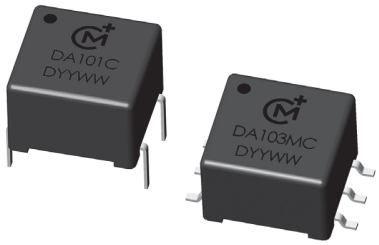
DA100 Series

Transformers for Digital Audio Data Transmission



FEATURES

- RoHS compliant
- Compatible with leading chip sets
- 2kVrms isolation
- Industry-standard pinout
- Surface mount option
- UL 94 V-0 package materials
- Low profile
- Suitable for both 75 & 110Ω circuits
- Toroidal construction
- Compliant with AES/EBU standards
- Fully encapsulated

DESCRIPTION

The Digital Audio Range of transformers is designed to improve the balance of transmitter and receiver circuitry in hi-fi equipment, video games and other applications requiring high-performance digital audio transmission. Compliant with AES/EBU recommendations for the digital audio interface, offering optimised shunt capacitance between primary and secondary windings. Capable of operating over the audio data rate frequency range, providing isolation from 50-60Hz noise.

Surface-mount parts

The surface-mount (M suffix) products are not recommended for new designs.

For recommended alternatives please refer to the DA100J Series datasheet.

SELECTION GUIDE

Order Code[1]	Turns Ratio	Primary Inductance	Max. Leakage Inductance (100kHz, 10mV)	Min. Volt-time Product, Et	Min. Return Loss (100kHz-3MHz)	Typ. Common Mode Rejection (100kHz, 110Ω)	Recommended Alternative
		mH	µH	Vµs	dB		
Recommended / In Production							
DA101C	1:1	1.00 - 2.06	0.26	15	46.80	52.10	
DA102C	1:1	2.00 - 3.90	0.65	20	40.40	49.70	
DA103C	1:1	4.00 - 7.75	0.91	28	36.30	46.40	
NRND							
DA101MC	1:1	1.00 - 2.06	0.26	15	46.80	52.10	DA101JC
DA102MC	1:1	2.00 - 4.40	0.65	20	40.40	49.70	DA102JC
DA103MC	1:1	4.00 - 9.00	0.91	28	36.30	46.40	DA103JC

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Flash tested for 1 second	2000			Vrms

TEMPERATURE CHARACTERISTICS

Operating free air temperature range	0°C to 70°C
Storage temperature range	–40°C to 125°C

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.

1. Components are supplied in both tube and tape and reel packaging, please refer to package specification section. Orderable part numbers are DAXXXC and DAXXXMC (50 pieces per tube) and DAXXXMC-R (500 pieces per reel).

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

RoHS COMPLIANT

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

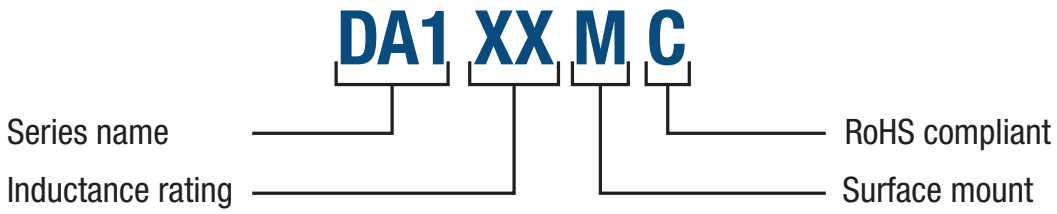
RoHS COMPLIANCE and MSL INFORMATION

The Through Hole parts in this series are compatible with RoHS soldering systems with a peak wave solder temperature of 260ºC 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 DA100 series is backward compatible with Sn/Pb soldering systems.

The Surface Mount parts in this series are compatible with Pb-Free soldering systems and is also backward compatible with Sn/Pb soldering systems. The DA100 (MC) series can be soldered with a peak temperature of 220°C[1]. The termination finish on this product is Matte Tin.

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

PART NUMBER STRUCTURE



APPLICATION NOTES

DA100 series digital audio transformers

The Digital Audio Range of transformers is designed to improve the balance of transmitter and receiver circuitry in hi-fi equipment, video games and other applications requiring high-performance digital audio transmission.

Compliant with AES/EBU recommendations for the digital audio interface, offering optimised shunt capacitance between primary and secondary windings. Capable of operating over the digital audio data rate frequency range (to 6MHz) while providing isolation from 50-60Hz noise.

