



CTS-CS-IB-SA-1000

Current Sensor Module

Features

- Open Loop transducer using the Hall effect sensor
- High insulation level: 4.7 kV RMS AC withstand voltage, ≥ 500 M Ω insulation resistance
- Unipolar +5 V DC power supply
- Primary current measuring range up to ± 1000 A
- Operating temperature range: -40 °C - $+125$ °C
- Output voltage: fully ratio-metric (in sensitivity and offset).

Advantages

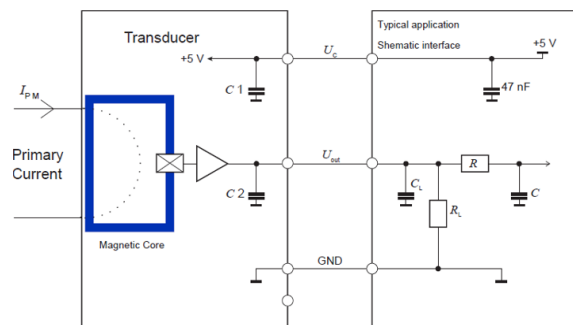
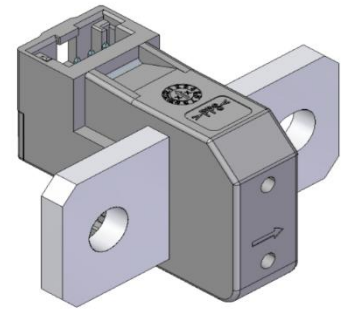
- Designed for automotive high voltage & safety applications
- Components selected per AEC-Q100 requirements
- IATF 16949 manufacturing system compliant
- EMC performance designed to meet CISPR 25, ISO 11452, ISO 7637
- RoHS & REACH compliant

Applications

- Inverters
- EV / HEV applications
- Starter generators
- DC / DC converters
- DC link

Description

- The integrated busbar family is automotive-grade Hall-effect current sensor for EV/HEV powertrain applications. It offers a galvanic separation between the primary circuit (high power) and the secondary circuit (electronic circuit).
- Our integrated busbar series features universal housing that supports multiple current measurement ranges (± 500 A to ± 1000 A) and output variants options for flexible configuration.





Configuration information

Product	Condition	Combination of signal types	Connector pin definition			
			pin1	pin2	pin3	pin4
CTS-CS-IB-SA-1000	CONF 1	1*analog	VDD	OUT	OCD	GND
CTS-CS-IB-DA-1000	CONF 2	2*analog	VDD	OUT1	OUT2	GND
CTS-CS-IB-SU-1000	CONF 3	1*digital	VDD	UTX	URX	GND
CTS-CS-IB-SL-1000	CONF 4	1*digital	VDD	LIN	N/A	GND
CTS-CS-IB-DL-1000	CONF 5	2*digital	VDD	LIN1	LIN2	GND

Product named definitions: I = Integrated B = Busbar S = Single D = Dual A = Analog output
U = Digital output UART L = Digital output LIN

Ordering information

Product	Option Code	Typical Sensitivity	Current Range
CTS-CS-IB-SA-500	500	4.00 mV/A	± 500 A _{pk}
CTS-CS-IB-SA-750	750	2.67 mV/A	± 750 A _{pk}
CTS-CS-IB-SA-1000	1000	2.00 mV/A	± 1000 A _{pk}

Absolute Maximum Ratings

Parameter	Symbol	Unit	Specification
Positive Supply Voltage (overvoltage)	V _{DD}	V	+8
Negative Supply Voltage	V _{DD}	V	-0.3
Ambient storage temperature	T _A	°C	-40 to 125
Electrostatic discharge voltage (HBM)	U _{ESD-HBM}	kV	± 2
RMS voltage for AC insulation test	U _D	kV	4.7
Insulation resistance	R _{INS}	MΩ	500
Continuous Output Source Current	I _{out_source}	mA	25



Continuous Output Sink Current	I_{out_max}	mA	50
Short-circuit Output Current to V _{DD}	I_{SHORT_VDD}	mA	60
Short-circuit Output Current to GND	I_{SHORT_GND}	mA	-100
Clearance distance	D _{CL}	mm	16.5
Creepage distance	D _{CP}	mm	9.5

NOTE: exceeding the absolute maximum ratings may cause permanent damage to the sensor module. Exposure to absolute maximum-rated conditions for extended periods of time may affect sensor module reliability.

Operating characteristics in nominal range

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Electrical Data						
Supply voltage	V _{DD}	V	4.5		5.5	
Ambient Operating temperature	T _A	°C	-40		125	
Current consumption	I _C	mA		15.5	19	V _{DD} = 5 V, T _A = 25 °C
Output voltage	V _{out}	V	V _{out} = (V _{DD} / 5) × (V _O + S × I _p)			
Offset voltage	V _O	V		2.5		V _{DD} = 5 V, I _p = 0 A
Load capacitance	C _L	nF		4.7	6	
Load resistance	R _L	KΩ	10			
Output internal resistance	R _{out}	Ω		1	5	V _{OUT} = 50%V _{DD} , I _{LOAD} = 10 mA
Output Voltage Linear Swing	V _{OUT_LSW}	%V _{DD}	10		90	R _L ≥ 10 kΩ
Diagnostics Data						
VDD undervoltage detection threshold (power-up)	V _{DD_UV_PU}	V		2.8		VDD rising
VDD undervoltage detection threshold (power-down)	V _{DD_UV_PD}	V		2.5		VDD falling
CRC error output level	V _{OUT_CRC}	%V _{DD}	0		4	R _L ≥ 10 kΩ, V _{DD} = 5 V
Broken OUT Output Level	V _{OUT_BROKEN}	%V _{DD}	0		4	R _L ≥ 10 kΩ, V _{DD} = 5 V



