

FEATURES

- Wide Temperature performance at full 2 Watt load, -40°C to 85°C
- Single Isolated Output
- Pin Compatible with LME and NME Series
- Industry Standard Pinout
- 1kVDC Isolation
- Efficiency to 85%
- Power Density up to $2.01\text{W}/\text{cm}^3$
- 5V & 12V Input
- 5V, 9V, 12V and 15V Output
- Footprint from 1.05cm^2
- UL 94V-0 Package Material
- No Heatsink Required
- Internal SMD Construction
- Toroidal Magnetics
- Fully Encapsulated
- No External Components Required
- MTTF up to 2.9 Million hours
- Custom Solutions Available
- No Electrolytic or Tantalum Capacitors

DESCRIPTION

The NML Series of DC-DC Converters is particularly suited to isolating and/or converting DC power rails. The galvanic isolation allows the device to be configured to provide an isolated negative rail in systems where only positive rails exist. The wide temperature range guarantees startup from -40°C and full 2 watt output at 85°C . Pin compatibility with the NME and LME ensures ease of upgradeability.

SELECTION GUIDE

	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	MTTF ¹
Order Code	(V)	(V)	(mA)	(mA)	(%)	(pF)	kHrs
NML0505S	5	5	400	513	78	19	2327
NML0509S	5	9	222	492	81	27	1393
NML0512S	5	12	167	479	84	32	832
NML0515S	5	15	133	481	83	27	481
NML1205S	12	5	400	207	81	28	716
NML1209S	12	9	222	198	84	42	593
NML1212S	12	12	167	197	85	46	461
NML1215S	12	15	133	197	85	54	328

i When operated **without** additional external load capacitance, the output voltage of the devices is guaranteed to be within 95% of its steady state value within 100ms after the input voltage has reached 95% of its steady state value, **irrespective of the rise time of the input voltage**.

ii 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	
Reflected Ripple Current	5V input types	20	33		mA p-p
	12V input types	23	38		

OUTPUT CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Rated Power ²	$T_A = -40^{\circ}\text{C}$ to 85°C			2	W
Voltage Set Point Accuracy	See tolerance envelope				
Line Regulation	High V_{IN} to low V_{IN}		1.0	1.2	%/%
Load Regulation	10% load to rated load, 5V output types		7.0	8.5	%
	10% load to rated load, 9V output types		4.5	5.2	
	10% load to rated load, 12V output types		4.5	5.5	
	10% load to rated load, 15V output types		3.7	8.5	
Ripple & Noise	NML0505S, BW=DC to 20MHz		96	200	mV p-p
	NML0509S, BW=DC to 20MHz		67		
	NML0512S, BW=DC to 20MHz		59		
	NML0515S, BW=DC to 20MHz		53		
	NML1205S, BW=DC to 20MHz		76		
	NML1209S, BW=DC to 20MHz		63		
	NML1212S, BW=DC to 20MHz		53		
NML1215S, BW=DC to 20MHz		45			

ABSOLUTE MAXIMUM RATINGS

Internal power dissipation	805mW
Lead temperature 1.5mm from case for 10 seconds	300°C
Input voltage V_{IN} , NML05 types	7V
Input voltage V_{IN} , NML12 types	15V

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

² See derating curve

All specifications typical at $T_A = 25^{\circ}\text{C}$, nominal input voltage and rated output current unless otherwise specified.

NML SERIES

Isolated 2W Single Output DC-DC Converters

ISOLATION CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Isolation Test Voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso=500VDC	10			G

GENERAL CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Switching Frequency	5V input types		90		kHz
	12V input types		90		

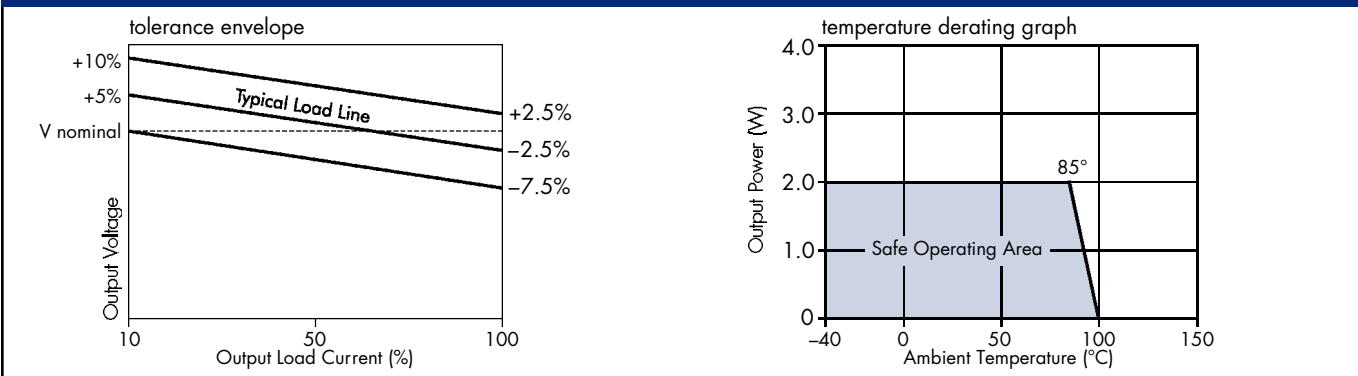
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Specification	All output types	-40		85	°C
Storage		-50		130	°C
Case Temperature Above Ambient	5V output types			45	°C
	All other output types			36	
Cooling	Free air convection				

