



FEATURES

- RoHS compliant
- UL1950 recognised
- Efficiency to 82%
- Power density up to 0.44W/cm³
- Dual outputs
- Low profile package
- UL 94V-0 package material
- No heatsink required
- Footprint 4.75cm²
- 6kVDC isolation
- 5V & 12V inputs
- 5V output
- Internal SMD construction
- Fully encapsulated with toroidal magnetics
- MTTF up to 747 kHrs
- PCB mounting

DESCRIPTION

The NMS series of DC-DC converters are UL1950 recognised which makes them ideal for all telecom and safety applications where approved isolation is required. The low profile package allows mounting in rack systems without risk of touching other boards. The output configuration allows all of the rated power to be drawn from a single pin provided the total load does not exceed 2 watts. The devices feature low noise and low isolation capacitance suitable for applications in high noise environments, e.g. heavy electrical machine interface.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Efficiency	Isolation Capacitance	MTTF ¹	Recommended Alternative
	V	V	mA	%	pF	kHrs	
NRND							
NMS0505C	5	±5	±200	74	1.8	747	MEJ2D0505SC
NMS1205C	12	±5	±200	78	1.9	365	MEJ2D1205SC

Discontinued

NMS0509C	5	±9	±111	76	1.9	327	MEJ2D0509SC
NMS0512C	5	±12	±83	77	2.0	169	MEJ2D0512SC
NMS0515C	5	±15	±67	78	2.1	93	MEJ2D0515SC
NMS1209C	12	±9	±111	81	2.0	224	MEJ2D1209SC
NMS1212C	12	±12	±83	82	2.1	136	MEJ2D1212SC
NMS1215C	12	±15	±67	82	2.2	82	MEJ2D1215SC

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, 5V input types	4.5	5	5.5	V
	Continuous operation, 12V input types	10.8	12	13.2	

GENERAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	All input types		35		kHz

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power ²	T _A =0°C to 70°C			2	W
Voltage Set Point Accuracy	See tolerance envelope	-7.5		10	%
Line regulation	High V _{IN} to low V _{IN}		1.0	1.2	%/%
	10% load to rated load, 5V output types		10	15	
	10% load to rated load, 9V output types		6	15	
	10% load to rated load, 12V output types		6	15	
Load Regulation	10% load to rated load, 15V output types		6	15	%
Ripple and Noise	BW=DC to 20MHz, all output types			200	mV p-p

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	6000			VDC
Resistance	Viso= 500VDC		10		GΩ

TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	All output types	0		70	°C
Storage		-50		130	
Case Temperature above ambient	All output types			32	
Cooling	Free air convection				

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.



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

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection ¹	1 second
Wave Solder	Wave Solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. Please refer to application notes for further information.
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	900mW
Input voltage V_{IN} , NMS05 types	7V
Input voltage V_{IN} , NMS12 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 NMS series of DC-DC converters are all 100% production tested at their stated isolation voltage. This is 6kVDC for 1 second.

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

The NMS series has been recognised by Underwriters Laboratory to a working voltage of 300Vrms for Supplementary Insulation system and 150Vrms for Reinforced Insulation systems.

REPEATED HIGH-VOLTAGE ISOLATION TESTING

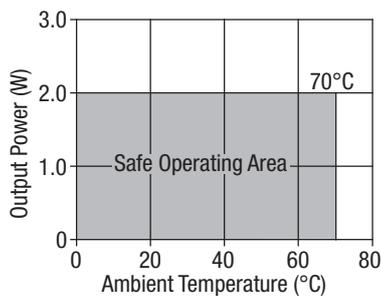
It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage.

RoHS COMPLIANCE INFORMATION

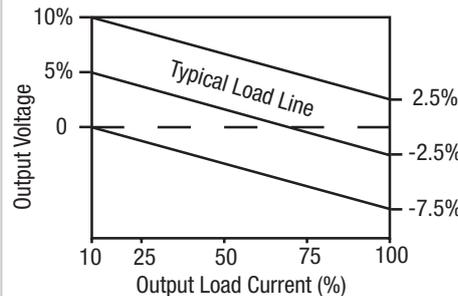


This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Please refer to [application notes](#) for further information. The pin termination finish on this product series is Matte Tin over Nickel Preplate. The series is backward compatible with Sn/Pb soldering systems. For further information, please visit www.murata.com/en-global/products/power/rohs

