TMR7102-D, TMR7102-E

CAN Bus Digital Output Current Sensor

Description

TMR7102 series are closed loop current sensors for accurate measurement of DC current with galvanic isolation between primary and secondary circuits.

Features and Benefits

- Low temperature coefficient
- Galvanic isolation
- High immunity to external interference
- High accuracy among all temperature ranges
- CAN bus output

Applications

- Full electric vehicle current measurement
- Hybrid vehicle current measurement
- Battery energy storage systems (BESS)

Selection Guide

Model	Primary Nominal Current	Primary Current Measuring Range	Output Format	Baud Rate
TMR7102-5000D	500 A	±580 A	CAN2.0B	500 kbps
TMR7102-5000E	500 A	±580 A	CAN2.0B	250 kbps

Insulation and Environmental Characteristics

Parameters	Symbol	Typical	Unit
Load Dump Over Voltage	V_{CC}	32	V (400 ms)
Over Voltage	V_{CC}	24	V (1 min)
Reverse Polarity	V_{CC}	-16	V (1 min)
Dielectric Strength	V_D	2.5	kV(50 Hz, 1 min)
Insulation Resistance	R_{IS}	500	MΩ
Creepage Distance	d_{CP}	7.3	mm
Clearance	d_{CL}	6	mm
Ambient Operating Temperature	T_A	-40 ~ +85	°C
Ambient Storage Temperature	T_{STG}	-40 ~ +85	°C
Mass	m	80	g

Catalogue

1. Specifications

T_A = +25 °C, V_{CC} = +13.5 V, unless otherwise noted

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
General Electrical Data						
Primary Nominal Current	I_{PN}	-	-	500	-	A
Primary Current Measuring Range	I_{PM}	-	-580	-	+580	A
Supply Voltage	V_{CC}	±5 %	+9	+13.5*	+16	V
Over Voltage Protection	OVP	±5 %	-	+18	-	V
Current Consumption	I_C	T_A = +25 °C, V_{CC} = +13.5 V, I_P = 0 A	-	30	-	mA
		T_A = +25 °C, V_{CC} = +13.5 V, I_P = 500 A	-	280	-	
Static Performance Data						
Offset Error	I_{OE}	T_A = +25 °C, I_P = 0 A	-	±0.1	-	A
		T_A = -40 °C ~ +85 °C, I_P = 0 ~ ±I_{PN}	-	±0.25	-	A
Accuracy	X_G	T_A = +25 °C, I_P = 0 ~ ±I_{PN}	-0.5	-	+0.5	% I_{PN}
		T_A = -40 °C ~ +85 °C, I_P = 0 ~ ±I_{PN}	-0.6	-	+0.6	% I_{PN}
Linearity	ε_L	T_A = +25 °C, I_P = 0 ~ ±I_{PN}	-	0.2	-	% I_{PN}

*Mean value for 12V lead acid battery system

2. CAN2.0 Output Format

Component	Properties	Unit	Applicable Part Number
Output Mode	CAN2.0B	-	All parts
Baud Rate	500	kbps	TMR7102-5000D
	250	kbps	TMR7102-5000E
Start Bit	big endian	-	All parts
CAN Report Rate	100	Hz	All parts

CAN ID	Data Length	Signal Name	Signal Description	Start Bit	End Bit
0x3C2	8	Current Value	0x80000000 = 0 mA	0	31
			0x80000001 = 1 mA		
			0x7FFFFFFF = -1 mA		
		Error Indicator	0-No error, 1-Error	32	32
		Error Information	Default 0x64, see error lookup table for detail	33	39
		Product Name	Default 0x48	40	55
		Software Revision	Default 0x00	56	63

3. Error Lookup Table

Failure Mode	Signal Value	Error Indicator	Error Infomation
Flash Error	0xFFFFFFFF	1	0x40
Over Current > 580A	0xFFFFFFFF	1	0x41
V_{CC} Out of Range	0xFFFFFFFF	1	0x46

4. Output Error

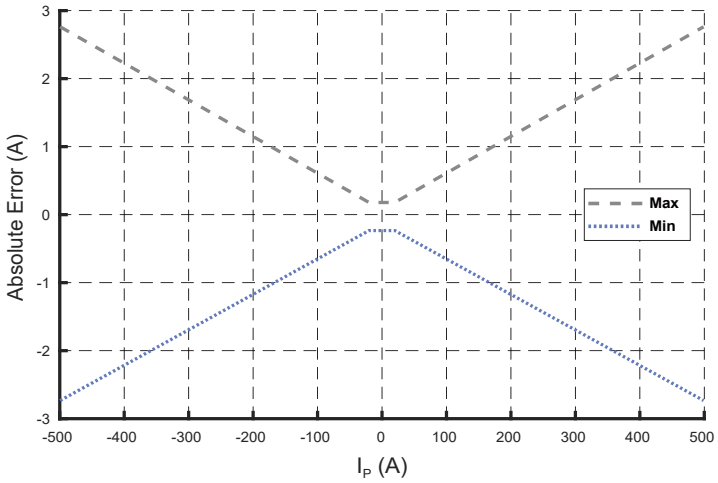


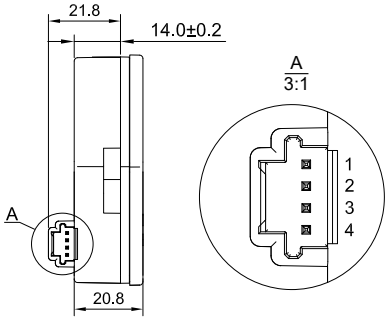
Figure 1. Output Error @ -40 °C ~ +85 °C

5. Application Information

Electrical Connection

Primary through hole dimension: ≤ Φ24 mm

Secondary electrical connection: 4 Position TYCO 1473672-1, wiring info shown in Figure.



