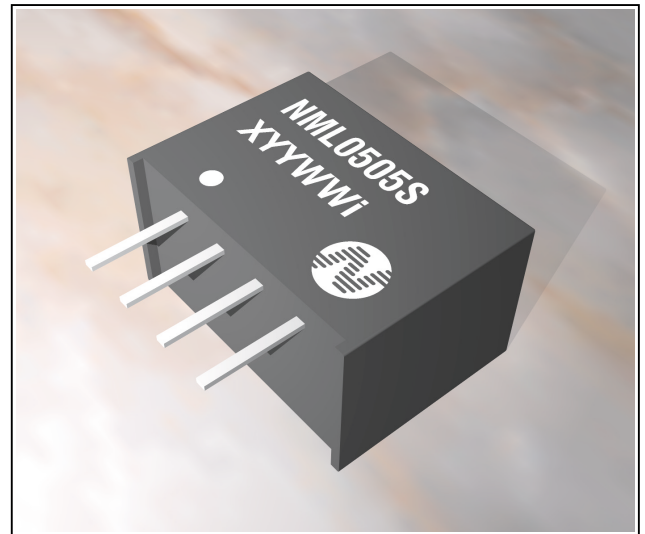


features

- 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

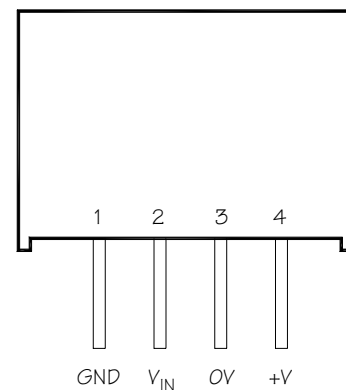
description

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.



pin connections

4 Pin SIP



PRELIMINARY

Notice : This is not a final specification.
Some parametric limits may be subject to change.

NML SERIES

Isolated 2W Single Output DC-DC Converters

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

electrical specifications

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

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

- i When operated **without** additional external load capacitance, the output voltage of the NML 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.

NML SERIES

Isolated 2W Single Output DC-DC Converters

family characteristics - input

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

Parameter	Conditions	MIN	NOM	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		

family characteristics - output

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

Parameter	Conditions	MIN	NOM	MAX	Units
Rated Power ¹	$T_A = -40^\circ\text{C}$ 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	5V output types		7.0	8.5	%
	9V output types		4.5	5.2	
	12V output types		4.5	5.5	
	15V output types		3.7	8.5	
Ripple and 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		

¹ See derating curve.

NML SERIES

Isolated 2W Single Output DC-DC Converters

family characteristics - isolation

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

Parameter	Conditions	MIN	NOM	MAX	Units
Isolation Voltage	Flash tested for 1 second	1000			VDC
Test Voltage	50Hz, 10 seconds	1000			Vpk
Resistance	$V_{iso}=500\text{V}$	10			$\text{G}\Omega$

family characteristics - general

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

Parameter	Conditions	MIN	NOM	MAX	Units
Switching Frequency	5V input types		90		kHz
	12V input types		90		
Package Weight	SIL		2.0		g

family characteristics - temperature

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

Parameter	Conditions	MIN	TYP	MAX	Units
Specification	All output types	-40		85	$^{\circ}\text{C}$
Storage		-50		130	$^{\circ}\text{C}$
Case Temperature above Ambient	5V output types			45	$^{\circ}\text{C}$
	All other output types			36	

NML SERIES

Isolated 2W Single Output DC-DC Converters

family characteristics - mean time to failure (MTTF)¹

Part Number	-40°C	25°C	85°C	Units
NML0505	3970	2327	934	kHrs
NML0509	1997	1393	719	
NML0512	1095	832	513	
NML0515	626	481	301	
NML1205	950	716	444	kHrs
NML1209	768	593	389	
NML1212	583	461	320	
NML1215	417	328	222	

