

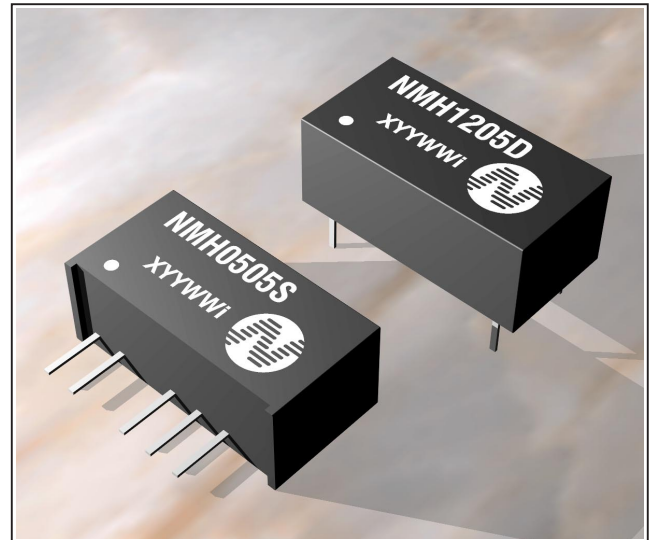
features

- Wide Temperature performance at full 2 Watt load, -40°C to 85°C
- Dual Output from a Single Input Rail
- Industry Standard Pinout
- Power Sharing on Output
- 1kVDC Isolation
- Efficiency to 86%
- Power Density up to $1.44\text{W}/\text{cm}^3$
- 5V, 12V, 24V & 48V Input
- 5V, 9V, 12V and 15V Output
- Footprint from 1.46cm^2
- UL 94V-0 Package Material
- No Heatsink Required
- Internal SMD Construction
- Toroidal Magnetics
- Fully Encapsulated
- No External Components Required
- MTF up to 2.0 Million hours
- Custom Solutions Available
- No Electrolytic or Tantalum Capacitors

description

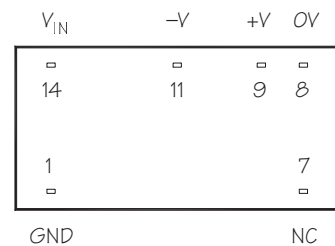
The NMH series of industrial temperature range DC-DC converters are the standard building blocks for on-board point-of-use power systems. They are ideally suited for providing dual rail supplies on single rail boards with the added benefit of galvanic isolation to reduce circuit noise. All of the rated power may be drawn from a single pin provided the total load does not exceed 2W.

Pin compatibility with the NMA 1 watt series ensures minimal effort in upgrading distributed power systems.

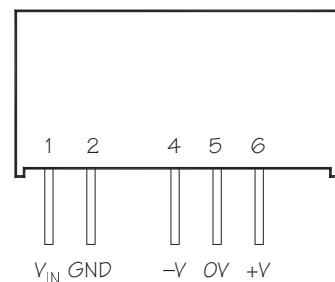


pin connections

14 Pin DIP (top view)



7 Pin SIP



PRELIMINARY

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

NMH SERIES

Isolated 2W Dual Output DC-DC Converters

absolute maximum ratings

Short circuit duration ¹ · · · · ·	1 second
Internal power dissipation · · · · ·	300mW
Lead temperature 1.5mm from case for 10 seconds · · · · ·	300°C
Input voltage V_{IN} , NMH05 types · · · · ·	7V
Input voltage V_{IN} , NMH12 types · · · · ·	15V
Input voltage V_{IN} , NMH24 types · · · · ·	28V
Input voltage V_{IN} , NMH48 types · · · · ·	54V

electrical specifications

5V & 12V input ranges

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

Order Code	Nominal Input Voltage	Rated Output Voltage	Rated Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	Package Style
	(V)	(V)	(mA)	(mA)	(%)	(pF)	
NMH0505D	5	5	±200	500	80	24	1
NMH0509D	5	9	±111	494	81	28	
NMH0512D	5	12	±83	488	82	30	
NMH0515D	5	15	±67	476	84	33	
NMH0505S	5	5	±200	500	80	24	2
NMH0509S	5	9	±111	494	81	28	
NMH0512S	5	12	±83	488	82	30	
NMH0515S	5	15	±67	476	84	33	
NMH1205D	12	5	±200	208	80	35	1
NMH1209D	12	9	±111	201	83	55	
NMH1212D	12	12	±83	198	84	63	
NMH1215D	12	15	±67	198	84	66	
NMH1205S	12	5	±200	208	80	35	2
NMH1209S	12	9	±111	201	83	55	
NMH1212S	12	12	±83	198	84	63	
NMH1215S	12	15	±67	198	84	66	

¹ Supply voltage must be discontinued at the end of the short circuit duration.

