

MTI04CS/MTI04CQ for Sensor Signal Amplifying

PRODUCT INFORMATION

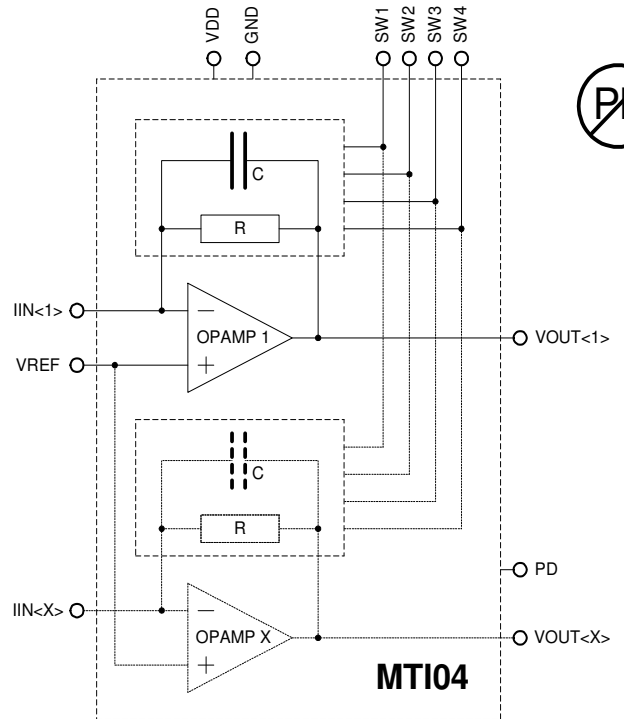
Multi-channel and programmable transimpedance amplifier (TIA)

Special features

- Switchable frequency response compensation for input photodiodes ($< 5\text{pF}$ and $< 80\text{pF}$)
- Good synchronization of the amplification and the temperature coefficients by the transfer function
- Settable power-save mode
- Supply voltage from 2.7 to 5.5V
- Extended temperature range from -40 to $+125^{\circ}\text{C}$

Applications

- amplifiers for sensors with current output in the nA and μA range, such as opto arrays and rows in the UV, VIS, NIR and IR spectra



With the MTI04CS/CQ, MAZeT introduces the second generation of multi-channel transimpedance amplifiers. While the previous ICs of the current TIA were developed mainly for connecting the photodiodes of small array and row sensors such as MAZeT colour sensors, the new devices are suitable for much broader application.

Special features of the MTI04CS/CQ include the option of adapting transimpedance amplifier compensation digitally at two stages (5pF and 80pF) to the sensor input capacity, e.g. diode size for optical components. Monolithic integration of multiple channels with such an amplifier ensures excellent synchronization of amplification and the temperature coefficients of the transmission function, as well as saving a great deal in terms of space and costs for the system. It also allows for digital programming of amplification in 8 stages with very little complex technology in the external circuit, which in turn gives the amplifier a high level of flexibility and bandwidth in application. Not only does this make the IC suitable for a wide range of applications with varying amplification requirements, it also means that the IC can be switched smoothly to the required amplification stage via μC programming, e.g. if input variables fail to reach or exceed a set threshold. Transimpedance programming is carried out via three inputs and affects all channels simultaneously. This means amplification setting has been increased by 4 stages in comparison to the first generation. With the MTI04CS/CQ, 4 channels are integrated into one chip, with the option for adapting this to multiples of 4 (8, 16, 32, etc) if the customer wishes.

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In connection with naked chip processing and corresponding sensors, this enables the use of space-optimized receiver modules that can be cascaded as scanning row modules.

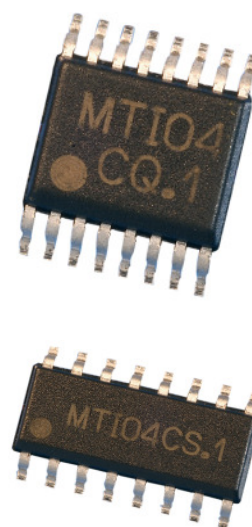
To increase input sensitivity in comparison to previous ICs, amplification has been quadrupled (previously 5M Ω , now 20 M Ω) and the amplifier noise level has been optimized. The smallest current measurement range is now 25 nA. Initial tests on the IC confirm minimal noise accompanied by increased amplification. This means the new MTI04CS/CQ is practically predestined for use in converting the smallest of photocurrents in lower nA areas or converting very high input frequencies in upper kHz and even Mhz areas

Parameter	typ.	Unit	Condition
Input current	0,025	μ A	Stage 1
	0,05	μ A	Stage 2

	20	μ A	Stage 8
Feedback Resistor	20000	k Ω	Stage 1
	1000	k Ω	Stage 2

	25	k Ω	Stage 8
Signal Frequency at Input ($C_{\text{FOTODIODE}} < 5\text{pF}$)	6	kHz	Stage 1
	11	kHz	Stage 2

	800	kHz	Stage 8



The power-down mode is also an innovation in the MTI04CS/CQ, allowing the IC to switch to low-current mode. If the TIA function is not required for a while, bias current consumption can be reduced to 8 μ A. The extended operating temperature range of -40°C to +125°C also provides further application options, e.g. in the mobile handheld sector outside industrial halls and laboratories. Given its many excellent features, such as multi-channels, programmability, sensitivity and bandwidth, the MTI04CS/CQ is ideally suitable for use as an amplifier for opto-arrays and rows in the UV, VIS, NIR and IR sectors. This typically covers applications such as industrial sensors (light grids; measurement of length, fill level, position, density and clearance), devices for surface analysis and temperature measurement (thermal imaging, combustion analysis) and detectors for α , β and γ rays, X-rays and ions, as well as applications for measuring, regulating and controlling light and laser sources.

The MTI circuits are RoHS-compliant and are available in optimized housing forms (SMD) for COB assembly. As a design house, MAZeT also offers customer-specific integration of the MTI04C together with naked chips and sensors at a board level (FR4, ceramic) and cascaded, as well as being able as an ASIC provider to adapt input / output variables, channel numbers, amplification and other IC parameters and functions to customer requirements.

For more information please visit our web site at www.JENCOLOR.de or contact our sales offices!