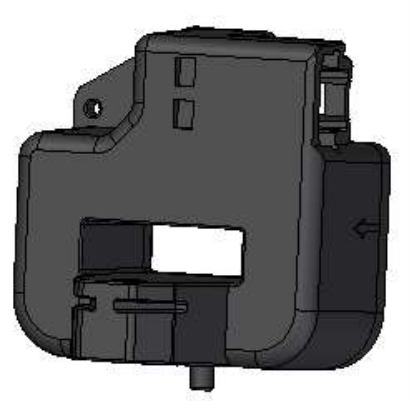
CTS-CS-BAX-20-XXXX-H

Current Sensor Module

Features

- Low Hysteresis
- High Permeability
- Unipolar 5 V_{DC} Power Supply
- Open Loop Hall-Effect Measurement
- Primary Current Range up to ±1500 A_{PK}
- Temperature Range: -40 to 125°C
- Fully Ratio-Metric



Advantages

- Excellent Accuracy
- Excellent Output Linearity ≤1 %FS
- Low Thermal Offset Drift ≤5 mV (T-0)
- Low Thermal Sensitivity Drift ≤1.2 %S (T-0)
- High Bandwidth ≥40 kHz
- Non-Intrusive Sensing (No Losses)
- Small Size, Lightweight

Applications

- Inverters
- DC Link
- DC/DC Converters

Description

The CTS-CS-BAX-20-XXXX-H is an analog open loop current sensor module designed for non-intrusive and galvanically isolated measurement of AC and DC currents. Thanks to its design, the CTS-CS-BAX-20-XXXX-H can be used in high power applications such as automotive traction inverters or DC/DC converters.

Ordering Information

Product	Option Code	Typical Sensitivity	Current Range
CTS-CS-BAX-20-0250-H	0250	8.00 mV/A	±250 A_{PK}
CTS-CS-BAX-20-0500-H	0500	4.00 mV/A	±500 APK
CTS-CS-BAX-20-1000-H	1000	2.00 mV/A	±1000 A_{PK}
CTS-CS-BAX-20-1500-H	1500	1.33 mV/A	±1500 A_{PK}

Option Codes ⇒ Current Range. Current Range defines the peak current value.
CTS-CS-BAX-20-XXXX (Option Code)-H.
Contact CTS for custom current ranges/sensitivity.

Absolute Maximum Ratings (uUpowered)

Parameter	Symbol	Value	Unit	Condition
Positive Supply Voltage	V_{CC}	+18	V	
Reverse Supply Voltage	V_{CC_REV}	-18	V	
Positive Output Voltage	V_{OUT}	+16	V	
Reverse Output Voltage	V_{OUT_REV}	-6	V	
Positive Output Current	I_{OUT}	10	mA	
Reverse Output Current	I_{OUT_REV}	-10	mA	
Operating Ambient Temperature	T_A	-40 to 125	°C	
Storage Temperature	T_S	-40 to 125	°C	
ESD Human Body Model	$U_{ESD-HBM}$	±8	kV	JEDEC JS-001
RMS Voltage, AC Insulation test	U_{INS}	2.5	kV	IEC 60664-1
Clearance Distance	D_{CL}	4.5	mm	
Creepage Distance	D_{CP}	7.5	mm	
Comparative Tracking Index	CTI	≥ 600	/	

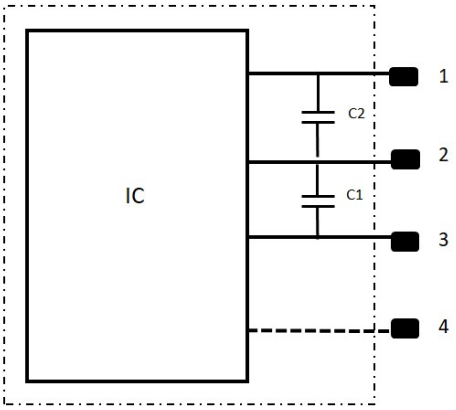
IMPORTANT: Exceeding the absolute maximum ratings may cause permanent damage to the sensor module. Exposure to absolute maximum-rated conditions for extended periods of time may affect sensor module reliability.

