Murata Power Solutions

78253 Series

MAX253 Compatible Converter Transformers

FEATURES

- RoHS compliant
- Maxim MAX253 compatible
- 3.3V and 5V versions
- Isolation to 4kVDC
- Frequency range to 500kHZ
- Toroidal construction
- Industry-standard pinout
- UL 94 V-0 package materials
- Fully encapsulated
- Low profile
- Surface mount option
- Industrial temperature range

DESCRIPTION

The 78253 series of converter transformers are specifically designed for use with the MAX253 chip set to provide isolated power supplies. The 5V version can supply 1W and the 3.3V version can supply 500mW. A centre tapped secondary winding allows for full bridge, half bridge or voltage doubling.

Surface-mount parts

The surface-mount (M suffix) products are not recommended for new designs. For existing designs, however, Murata Power Solutions will continue to manufacture and fully support these parts.

For recommended alternatives please refer to the 78253J Series datasheet.

RoHS COMPLIANT

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For full details go to
www.murata-ps.com/rohs

SELECTION GUIDE

Order Code	Input Voltage	Output Voltage	Max. Output Current	Isolation Voltage	Turns Ratio	Package Style
	V	V	mA	VDC		
78253/35C	3.3	5.0	100	1500	1:2.27	DIL
78253/35MC						SM
78253/55C	5.0	5.0	200	1500	1:1.31	DIL
78253/55MC						SM
78253/35VC	3.3	5.0	100	4000	1:2.14	DIL
78253/35MVC						SM
78253/55VC	5.0	5.0	200	4000	1:1.33	DIL
78253/55MVC						SM

ORDER CODE DETAILS

Order Code	Package Type	Packaging Type	Quantity
78253/XX(V)C	6 Pin DIL	Tube	50
78253/XXM(V)C	6 Pin SM	Tube	50
78253/XXM(V)C-R	6 Pin SM	Tape & Reel	500

78253/35(M)C CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Primary Inductance, L_P	100kHz, 250mV	0.30	0.38	0.46	mH
Secondary Inductance, L_S	100kHz, 250mV	1.60	2.00	2.40	mH
Leakage Inductance, L_L	100kHz, 250mV		0.30	1.00	µH
Interwinding Capacitance, C_{WW}	100kHz, 250mV		30	50	pF
Primary D.C. Resistance, R_{DC}	>0.1VDC		0.40	1.00	Ω
Volt-time Product, Et	Pins 1/2 or 2/3	30	35		Vµs

78253/55(M)C CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Primary Inductance, L_P	100kHz, 250mV	0.60	0.83	1.10	mH
Secondary Inductance, L_S	100kHz, 250mV	1.10	1.40	1.70	mH
Leakage Inductance, L_L	100kHz, 250mV		0.35	1.00	µH
Interwinding Capacitance, C_{WW}	100kHz, 250mV		30	50	pF
Primary D.C. Resistance, R_{DC}	>0.1VDC		0.70	1.50	Ω
Volt-time Product, Et	Pins 1/2 or 2/3	40	50		Vµs

78253/35(M)VC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Primary Inductance, L_P	100kHz, 20mV	110	142	185	µH
Secondary Inductance, L_S	100kHz, 20mV	550	710	850	µH
Leakage Inductance, L_L	100kHz, 250mV		3.00	5.00	µH
Interwinding Capacitance, C_{WW}	100kHz, 250mV		4.20	8.00	pF
Primary D.C. Resistance, R_{DC}	>0.1VDC		0.30	0.50	Ω
Volt-time Product, Et	Pins 1/2 or 2/3	18	22		Vµs

78253/55(M)VC CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Primary Inductance, L_P	100kHz, 20mV	190	240	310	µH
Secondary Inductance, L_S	100kHz, 20mV	350	444	540	µH
Leakage Inductance, L_L	100kHz, 250mV		5.20	8.00	µH
Interwinding Capacitance, C_{WW}	100kHz, 250mV		4.20	8.00	pF
Primary D.C. Resistance, R_{DC}	>0.1VDC		0.40	0.60	Ω
Volt-time Product, Et	Pins 1/2 or 2/3	25	28		Vµs