Pin Number	Name	Function
1	CAN-L	CAN-L
2	CAN-H	CAN-H
3	GND	Ground
4	V_{CC}	Power supply

Figure 2. Pin configuration and wiring Diagram

Mounting method

2 × M6 copper or SS304 screws (Recommended torque 2.5 N•m).

TMR7102 Guidelines

1) V_{OUT} is positive when the primary current (I_P) is in the same direction as the arrow indication on the label and vice versa.
2) Improper connection may result in permanent damage of the sensor.
3) Sensor is customizable upon request.

6. Dimensions

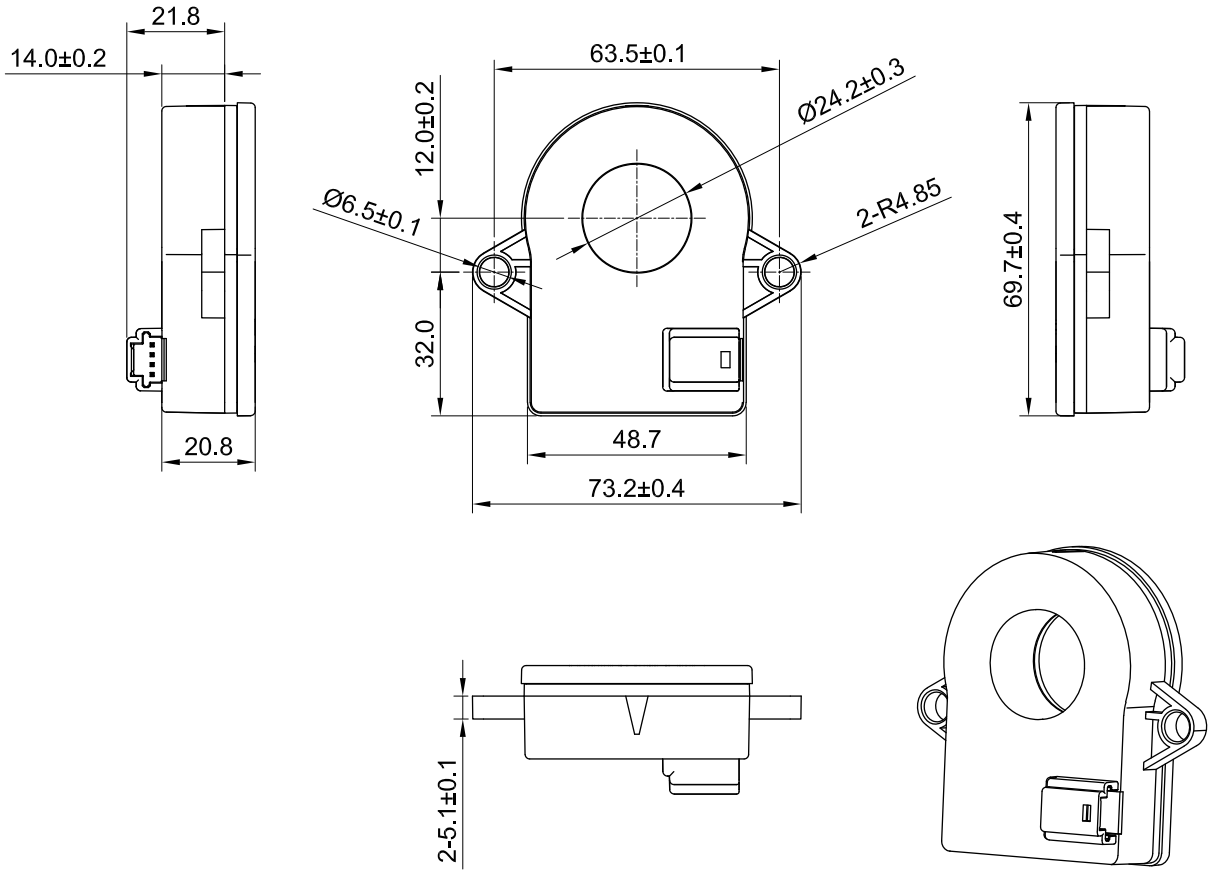


Figure 3. Dimension (unit: mm, tolerances for unmarked scales ±1 mm)

Recycling

The product(s) in this document need to be handed over to a qualified solid waste management services company for recycling in accordance with relevant regulations on waste classification after the end of the product(s) life.

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