Nominal Operating Ratings (Powered)

Operating Parameters T_A = -40 to 125°C, V_{CC} = 5V±10%, unless otherwise specified.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{CC}	-	4.5	5	5.5	V
Supply Current	I_{CC}	No output load		13	15	mA
Output Resistive Load	R_L	OUT to GND	4.7	10	-	kΩ
Output Capacitor Load	C_L	OUT to GND	-	-	5	nF
Linear Output Range	V_{OUTLIN}	$R_L \geq 10k\Omega$	10	-	90	$\%V_{CC}$
Output Quiescent Voltage	V_{OQ}	$R_L \geq 10k\Omega$, V_{CC} = 5V	-	50	-	$\%V_{CC}$
Under-Voltage Detection	V_{CC_UVDH}	TA = 25°C	4.0	4.2	4.4	V
	V_{CC_UVDL}	TA = 25°C	3.6	3.8	4.0	V
Over-Voltage Detection	V_{CC_OVDH}	TA = 25°C	-	6.5	-	V
	V_{CC_OVDL}	TA = 25°C	-	6.0	-	V
Output Voltage with Broken GND	V_{BRK_L}	R_L to GND, $R_L \geq 10k\Omega$, V_{CC} = 5V	-	2	4	$\%V_{CC}$
	V_{BRK_H}	R_L to V_{CC}, $R_L \geq 10k\Omega$, V_{CC} = 5V	96	98	100	$\%V_{CC}$

ELECTRICAL DIAGRAM



Components list	
IC	Hall sensor ASIC
C1	Decoupling Capacitor
C2	Decoupling Capacitor

Pin out	
1	OUT
2	GND
3	VCC
4	OPT

Current Ranges

Operating Parameters T_A = 25°C, V_{CC} = 5V±10%, unless otherwise specified.

CTS-CS-BAX-20-0250-H

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Primary Current Range	I_P	-	-250		250	A
Sensitivity	S	V_{CC} = 5V		8.00		mV/A
Output Quiescent Voltage	V_{OQ}	V_{CC} = 5V, R_L ≥ 10kΩ		2.5		V
RMS Output Noise	N_{RMS}	V_{CC} = 5V	-	1.9	-	mV_{RMS}

CTS-CS-BAX-20-0500-H

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Primary Current Range	I_P	-	-500		500	A
Sensitivity	S	V_{CC} = 5V		4.00		mV/A
Output Quiescent Voltage	V_{OQ}	V_{CC} = 5V, R_L ≥ 10kΩ		2.5		V
RMS Output Noise	N_{RMS}	V_{CC} = 5V	-	0.9	-	mV_{RMS}

CTS-CS-BAX-20-1000-H

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Primary Current Range	I_P	-	-1000		1000	A
Sensitivity	S	V_{CC} = 5V		2.00		mV/A
Output Quiescent Voltage	V_{OQ}	V_{CC} = 5V, R_L ≥ 10kΩ		2.5		V
RMS Output Noise	N_{RMS}	V_{CC} = 5V	-	1.0	-	mV_{RMS}

CTS-CS-BAX-20-1500-H

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Primary Current Range	I_P	-	-1500		1500	A
Sensitivity	S	V_{CC} = 5V		1.33		mV/A
Output Quiescent Voltage	V_{OQ}	V_{CC} = 5V, R_L ≥ 10kΩ		2.5		V
RMS Output Noise	N_{RMS}	V_{CC} = 5V	-	0.7	-	mV_{RMS}

Accuracy Specifications

Operating Parameters T_A = -40 to 125°C, V_{CC} = 5V±10%, unless otherwise specified.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Sensitivity Resolution	S_Δ	T_A = 25°C, V_{CC} = 5V	-	1	-	%S
Thermal Sensitivity Drift	$\Delta^T S$	V_{CC} = 5V	-1.25	-	1.25	%S
Sensitivity Ratiometry Error	$\Delta^R S$	V_{CC} = 4.85 to 5.15V	-0.55	-	0.55	%S
Sensitivity Lifetime Drift	$\Delta^R S_{LIFE}$	T_A = 25°C	-	0.5	-	%S
Offset Resolution	$V_{OQ\Delta}$	TA = 25°C, V_{CC} = 5V	-5	-	5	mV
Thermal Offset Drift	$\Delta^T V_{OQ}$	V_{CC} = 5V	-5	-	5	mV
Offset Ratiometry Error	$\Delta^R V_{OQ}$	V_{CC} = 4.85 to 5.15V	-5	-	5	mV
Offset Lifetime Drift	$\Delta^T V_{OQ\_LIFE}$	T_A = 25°C	-	0.5	-	mV
Magnetic Sensitivity Drift	Δ^T MS	V_{CC} = 5V	-	0.1	-	%S
Magnetic Offset Drift	Δ^T MHys	V_{CC} = 5V, ±I_P	-0.2	-	0.2	%I_P
Linearity Error	N_L	Full Range of I_P	-1	-	1	%I_P
Step Response Time	T_R	@ 100 A/µs	-	2.5	5	µs
Frequency Bandwidth	BW	@ -3 dB (output)	40	-	-	kHz
Phase Shift	Δ ϕ	@ DC to 1 kHz	4	-	-	°

