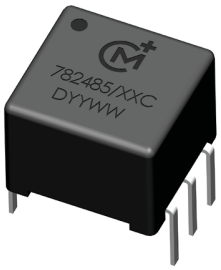
782485 Series

ADM2485 Compatible Converter Transformers



FEATURES

- Analog devices ADM2485 compatible
- 2.5kVrms isolation 'Hi Pot Test'
- Low profile
- Toroidal construction
- Fully encapsulated
- Industrial temperature range
- Backward compatible with Sn/Pb soldering systems

DESCRIPTION

The 782485 series of converter transformers are specifically designed for use with Analog Devices chipsets to provide isolated RS-485 and RS-422 interfaces. Carefully controlled turns ratios ensure consistent performance whilst a toroidal construction minimises EMI.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Nominal Output Voltage	Max. Output Current	Turns Ratio	Package Style
	V	V	mA		
782485/35C	3.3	6.0	200	1CT:2.2CT	DIL
782485/55C	5.0	6.0	200	1CT:1.5CT	DIL

CHARACTERISTICS

Parameter	Conditions	782485/35C			782485/55C			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Primary Inductance, L_p	100kHz, 10mV	140	234	260	315	513	585	µH
Leakage Inductance, L_L	100kHz, 10mV		168			192		nH
Interwinding Capacitance, C_{ww}	100kHz, 10mV		24	50		37	50	pF
Primary DC Resistance, R_{DC}	<0.1VDC		273	500		383	600	mΩ
Volt-time Product, Et[1]	5kHz, 5V		12			19		Vµs

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Production tested for 1 second	2500			Vrms

TEMPERATURE CHARACTERISTICS

Operating free air temperature range	-40°C to 85°C
Storage temperature range	-40°C to 125°C
Isolation voltage (flash tested for 1 second)	2.5kVrms

TECHNICAL NOTES

ISOLATION VOLTAGE

'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage' are all terms that relate to the same thing, a test voltage, applied for a specified time, across a component designed to provide electrical isolation, to verify the integrity of that isolation.

All products in this series are 100% production tested at their stated isolation voltage.

A question commonly asked is, "What is the continuous voltage that can be applied across the part in normal operation?"

For a part holding no specific agency approvals both input and output should normally be maintained within SELV limits i.e. less than 42.4V peak, or 60VDC. The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with several hundred volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

REPEATED HIGH-VOLTAGE ISOLATION TESTING

It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. This series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enamelled wire. While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation. Any material, including this enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

This consideration equally applies to agency recognised parts rated for better than functional isolation where the wire enamel insulation is always supplemented by a further insulation system of physical spacing or barriers.

RoHS COMPLIANT

For full details go to
www.murata.com/en-global/products/power/rohs

All specifications typical at T_A=25°C unless otherwise specified.

1 Where pulse applied across pins 1 and 2.

APPLICATION NOTES

Typical applications

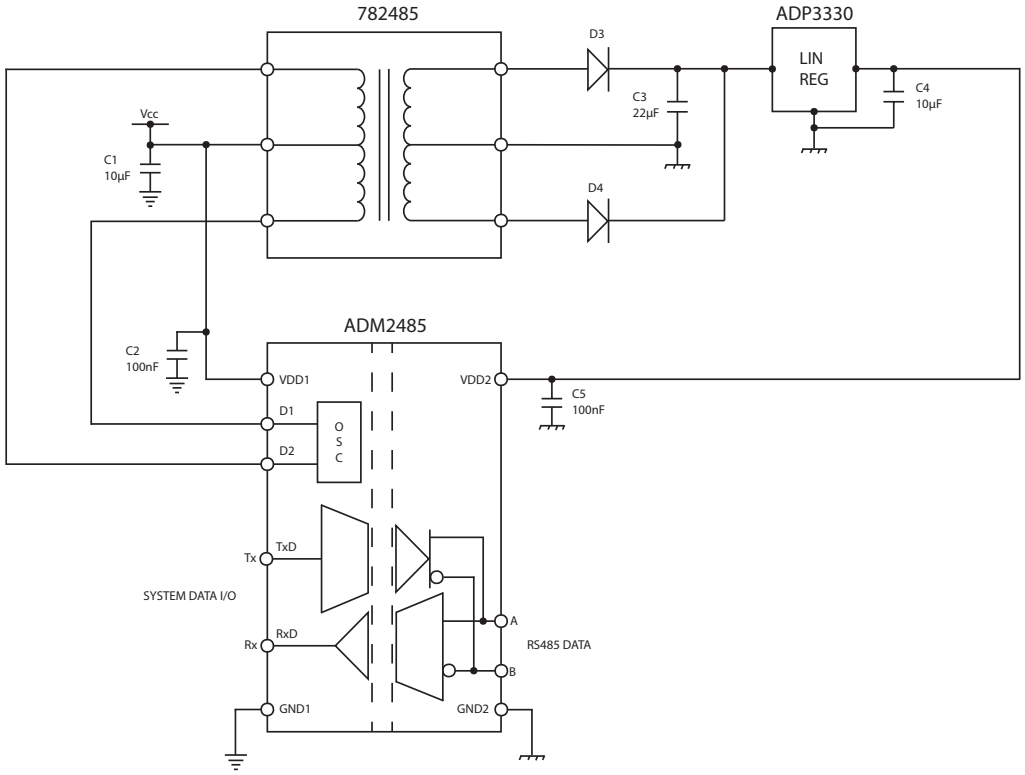
The 782485 transformers are designed as companion power transformers for the Analog Devices Inc (ADI) ADM2485 Isolated 485 Transceiver IC.

