

**FEATURES**

- RoHS compliant
- 1kVDC isolation
- Efficiency up to 80%
- Wide temperature performance at full 1 watt load, -40°C to 85°C
- Power density up to 0.90W/cm<sup>3</sup>
- UL 94V-0 package material
- Footprint from 1.17cm<sup>2</sup>
- Industry standard pinout
- 5V, 12V & 24V input
- 5V, 12V & 15V output
- No heatsink required
- Internal SMD construction
- Fully encapsulated with toroidal magnetics
- MTTF up to 1.6 million hours
- Custom solutions available
- No electrolytic or tantalum capacitors

**DESCRIPTION**

The NMR series of industrial temperature range DC/DC converters are the standard building blocks for on-board distributed power systems. They are ideally suited for providing single rail supplies on primarily digital boards with the added benefit of galvanic isolation to reduce switching noise. Surface mount technology and advanced packaging materials produce rugged reliable performance over an extended temperature range from -40°C to 85°C.

**SELECTION GUIDE**

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	MTTF <sup>1</sup>
	(V)	(V)	(mA)	(mA)	%	pF	kHrs
<b>NMR100C</b>	5	5	200	290	69	28	1322
<b>NMR101C</b>	5	12	83	260	77	33	235
<b>NMR102C</b>	5	15	67	253	79	40	127
<b>NMR106C</b>	12	5	200	121	69	36	515
<b>NMR107C</b>	12	12	83	110	76	58	184
<b>NMR108C</b>	12	15	67	110	76	56	111
<b>NMR118C</b>	24	5	200	60	70	61	156
<b>NMR119C</b>	24	12	83	53	78	98	77
<b>NMR120C</b>	24	15	67	52	80	122	51

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	
	Continuous operation, 24V input types	21.6	24	26.4	
Reflected ripple current	5V & 12V input types		40	60	mA p-p
	24V input types		50	90	

**OUTPUT CHARACTERISTICS**

Parameter	Conditions	MIN.	TYP.	MAX.	Units
Rated Power <sup>2</sup>	T <sub>A</sub> =-40°C to 85°C			1.0	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High V <sub>IN</sub> to low V <sub>IN</sub>		1.0	1.2	%/%
Load Regulation <sup>2</sup>	10% load to rated load, NMR100C/106C		12.5	13.4	%
	10% load to rated load, NMR101C/107C		6.90	7.70	
	10% load to rated load, NMR102C/108C		6.50	7.50	
	10% load to rated load, NMR118C		6.80	10	
	10% load to rated load, NMR119C		2.80	4.0	
	10% load to rated load, NMR120C		2.50	3.50	
Ripple and Noise	BW=DC to 20MHz		30	50	mV p-p

**ISOLATION CHARACTERISTICS**

Parameter	Conditions	MIN.	TYP.	MAX.	Units
Isolation voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso=1000VDC	10			GΩ

**ABSOLUTE MAXIMUM RATINGS**

Short-circuit protection <sup>3</sup>	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	550mW
Input voltage V <sub>IN</sub> , NMR100C, NMR101C, NMR102C	7V
Input voltage V <sub>IN</sub> , NMR106C, NMR107C, NMR108C	15V
Input voltage V <sub>IN</sub> , NMR118C, NMR119C, NMR120C	28V

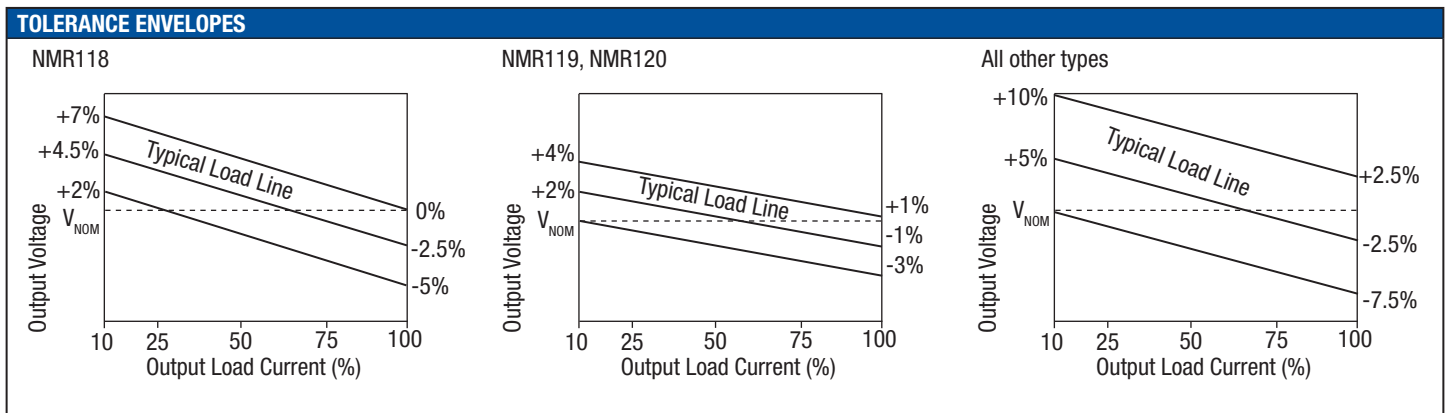
1. Calculated using MIL-HDBK-217F with nominal input voltage at full load.
  2. See derating graph.
  3. Supply voltage must be disconnected at the end of the short circuit duration.
- All specifications typical at T<sub>A</sub>=25°C, nominal input voltage and rated output current unless otherwise specified.