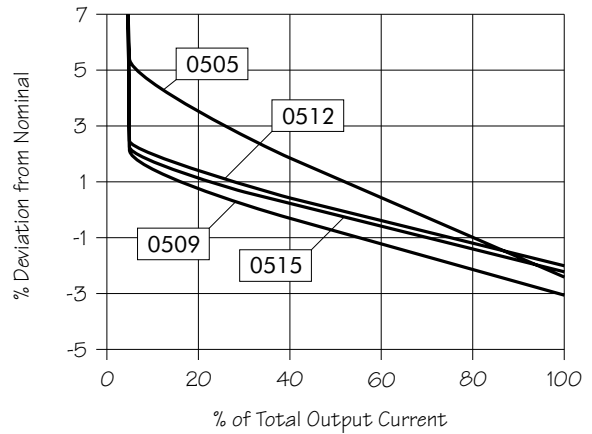
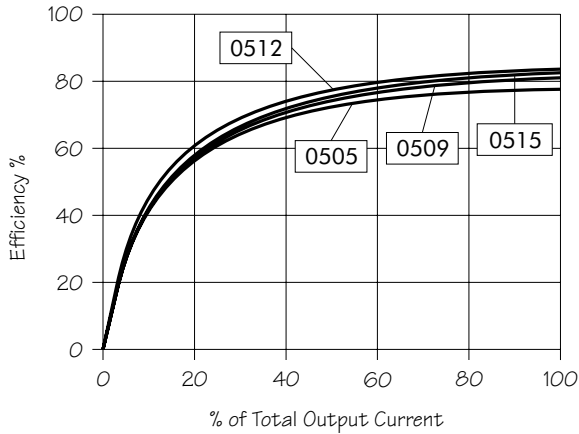
¹ Calculated using MIL-HDBK-217F with nominal input voltage at full load.

NML SERIES

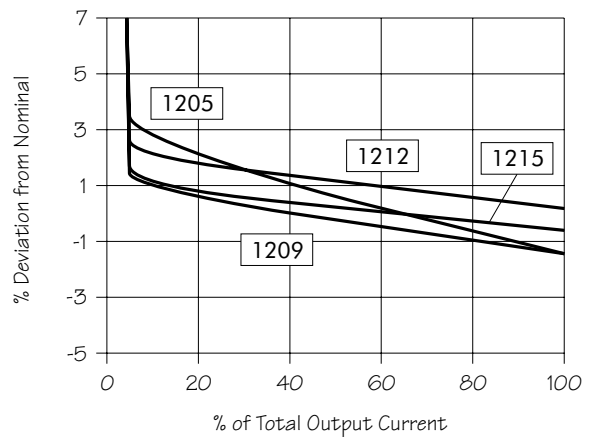
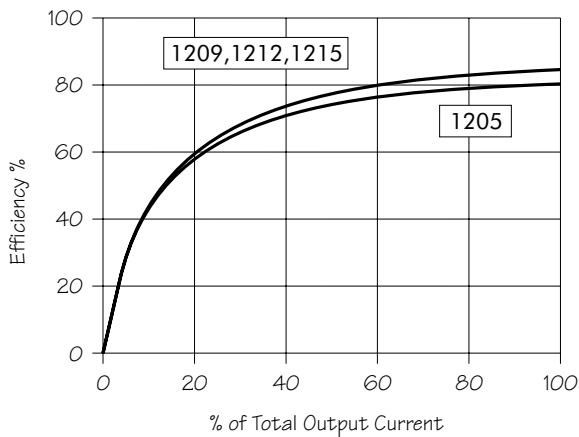
Isolated 2W Single Output DC-DC Converters

