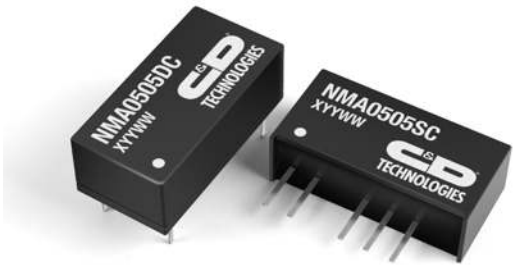
NMA 5V & 12V SERIES

Isolated 1W Dual Output DC/DC Converters



FEATURES

- RoHS compliant
- Efficiency up to 78%
- Power density up to 0.85W/cm^3
- Wide temperature performance at full 1 Watt load, –40°C to 85°C
- Dual output from a single input rail
- UL 94V-0 package material
- No heatsink required
- Footprint from 1.17cm^2
- Industry standard pinout
- Power sharing on output
- 1kVDC isolation
- 5V & 12V input
- 5V, 9V, 12V and 15V output
- Internal SMD construction
- Fully encapsulated with toroidal magnetics
- No external components required
- MTTF up to 1.6 million hours
- No electrolytic or tantalum capacitors

DESCRIPTION

The NMA series of industrial temperature range DC/DC converters are the standard buliding blocks for on-board distributed power systems. They are ideally suited for providing dual rail supplies on primarily digital boards with the added benefit of galvanic isolation to reduce switching noise. All of the rated power may be drawn from a single pin provided the total load does not exceed 1 watt.

SELECTION GUIDE

Order Code	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	MTTF[1]	Package Style
	(V)	(V)	(mA)	(mA)	%	pF	kHrs	
NMA0505DC	5	±5	±100	289	69	28	1697	DIP
NMA0509DC	5	±9	±55	267	75	32	682	
NMA0512DC	5	±12	±42	260	77	34	343	
NMA0515DC	5	±15	±33	256	78	36	188	
NMA0505SC	5	±5	±100	289	69	28	1697	SIP
NMA0509SC	5	±9	±55	267	75	32	682	
NMA0512SC	5	±12	±42	260	77	34	343	
NMA0515SC	5	±15	±33	256	78	36	188	
NMA1205DC	12	±5	±100	120	69	33	559	DIP
NMA1209DC	12	±9	±55	113	74	46	375	
NMA1212DC	12	±12	±42	111	75	55	243	
NMA1215DC	12	±15	±33	110	76	54	154	
NMA1205SC	12	±5	±100	120	69	33	559	SIP
NMA1209SC	12	±9	±55	113	74	46	375	
NMA1212SC	12	±12	±42	111	75	55	243	
NMA1215SC	12	±15	±33	110	76	54	154	

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			20	33	mA p-p

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power[2]	T_A=-40°C to 120°C			1	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		10	12.5	%
	10% load to rated load, 9V output types		9	10	
	10% load to rated load, 12V output types		6.5	7.5	
	10% load to rated load, 15V output types		6	7.0	
Ripple and Noise	BW=DC to 20MHz, 5V output types		40	75	mV p-p
	BW=DC to 20MHz, 9V output types		25	50	
	BW=DC to 20MHz, 12V output types		25	50	
	BW=DC to 20MHz, 15V output types		20	50	

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection[3]	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	450mW
Input voltage V_{IN}, NMA05 types	7V
Input voltage V_{IN}, NMA12 types	15V

1. Calculated using MIL-HDBK-217F with nominal input voltage at full load.
2. See derating graph.
3. Supply voltage must be discontinued 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.

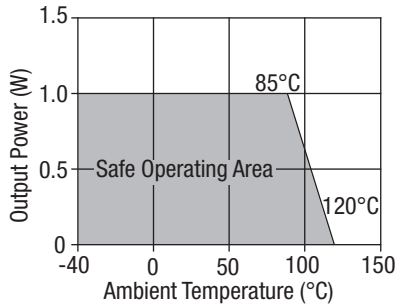
RoHS COMPLIANT 2002/95/EC

ISOLATION CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation test voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso= 1000VDC		10		GΩ

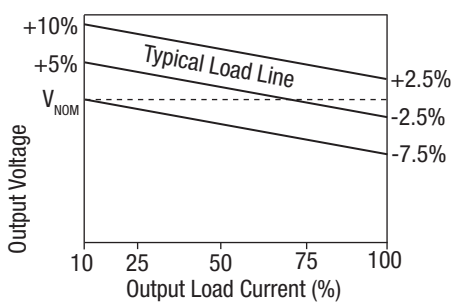
GENERAL CHARACTERISTICS					
Parameter	Conditions	Min.	Typ.	Max.	Units
Switching frequency	5V input types		110		kHz
	12V input types		140		

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				

TEMPERATURE DERATING GRAPH



TOLERANCE ENVELOPE



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 NMA 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 NMA 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

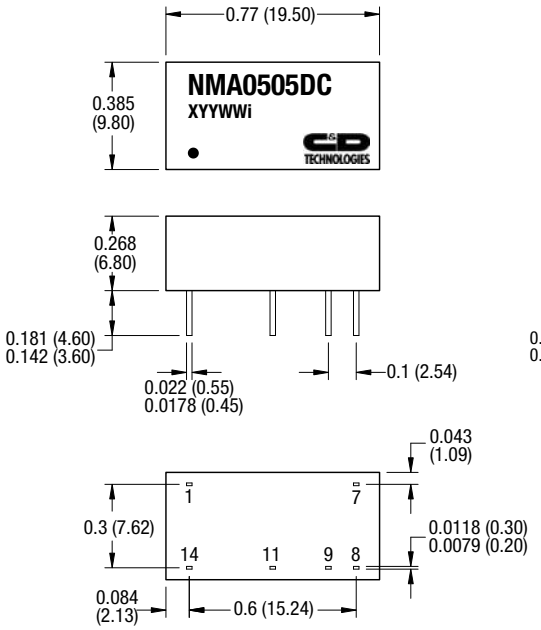
It is well known that repeated high-voltage isolation testing of a barrier component can actually degrade isolation capability, to a lesser or greater degree depending on materials, construction and environment. The NMA series has toroidal isolation transformers, with no additional insulation between 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.