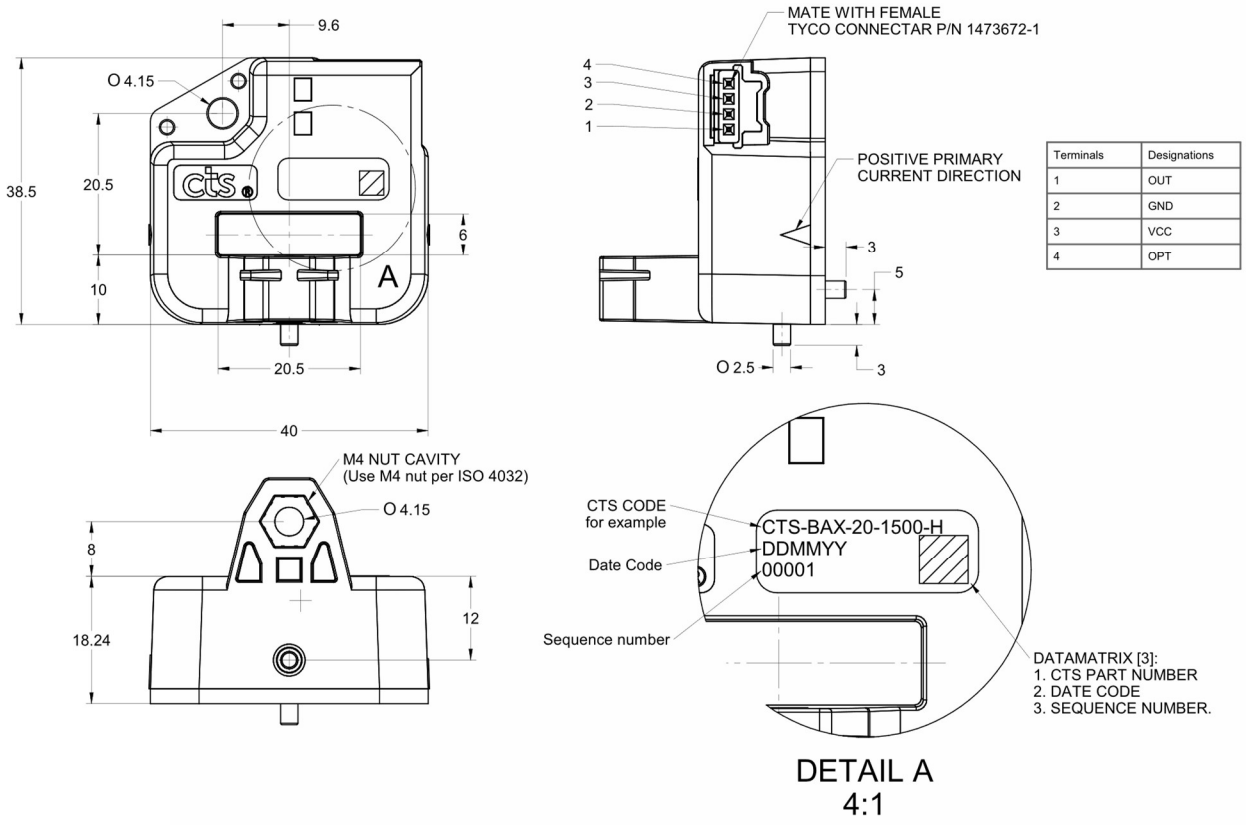
Durability Specifications

Specifications are according to defined standards. Please contact us for more details.

Dimensions

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

NOTE: Dimensions are preliminary



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