

TY3-1802/1600-dLV-32

- ▶ Multi-function module with voltage inputs, digital I/Os, counter and CAN
- ▶ Channels: 32 single-ended or 16 differential, synchronous channels
- ▶ Sampling
 - TY3-1802-dLV-32: 18-bit; 200 kS/s per channel
 - TY3-1600-dLV-32: 16-bit; 20 kS/s per channel
- ▶ Input type: 5 V/10 V
- ▶ Features: 2x counter; CAN bus; RS-485; 8x DI; 4x DO



Module specifications

TY3-1802/1600-dLV-32 specifications			
Input channels		TY3-1802-dLV-32	32 channels single-ended or 16 channels fully differential
		TY3-1802-dLV-32-CAN	32 channels single-ended or 16 channels fully differential + CAN
		TY3-1600-dLV-32	32 channels single-ended or 16 channels fully differential
		TY3-1600-dLV-32-CAN	32 channels single-ended or 16 channels fully differential + CAN
Sampling rate / resolution		TY3-1802-dLV-32	High-speed mode: >50 to 200 kS/s, 18-bit Over-sampling mode: 100 S/s to 20 kS/s, 24-bit
		TY3-1600-dLV-32	100 S/s to 20 kS/s 16-bit
Data transfer		TY3-1802-dLV-32: 16-bit / 24-bit / 32-bit TY3-1600-dLV-32: 16-bit	
Onboard data buffer		512 MB	
ADC type		18-bit SAR ²⁾ (Successive Approximation Register)	
Data rate DMA transfer		32 analog channels: max 28 MB/s; 2x counter: max. 6 MB/s	
Input ranges			
– Voltage		±5 V, ±10 V	
Input noise (5 mV range)			
– 0 to 10 Hz		10 μV _{pp}	
– Full bandwidth		1.35 mV _{pp}	
Input impedance		1 MΩ single-ended, 2 MΩ differential	
Input bias current		<25 pA	
Input coupling		DC	
Accuracy ¹⁾	Voltage	DC to 1 kHz	±0.02 % of reading ± 0.01 % of range ±20 μV
		>1 kHz to 5 kHz	±0.5 % of reading ± 0.01 % of range ±20 μV
		>5 kHz to 10 kHz ²⁾	±1 % of reading ± 0.01 % of range ±20 μV
Gain drift		Typical 10 ppm/°C max. 20 ppm/°C	
Offset drift		Typical 0.3 μV/°C + 10 ppm of range/°C, max 15 μV/°C + 20 ppm of range/°C	
Linearity		<20 ppm	
Input configuration		Differential or single-ended with GND sense	
Typical THD		-95 dB	
Typical CMRR in differential mode		100 dB @ 50 Hz; >70 dB @ 1 kHz	

Tab. 34: Module specifications

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Typical signal-to-noise ratio, spurious	10 V range			
Free SNR, effective number of Bits, $V_{pp}^{(2)}$	SNR	SFDR ⁽³⁾	ENOB ⁽⁴⁾	Noise peak to peak
Sample rate	[dB]	[dB]	[Bit]	[mV _{pp}]
0.1 kS/s	127	130	20.8	0.015
1 kS/s	118	130	19.3	0.055
10 kS/s	109	130	17.8	0.22
20 kS/s	106	130	17.3	0.33
50 kS/s ⁽²⁾	102 ⁽²⁾	130 ⁽²⁾	16.7	0.52 ⁽⁵⁾
100 kS/s ⁽²⁾	99 ⁽²⁾	130 ⁽²⁾	16.2	0.66 ⁽⁵⁾
200 kS/s ⁽²⁾	96 ⁽²⁾	125 ⁽²⁾	15.7	1.00 ⁽⁵⁾
Low pass filter (-3 dB, dig.)	1 Hz to 40 % of sample rate freely programmable or OFF			
– Characteristic	Bessel or Butterworth			
– Filter order	2 nd , 4 th , 6 th , 8 th			
Analog antialiasing filter	2 rd order Butterworth			
Bandwidth (-3 dB, deactivated digital filter)	70 kHz 3 rd order Butterworth filter			
Crosstalk fin 1 kHz [10 kHz]	>108 dB			
Channel-to-channel phase mismatch	Typically <30 ns when using the same input range			
Board-to-board phase mismatch	<30 ns			
Common mode voltage	$\pm 12.5 V_{DC}$			
Overvoltage protection	$\pm 50 V_{DC}$			
Digital IN specification	Digital Input	8 CMOS/TTL compatible digital inputs; weak pullup via 100 k Ω		
	Overvoltage protection	$\pm 30 V_{DC}$, 50 V _{PEAK} (for 100 ms)		
	Counter	2 counter channels; TTL input; shared with digital inputs		
	– Counter resolution	32-bit		
	– Counter time base	80 MHz		
	– Max. input freq.	10 MHz		
Digital OUT specification	Counter modes	Period, frequency, pulse width duty cycle and edge separation		
	– Waveform timing	Encoder (angle and linear)		
	– Sensor modes	Basic event counting, gated counting, up/down counting and encoder mode (X1, X2 and X4)		
	– Event counting			
General specification	Digital output	4 DO; TTL		
	Output indication	LED (green = high; off = low)		
	Maximum current	25 mA continuously		
	Power-on default	Low		
General specification	Sensor power supply (per module)	5 V (600 mA) and 12 V (600 mA)		
	ESD protection	IEC61000-4-2: ± 8 kV air discharge, ± 4 kV contact discharge		
	Power consumption	Voltage mode: 6 W		

Tab. 34: Module specifications

TY3-1802/1600-dLV-32 specifications		
Interfaces	CAN bus – CAN specification – CAN physical layer – Bus pin fault protection – Termination – RS485	1 CAN Bus; not isolated; routed to D-SUB-25 CAN 2.0B High-speed $\pm 36\text{ V}_{\text{DC}}$ Programmable: High impedance or 120 Ω 1 RS485 interface dedicated to DAQP series modules

Tab. 34: Module specifications

- 1) 1 year accuracy 23 °C $\pm$ 5 °C

2) LP Filter in auto mode

3) SFDR excluding harmonics
- 4) ENOB calculated from SNR

5) TRION3-1802-dLV-32 only