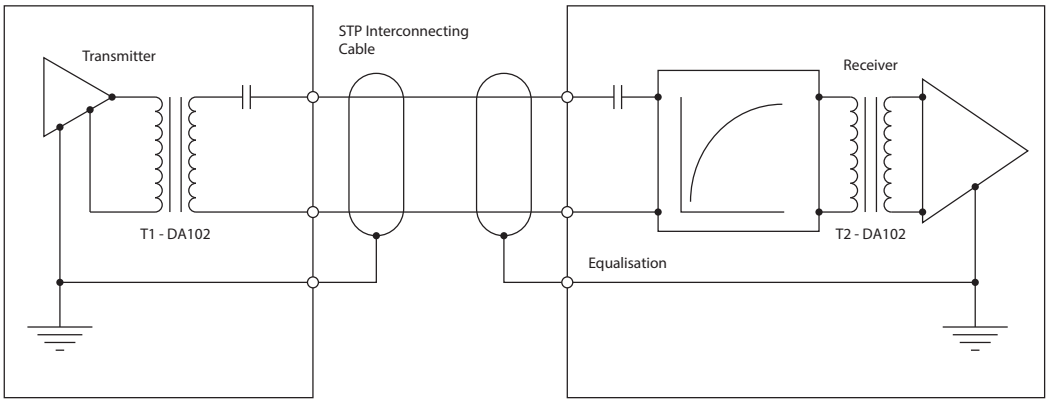
The transformers are 1:1 ratio to reflect the Transmitter Impedance (110Ω) to Receiver Impendence (75Ω) at the connections whether BNC, co-axial or XLR type connectors.

Digital audio standard

The S/PDIF (Sony/Philips Digital Interface Format) was designed to permit high quality digital stereo audio to be transmitted from a source to a receiver (usually an amplifier or other sound processing system) with no loss in quality of the source signal, in stereo using a multiplexed single transmission line. This was adopted as an International Standard (IEC958) and used extensively in high end audio for home and theatre use, including gaming and high-definition audio interfaces embedded within other communications systems (Figure 1).

An optical version was developed by Toshiba (TosLink/EIAJ optical) that utilises optical fibre connections, but comes at a premium cost to the interface, hence S/PDIF still survives in many applications. Bi-direction transmission is possible, although less common, by multiplexing a transmit and receive signal onto the same cable.

Figure 1: Typical IEC958 digital audio transmission system



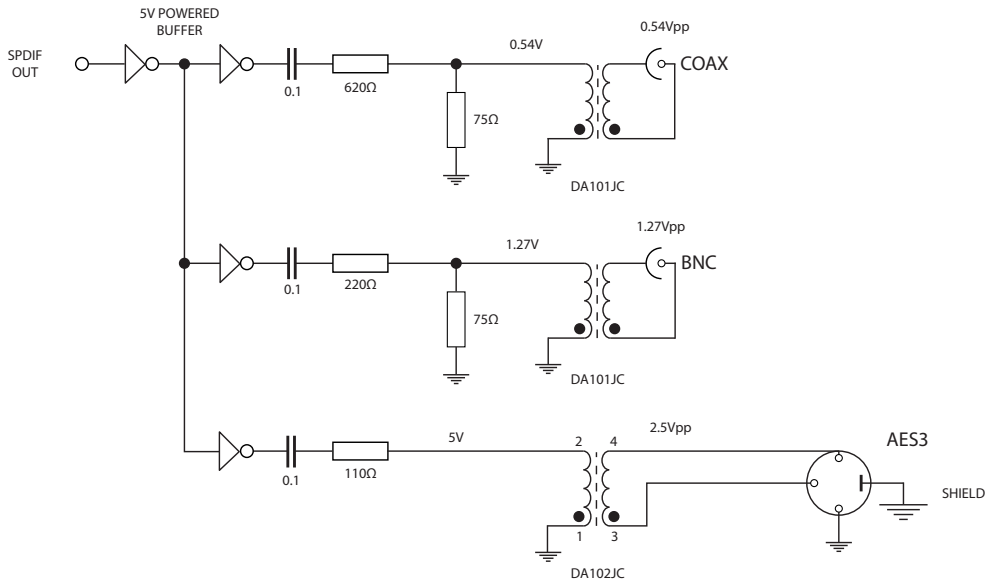
1 For high temperature reflow parts see DA100J series datasheet.

