Murata Power Solutions

NMS Series

6kVDC Isolated 2W Dual Output DC/DC Converters

FEATURES

- RoHS compliant
- UL1950 recognized
- Efficiency to 82%
- Power density up to 0.44W/cm^3
- Dual outputs
- Low profile package
- UL 94V-0 package material
- No heatsink required
- Footprint 4.75cm^2
- 6kVDC isolation
- 5V & 12V input
- 5V, 9V, 12V and 15V 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 recognized 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 suiltable for applications in high noise environments, e.g. heavy electrical machine interface.

c UL us

RoHS COMPLIANT

25

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

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Efficiency	Isolation Capacitance	MTTF[1]
	V	V	mA	%	pF	kHrs
NMS0505C	5	±5	±200	74	1.8	747
NMS0509C	5	±9	±111	76	1.9	327
NMS0512C	5	±12	±83	77	2.0	169
NMS0515C	5	±15	±67	78	2.1	93
NMS1205C	12	±5	±200	78	1.9	365
NMS1209C	12	±9	±111	81	2.0	224
NMS1212C	12	±12	±83	82	2.1	136
NMS1215C	12	±15	±67	82	2.2	82

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[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	%/%
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[3]	1 second
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

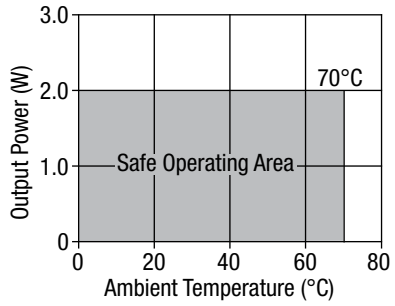
1. Calculated using MIL-HDBK-217F with nominal input voltage at full load.
2. See derating graph.
3. Supply voltage must be disconnected at the end of the short circuit duration.

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

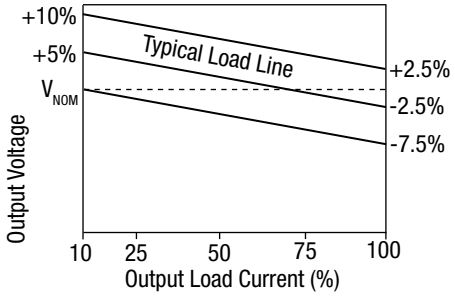
TEMPERATURE CHARACTERISTICS

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				

TEMPERATURE DERATING GRAPH



TOLERANCE ENVELOPE



SAFETY APPROVAL

The NMS series has been recognised by Underwriters Laboratory (UL) to UL 60950 for supplementary insulation up to 300Vrms and reinforced insulation up to 150Vrms working voltage.

File number E151252 applies.

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?"

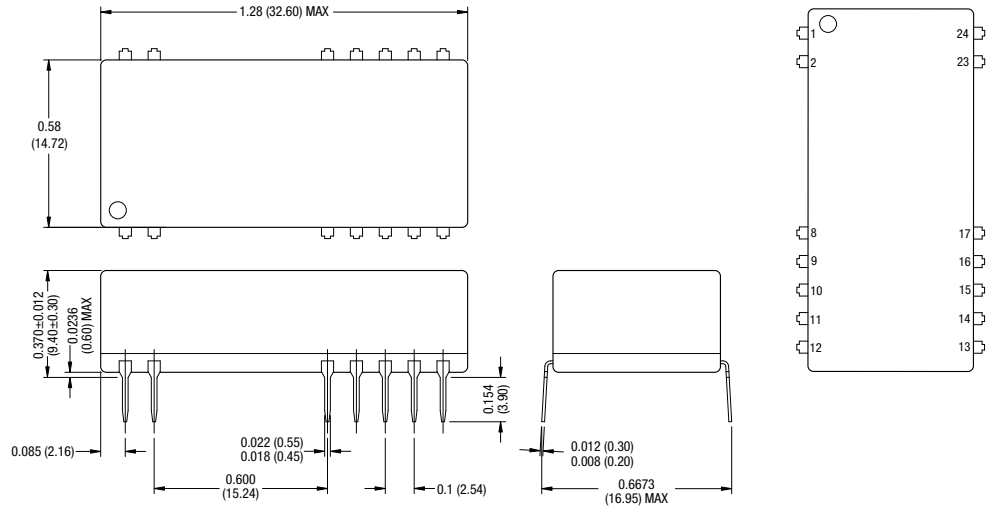
The NMS series has been recognized by Underwriters Laboratory to a working voltage of 300Vrms for Supplementary Insulation system and 150Vrms for Reinforced Insulation systems.

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.

PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS



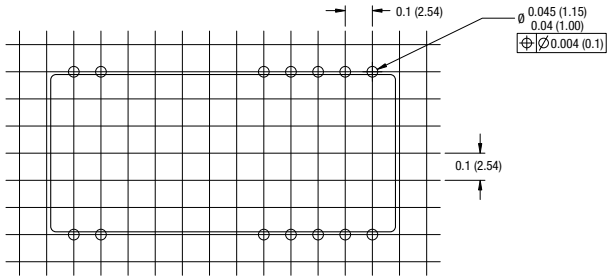
All dimensions in inches ±0.01 (mm ±0.25mm). All pins on a 0.1 (2.54) pitch and within ±0.01 (0.25) of true position.

Weight: 7.5g

PIN CONNECTIONS

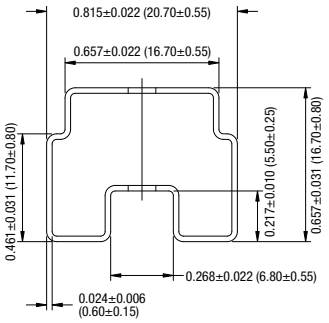
Pin	Function
1	+V_{IN}
2	-V_{IN}
8	-V_{OUT}
9	NC
10	OV
11	NC
12	+V_{OUT}
13	+V_{OUT}
14	NC
15	OV
16	NC
17	-V_{OUT}
23	NC
24	NC

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

RoHS COMPLIANCE INFORMATION

RoHS COMPLIANT

This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300ºC for 10 seconds. 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

Murata Power Solutions, Inc.
11 Cabot Boulevard, Mansfield, MA 02048-1151 U.S.A.
ISO 9001 and 14001 REGISTERED

This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy:
Refer to: http://www.murata-ps.com/requirements/

Murata Power Solutions, Inc. 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.
© 2013 Murata Power Solutions, Inc.