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Isolated 2W Dual Output DC-DC Converters

electrical specifications

24V & 48V input ranges

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified.

Order Code	Nominal Input Voltage	Rated Output Voltage	Rated Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	Package Style
	(V)	(V)	(mA)	(mA)	(%)	(pF)	
NMH2405D	24	5	±200	103	81	41	1
NMH2409D	24	9	±111	98	85	75	
NMH2412D	24	12	±83	97	86	95	
NMH2415D	24	15	±67	97	86	104	
NMH2405S	24	5	±200	103	81	41	2
NMH2409S	24	9	±111	98	85	75	
NMH2412S	24	12	±83	97	86	95	
NMH2415S	24	15	±67	97	86	104	
NMH4805D	48	5	±200	51	82	45	1
NMH4809D	48	9	±111	51	82	74	
NMH4812D	48	12	±83	49	85	90	
NMH4815D	48	15	±67	49	85	112	
NMH4805S	48	5	±200	51	82	45	2
NMH4809S	48	9	±111	51	82	74	
NMH4812S	48	12	±83	49	85	90	
NMH4815S	48	15	±67	49	85	112	

NMH SERIES

Isolated 2W Dual 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	
	Continuous operation, 24V input types	21.6	24	26.4	
	Continuous operation, 48V input types	43.2	48	52.8	
Reflected Ripple Current	5V input types		50		mA p-p
	12V input types		70		
	24V input types		130		
	48V input types		200		

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	TYP	MAX	Units
Rated Power ¹	$T_A = -40^\circ\text{C}$ to 85°C			2	W
Output Voltage Accuracy	NMH0505	-5		7.5	%
	All other types	-5		5	
Line Regulation	High V_{IN} to low V_{IN}		1.0	1.2	%/%
Load Regulation	10% load to rated load, 5V output types		5	10	%
	10% load to rated load, 9V, 12V & 15V output types		3	10	
Ripple and Noise	BW=DC to 20MHz, 5V output types		150	200	mV p-p
	BW=DC to 20MHz, 9V output types		100	150	
	BW=DC to 20MHz, 12V output types		80	150	
	BW=DC to 20MHz, 15V output types		70	150	

¹ See derating curve.

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Isolated 2W Dual Output DC-DC Converters

family characteristics - isolation

Specifications typical at $T_A=25^\circ\text{C}$.

Parameter	Conditions	MIN	TYP	MAX	Units
Isolation Voltage	Flash tested for 1 second	1000			VDC
Test Voltage	50Hz, 10 seconds	1000			V _{pk}
Resistance	Viso=500V	1	10		GΩ

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	TYP	MAX	Units
Switching Frequency	5V input types		95		kHz
	12V input types		90		
	24V input types		80		
	48V input types		80		
Package Weight	SIL		2.76		g
	DIL		2.85		
Efficiency	100% load	70			%
Power Consumption	0% load		300		mW

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	°C
Storage		-50		130	°C
Case Temperature above Ambient	5V output types		30		°C
	All other output types		25		

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Isolated 2W Dual Output DC-DC Converters

family characteristics - mean time to failure (MTTF)¹

Part Number	-40°C	25°C	85°C	Units
NMH0505	2004	1574	1101	kHrs
NMH0509	812	663	518	
NMH0512	409	338	274	
NMH0515	225	187	154	
NMA1205	599	490	388	kHrs
NMH1209	416	343	278	
NMH1212	277	229	188	
NMH1215	178	148	123	
NMH2405	386	318	258	kHrs
NMH2409	301	249	204	
NMH2412	220	183	151	
NMH2415	153	127	106	
NMH4805	285	235	192	kHrs
NMH4809	236	195	161	
NMH4812	184	152	126	
NMH4815	134	112	93	