typical characteristics¹

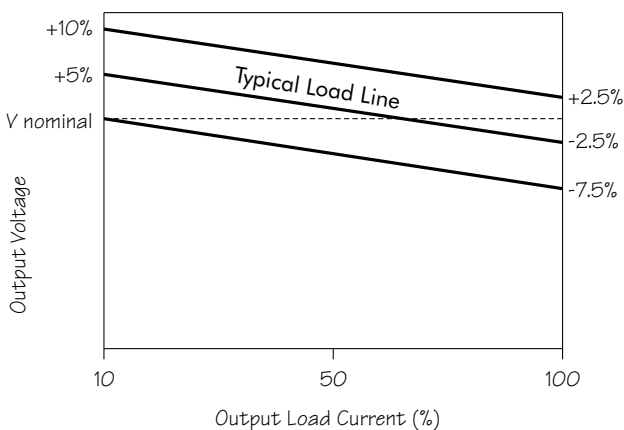
NML05 series



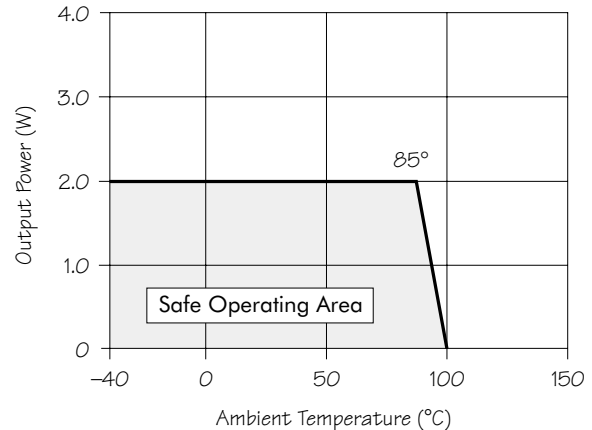
NML12 series



tolerance envelope



temperature derating graph



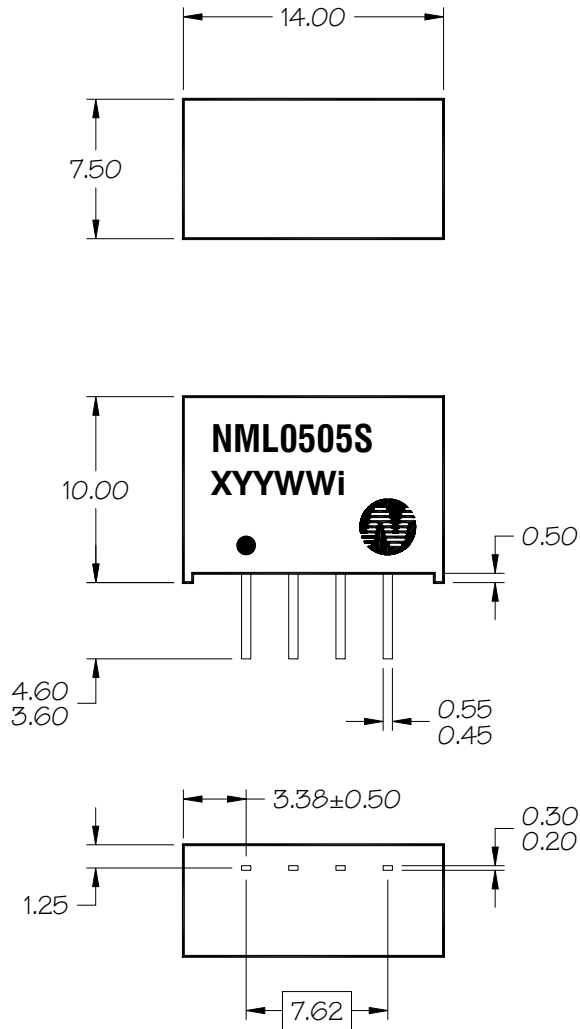
¹ All data taken at $T_A=25^\circ\text{C}$.

NML SERIES

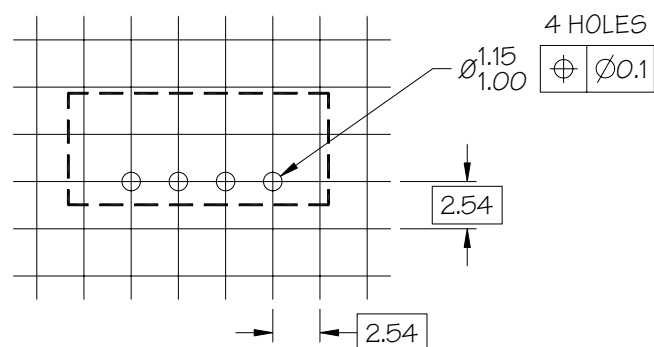
Isolated 2W Single Output DC-DC Converters

outline dimensions¹

4 Pin SIP



recommended footprint details



¹ Unless otherwise stated all dimensions in mm XX.XX ± 0.25mm.
All pins on a 2.54mm pitch and within Ø0.25mm of true pin pitch position.

NML SERIES

Isolated 2W Single Output DC-DC Converters

packaging details

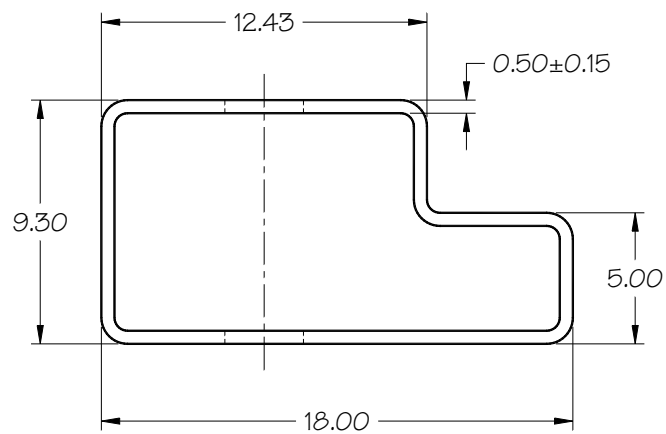
Order Code	Packaging Style	Quantity
NMLXXXXS	SIP Tube	35

tube outline dimensions¹

SIP

tube length : 520mm \pm 2mm.

tube material : antistatic coated clear pvc.



¹ Unless otherwise stated all dimensions in mm \pm 0.5mm.

The following Newport Components publications are also available :

- The Power Components Handbook (also in CD ROM format)
- EMC Design Guidelines

Please contact Newport Components or your local supplier for a copy of these data books.



FM 13273 / RS 31306

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