



### FEATURES

- RoHS compliant
- UL1950 recognised
- Efficiency to 82%
- Power density up to 0.44W/cm<sup>3</sup>
- Dual outputs
- Low profile package
- UL 94V-0 package material
- No heatsink required
- Footprint 4.75cm<sup>2</sup>
- 6kVDC isolation
- 5V & 12V inputs
- 5V, 9V, 12V & 15V outputs
- 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.



For full details go to [www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

### SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Efficiency	Isolation Capacitance	MTTF <sup>1</sup>	Recommended Alternative
	V	V	mA	%	pF	kHrs	
<b>NRND</b>							
<b>NMS0505C</b>	5	±5	±200	74	1.8	747	MEJ2D0505SC
<b>NMS0509C</b>	5	±9	±111	76	1.9	327	MEJ2D0509SC
<b>NMS0512C</b>	5	±12	±83	77	2.0	169	MEJ2D0512SC
<b>NMS0515C</b>	5	±15	±67	78	2.1	93	MEJ2D0515SC
<b>NMS1205C</b>	12	±5	±200	78	1.9	365	MEJ2D1205SC
<b>NMS1209C</b>	12	±9	±111	81	2.0	224	MEJ2D1209SC
<b>NMS1212C</b>	12	±12	±83	82	2.1	136	MEJ2D1212SC
<b>NMS1215C</b>	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	

### OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power <sup>2</sup>	T <sub>A</sub> =0°C to 70°C			2	W
Voltage Set Point Accuracy	See tolerance envelope	-7.5		10	%
Line regulation	High V <sub>IN</sub> to low V <sub>IN</sub>		1.0	1.2	%/%
Load Regulation	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	
	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

### GENERAL CHARACTERISTICS

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

### ABSOLUTE MAXIMUM RATINGS

Short-circuit protection <sup>3</sup>	1 second
Wave Solder	Wave Solder profile not to exceed the profile recommended in IEC 61760-1 Section 6.1.3. Please refer to <a href="#">application notes</a> for further information.
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	900mW
Input voltage V <sub>IN</sub> , NMS05 types	7V
Input voltage V <sub>IN</sub> , NMS12 types	15V

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

2. See derating graph.

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

All specifications typical at T<sub>A</sub>=25°C, nominal input voltage and rated output current unless otherwise specified.

**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				

**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**

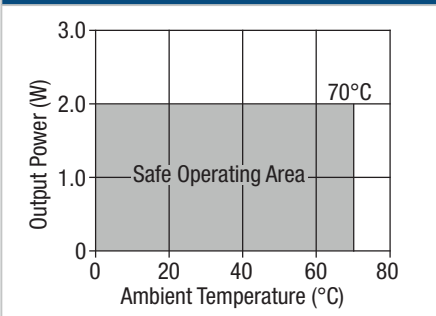
It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. We therefore strongly advise against repeated high voltage isolation testing, but if it is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

**RoHS COMPLIANCE INFORMATION**

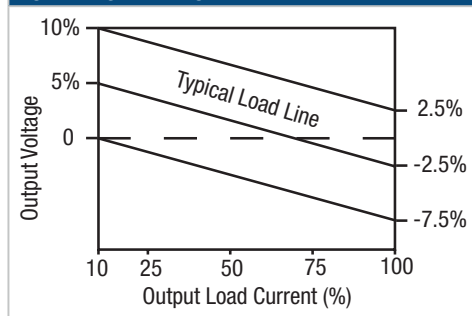


This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. Please refer to [application notes](#) for further information. The pin termination finish on this product series is Matte Tin over Nickel Preplate. The series is backward compatible with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

**TEMPERATURE DERATING GRAPH**



**TOLERANCE ENVELOPE**

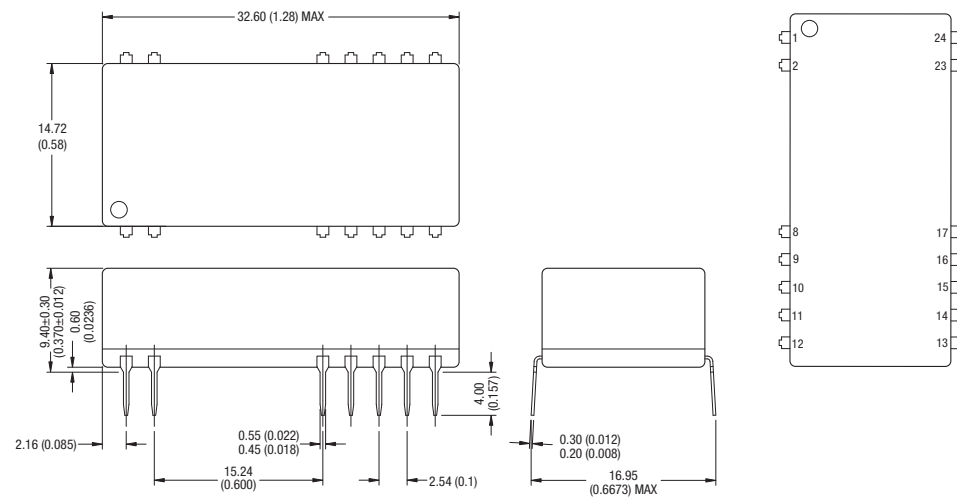


**SAFETY APPROVAL**

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.

**PACKAGE SPECIFICATIONS**

**MECHANICAL DIMENSIONS**

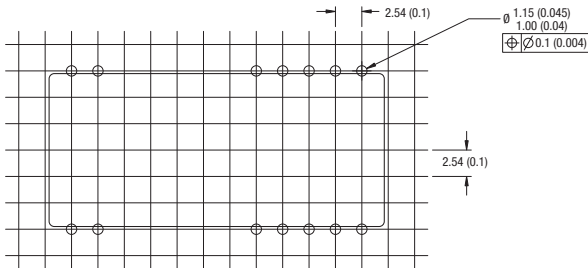


All dimensions in inches ±0.01 (mm ±0.25mm). All pins on a 0.1 (2.54) pitch and within ±0.01 (0.25) of true position.

**PIN CONNECTIONS**

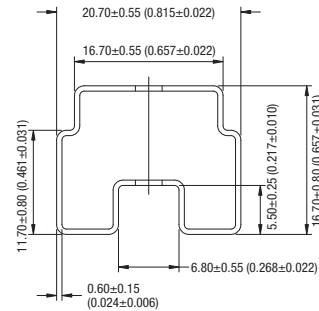
Pin	Function
1	+VIN
2	-VIN
8	-VOUT
9	NC
10	OV
11	NC
12	+VOUT
13	+VOUT
14	NC
15	OV
16	NC
17	-VOUT
23	NC
24	NC

**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**

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- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Data Processing equipment

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