ISOLATION CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso= 1000VDC	10			GΩ

GENERAL CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	0312MC, 0315MC		100		kHz
	0303MC, 0305MC, 0503MC, 0505MEC		110		
	All other variants		115		

TEMPERATURE CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	-40		85	°C
Storage		-55		125	
Case temperature rise above ambient	0305MC, 0505MEC, 0312MC, 0315MC		19		
	0303MC, 0309MC, 0503MC		25		
	0505MC, 1205MC		46		
	All other variants		35		
Cooling	Free air convection				

ABSOLUTE MAXIMUM RATINGS	
Internal power dissipation	700mW
Input voltage V_{IN}, NTA03 types	5.5V
Input voltage V_{IN}, NTA05 types	7V
Input voltage V_{IN}, NTA12 types	15V

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.

Murata Power Solutions NTA series of DC-DC converters are all 100% production tested at their stated isolation voltage. This is 1kVDC for 1 second.

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, such as the NTA series, 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. The NTA 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.

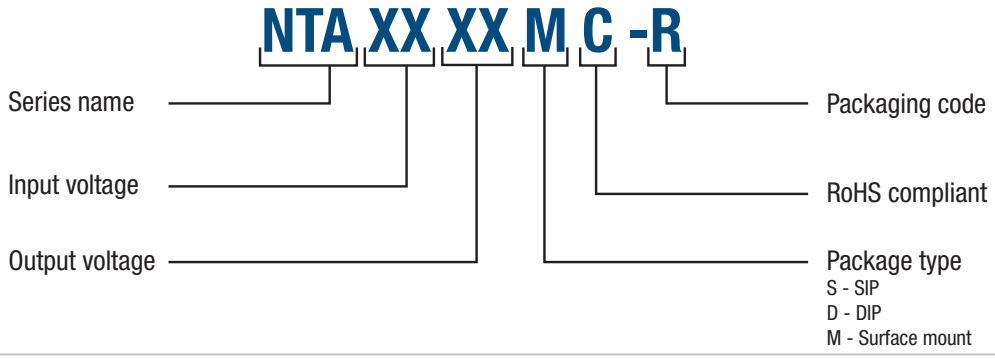
RoHS COMPLIANCE, MSL AND PSL INFORMATION

RoHS COMPLIANT

This series is compatible with RoHS soldering systems and is also backward compatible with Sn/Pb soldering systems. The NTA series has a process, moisture, and reflow sensitivity classification of MSL1 PSL R7F as defined in J-STD-020 and J-STD-075. Please refer to application notes for further information. This translates to: MSL1 = unlimited floor life, PSL R7F = Peak reflow temperature 245°C with a limitation on the time above liquidus (217°C) which for this series is 60sec max. The pin termination finish on this product series is Gold with a plating thickness of 0.05 microns minimum.

For further information please visit www.murata-ps.com/rohs

PART NUMBER STRUCTURE



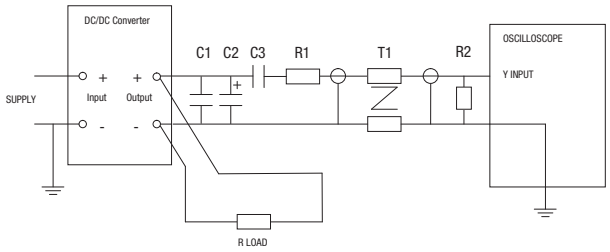
CHARACTERISATION TEST METHODS

Ripple & Noise Characterisation Method

Ripple and noise measurements are performed with the following test configuration.

C1	1µF X7R multilayer ceramic capacitor, voltage rating to be a minimum of 3 times the output voltage of the DC-DC converter
C2	10µF tantalum capacitor, voltage rating to be a minimum of 1.5 times the output voltage of the DC-DC converter with an ESR of less than 100mΩ at 100 kHz
C3	100nF multilayer ceramic capacitor, general purpose
R1	450Ω resistor, carbon film, ±1% tolerance
R2	50Ω BNC termination
T1	3T of the coax cable through a ferrite toroid
RLOAD	Resistive load to the maximum power rating of the DC-DC converter. Connections should be made via twisted wires
Measured values are multiplied by 10 to obtain the specified values.	

Differential Mode Noise Test Schematic



APPLICATION NOTES

Minimum load

The minimum load to meet datasheet specification is 10% of the full rated load across the specified input voltage range. Lower than 10% minimum loading will result in an increase in output voltage, which may rise to typically double the specified output voltage if the output load falls to less than 5%.