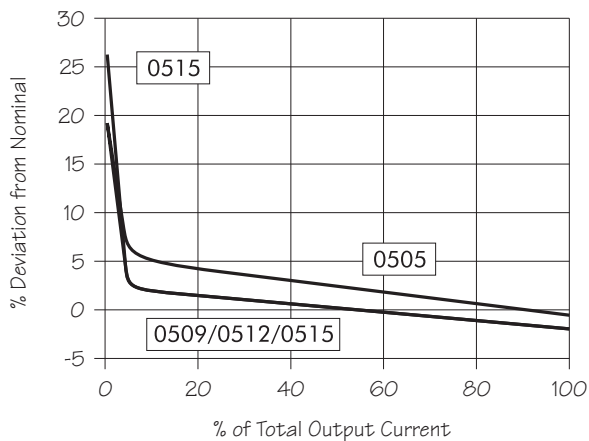
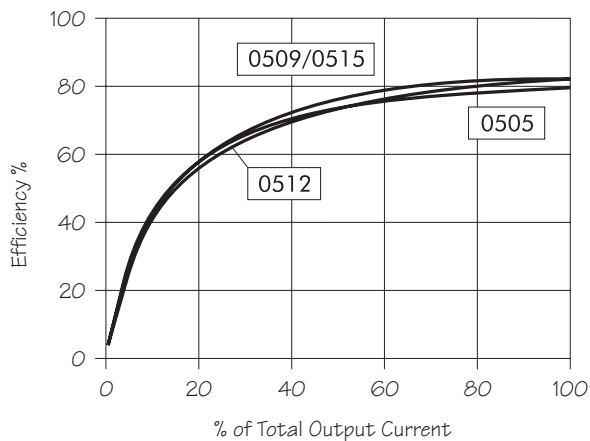
¹ Calculated using MIL-HDBK-217F with nominal input voltage at full load.

NMH SERIES

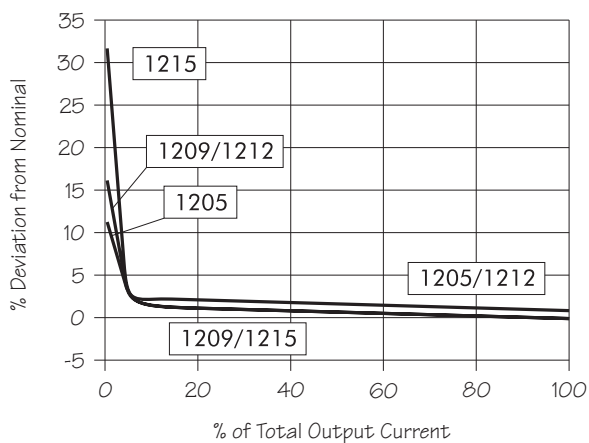
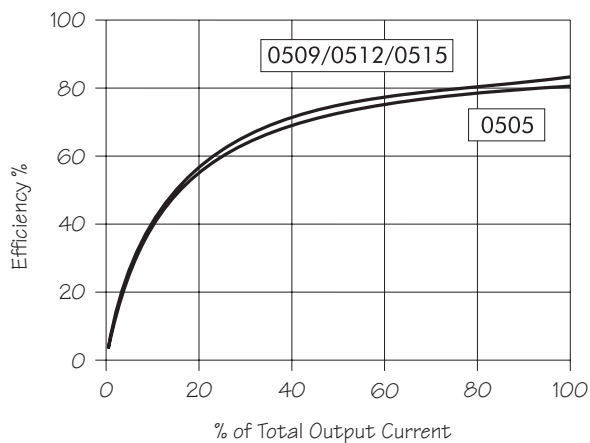
Isolated 2W Dual Output DC-DC Converters

typical characteristics¹

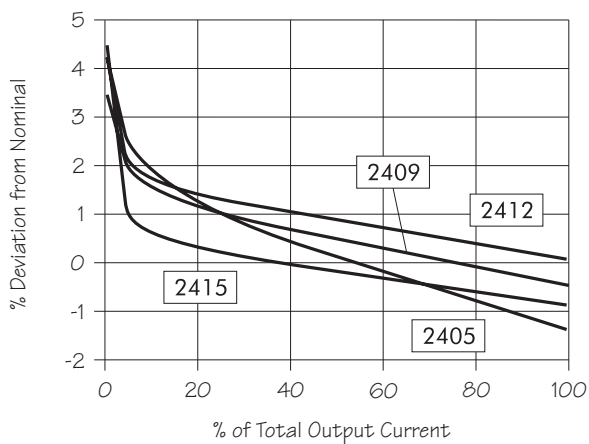
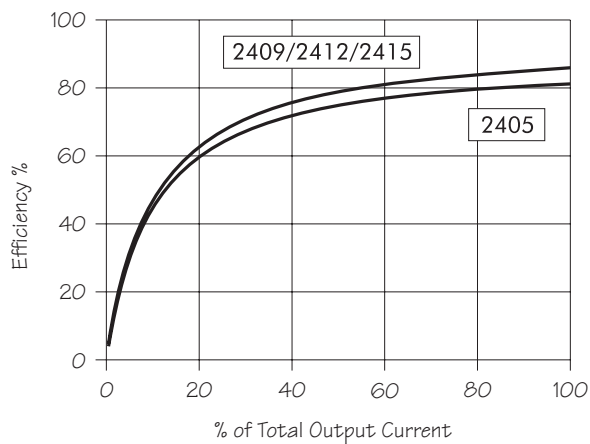
NMH05 series



