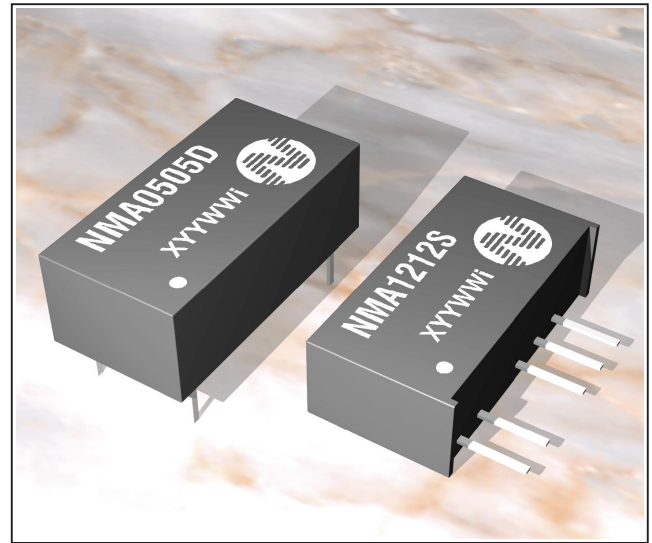


### features

- Wide Temperature performance at full 1 Watt load,  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Dual Output from a Single Input Rail
- Industry Standard Pinout
- Power Sharing on Output
- 1kVDC Isolation
- Efficiency to 78%
- Power Density upto  $0.85\text{W}/\text{cm}^3$
- 5V & 12V Input
- 5V, 9V, 12V and 15V Output
- Footprint from  $1.17\text{cm}^2$
- UL 94V-0 Package Material
- No Heatsink Required
- Internal SMD Construction
- Toroidal Magnetics
- Fully Encapsulated
- No External Components Required
- MTF up to 2.1 Million hours
- Custom Solutions Available
- No Electrolytic or Tantalum Capacitors

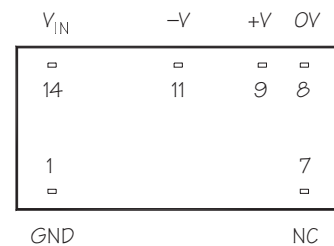
### description

The NMA 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 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 1watt.

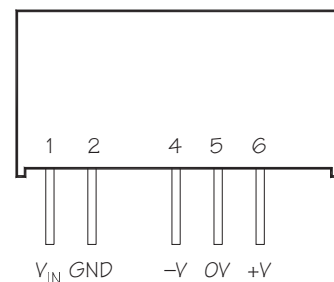


### pin connections

14 Pin DIP (top view)



7 Pin SIP



## PRELIMINARY

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

# NMA SERIES

## Isolated 1W Dual Output DC-DC Converters

### absolute maximum ratings

|   |          |
|---|----------|
| Short circuit duration <sup>1</sup> · · · · ·             | 1 second |
| Internal power dissipation · · · · ·                      | 450mW    |
| Lead temperature 1.5mm from case for 10 seconds · · · · · | 300°C    |
| Input voltage $V_{IN}$ , NMA05 types · · · · ·            | 7V       |
| Input voltage $V_{IN}$ , NMA12 types · · · · ·            | 15V      |

### electrical specifications

Specifications typical at  $T_A=25^{\circ}C$ , 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)                  |               |
| NMA0505D   | 5                     | 5                    | ±100                 | 289                         | 69         | 28                    | 1             |
| NMA0509D   | 5                     | 9                    | ±55                  | 270                         | 75         | 32                    |               |
| NMA0512D   | 5                     | 12                   | ±42                  | 266                         | 77         | 34                    |               |
| NMA0515D   | 5                     | 15                   | ±33                  | 263                         | 78         | 36                    |               |
| NMA0505S   | 5                     | 5                    | ±100                 | 289                         | 69         | 28                    | 2             |
| NMA0509S   | 5                     | 9                    | ±55                  | 270                         | 75         | 32                    |               |
| NMA0512S   | 5                     | 12                   | ±42                  | 266                         | 77         | 34                    |               |
| NMA0515S   | 5                     | 15                   | ±33                  | 263                         | 78         | 36                    |               |
| NMA1205D   | 12                    | 5                    | ±100                 | 120                         | 69         | 33                    | 1             |
| NMA1209D   | 12                    | 9                    | ±55                  | 113                         | 74         | 46                    |               |
| NMA1212D   | 12                    | 12                   | ±42                  | 111                         | 75         | 55                    |               |
| NMA1215D   | 12                    | 15                   | ±33                  | 110                         | 76         | 54                    |               |
| NMA1205S   | 12                    | 5                    | ±100                 | 120                         | 69         | 33                    | 2             |
| NMA1209S   | 12                    | 9                    | ±55                  | 113                         | 74         | 46                    |               |
| NMA1212S   | 12                    | 12                   | ±42                  | 111                         | 75         | 55                    |               |
| NMA1215S   | 12                    | 15                   | ±33                  | 110                         | 76         | 54                    |               |