All specifications typical at T_A=25°C

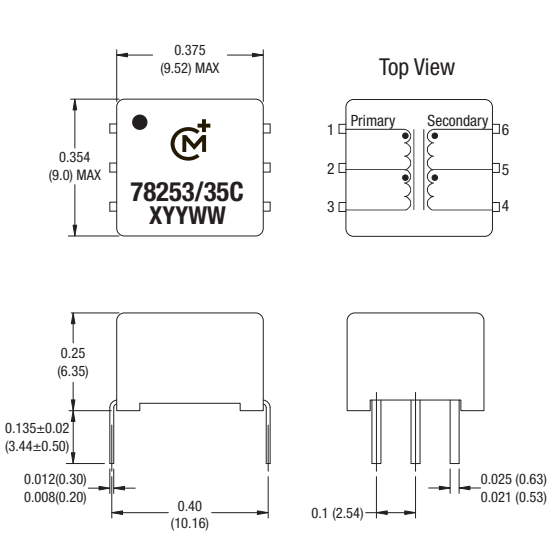
ABSOLUTE MAXIMUM RATINGS

Operating free air temperature range	-40°C to 85°C
Storage temperature range	-50°C to 125°C
Lead Temperature 1.5mm from case for 10 seconds	300°C
Peak current I_{PK}	400mA
Isolation voltage 78253/XX(M)C (flash tested for 1 second)	1500VDC
Isolation voltage 78253/XX(M)VC (flash tested for 1 second)	4000VDC

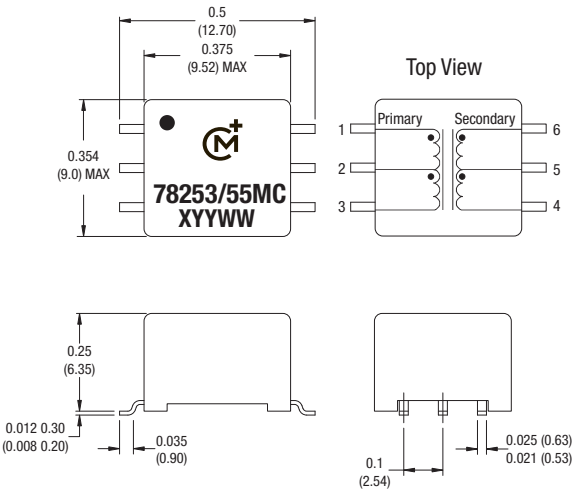
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

6 Pin DIL



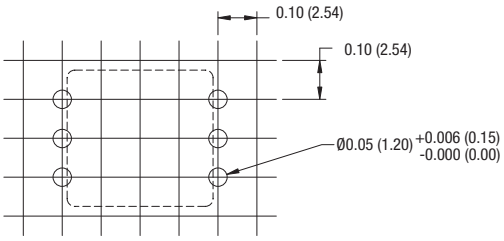
6 Pin SM



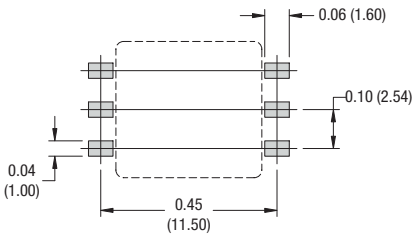
Unless otherwise stated all dimensions in inches (mm) ±0.01 (0.25).
All pins on a 0.1 (2.54) pitch and within ±0.01 (0.25) of true position.
Package weight 1.0g Typ.

RECOMMENDED FOOTPRINT DETAILS

6 Pin DIL



6 Pin SM

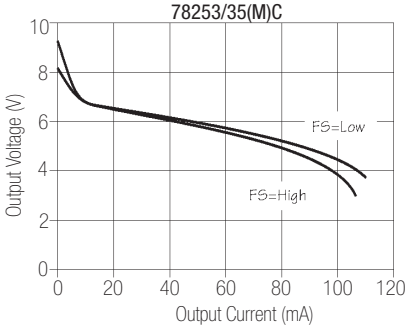


Unless otherwise stated all dimensions in inches (mm) ±0.01 (0.25).
All pins on a 0.1 (2.54) pitch and within ±0.01 (0.25) of true position.