The transformers are designed to operate from the 2 driver outputs of the oscillator within the ADM2485 IC (D1 and D2) to drive the primary side of the 782485 transformers, with the centre-tapped pin connected to the input supply line (Vcc) as shown in Figure 1.

There are 2 transformers in the series that are chosen depending on the system supply voltage (Vcc), with a 3.3V supply the 782485/35C should be used and if a 5V supply is provided the 782485/55C should be used. Both transformers provide an unregulated 6V output on their secondary terminals, this reduces to approximately 5V after rectification (D3 and D4 in Figure 1), which can then be regulated with a linear regulator, or if using a suitable pi-filter may be able to work without linear regulation.

The regulator shown in Figure 1 is the ADI ADP3330 3V linear regulator, however, any suitable low drop-out device could be used capable of supplying at least 75mA of current with a set voltage regulation from 5V to 3V (e.g. MAX8881, TLV7003DCKR, NCP160-D and TSL9A12V33CX5).

Typical application circuit



Other applications

The transformers could be used in other switching applications where a step-up from 5V to 6V or 3.3V to 6V at the transformer (that is pre-regulation) is required, typically giving a 5V regulated output. Operating frequencies from around 100kHz to 500kHz for the 3.3V input and 200kHz to 600kHz for the 5V input version in a centre- tapped push-pull configuration can be supported. The maximum output current on the secondary windings is 200mA, therefore after regulation typically a 1W total output power at 5V may be possible with a different driver. Hence any other IC or a discrete oscillator with this frequency range and current switching capability could be used to produce an isolated power supply for an isolated data interface or any other suitable isolated application using these transformers.

Note: if using a discrete or alternative IC ensure that there is a small “dead-time” between switching cycles and that both drivers are not “on” at the same time (however, both can be “off” at the same time).

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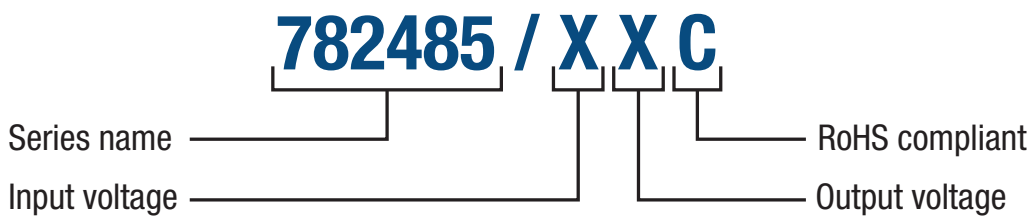
PART NUMBER STRUCTURE



RoHS COMPLIANCE AND WAVE SOLDERING INFORMATION

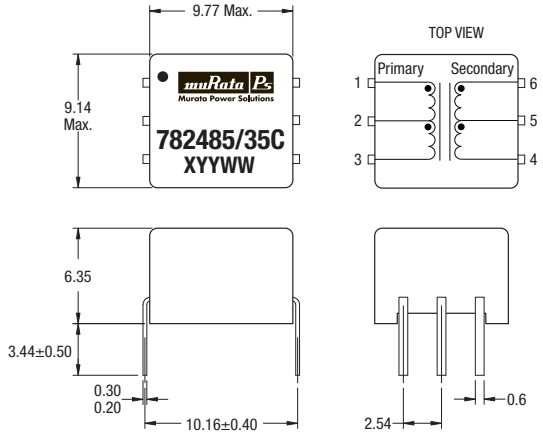
RoHS COMPLIANT

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300ºC for 10 seconds. Wave solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. The pin termination finish on this product series is Matte Tin. The 782485 series is backward compatible with Sn/Pb soldering systems.

For further information, please visit www.murata.com/en-global/products/power/rohs

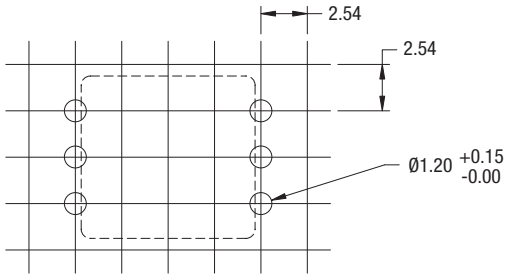
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



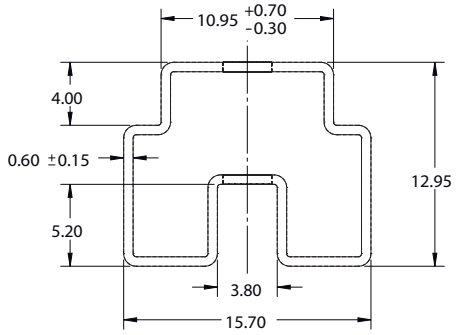
Unless otherwise stated all dimensions in mm ±0.25.
All pins on a 2.54 pitch and within ±0.25 of true position.
Package Weight 1.0g TYP.

RECOMMENDED FOOTPRINT DETAILS



Unless otherwise stated all dimensions in mm ± 0.25.
All pins on a 2.54 pitch and within ±0.25 of true position.

TUBE OUTLINE DIMENSIONS



Unless otherwise stated all dimensions in mm ±0.25.
Tube length: 500 ±2.
Tube quantity: 50.
Tube material: Antistatic coated clear PVC.

DISCLAIMER

Unless otherwise stated in the datasheet, all products are designed for standard commercial and industrial applications and NOT for safety-critical and/or life-critical applications.

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These applications include but are not limited to:

- Aircraft equipment
- Aerospace equipment
- Undersea equipment
- Power plant control equipment
- Medical equipment
- Transportation equipment (automobiles, trains, ships, etc.)
- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Data Processing equipment

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