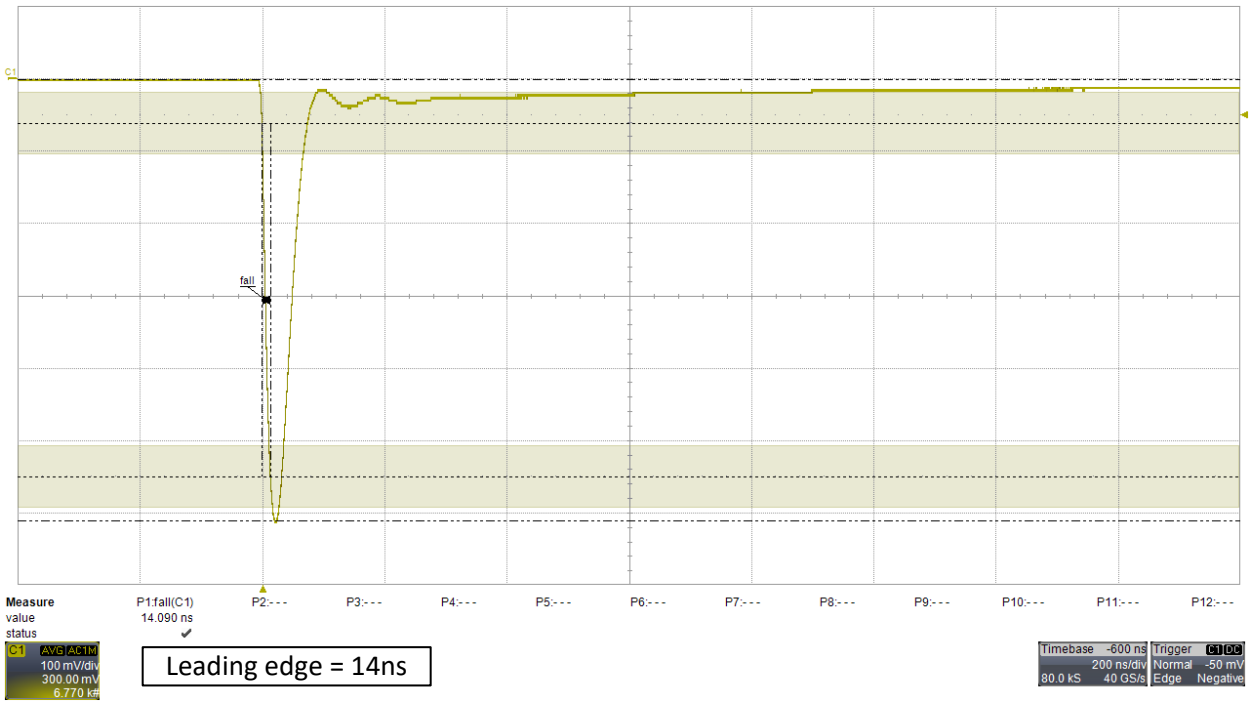


Leading edge = 32ns

Typical Signals: ArrayJ, Main Sum – Diode Coupling

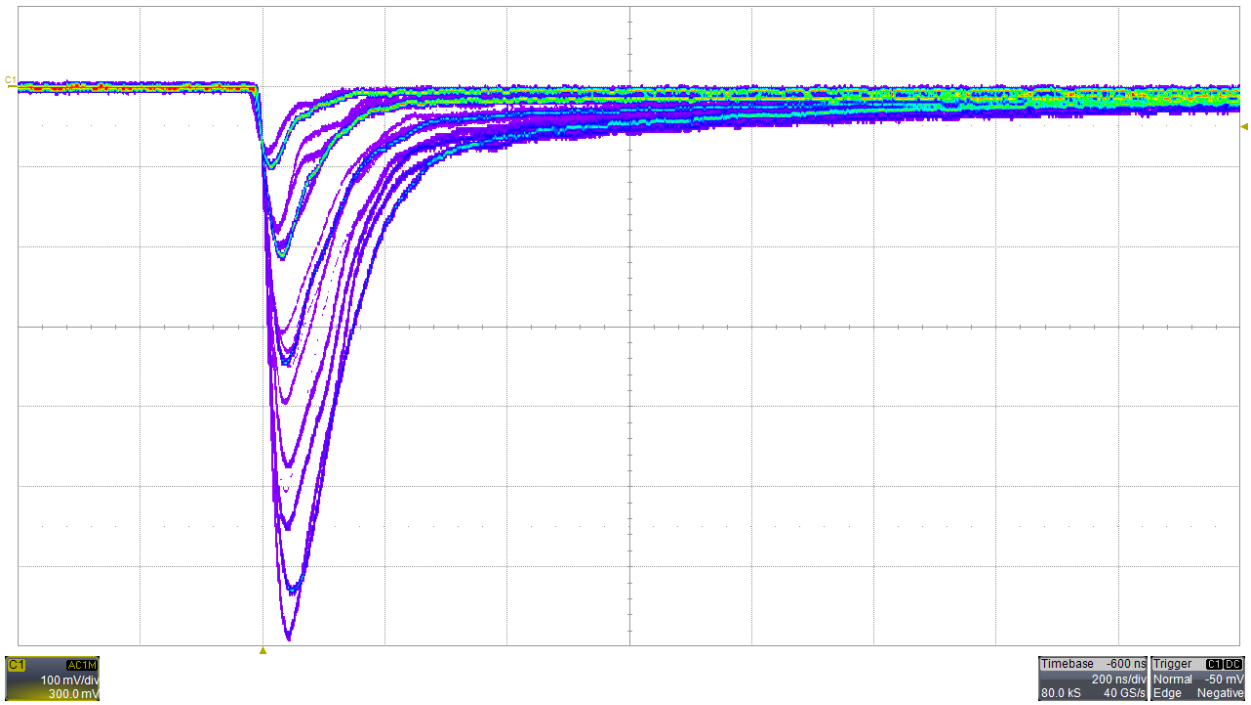
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling, quadrant signals disconnected

Source = Laser; Bias = +29V; averaged signal



Leading edge = 14ns

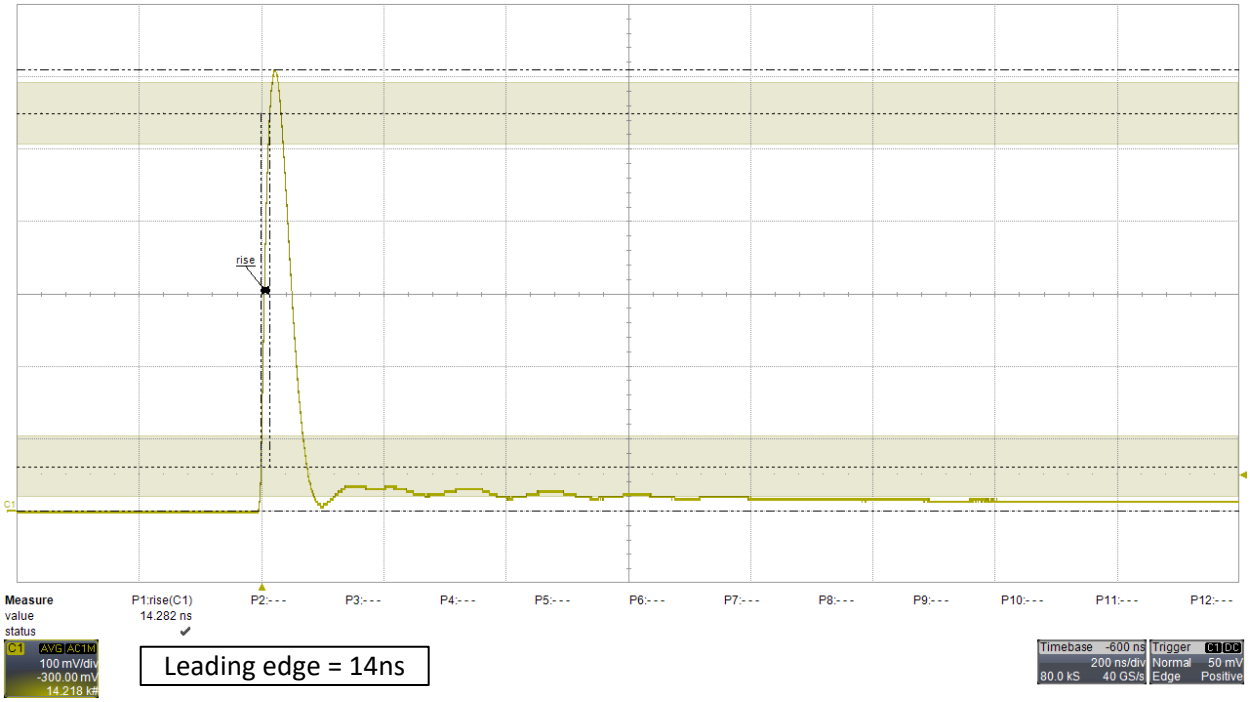
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayJ, Main Sum – Diode Coupling (positive polarity)

Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal

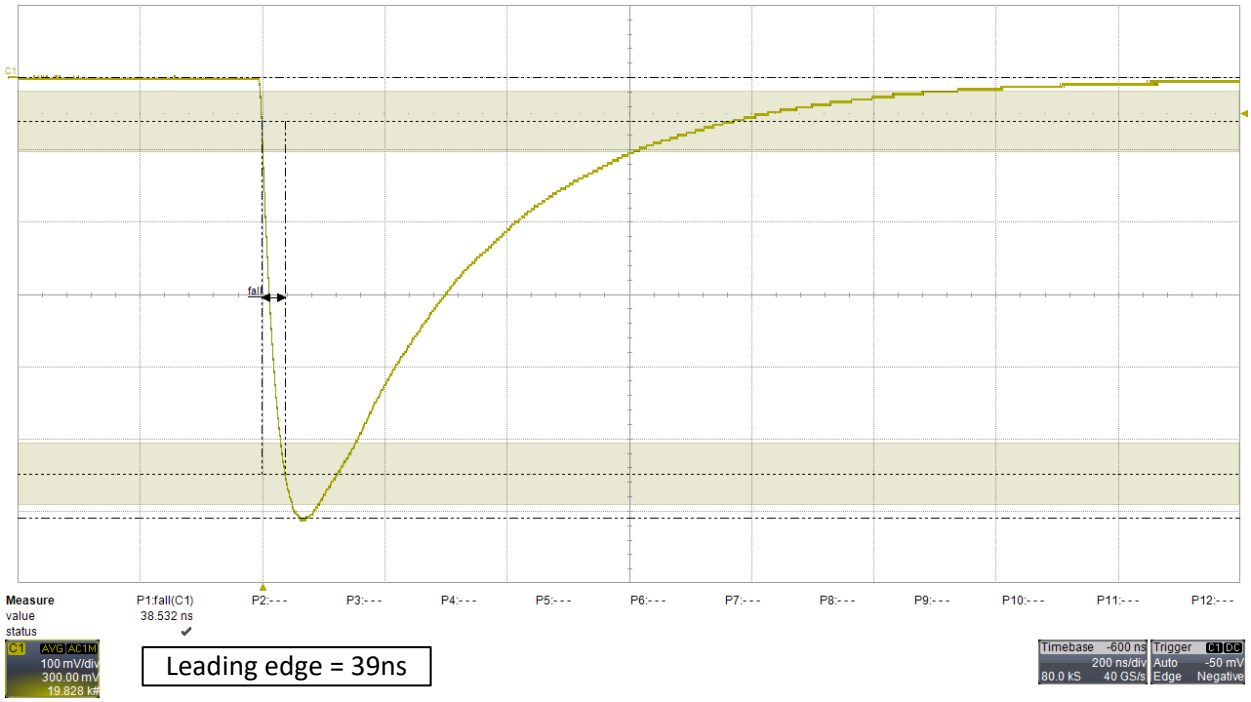


Leading edge = 14ns

Typical Signals: ArrayJ, Quadrant Sum – Resistor Coupling

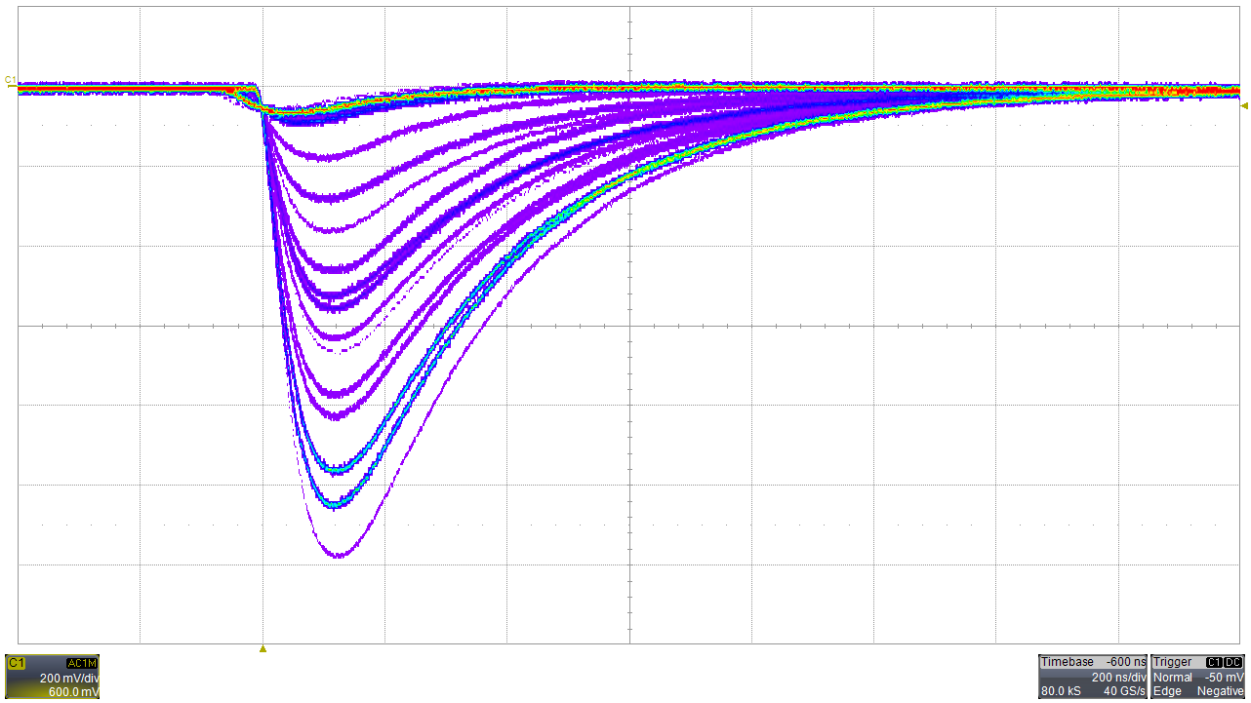
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 39ns