APPLICATION NOTES (Continued)

Different connector options

As noted above, different connectors can be used for the S/PDIF signal, providing the appropriate matching impedance and signalling voltage is maintained. This can be simply implemented by using biasing resistors, the values of which will depend on the supply and output voltage of the S/PDIF buffers (Figure 2).

Figure 2: S/PDIF buffered outputs to co-axial, BNC and AES3/XLR connectors

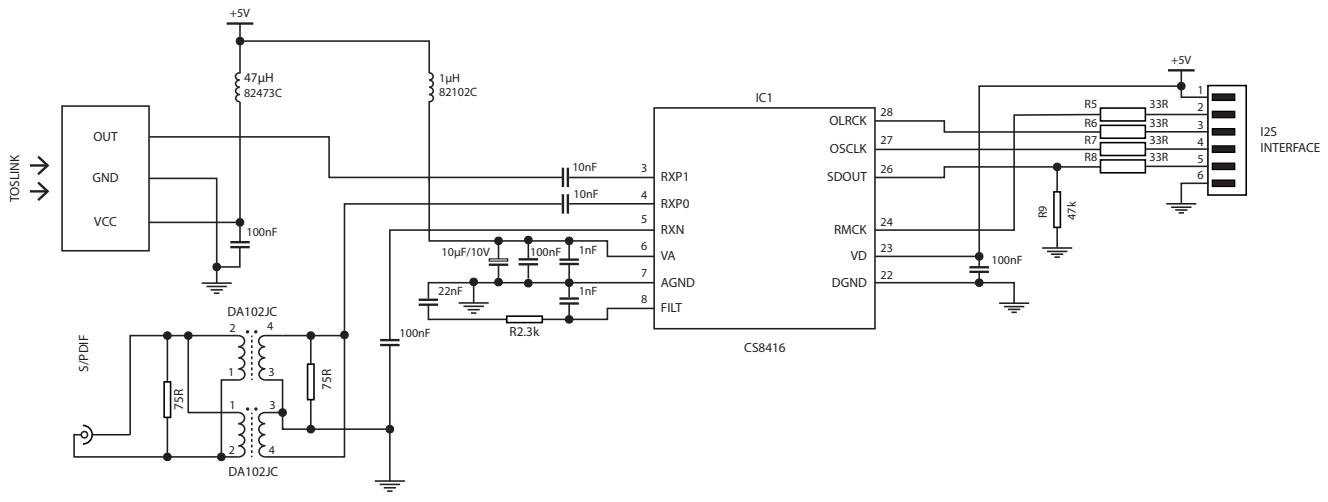


Other interfaces

Inter-Integrated Circuit Sound (I2S) and TosLink can be interfaced with S/PDIF via an appropriate audio transceiver IC. This gives multiple options for the exchange of digital audio data within a sound processing system (Figure 3).

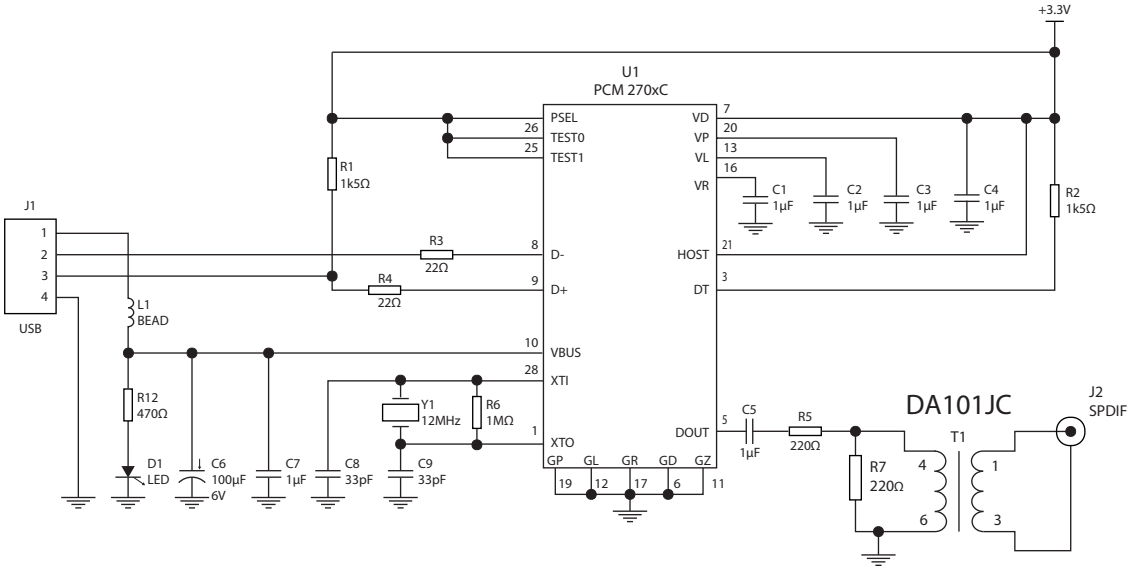
The Universal Serial Bus (USB) standard has taken over a lot of other proprietary digital interface standard in more recent times and this too can be simply interfaced to the S/PDIF signal and isolated to ensure ground noise is minimised between systems (Figure 4).