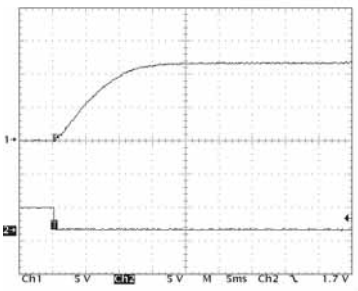
Capacitive loading and start up

Typical start up times for this series, with a typical input voltage rise time of 2.2µs and output capacitance of 10µF, are shown in the table below. The product series will start into a capacitance of 47µF with an increased start time, however, the maximum recommended output capacitance is 10µF.

	Start-up time µs
NTA0303MC	1630
NTA0305MC	1359
NTA0309MC	3435
NTA0312MC	6590
NTA0315MC	25340
NTA0503MC	1599
NTA0505MC	2185
NTA0505MEC	1395

	Start-up time µs
NTA0509MC	6850
NTA0512MC	11560
NTA0515MC	15640
NTA1205MC	1154
NTA1209MC	4050
NTA1212MC	7995
NTA1215MC	11200

Typical Start-Up Wave Form



APPLICATION NOTES (Continued)

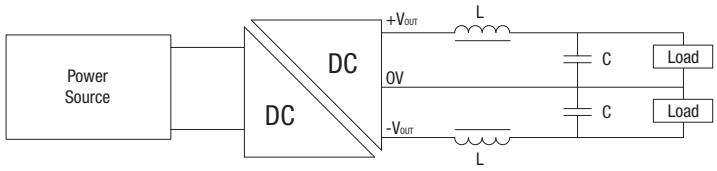
Output Ripple Reduction

By using the values of inductance and capacitance stated, the output ripple at the rated load is lowered to 5mV p-p max.

Component selection

Capacitor: It is required that the ESR (Equivalent Series Resistance) should be as low as possible, ceramic types are recommended.
The voltage rating should be at least twice (except for 15V output), the rated output voltage of the DC-DC converter.

Inductor: The rated current of the inductor should not be less than that of the output of the DC-DC converter. At the rated current, the DC resistance of the inductor should be such that the voltage drop across the inductor is <2% of the rated voltage of the DC-DC converter. The SRF (Self Resonant Frequency) should be >20MHz.

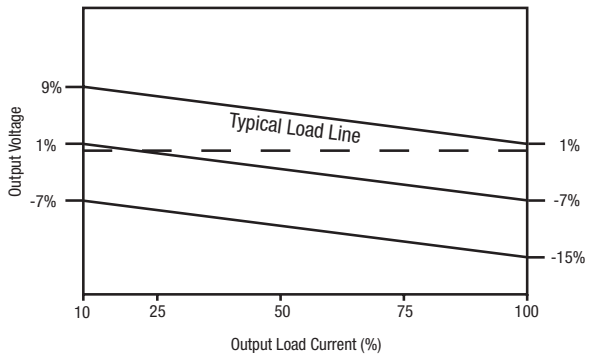


	Inductor			Capacitor
	L, µH	SMD	Through Hole	C, µF
NTA0303MC	10	82103C	11R103C	4.7
NTA0305MC	22	82223C	11R223C	2.2
NTA0309MC	22	82223C	11R223C	2.2
NTA0312MC	22	82223C	11R223C	1
NTA0315MC	22	82223C	11R223C	1
NTA0503MC	10	82103C	11R103C	4.7
NTA0505MC	10	82103C	11R103C	4.7
NTA0505MEC	10	82103C	11R103C	4.7
NTA0509MC	22	82223C	11R223C	2.2
NTA0512MC	22	82223C	11R223C	1
NTA0515MC	22	82223C	11R223C	1
NTA1205MC	10	82103C	11R103C	4.7
NTA1209MC	22	82223C	11R223C	2.2
NTA1212MC	22	82223C	11R223C	1
NTA1215MC	22	82223C	11R223C	1

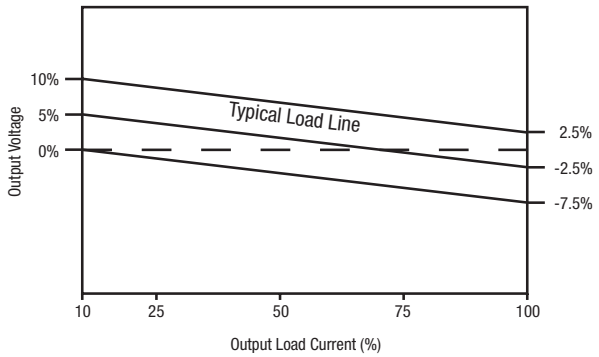
TOLERANCE ENVELOPES

The voltage tolerance envelope shows typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading.