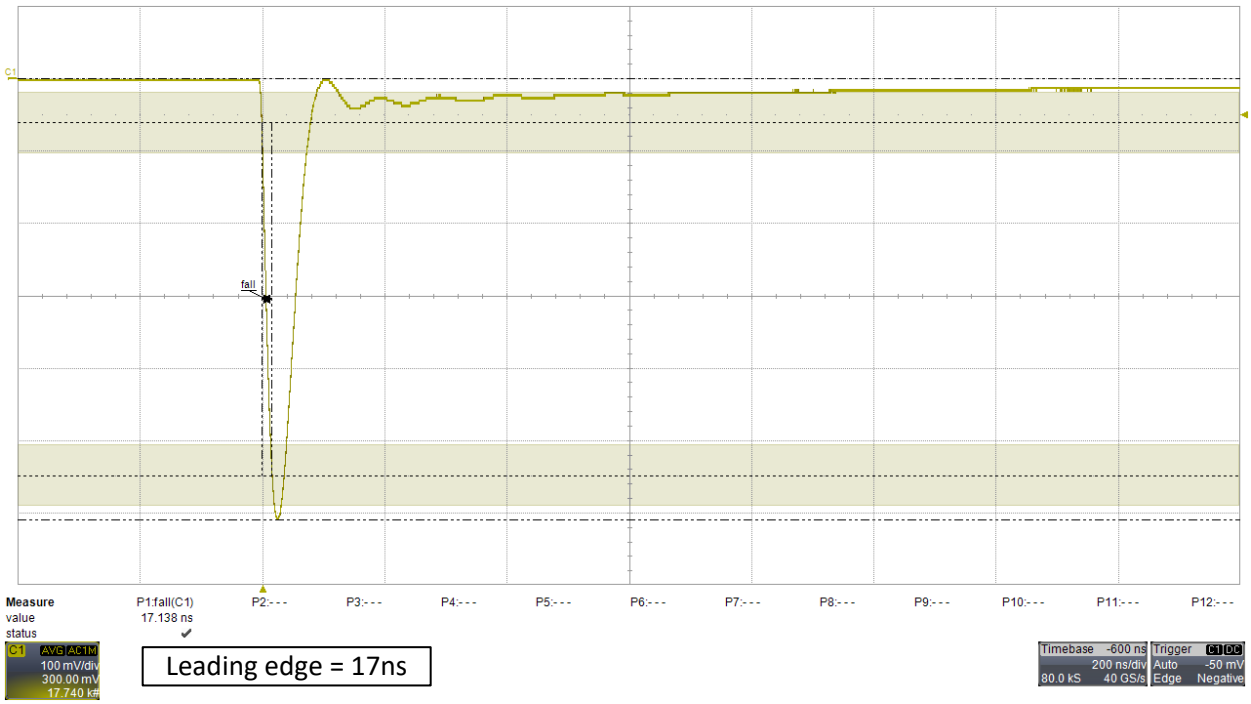
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayJ, Quadrant Sum – Diode Coupling

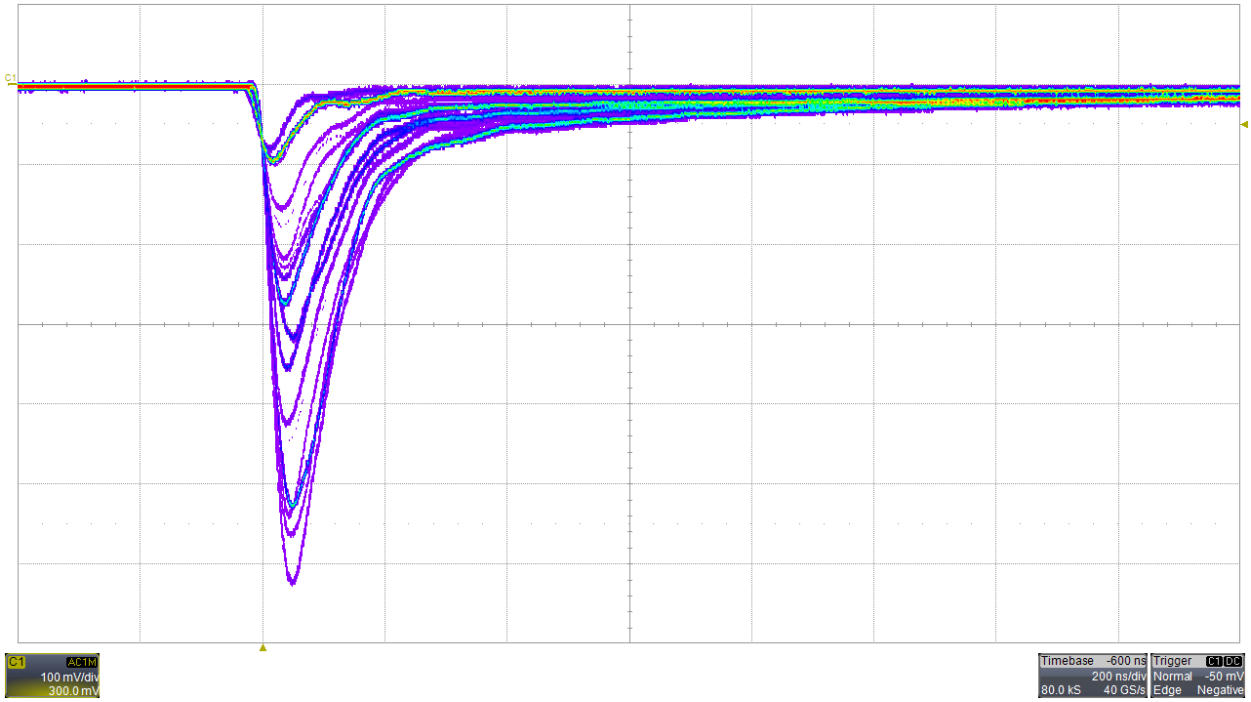
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 17ns

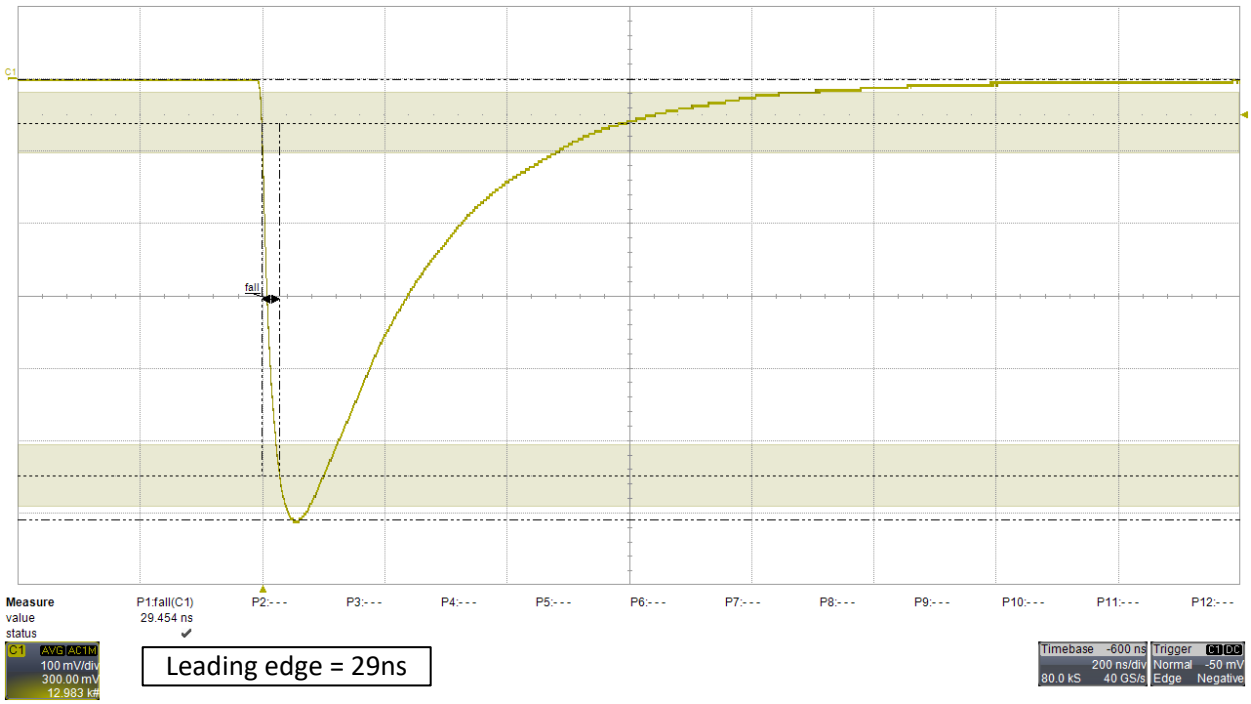
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayC, Main Sum – Resistor Coupling