Figure 3: S/PDIF, TosLink and I2S Interfaces



APPLICATION NOTES (Continued)

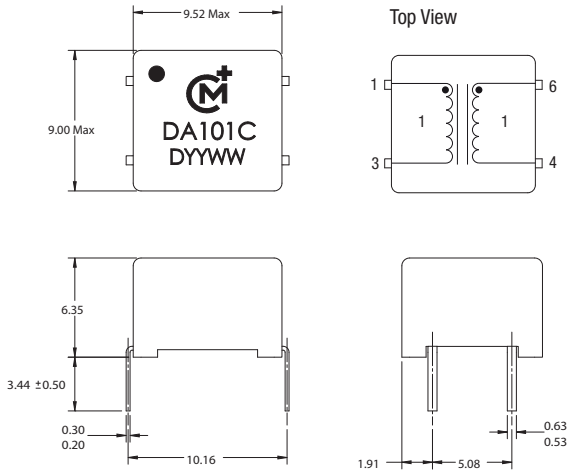
Figure 4: S/PDIF to USB Interface



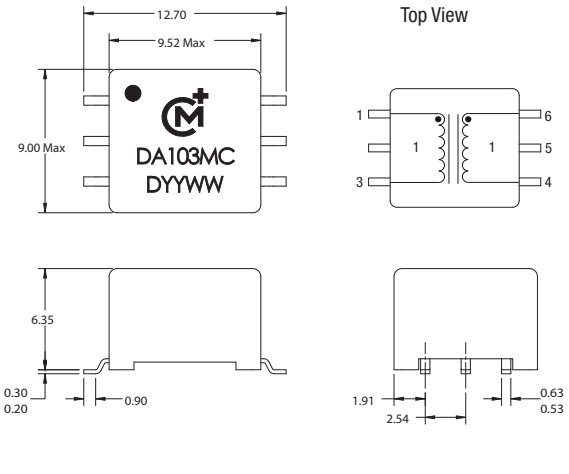
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

6 Pin DIL



6 Pin SM

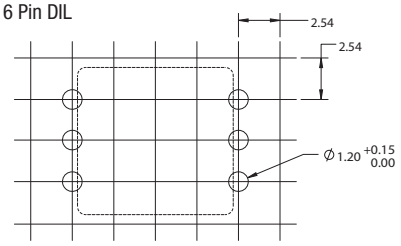


Unless otherwise stated all dimensions in mm ±0.25.
All pins on a 2.54 pitch and within ±0.25 of true position.

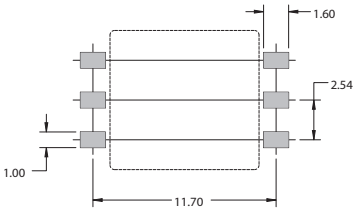
Package Weight 0.93g Typ.

RECOMMENDED FOOTPRINT DETAILS

6 Pin DIL

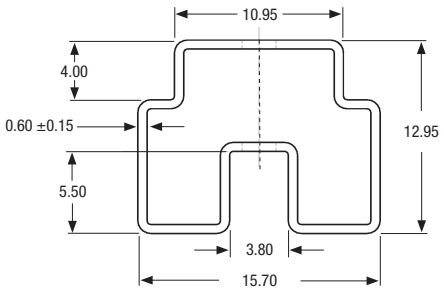


6 Pin SM



All pins on a 2.54 pitch and within ±0.25 of true position.