NMH12 series



NMH24 series



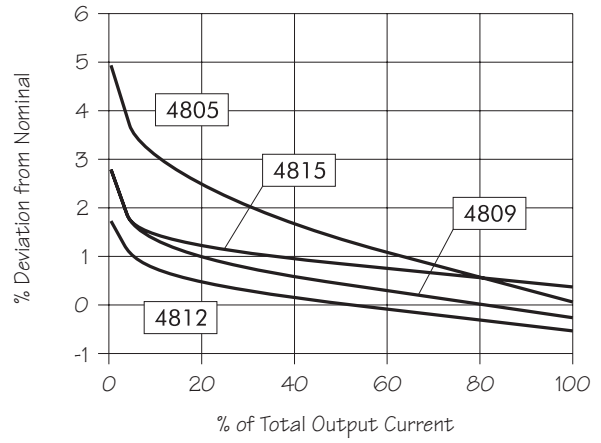
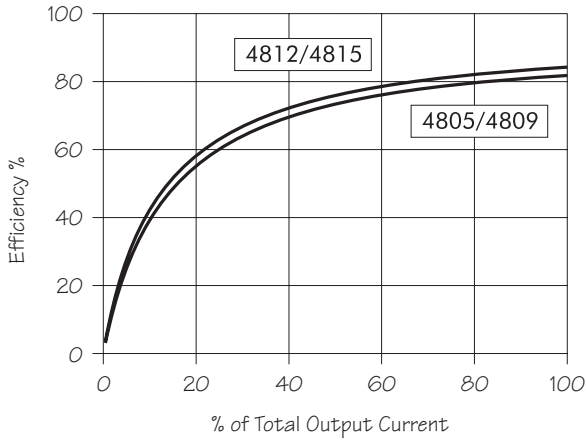
¹ All data taken at $T_A=25^\circ\text{C}$.

NMH SERIES

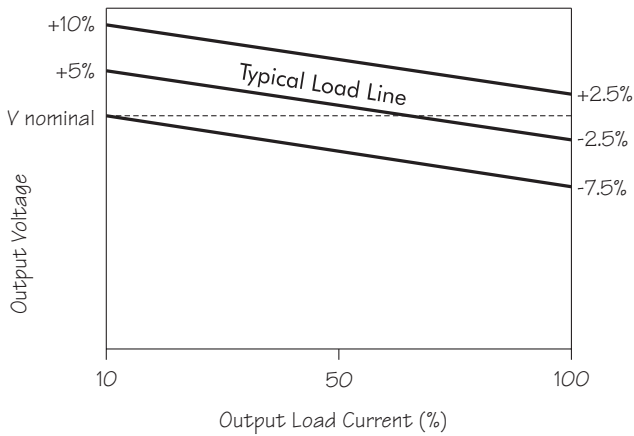
Isolated 2W Dual Output DC-DC Converters

