

## Isolated voltage input module

- Sampling: 250 kS/s per channel at 16-bit;
- ADC: Low noise, SAR
- Input types: Voltage:  $\pm 5$  mV to  $\pm 100$  V<sup>1)</sup>  
Current: 10 mA to 100 mA
- Isolation: 1.5 kV



## Module specifications

TRION-1603-LV series specifications										
Input channels	TRION-1603-LV-6-BNC		6 channels BNC; voltage input							
	TRION-1603-LV-6-L1B		6 channels LEMO; voltage input; 5/12 V sensor supply; TEDS							
Sampling Rate / Resolution	100 S/s to 250 kS/s		16-bit							
Data Transfer	16-bit									
ADC type	SAR (Successive Approximation Register)									
Data rate DMA transfer	6 analog channels: max 3 MB/s									
Input ranges	Voltage	$\pm 5, \pm 10, \pm 20, \pm 50, \pm 100, \pm 200, \pm 500$ mV, $\pm 1$ V, $\pm 2$ V, $\pm 5$ V, $\pm 10$ V, $\pm 20$ V, $\pm 50$ V, $\pm 100$ V <sup>1)</sup>								
	Current <sup>2)</sup>	10, 20, 50, 100 mA								
Input noise (5 mV range)	0 to 10 Hz :		1.5 $\mu$ V <sub>pp</sub>							
	Noise density:		6.4 nV/SQRT(Hz)							
Input impedance	1 M $\Omega$ shunted by 18 pF									
Input bias current	<1 nA									
Input coupling	DC									
Accuracy <sup>3)</sup>	Voltage	DC to 1kHz		$\pm 0.02$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V						
		>1 kHz to 5 kHz		$\pm 0.2$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V						
		>5 kHz to 10 kHz		$\pm 1$ % of reading $\pm 0.02$ % of range $\pm 20$ $\mu$ V						
	Current <sup>2)</sup>	DC to 1kHz		$\pm 0.1$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A						
		>1 kHz to 5 kHz		$\pm 0.2$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A						
		>5 kHz to 10 kHz		$\pm 0.5$ % of reading $\pm 0.02$ % of range $\pm 10$ $\mu$ A						
Gain drift	typical 10 ppm/ $^{\circ}$ C max. 20 ppm/ $^{\circ}$ C									
Offset drift	typical 0.3 $\mu$ V/ $^{\circ}$ C + 10 ppm of range/ $^{\circ}$ C, max 15 $\mu$ V/ $^{\circ}$ C + 20 ppm of range/ $^{\circ}$ C									
Linearity	typical 0.01 %									
Sensor excitation <sup>2)</sup>	1 to 28 V freely programmable @ 1 % $\pm 1$ mV accuracy (max. 100 mA, max 1 W) per channel									
Input configuration	Isolated									
Isolation impedance	Isolation resistance >1 G $\Omega$ ; Isolation capacitance typically 15 pF									
Current input	Internal 10 $\Omega$ shunt; max. 100 mA protected with resettable fuse									
Isolation voltage	1500 V with TRION-1603-LV-6-BNC 800 V with TRION-1603-LV-6-L1B									
Typical Signal-to-noise ratio, spurious-free SNR, Effective number of Bits <sup>4)</sup>	20 mV range			2 V range			100 V range			
		SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>	SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>	SNR	SFDR <sup>5)</sup>	ENOB <sup>6)</sup>
	Sample rate	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]	[dB]	[dB]	[Bit]
	1 kS/s	93	120	15.2	93	120	15.2	93	120	15.2
	10 kS/s	90	120	14.7	93	120	15.2	93	120	15.2
100 kS/s	80	116	13.0	93	120	15.2	93	120	15.2	
250 kS/s	74	100	12.0	93	120	15.2	93	120	15.2	
Typical THD	-97 dB									
Typical CMRR	$\leq 2$ V range	>140 dB @ 50 Hz		>120 dB @ 1 kHz						
	>2 V range	>90 dB @ 50 Hz		>60 dB @ 1 kHz						
Low pass Filter (-3 dB, digital)	10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz									
Characterisic	Bessel or Butterworth									
Filter order	2 <sup>nd</sup> , 4 <sup>th</sup> , 6 <sup>th</sup> , 8 <sup>th</sup>									
Analog antialiasing filter	2 <sup>nd</sup> order Bessel, automatically selected									
Bandwidth (-3 dB, deactivated digital filter)	100 kHz 2 <sup>nd</sup> order Bessel filter									
Crosstalk fin 1 kHz [10 kHz]	$\leq 2$ V Range: 120 dB [105 dB]									
Channel to channel phase mismatch	typically <60 nsec when using the same range; <200 nsec for using different ranges									
Board to board phase mismatch	<30 nsec									
Over voltage protection	$\pm 300$ V <sub>DC</sub>									
ESD protection	IEC61000-4-2: $\pm 8$ kV air discharge, $\pm 4$ kV contact discharge									
Supported TEDS chips <sup>2)</sup>	DS2406, DS2430A, DS2431, DS2432, DS2433									
Power consumption	6 W w/o sensor supply <sup>2)</sup> ; absolute maximum with sensor supply <sup>2)</sup> : 13 W									
<sup>1)</sup> For safety reasons maximum allowed voltage: 70 V <sub>DC</sub> (46.7 V <sub>RMS</sub> AC)										
<sup>2)</sup> TRION-1603-LV-6-L1B only										
<sup>3)</sup> 1 year accuracy 23 $^{\circ}$ C $\pm 5$ $^{\circ}$ C										
<sup>4)</sup> LP Filter in auto mode										
<sup>5)</sup> SFDR excluding harmonics										
<sup>6)</sup> ENOB calculated from SNR										