Performance Data						
Thermal Sensitivity Drift	$\Delta^T S$	%S	-1.5		1.5	$V_{DD} = 5V$
Sensitivity Ratiometric Drift	$\Delta^R S$	%S/% V_{DD}		0.16		$V_{DD} = 5V$
Offset error	$V_{OQ\Delta}$	mV		± 5		$T_A = 25^\circ C, V_{DD} = 5V$
Thermal Offset Drift	$\Delta^T V_{OQ}$	mV		± 6		$V_{DD} = 5V$
Offset Ratiometric Drift	$\Delta^R V_{OQ}$	mV/% V_{DD}		1.6		$V_{DD} = 5V$
Magnetic Offset Drift (hyst.)	$\Delta^T M$	mV	-6		6	$T_A = 25^\circ C, V_{DD} = 5V, \pm I_P$
Linearity Error	N_L	% I_P	-0.5		0.5	$T_A = 25^\circ C, V_{DD} = 5V, I_P = I_{PM}$
Step Response Time	T_R	μs			2	100 A/ μs
Frequency Bandwidth	BW	kHz	30			-3 dB
Phase shift	Δ_ϕ	$^\circ$	4			1 kHz

Total error ϵ_{Tot}



Primary current	Total error T = 25 °C		Total error -40°C ≤ T ≤ 125°C	
	A	(%)I _{pm}	A	(%)I _{pm}
-1000	10	1%	15	1.5%
0	4	-	6	-
1000	10	1%	15	1.5%

I_{pm} = Peak primary current

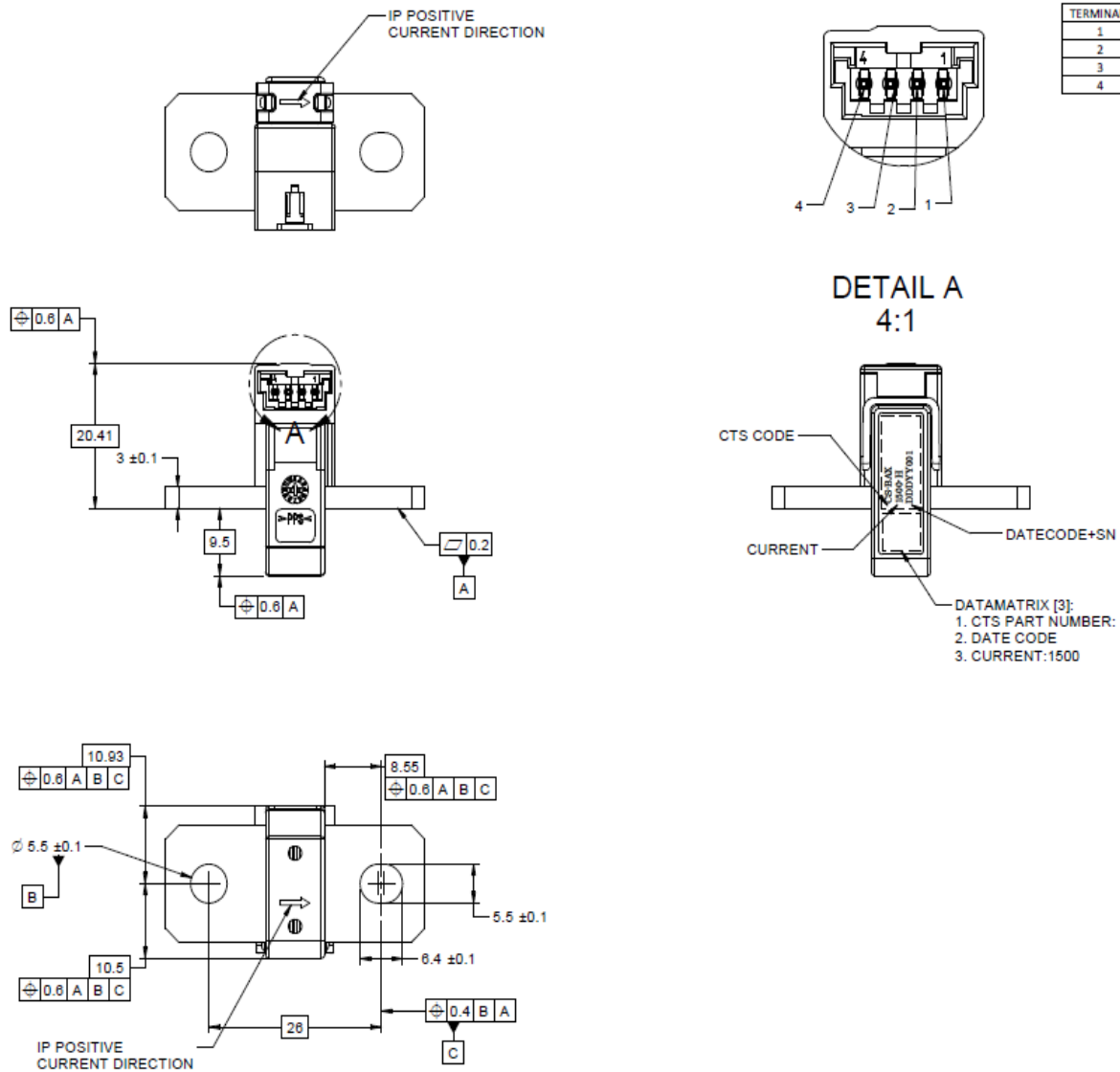


Dimensions

All the dimensions are expressed in [mm], unless otherwise specified.

Note: Connector Molex Duraclik 4 ways mates with: ISL version

Housing 4w white: 5601230400; Retainer 4w grey: 5601250400; Terminal tin plated: 5601240101.





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