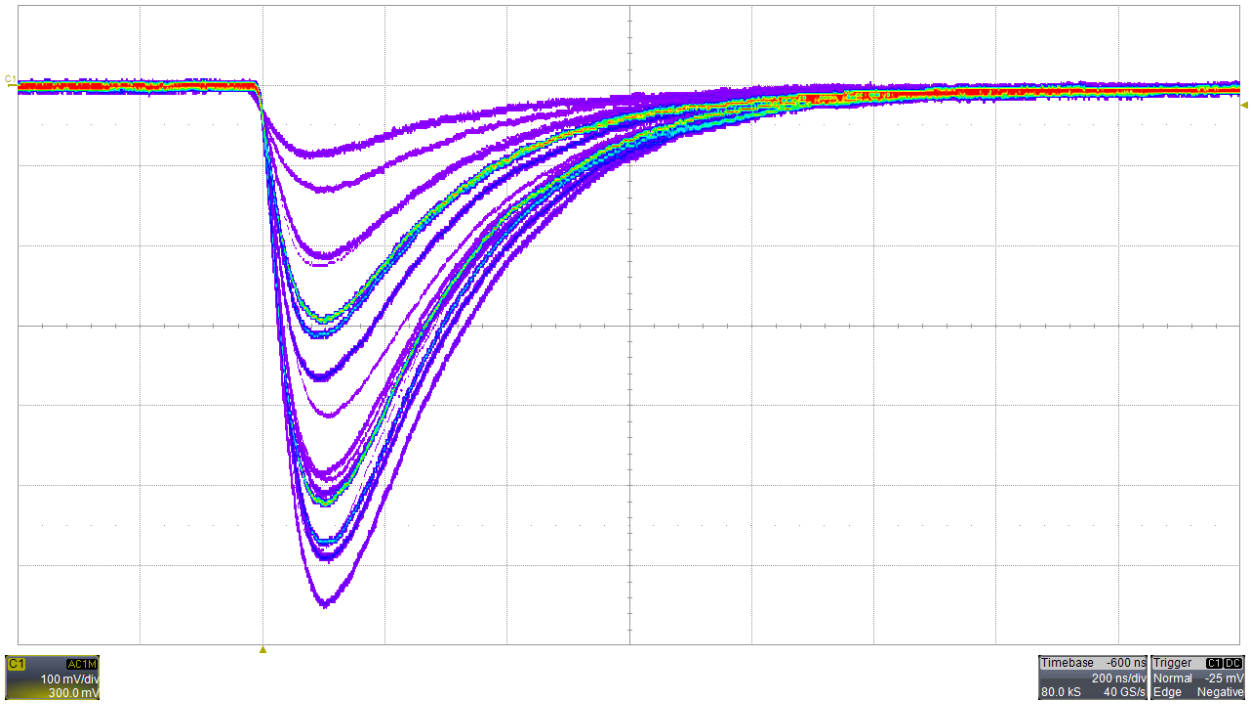
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling, quadrant signals disconnected

Source = Laser; Bias = +29V; averaged signal



Leading edge = 29ns

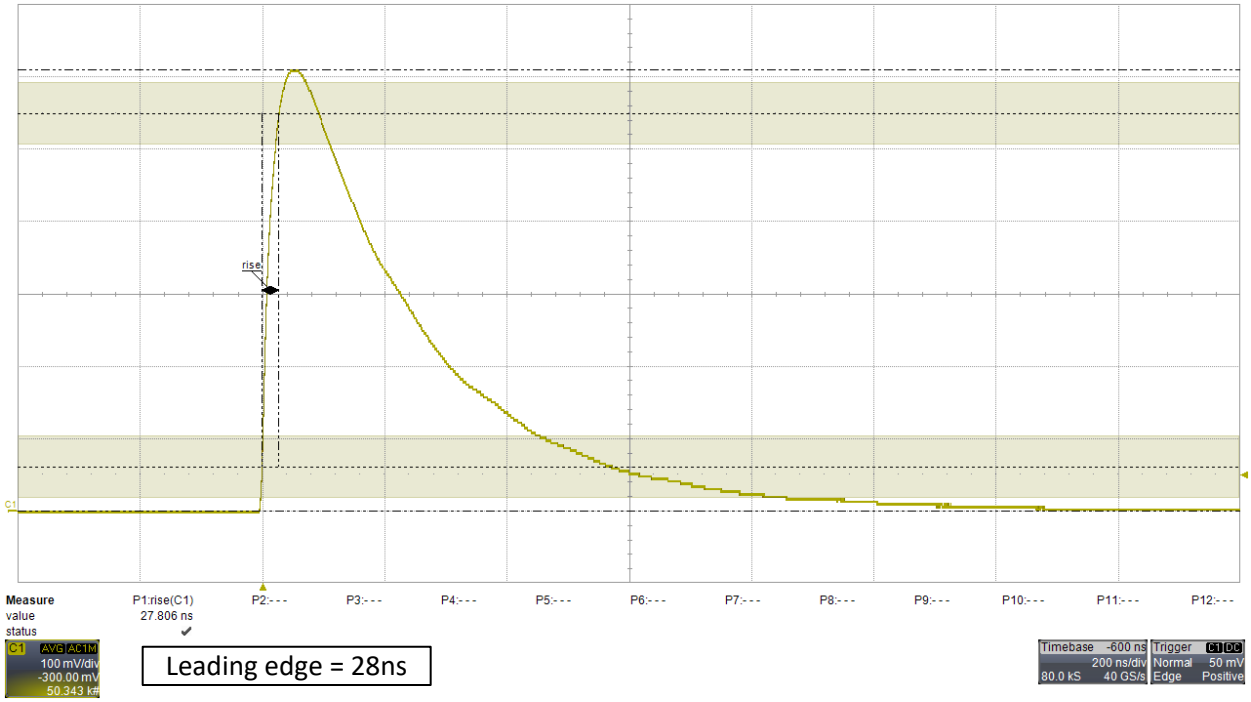
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayC, Main Sum – Diode Coupling (positive polarity)

Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal

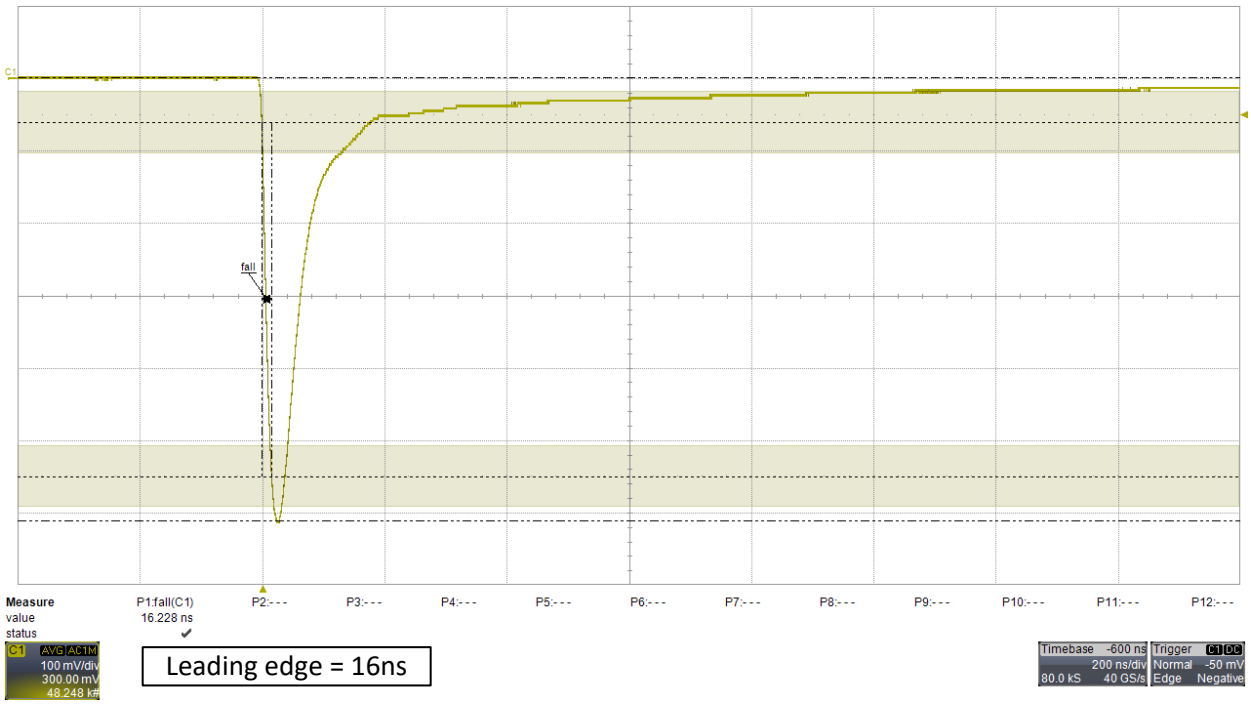


Leading edge = 28ns

Typical Signals: ArrayC, Main Sum – Diode Coupling

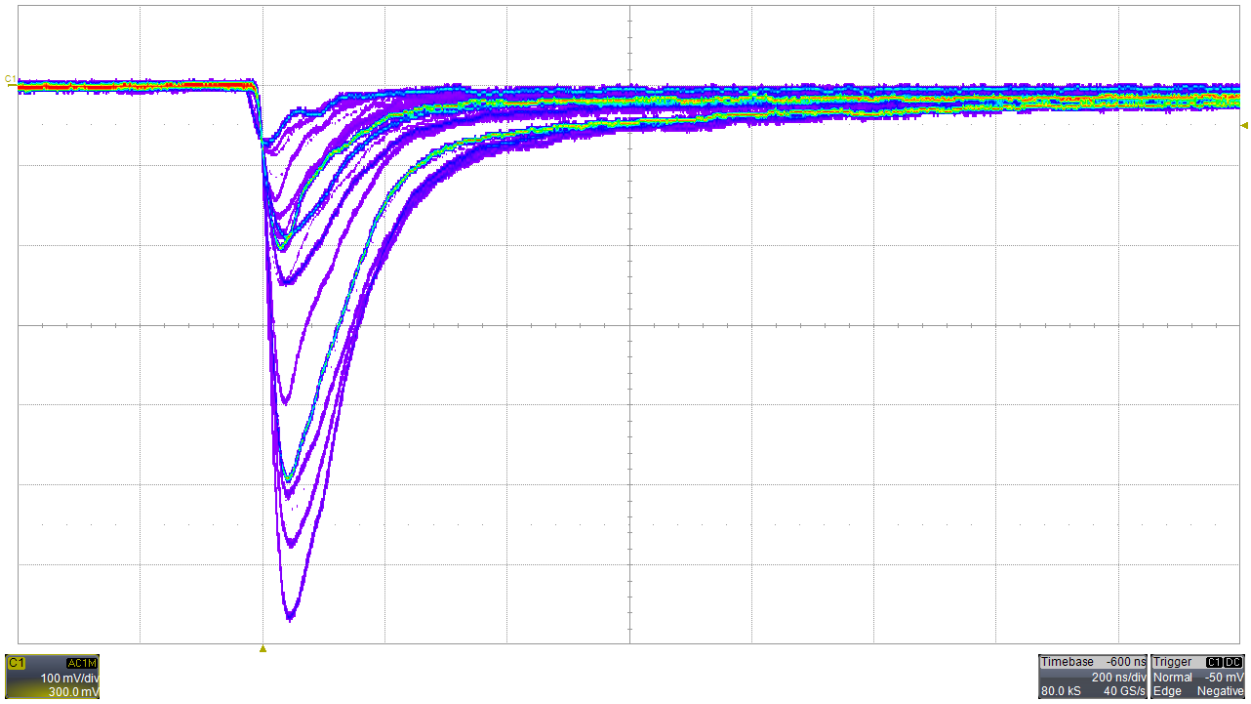
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling, quadrant signals disconnected

Source = Laser; Bias = +29V; averaged signal



Leading edge = 16ns

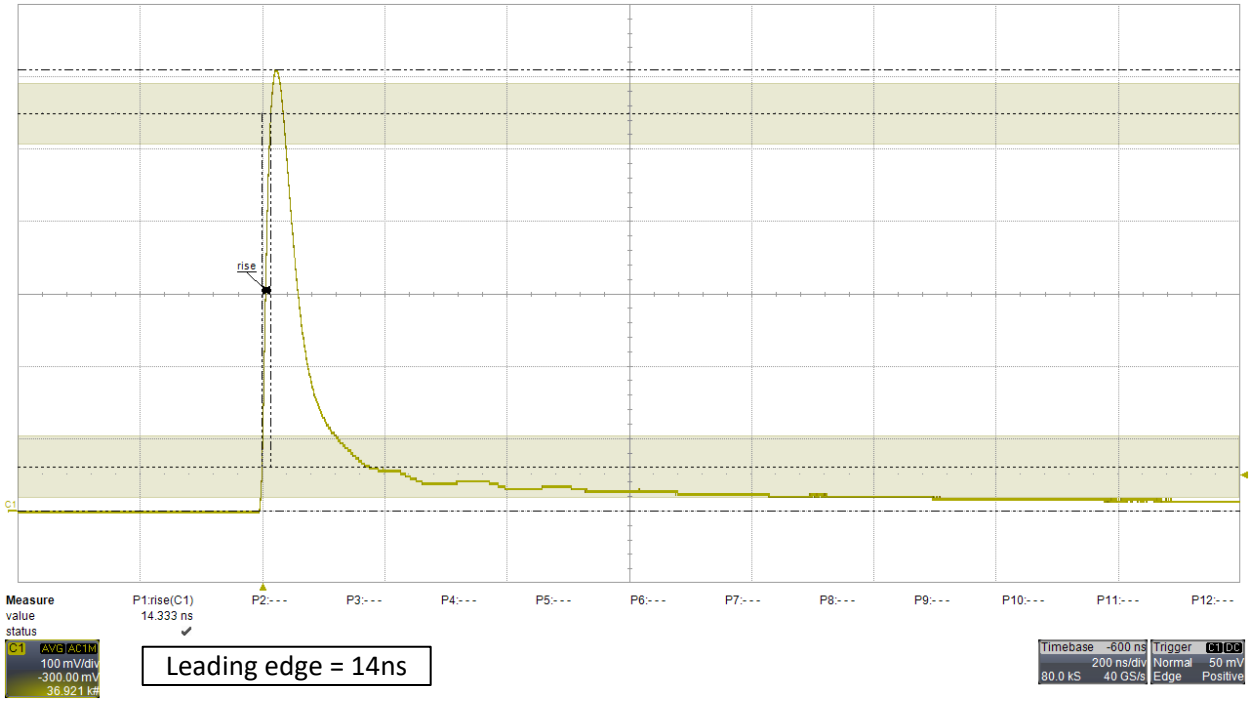
Source = LYSO emission; Bias = +28.5V; persistence display



Typical Signals: ArrayC, Main Sum – Diode Coupling (positive polarity)

Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal

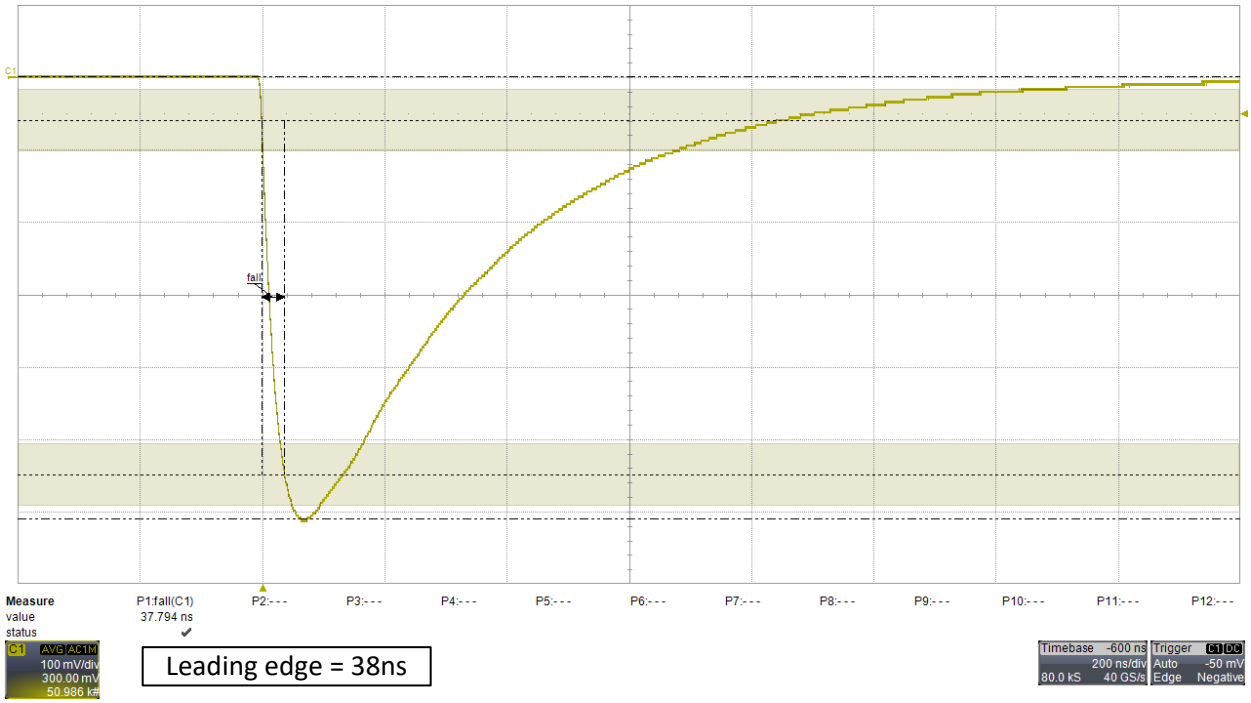


Leading edge = 14ns

Typical Signals: ArrayC, Quadrant Sum – Resistor Coupling

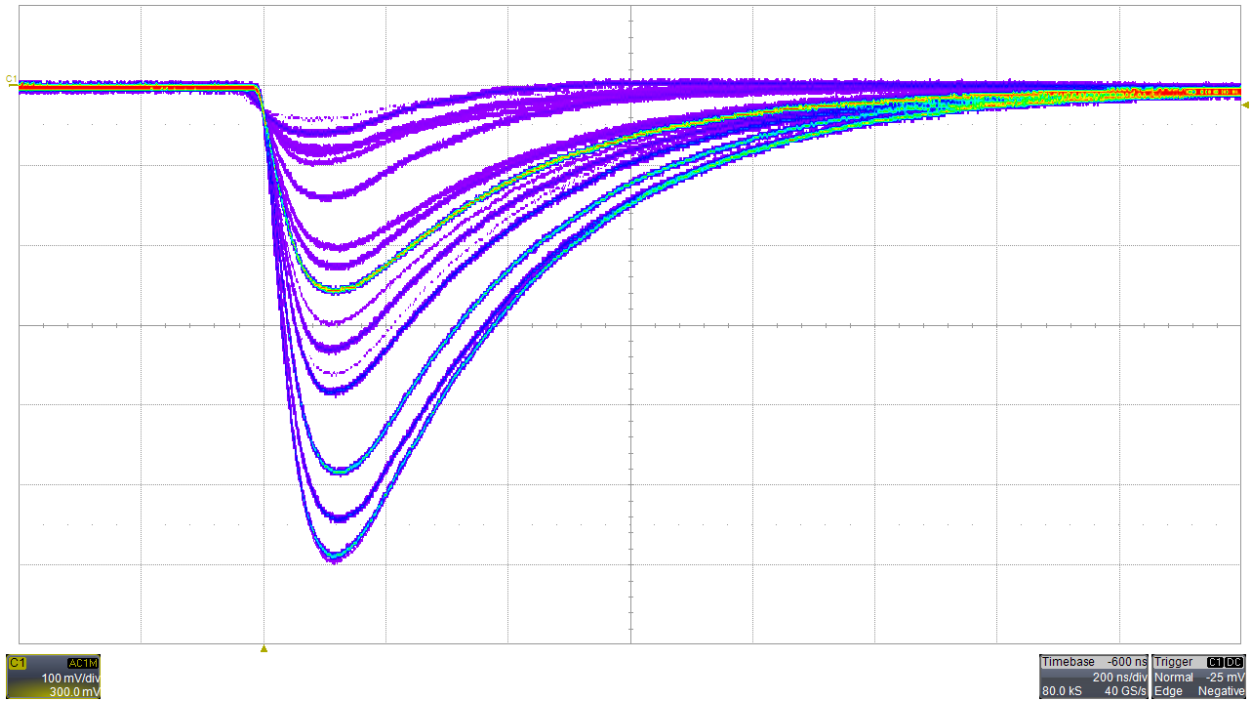
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 38ns

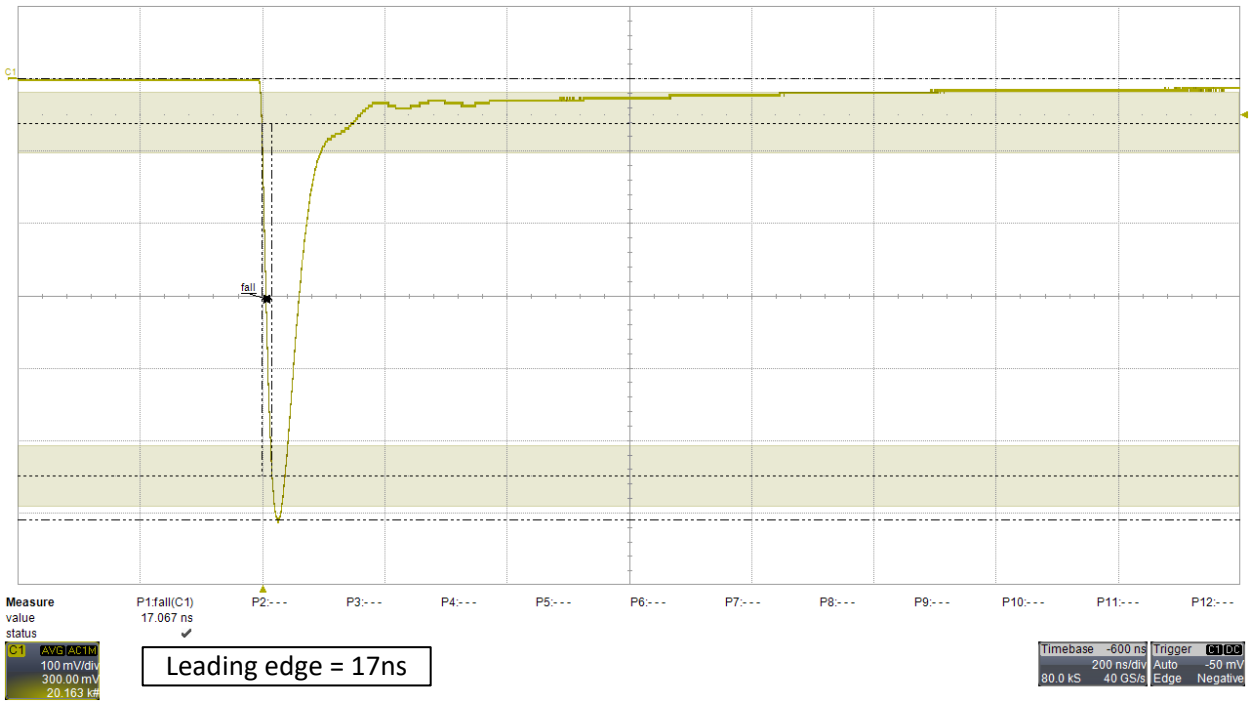
Source = LYSO emission; Bias = +28V; persistence display