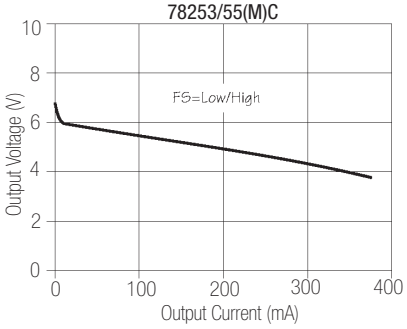
TYPICAL CHARACTERISTICS (VOLTAGE CURVES)

VOLTAGE CURVES

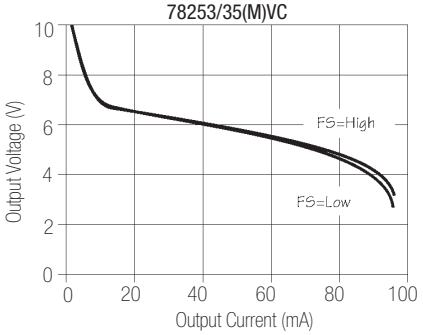
78253/35(M)C



78253/55(M)C



78253/35(M)VC



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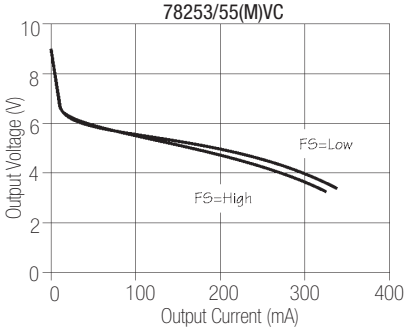
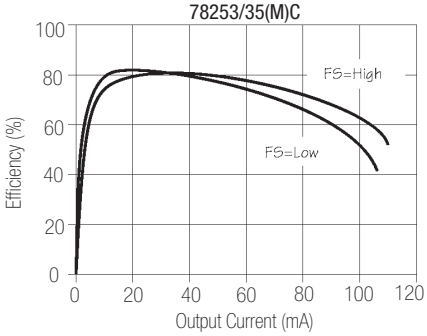
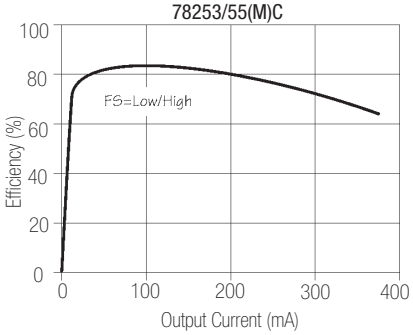