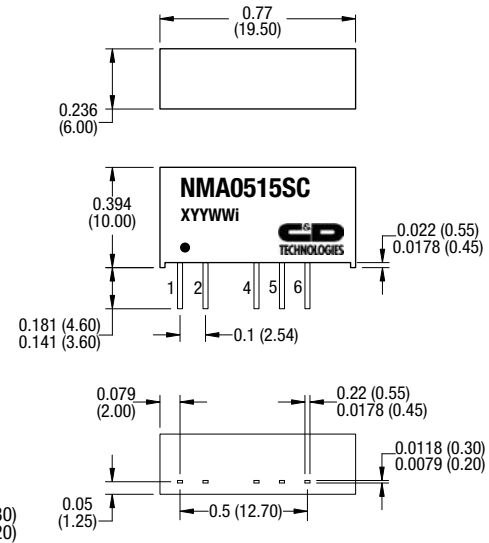
PACKAGE SPECIFICATIONS

MECHANICAL DIMENSIONS

DIP package



SIP package



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: 2.4g (DIP) 2.1g (SIP)

PIN CONNECTIONS - 14 PIN DIP

Pin	Function
1	-V_{IN}
7	NC
8	0V
9	+V_{OUT}
11	-V_{OUT}
14	+V_{IN}

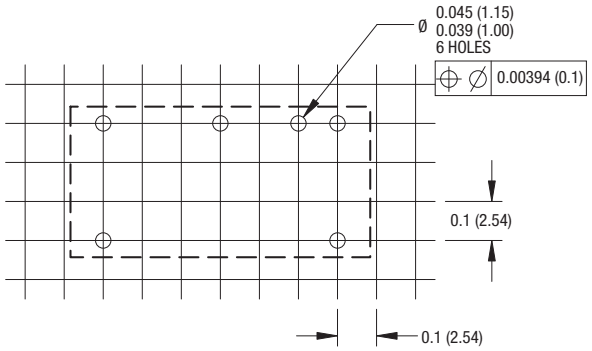
PIN CONNECTIONS - 7 PIN SIP

Pin	Function
1	+V_{IN}
2	-V_{IN}
4	-V_{OUT}
5	0V
6	+V_{OUT}

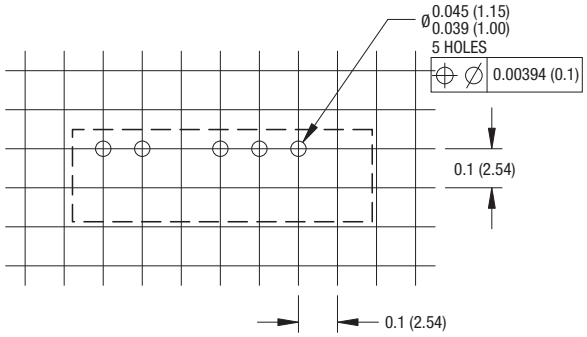
PACKAGE SPECIFICATIONS (continued)

RECOMMENDED FOOTPRINT DETAILS

14 Pin DIP Package

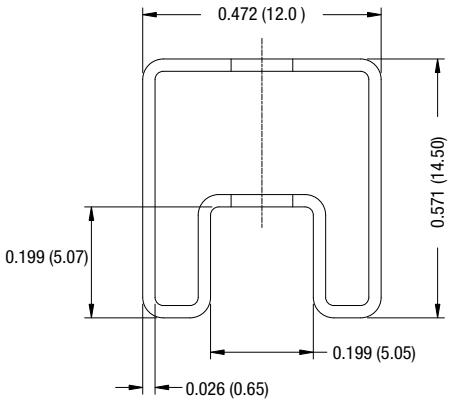


7 Pin SIP Package

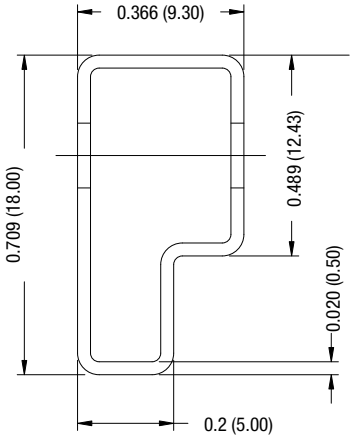


TUBE OUTLINE DIMENSIONS

14 Pin DIP Tube



7 Pin SIP Tube



Unless otherwise stated all dimensions in inches (mm) ±0.5mm.
Tube length (14 Pin DIP) : 20.47 (520mm ±2mm).
Tube length (7 Pin SIP) : 20.47 (520mm ±2mm).

Tube Quantity : 25

RoHS COMPLIANT INFORMATION

RoHS COMPLIANT 2002/95/EC

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 the SIP package type is Tin Plate, Hot Dipped over Matte Tin with Nickel Preplate. The DIP types are Matte Tin over Nickel Preplate. Both types in this series are backward compatible with Sn/Pb soldering systems.

For further information, please visit www.cd4power.com/rohs

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