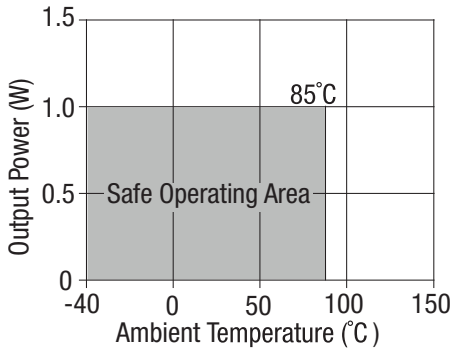
3.3Vout



All other output voltage

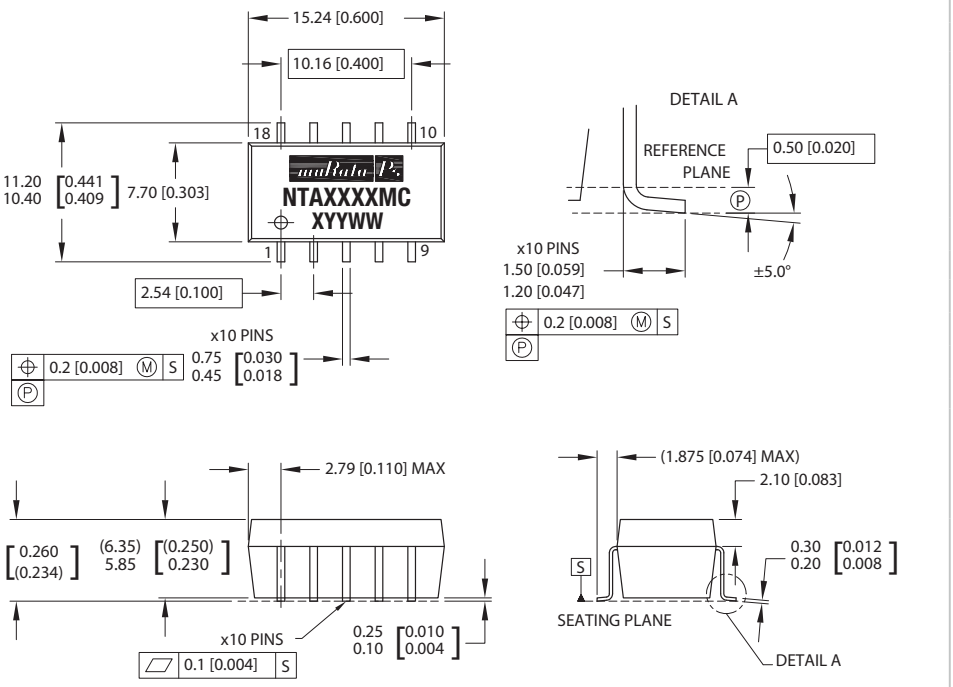


TEMPERATURE DERATING GRAPH



PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



All dimensions in mm (inches), Controlling dimension is mm.
Tolerances (unless otherwise stated) ±0.25 (0.010).

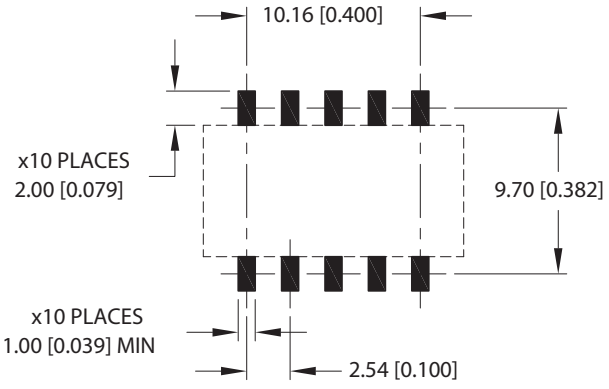
Weight: 1.53g

PIN CONNECTIONS

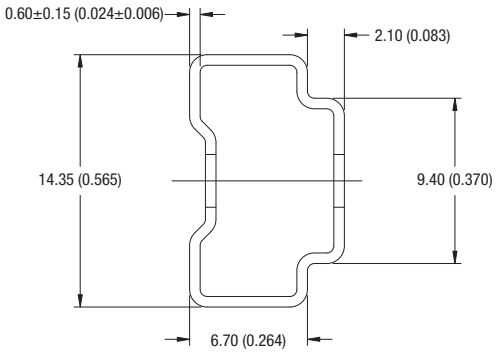
Pin	Function
1	$-V_{IN}$
3	$+V_{IN}$
5	NA
7	0V
9	$-V_{OUT}$
10	NA
12	$+V_{OUT}$
14	NA
16	NA
18	NA

NA - Not available for electrical connection.

