

4-20mA CURRENT TRANSMITTER WITH SENSOR EXCITATION AND LINEARIZATION

FEATURES

- Low Unadjusted Error
- Two Precision Current Sources
- Linearization
- 2- or 3-Wire RTD Operation
- Low Offset Drift
- Low Output Current Noise
- High PSR
- High CMR
- Wide Supply Range

APPLICATIONS

- Industrial Process Control
- Factory Automation
- SCADA Remote Data Acquisition
- Remote Temperature and Pressure Transducers

DESCRIPTION

The XTR105 is a monolithic 4-20mA, 2-wire current transmitter with two precision current sources. It provides complete current excitation for platinum RTD temperature sensors and bridges, instrumentation amplifiers, and current output circuitry on a single integrated circuit.

Versatile linearization circuitry provides a 2nd-order correction to the RTD, typically achieving a 40:1 improvement in linearity.

Instrumentation amplifier gain can be configured for a wide range of temperature or pressure measurements. Total unadjusted error of the complete current transmitter is low enough to permit use without adjustment in many applications. This includes zero output current drift, span drift, and nonlinearity. The XTR105 operates on loop power-supply voltages.

ORDERING INFORMATION⁽¹⁾

PRODUCT	PACKAGE DESIGNATOR	PACKAGE	ORDERABLE PART NUMBER	PACKAGE QUANTITY
XTR105	TD	Bare die in waffle pack ⁽²⁾	XTR105TDC1	80
			XTR105TDC2	10

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

(2) Processing is per the Texas Instruments commercial production baseline and is in compliance with the Texas Instruments Quality Control System in effect at the time of manufacture. Electrical screening consists of DC parametric and functional testing at room temperature only. Unless otherwise specified by Texas Instruments AC performance and performance over temperature is not warranted. Visual Inspection is performed in accordance with MIL-STD-883 Test Method 2010 Condition B at 75X minimum.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

BARE DIE INFORMATION

DIE THICKNESS	BACKSIDE FINISH	BACKSIDE POTENTIAL	BOND PAD METALLIZATION COMPOSITION	BOND PAD THICKNESS
10.5 mils.	Silicon with backgrind	Floating	AlCu (0.5%)	1100 nm



Table 1. Bond Pad Coordinates in Microns

DESCRIPTION	PAD NUMBER	X MIN	Y MIN	X MAX	Y MAX
IR1	1	-1612.9	-462.28	-1511.3	-360.68
VIN-	2	-1176.02	-833.12	-1074.42	-731.52
RG	3	-972.82	-817.88	-805.18	-716.28
RG	4	-590.55	-833.12	-488.95	-731.52
RG	5	-180.34	-833.12	-12.7	-731.52
RG	6	157.48	-802.64	259.08	-701.04
N/C	7	407.67	-848.36	509.27	-746.76
N/C	8	613.41	-848.36	715.01	-746.76
IRET	9	1483.36	-848.36	1584.96	-746.76
IO	10	1511.3	-513.08	1612.9	-411.48
E (Emitter)	11	1483.36	-281.94	1584.96	-180.34
B (Base)	12	1483.36	514.35	1584.96	615.95
V+	13	1508.76	751.84	1610.26	854.44
VREG	14	175.26	716.28	276.86	817.88
VLIN	15	-1123.95	731.52	-1022.35	833.12
VIN+	16	-1408.43	731.52	-1306.83	833.12
N/C	17	-1612.9	576.58	-1511.3	678.18
IR2	18	-1612.9	360.68	-1511.3	462.28

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
XTR105TDC1	LIFEBUY			0	80	RoHS & Green	Call TI	N / A for Pkg Type			
XTR105TDC2	LIFEBUY			0	10	RoHS & Green	Call TI	N / A for Pkg Type			

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

⁽³⁾ MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

⁽⁴⁾ There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

⁽⁵⁾ Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

⁽⁶⁾ Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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