CTS-CS-PAX-12-XXXX

Current Sensor Module

Features

- Low Hysteresis
- High Permeability
- Unipolar 5 V DC Power Supply
- Open Loop Hall-Effect Measurement
- Primary Current Range up to ±1000 A_{PK}
- Temperature Range: -40 to 125 °C
- Fully Ratio-Metric

Advantages

- Excellent Accuracy
- High Linearity
- Excellent Output Linearity
- Low Thermal Offset Drift <5 mV (T-0)
- Low Thermal Sensitivity Drift <1 % (T-0)
- High Bandwidth (>30 kHz)
- Non-Intrusive Sensing (no losses)
- Small Size, Lightweight

Applications

- Inverters
- DC Link
- DC/DC Converters

Description

The CTS-CS-PAX-12-XXXX is an analog open loop current sensor module designed for non-intrusive and galvanically isolated measurement of AC and DC currents. Thanks to it's design CTS-CS-PAX-12-XXXX can be used in high power applications such as automotive inverters or DC/DC converters.

Ordering Information

Product	Option Code	Typical Sensitivity	Current Range
CTS-CS-PAX-12-0250	0250	8.00 mV/A	±250 A_{PK}
CTS-CS-PAX-12-0500	0500	4.00 mV/A	±500 A_{PK}
CTS-CS-PAX-12-0750	0750	2.67 mV/A	±750 A_{PK}
CTS-CS-PAX-12-1000	1000	2.00 mV/A	±1000 A_{PK}

Option Codes ⇒ Current Range. Current Range defines the peak current value.
CTS-CS-PAX-12-XXXX (Option Code).
Contact CTS for custom current ranges/sensitivity.

Absolute Maximum Ratings (unpowered)

Parameter	Symbol	Value	Unit	Condition
Positive Supply Voltage	V_{DD}	+10	V	
Reverse Supply Voltage	V_{DD_REV}	-0.3	V	
Positive Output Voltage	V_{OUT}	+10	V	
Reverse Output Voltage	V_{OUT_REV}	-0.3	V	
Output Current	I_{OUT}	+70	mA	
Reverse Output Current	I_{OUT_REV}	-50	mA	
Operating Ambient Temperature	T_A	-40 to 125	°C	
Storage Temperature	T_S	-40 to 125	°C	
ESD Human Body Model	$U_{ESD-HBM}$	2	kV	JESD 22-A 114-B Class 2
RMS Voltage, AC insulation test	U_{INS}	2.5	kV	IEC 60664-1
Clearance distance	D_{CL}	≥ 5.5	mm	
Creepage distance	D_{CP}	≥ 8.0	mm	
Comparative Tracking Index	CTI	≥ 600	/	

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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 150°C, V_{DD} = 5V±10%, unless otherwise specified.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	V_{DD}	-	4.5	5	5.5	V
Supply Current	I_{DD}	No output load		12.5	15.0	mA
Output Resistive Load	R_L	For high linearity	10	25	200	kΩ
Output Capacitor Load	C_L	-	1	4.7	10	nF
Linear Output Range	V_{OUTLIN}	$R_L \geq 10k\Omega$	10	-	90	$\%V_{DD}$
Output Quiescent Voltage	V_{OQ}	$R_L \geq 10k\Omega$, V_{DD} = 5V	-	50	-	$\%V_{DD}$
Diagnostic Band	DIAG	$10k\Omega \leq R_L \leq 200$ V_{DD} = 5 V	0	-	4	$\%V_{DD}$
Under-Voltage Detection	V_{DD_UVD}	Detected Voltage	4.0	-	4.5	V
	V_{DD_UVH}	Hysteresis	0.01	-	0.2	V
Over-Voltage Detection	V_{DD_OVD}	Detected Voltage	6.7	-	7.4	V
	V_{DD_OVH}	Hysteresis	0.37	-	0.66	V
Broken GND Ouptut Level	-	$R_L \geq 10k\Omega$, V_{DD} = 5V	96	-	100	$\%V_{DD}$
Broken VDD Ouptut Level	-	$R_L \geq 10k\Omega$, V_{DD} = 5V	0	-	4	$\%V_{DD}$

Current Ranges

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

CTS-CS-PAX-12-0250

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

CTS-CS-PAX-12-0500

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

CTS-CS-PAX-12-0750

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Primary Current Range	I_P	-	-750		750	A
Sensitivity	S	V_{DD} = 5V		2.67		mV/A
Output Quiescent Voltage	V_{OQ}	V_{DD} = 5V, R_L ≥ 10kΩ		2.5		V