TUBE OUTLINE DIMENSIONS

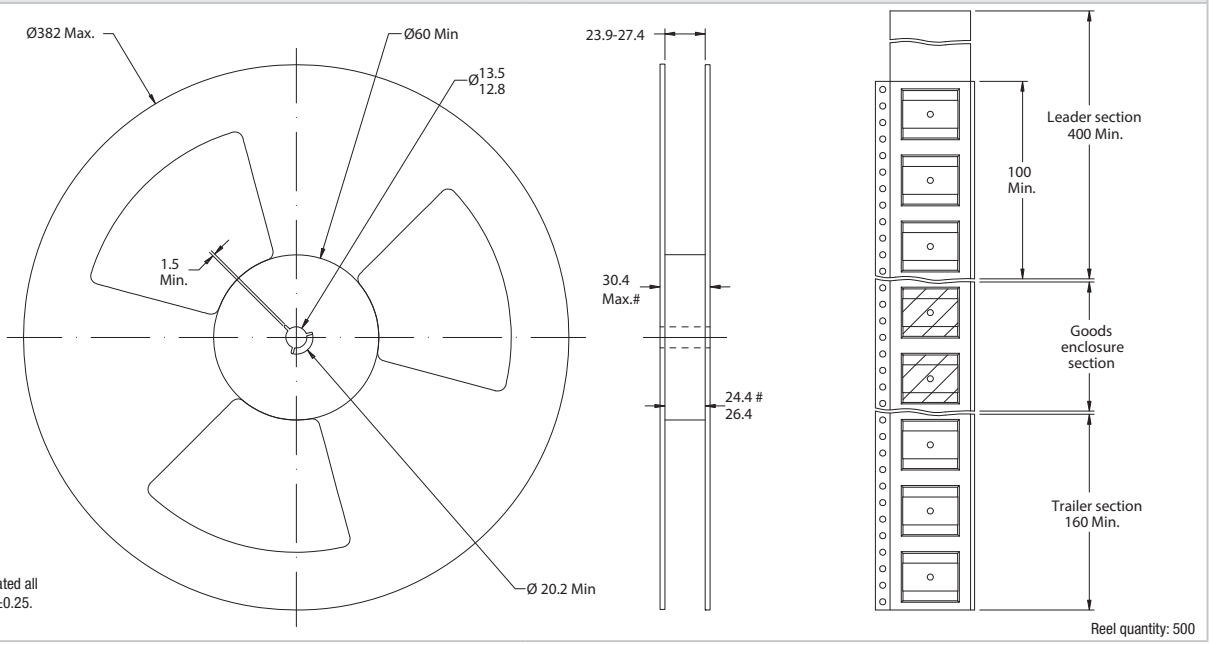


Tube length: 465 ±2.
Tube material: Antistatic coated clear PVC.

Tube quantity: 50

TAPE & REEL SPECIFICATIONS

REEL OUTLINE DIMENSIONS

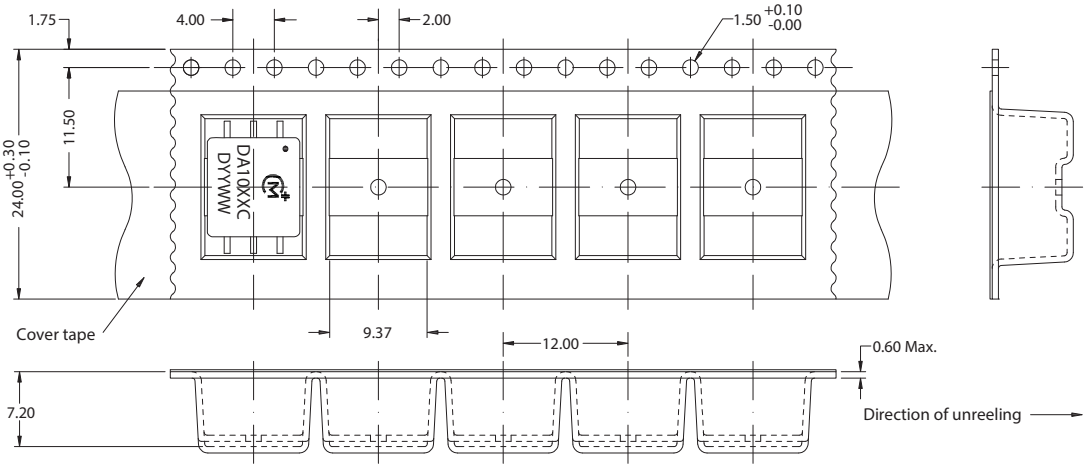


Unless otherwise stated all dimensions in mm ±0.25.

Measured at hub.

Reel quantity: 500

TAPE OUTLINE DIMENSIONS



Unless otherwise stated all dimensions in mm ±0.25.

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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