Typical Signals: ArrayC, Quadrant Sum – Diode Coupling

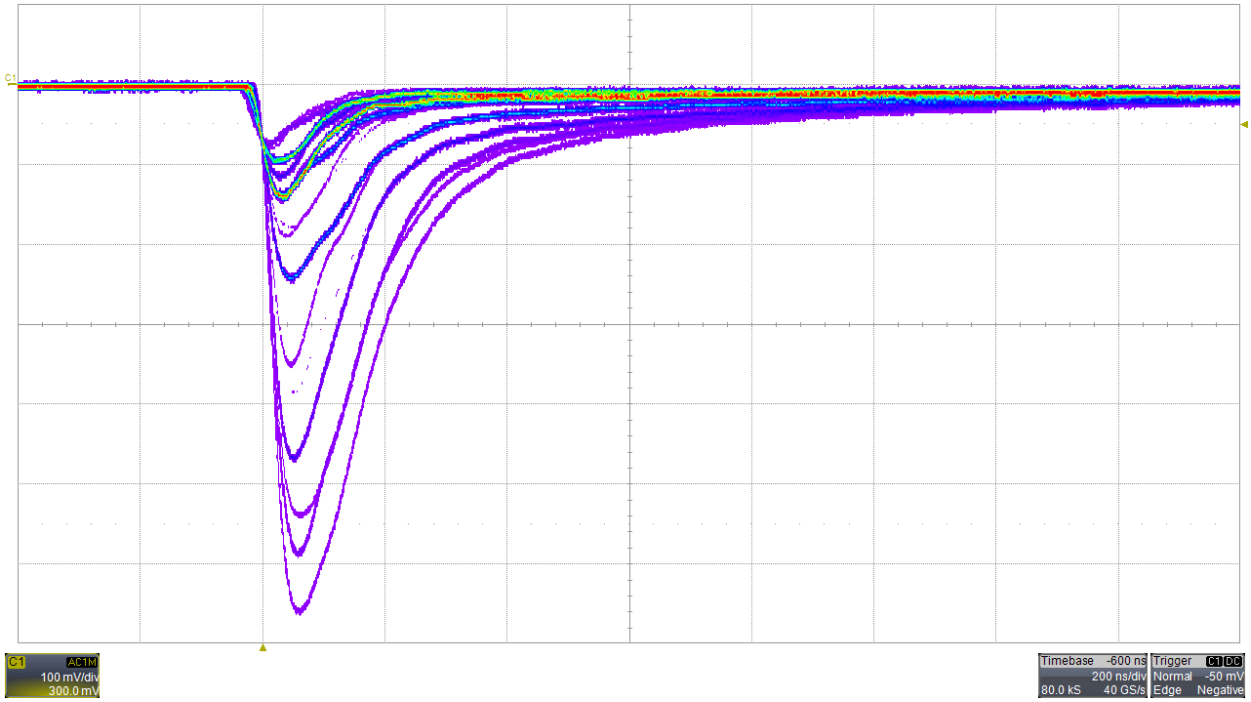
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 17ns

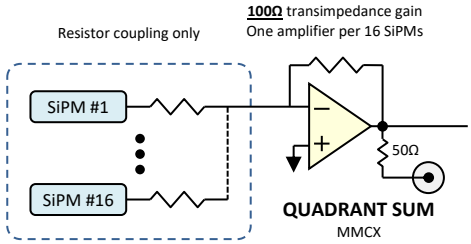
Source = LYSO emission; Bias = +28.5V; persistence display



Variant AB1TR-G100

- 100Ω transimpedance gain replaces the standard 500Ω gain
- Applies to resistor coupling only
- Quadrant sum timing performance is identical to the standard 500Ω version

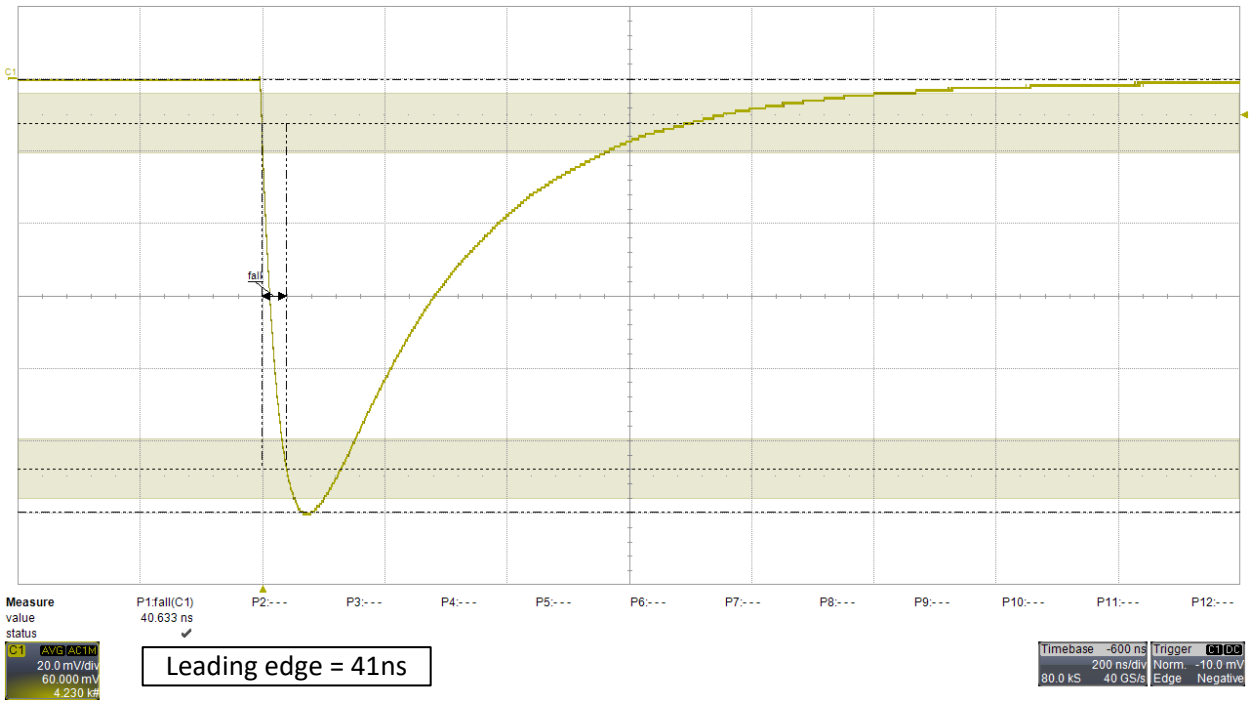
-G100 Variant



(-G100 Variant) Typical Signals: ArrayJ, Quadrant Sum – Resistor Coupling

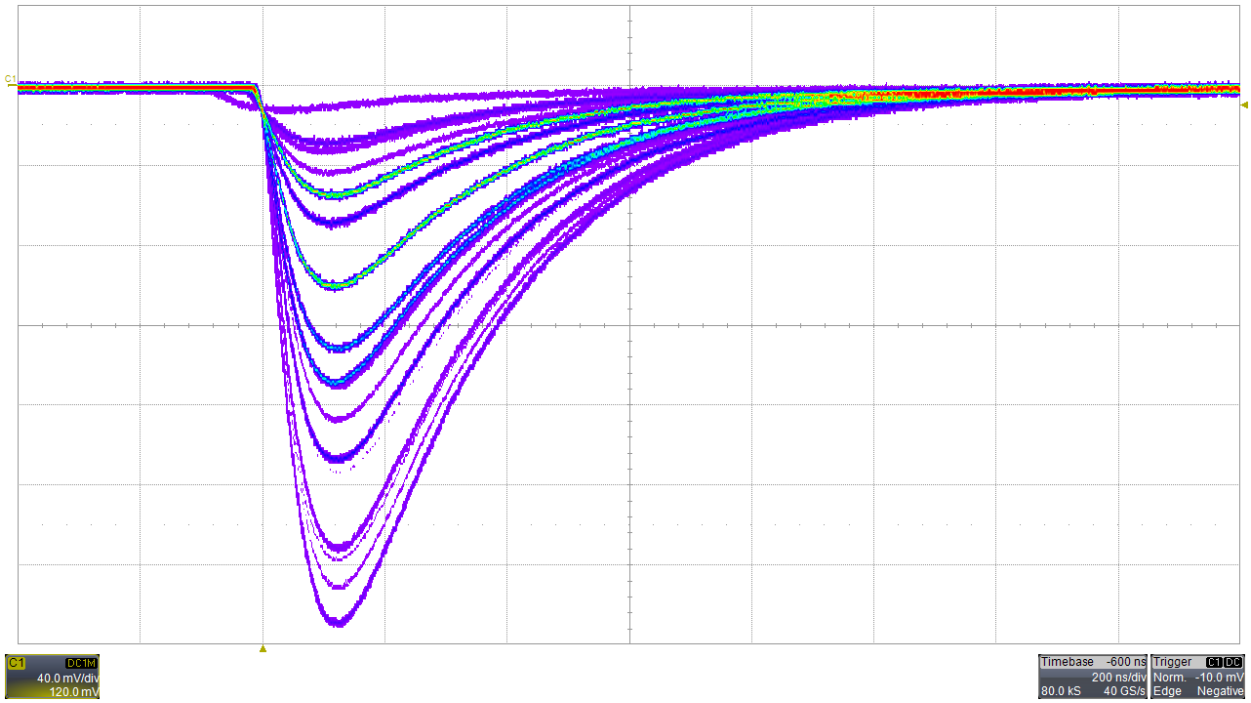
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 41ns