CTS-CS-PAX-12-1000

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

Accuracy Specifications

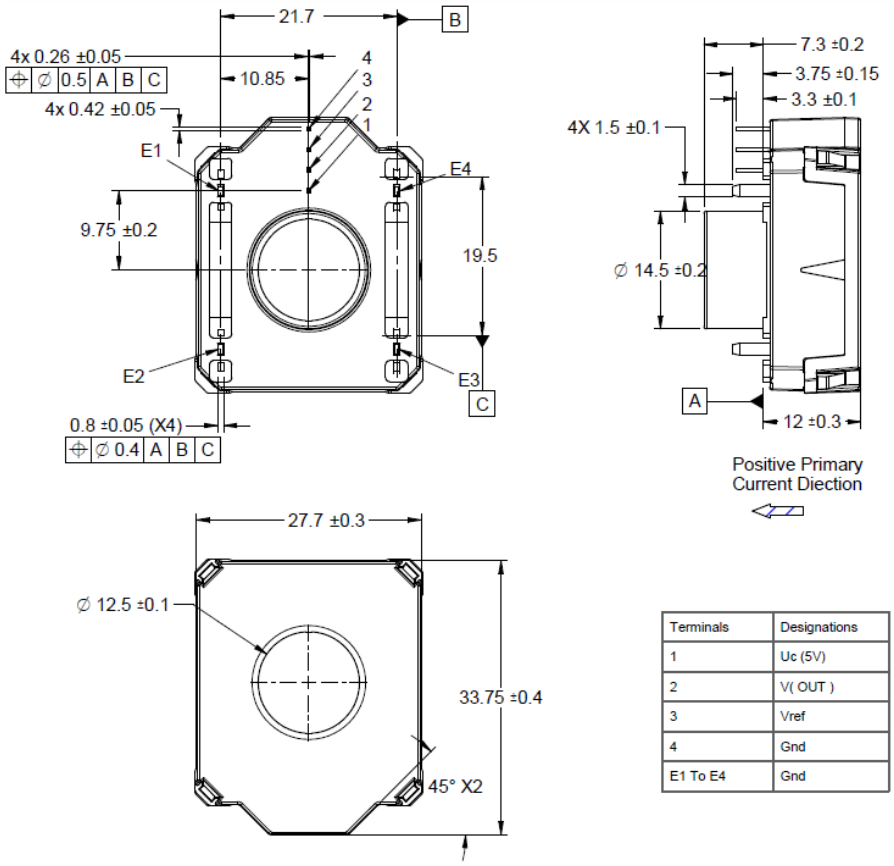
Operating Parameters T_A = -40 to 125°C, V_{DD} = 5V±10%, unless otherwise specified.

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Sensitivity Resolution	S_Δ	T_A = 25°C, V_{DD} = 5V	-0.5	-	0.5	%S
Thermal Sensitivity Drift	$\Delta^T S$	V_{DD} = 5V	-1	-	1	%S
Sensitivity Ratiometry Drift	$\Delta^R S$	V_{DD} = 5V	-0.5	-	0.5	%S
Offset Resolution	$V_{OQ\Delta}$	TA = 25°C, VDD = 5V	-2.5	-	2.5	mV
Thermal Offset Drift (total)	$\Delta^T V_{OQ}$	V_{DD} = 5V	-5	-	5	mV
Offset Ratiometry Drift	$\Delta^R V_{OQ}$	V_{DD} = 5V	-0.4	-	0.4	$\%V_{OQ}$
RMS Output Noise	N_{RMS}	V_{DD} = 5V	-	10	-	mV_{RMS}
Magnetic Offset Drift (hyst.)	$\Delta^T M$	T_A = 25°C, V_{DD} = 5V, $\pm I_P$	-2	-	2	mV
Linearity Error	N_L	Full Range of I_P	-1	-	1	$\%I_P$
Step Response Time	T_R	@ 100 A/µs	-	2	4	µs
Frequency Bandwidth	BW	@ -3 dB (output)	30	-	-	kHz
Phase shift	Δ_ϕ	@ DC to 1 kHz	3	-	-	°

Dimensions

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

NOTE: Dimensions are preliminary



Terminals	Designations
1	Uc (5V)
2	V(OUT)
3	Vref
4	Gnd
E1 To E4	Gnd

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