RECOMMENDED FOOTPRINT DETAILS



TUBE OUTLINE DIMENSIONS

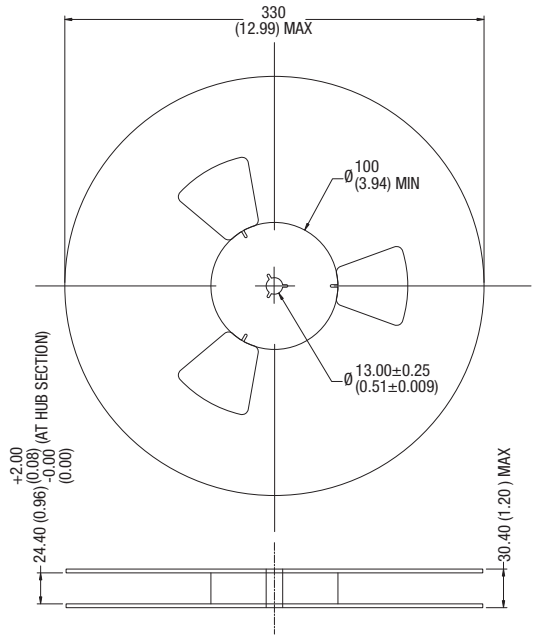


Unless otherwise stated all dimensions in mm±0.5 (inches ±0.02).
Tube length : 475±2.0 (18.70±0.07).

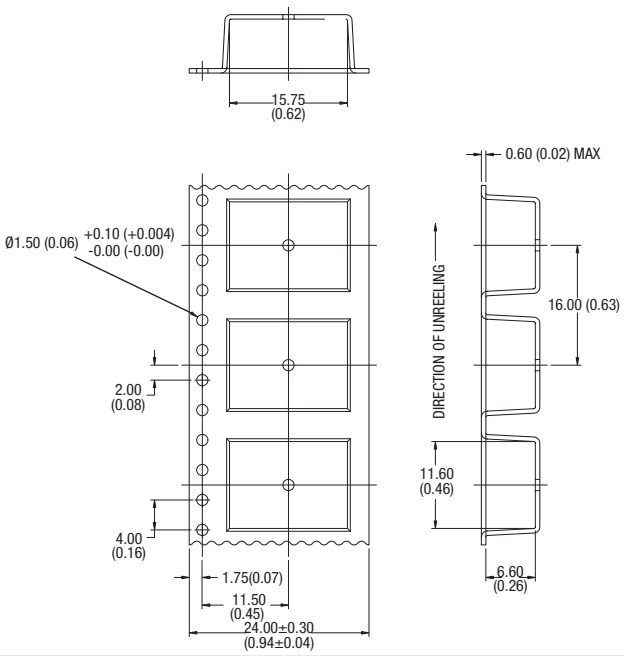
Tube Quantity : 25

TAPE & REEL SPECIFICATIONS

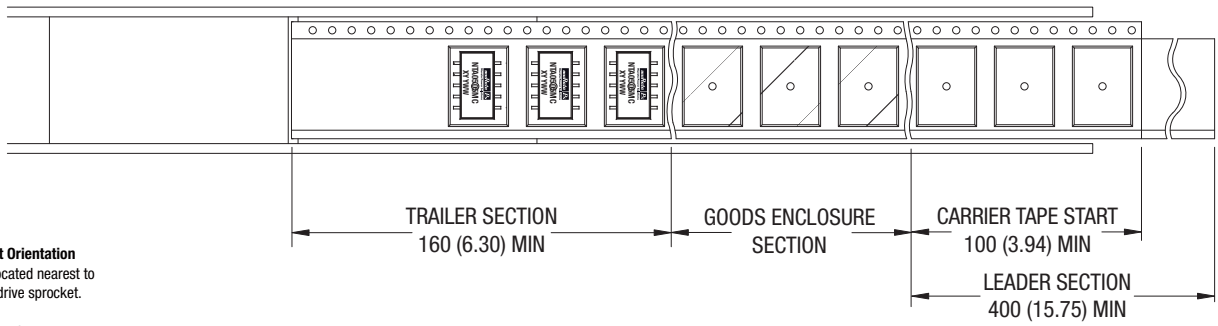
REEL OUTLINE DIMENSIONS



TAPE OUTLINE DIMENSIONS



REEL PACKAGING DETAILS



Product Orientation
Pin 1, located nearest to carrier drive sprocket.

Reel Quantity : 500

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- Traffic signal equipment
- Disaster prevention / crime prevention equipment
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