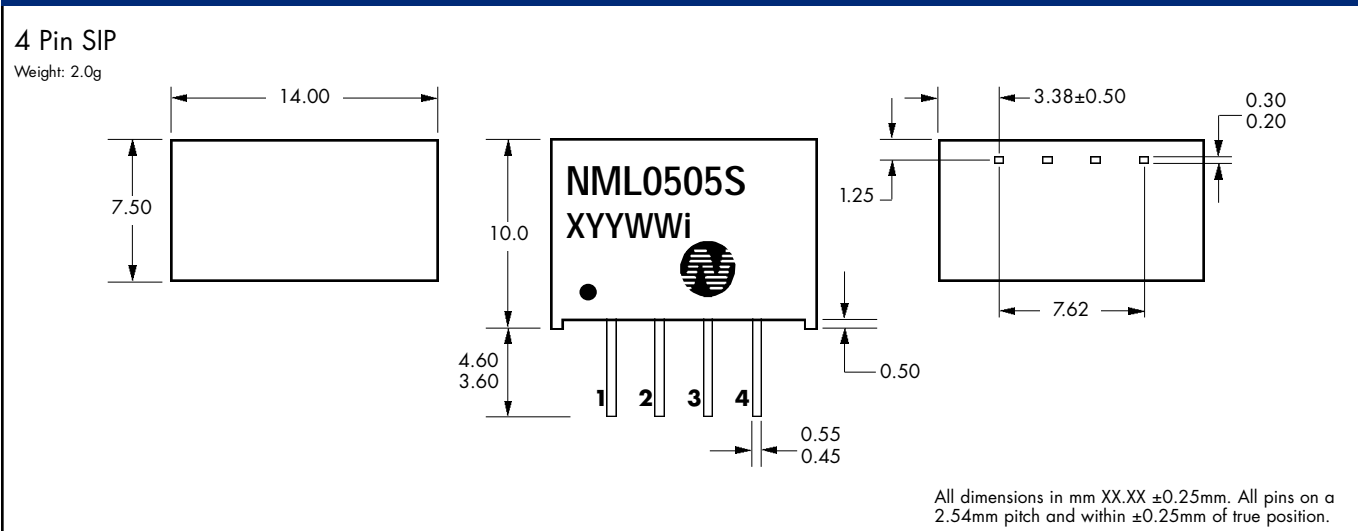
PIN CONNECTIONS

4 Pin SIP	
PIN	
1	GND
2	VIN
3	0V
4	+V

PERFORMANCE CHARACTERISTICS



MECHANICAL DIMENSIONS



C&D Technologies (NCL) Limited reserve the right to alter or improve the specification, internal design or manufacturing process at any time, without notice. Please check with your supplier or visit our web site to ensure that you have the current and complete specification for your product before use.

© C&D Technologies (NCL) Limited 2000

NDC NML.2

No part of this publication may be copied, transmitted or stored in a retrieval system or reproduced in any way including, but not limited to, photography, photocopy, magnetic or other recording means, without prior written permission from C&D Technologies (NCL) Limited.

Instructions for use are available from www.dc-dc.com

C&D Technologies (NCL) Ltd
Tanners Drive, Blakelands North
Milton Keynes MK14 5BU, England
Tel: +44 (0)1908 615232
Fax: +44 (0)1908 617545
email: info@cdtechno-ncl.com

[www: http://www.dc-dc.com](http://www.dc-dc.com)

C&D Technologies (NCL), Inc.
8917 Glenwood Avenue, Raleigh
NC 27612, USA
Tel: +1 (919) 571-9405
Fax: +1 (919) 571-9262
email: info@us.cdtechno-ncl.com

C&D TECHNOLOGIES
Power Solutions