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Murata Power Solutions

NOT RECOMMENDED FOR NEW DESIGNS

NMA 24V & 48V Series

Isolated 1W Dual Output DC/DC Converters

FEATURES

- RoHS compliant
- Efficiency up to 80%
- Power density up to 0.85W/cm³
- Dual output from a single input rail
- UL 94V-0 package material
- No heatsink required
- Footprint from 1.17cm²
- Industry standard pinout
- Power sharing on output
- 1kVDC isolation
- 24V & 48V input
- 5V, 9V, 12V and 15V output
- Internal SMD construction
- Fully encapsulated with toroidal magnetics
- No external components required

DESCRIPTION

The NMA series of DC/DC converters are the standard buliding blocks for on-board distributed power systems. They are ideally suited for providing dual rail supplies on primarily digital boards with the added benefit of galvanic isolation to reduce switching noise. All of the rated power may be drawn from a single pin provided the total load does not exceed 1 watt.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Efficiency	Isolation Capacitance	MTTF[1]	Package Style	Recommended Alternatives (click for data sheet)
	V	V	mA	%	pF	kHrs		
Not recommended for new designs:								
NMA2405SC	24	±5	±100	70	39	194	SIP	**MEA1D2405SC**
NMA2409SC	24	±9	±55	77	85	129		**MEA1D2409SC**
NMA2412SC	24	±12	±42	80	65	134		**MEA1D2412SC**
NMA2415SC	24	±15	±33	80	95	101		**MEA1D2415SC**
Obsolete:								
NMA2405DC	24	±5	±100	70	39	194	DIP	**MEA1D2405DC**
NMA2409DC	24	±9	±55	77	85	129		**MEA1D2409DC**
NMA2412DC	24	±12	±42	80	65	134		**MEA1D2412DC**
NMA2415DC	24	±15	±33	80	95	101		**MEA1D2415DC**
NMA4805DC	48	±5	±100	70	26	206		**MEA1D4805DC**
NMA4809DC	48	±9	±55	80	38	174		**MEA1D4809DC**
NMA4812DC	48	±12	±42	80	52	139		**MEA1D4812DC**
NMA4815DC	48	±15	±33	80	56	104		**MEA1D4815DC**
NMA4805SC	48	±5	±100	70	26	206	SIP	**MEA1D4805SC**
NMA4809SC	48	±9	±55	80	38	174		**MEA1D4809SC**
NMA4812SC	48	±12	±42	80	52	139		**MEA1D4812SC**
NMA4815SC	48	±15	±33	80	56	104		**MEA1D4815SC**

When operated **with** additional external load capacitance the rise time of the input voltage will determine the maximum external capacitance value for guaranteed start up. The slower the rise time of the input voltage the greater the maximum value of the additional external capacitance for reliable start up.

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	Continuous operation, 24V input types	21.6	24	26.4	V
	Continuous operation, 48V input types	43.2	48	52.8	

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power[2]	T_A=0°C to 70°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High V_{IN} to low V_{IN}			1.2	%/%
Load Regulation	10% load to rated load, 5V output types			15	%
	10% load to rated load, all other output types			10	
Ripple and Noise	BW=DC to 20MHz, all input types			150	mV p-p

ABSOLUTE MAXIMUM RATINGS

Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	450mW
Input voltage V_{IN}, NMA24 types	28V
Input voltage V_{IN}, NMA48 types	54V

1. Calculated using MIL-HDBK-217F with nominal input voltage at full load.
2. See derating graph.

All specifications typical at T_A=25°C, nominal input voltage and rated output current unless otherwise specified.

RoHS COMPLIANT 2002/95/EC

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

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso= 500VDC	10			GΩ

GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All input types		100		kHz

TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	0		70	°C
Storage		-55		150	
Cooling	Free air convection				

RoHS COMPLIANCE INFORMATION

RoHS COMPLIANT 2002/95/EC

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

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

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 NMA 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 NMA 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 NMA series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enameled 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 recognized 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.

APPLICATION NOTES

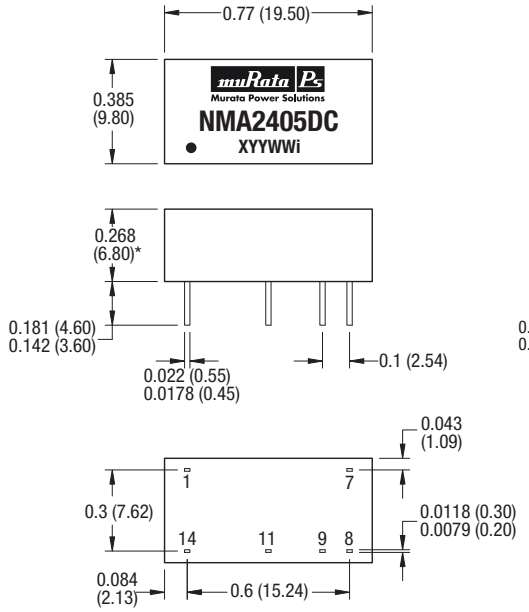
Minimum load

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%.