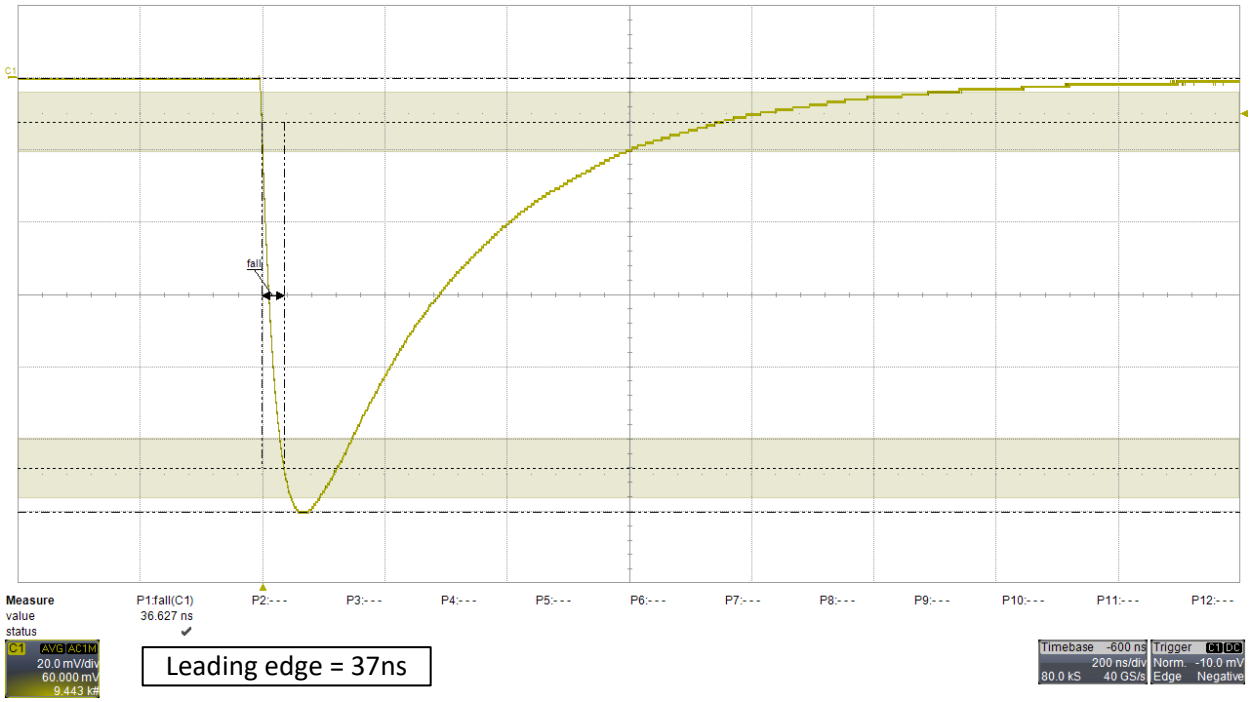
Source = LYSO emission; Bias = +28V; persistence display



(-G100 Variant) Typical Signals: ArrayC, Quadrant Sum – Resistor Coupling

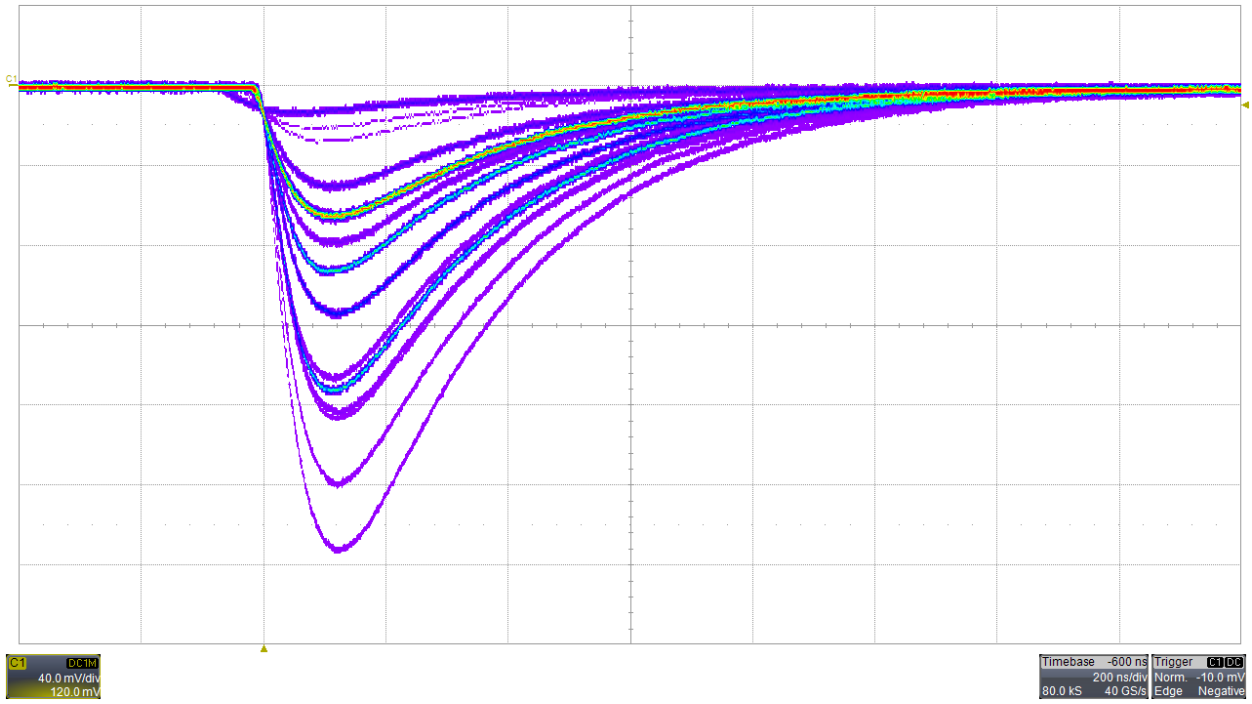
Note: Coaxial sum output with 50Ω external termination, oscilloscope AC coupling

Source = Laser; Bias = +29V; averaged signal



Leading edge = 37ns

Source = LYSO emission; Bias = +28V; persistence display



Safety Information

WARNING – High Voltage

- High voltage may be present during operation
- High voltage stored on capacitors may be present after power is removed
- Improper handling may result in personnel injury or equipment damage

This high-voltage device must be used only by personnel trained and qualified in safe handling, installation, and operation of high-voltage equipment.

CAUTION – Electrostatic Discharge (ESD) Sensitivity

The circuit board can be damaged by electrostatic discharge. Observe precautions for handling electrostatic sensitive devices. Handle only at static-safe workstations.

High-Gain Photodetectors

High-gain photodetectors such as silicon photomultipliers may conduct damaging currents if exposed to high optical signal levels while the bias voltage is applied, or if the bias voltage exceeds the recommended operating range. These devices must be operated only in low-light conditions, and only within the manufacturer's recommended bias voltage range.

Handling and Disassembly

This product may be provided with a protective enclosure. Disassembled enclosure components and circuit boards may contain sharp edges. Take appropriate safety precautions while assembling or disassembling the enclosure and handling disassembled components.

Indoor Use Only

Do not operate this product in a wet or damp environment. Do not operate in an explosive atmosphere.