typical characteristics¹

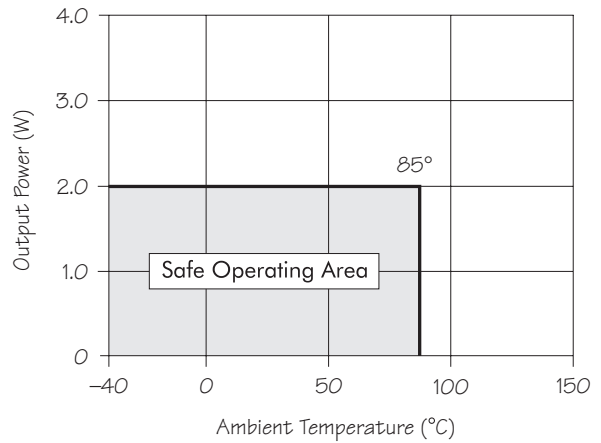
NMH48 series



tolerance envelope



temperature derating



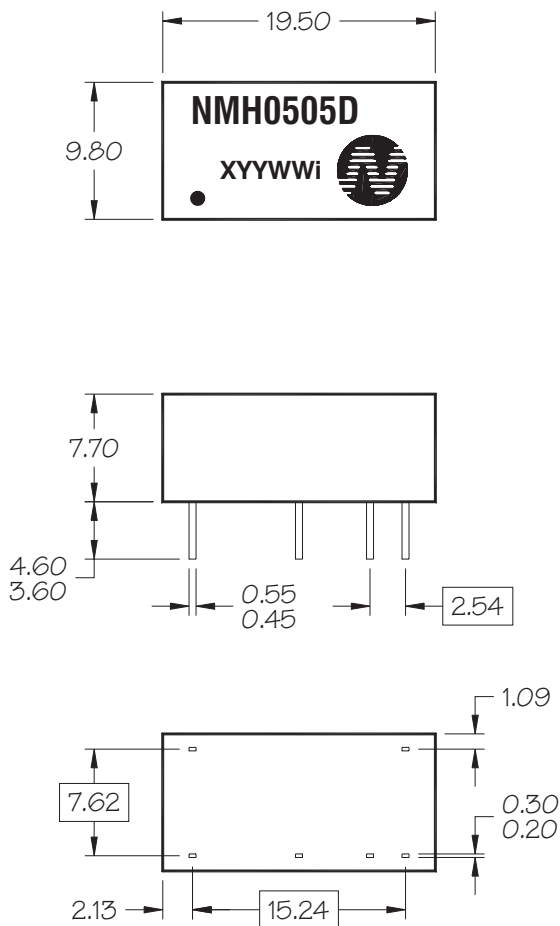
¹ All data taken at $T_A=25^\circ\text{C}$.

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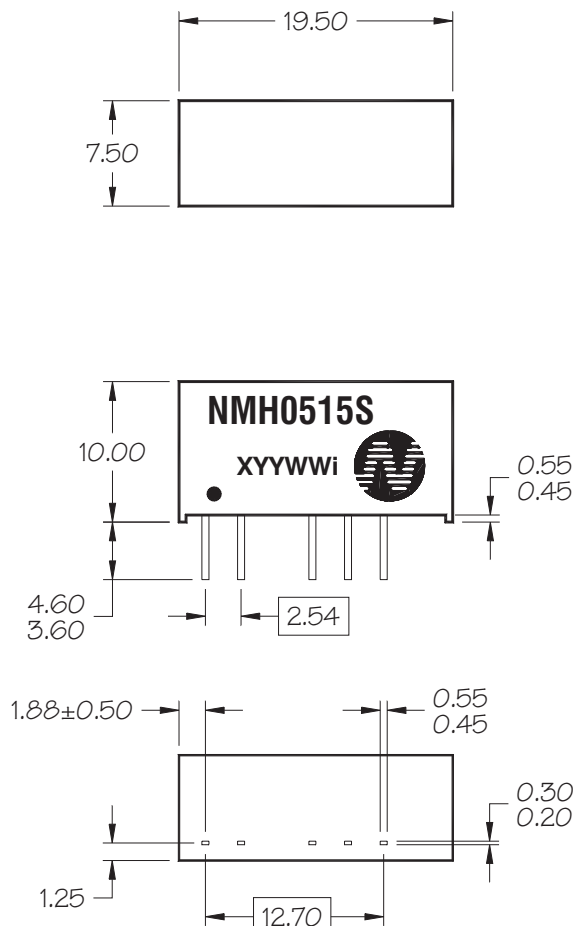
Isolated 2W Dual Output DC-DC Converters

outline dimensions¹

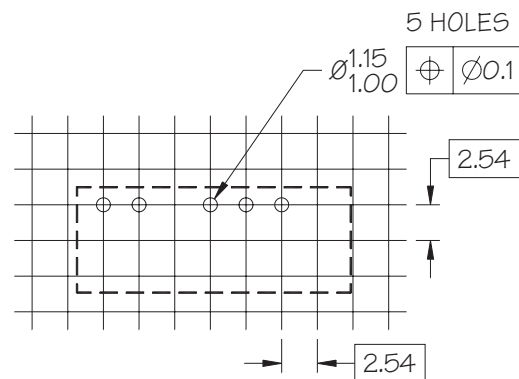
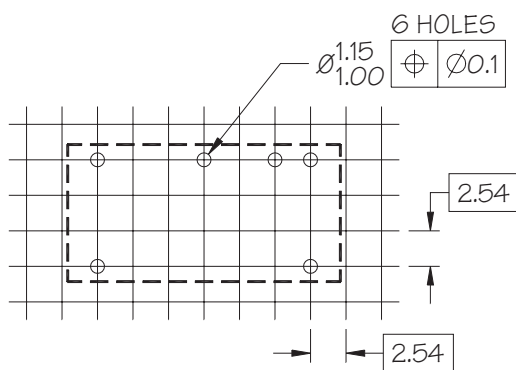
14 Pin DIP Package style



7 Pin SIP package style



recommended footprint details



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