EFFICIENCY CURVES

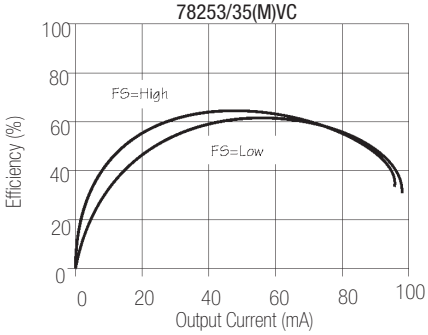
78253/35(M)C



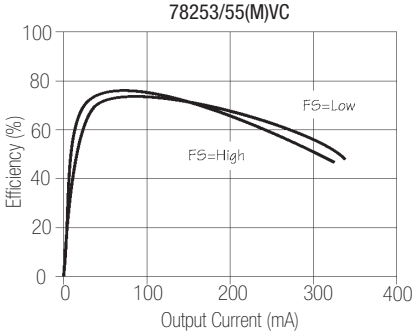
78253/55(M)C



78253/35(M)VC



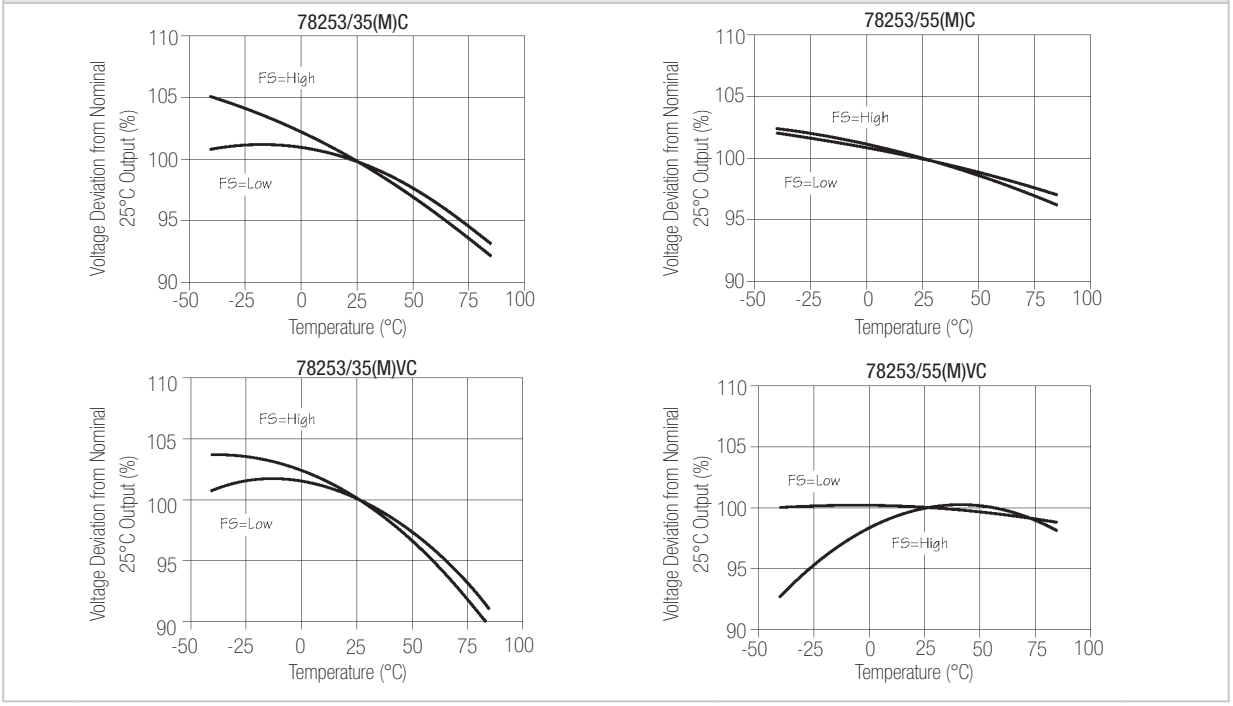
78253/55(M)VC



All curves are derived from testing with the Maxim MAX235 IC using the circuit shown in application note MPAN-03 (download at http://www.murata-ps.com/data/apnotes/mpan-03.pdf).

TYPICAL CHARACTERISTICS (VOLTAGE CURVES) (Continued)

VOLTAGE DEVIATION



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

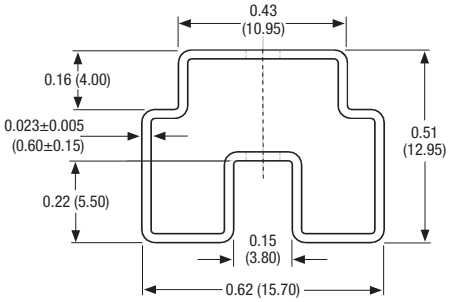
It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. This series has toroidal isolation transformers, with no additional insulation between primary 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.

SOLDERING INFORMATION[1]

Pin finish	Matte tin
Peak wave solder temperature	300˚C for 10 seconds
Peak reflow temperature	220˚C[2]