For full details go to [www.cd4power.com/rohs](http://www.cd4power.com/rohs)

GENERAL CHARACTERISTICS					
Parameter	Conditions	MIN.	TYP.	MAX.	Units
Switching frequency	5V input types		110		kHz
	12V input types		160		
	24V input types		80		

TEMPERATURE CHARACTERISTICS					
Parameter	Conditions	MIN.	TYP.	MAX.	Units
Specification	All output types	-40		85	°C
Storage		-50		130	
Case Temperature above ambient	5V output types		33		
	All other output types		28		
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.

C&D Technologies NMR series of DC/DC converters are all 100% production tested at their stated isolation voltage. This is 1kVDC for 1 second.

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

For a part holding no specific agency approvals, such as the NMR series, both input and output should normally be maintained within SELV limits i.e. less than 42.4V peak, or 60VDC. The isolation test voltage represents a measure of immunity to transient voltages and the part should never be used as an element of a safety isolation system. The part could be expected to function correctly with several hundred volts offset applied continuously across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

**REPEATED HIGH-VOLTAGE ISOLATION TESTING**

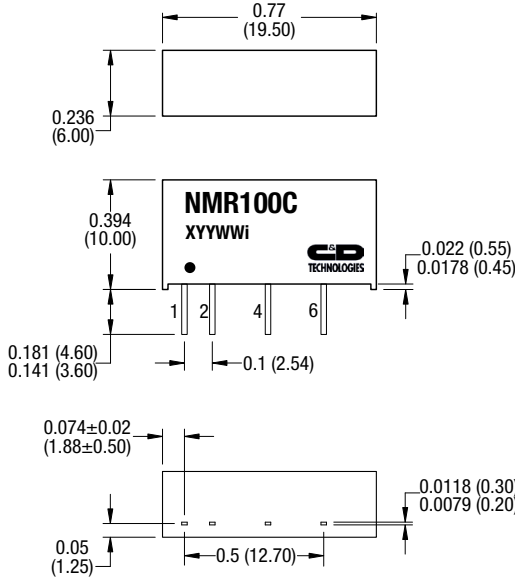
It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. The NMR series has toroidal isolation transformers, with no additional insulation between primary and secondary windings of enameled wire. While parts can be expected to withstand several times the stated test voltage, the isolation capability does depend on the wire insulation. Any material, including this enamel (typically polyurethane) is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. 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.

This consideration equally applies to agency recognized parts rated for better than functional isolation where the wire enamel insulation is always supplemented by a further insulation system of physical spacing or barriers.

**PACKAGE SPECIFICATIONS**

**MECHANICAL DIMENSIONS**

7 Pin SIP Package

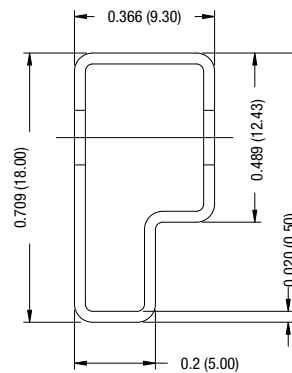


All dimensions in inches  $\pm 0.01$  (mm  $\pm 0.25$ mm). All pins on a 0.1 (2.54) pitch and within  $\pm 0.01$  (0.25) of true position. Weight: 2.1g

**PIN CONNECTIONS - 7 PIN SIP**

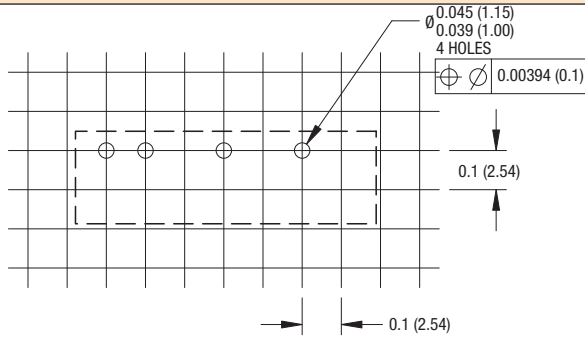
Pin	Function
1	+VIN
2	-VIN
4	-VOUT
6	+VOUT

**TUBE OUTLINE DIMENSIONS**



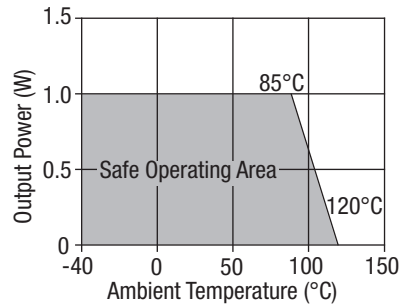
All dimensions in inches  $\pm 0.01$  (mm  $\pm 0.25$ mm) Tube quantity: 25

**RECOMMENDED FOOTPRINT DETAILS**



All dimensions in inches  $\pm 0.01$  (mm  $\pm 0.25$ mm)

**TEMPERATURE DERATING GRAPH**



**RoHS COMPLIANT INFORMATION**



This series is compatible with RoHS soldering systems with a peak wave solder temperature of 300°C for 10 seconds. The pin termination finish on this product series is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The series is backward compatible with Sn/Pb soldering systems.

For further information, please visit [www.cd4power.com/rohs](http://www.cd4power.com/rohs)