TEMPERATURE DERATING GRAPH



TOLERANCE ENVELOPE



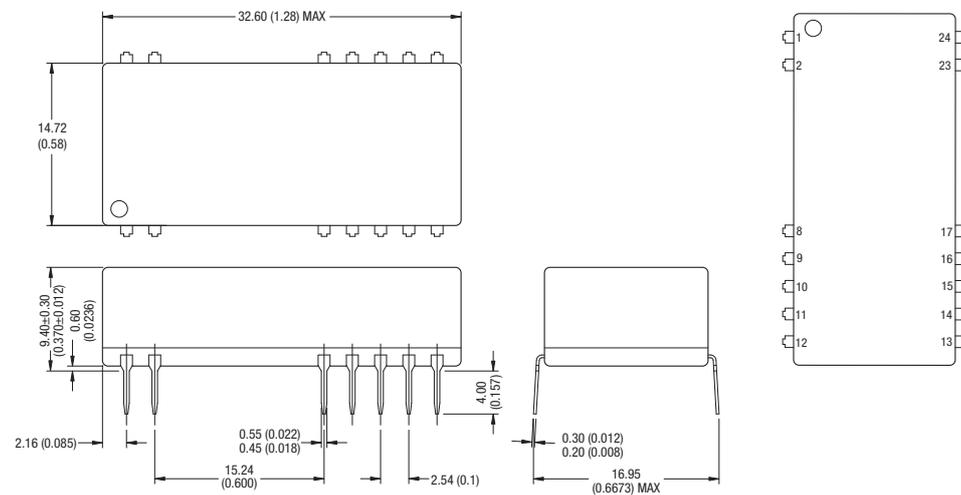
SAFETY APPROVAL

The NMS series has been recognised by Underwriters Laboratory (UL) to UL1950 for supplementary insulation up to 300Vrms and reinforced insulation up to 150Vrms working voltage. File number E151252 applies.

1. Supply voltage must be disconnected at the end of the short circuit duration.

PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

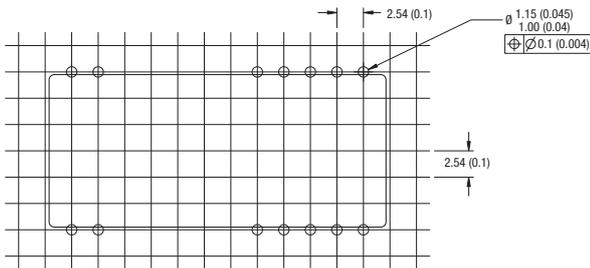


All dimensions in inches ±0.01 (mm ±0.25mm). All pins on a 0.1 (2.54) pitch and within ±0.01 (0.25) of true position.

PIN CONNECTIONS

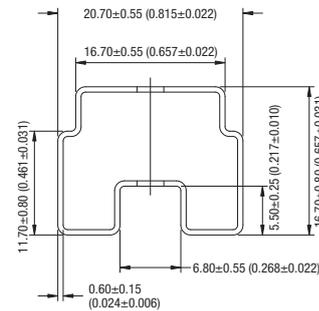
Pin	Function
1	+VIN
2	-VIN
8	-VOUT
9	NC
10	OV
11	NC
12	+VOUT
13	+VOUT
14	NC
15	OV
16	NC
17	-VOUT
23	NC
24	NC

RECOMMENDED FOOTPRINT DETAILS



Unless otherwise stated all dimensions in inches ±0.01 (mm) ±0.5mm.

TUBE OUTLINE DIMENSIONS



Unless otherwise stated all dimensions in inches ±0.01 (mm) ±0.5mm.
Tube length : 20.47±0.079 (520mm ±2mm).

Tube Quantity: 15

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

Murata makes no express or implied warranty, representation, or guarantee of suitability, fitness for any particular use/purpose and/or compatibility with any application or device of the buyer, nor does Murata assume any liability whatsoever arising out of unauthorised use of any Murata product for the application of the buyer. The suitability, fitness for any particular use/purpose and/or compatibility of Murata product with any application or device of the buyer remain to be the responsibility and liability of the buyer.

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.

Remark: Murata in this section refers to Murata Manufacturing Company and its affiliated companies worldwide including, but not limited to, Murata Power Solutions.



This product is subject to the following [operating requirements](https://www.murata.com/en-eu/products/power/requirements) and the [Life and Safety Critical Application Sales Policy](https://www.murata.com/en-eu/products/power/requirements):

Refer to: <https://www.murata.com/en-eu/products/power/requirements>

Murata Power Solutions (Milton Keynes) Ltd. makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Specifications are subject to change without notice.

© 2023 Murata Power Solutions (Milton Keynes) Ltd.