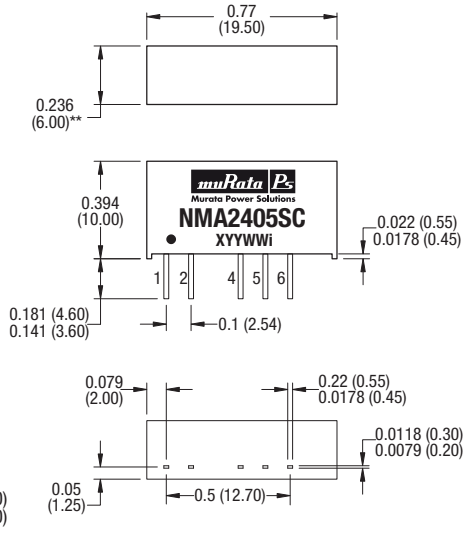
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

DIP package



SIP package



Weight:
2.4g (24V DIP)
2.9g (48V DIP)
2.2g (24V SIP)
2.9g (48V SIP)

* 0.303 (7.70) for 48V variants

** 0.295 (7.50) for 48V variants

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

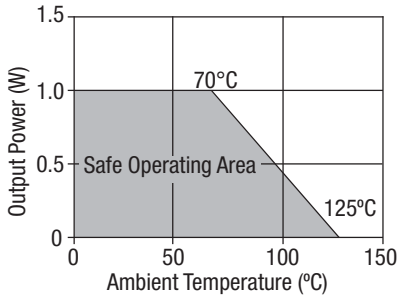
PIN CONNECTIONS - 14 PIN DIP

Pin	Function
1	-V_{IN}
7	NC
8	0V
9	+V_{OUT}
11	-V_{OUT}
14	+V_{IN}

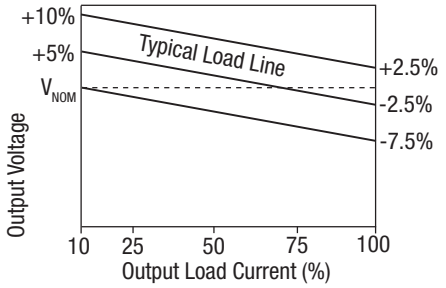
PIN CONNECTIONS - 7 PIN SIP

Pin	Function
1	+V_{IN}
2	-V_{IN}
4	-V_{OUT}
5	0V
6	+V_{OUT}

TEMPERATURE DERATING GRAPH



TOLERANCE ENVELOPE

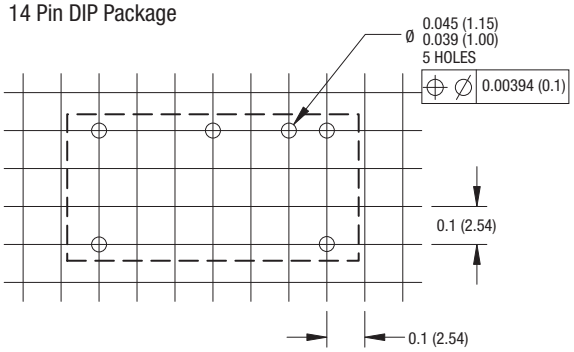


The voltage tolerance envelope shows typical load regulation characteristics for this product series. The tolerance envelope is the maximum output voltage variation due to changes in output loading.

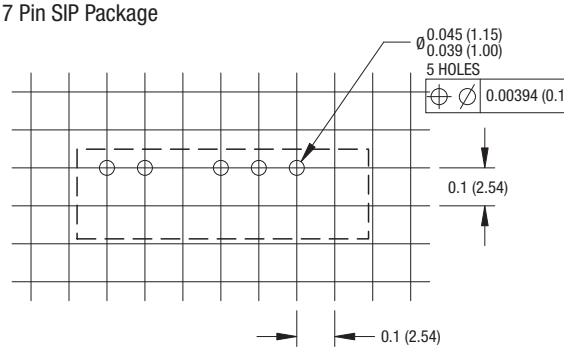
PACKAGE SPECIFICATIONS (continued)

RECOMMENDED FOOTPRINT DETAILS

14 Pin DIP Package

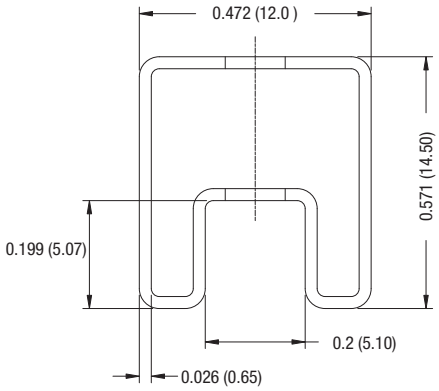


7 Pin SIP Package

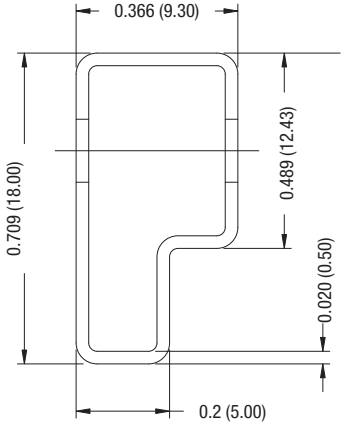


TUBE OUTLINE DIMENSIONS

14 Pin DIP Tube



7 Pin SIP Tube



Unless otherwise stated all dimensions in inches (mm) ±0.5mm.
Tube length (14 Pin DIP) : 20.47 (520mm ±2mm).
Tube length (7 Pin SIP) : 20.47 (520mm ±2mm).

Tube Quantity : 25