TUBE OUTLINE DIMENSIONS

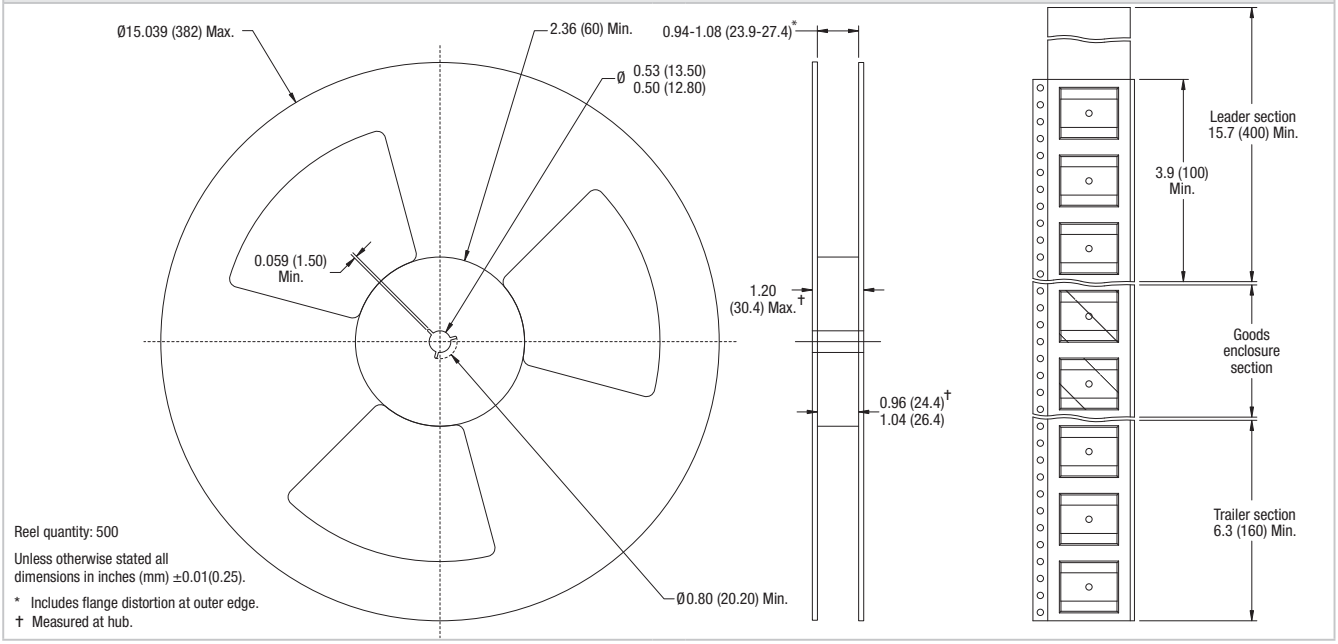


Tube length: 18.3±0.08 (465±2). Tube quantity: 50.
Tube material: Antistatic coated clear pvc.
Unless otherwise stated all dimensions in inches(mm) ±0.01 (0.25).

All specifications typical at T_A=25°C
1 For further information, please visit www.murata-ps.com/rohs
2 For high temperature reflow parts see 78253J series.

TAPE & REEL SPECIFICATIONS

REEL OUTLINE DIMENSIONS

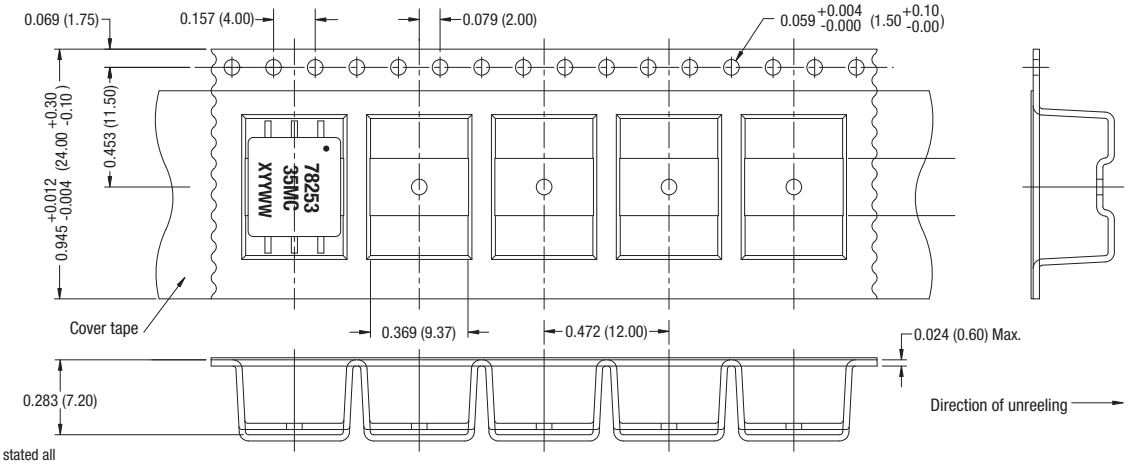


Reel quantity: 500

Unless otherwise stated all dimensions in inches (mm) ±0.01(0.25).

* Includes flange distortion at outer edge.
† Measured at hub.

TAPE OUTLINE DIMENSIONS



Unless otherwise stated all dimensions in inches (mm) ±0.01(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.

Particularly for safety-critical and/or life-critical applications, i.e. applications that may directly endanger or cause the loss of life, inflict bodily harm and/or loss or severe damage to equipment/property, and severely harm the environment, a prior explicit written approval from Murata is strictly required. Any use of Murata standard products for any safety-critical, life-critical or any related applications without any prior explicit written approval from Murata shall be deemed unauthorised use.

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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Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm, and take appropriate remedial actions. Buyer will fully indemnify and hold Murata, its affiliated companies, and its representatives harmless against any damages arising out of unauthorised use of any Murata products in any safety-critical and/or life-critical applications.

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