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

<sup>1</sup> Supply voltage must be discontinued at the end of the short circuit duration.

# NMA SERIES

## Isolated 1W 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 |        |
| Reflected Ripple Current |                                       |      | 20  | 33   | mA p-p |

### 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 <sup>1</sup>   | $T_A = -40^\circ\text{C}$ to $120^\circ\text{C}$ |     |     | 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   | 7.5  |        |
| 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   |        |

### 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  | TYP | 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  |     | $\text{G}\Omega$ |

<sup>1</sup> See derating curve.

# NMA SERIES

## Isolated 1W Dual Output DC-DC Converters

### 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 | $V_{IN}$ 5V types  |     | 110 |     | kHz   |
|                     | $V_{IN}$ 12V types |     | 140 |     |       |
| Package Weight      | SIL                |     | 2.1 |     | g     |
|                     | DIL                |     | 2.4 |     |       |

### 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        |     | 33  |     | $^{\circ}\text{C}$ |
|                                | All other output types |     | 28  |     |                    |

### family characteristics - mean time to failure (MTTF)

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

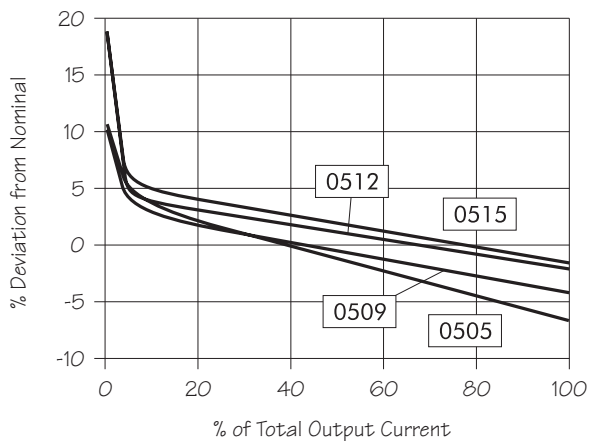
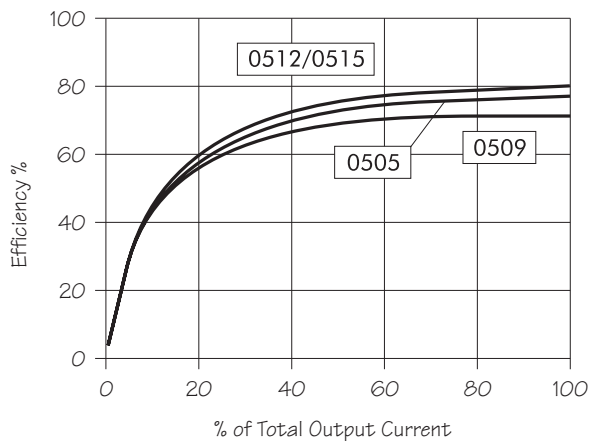
| Part Number | -40 $^{\circ}\text{C}$ | 25 $^{\circ}\text{C}$ | 85 $^{\circ}\text{C}$ | Units |
|-------------|------------------------|-----------------------|-----------------------|-------|
| NMA0505     | 2068                   | 1697                  | 1368                  | kHrs  |
| NMA0509     | 652                    | 682                   | 567                   |       |
| NMA0512     | 412                    | 343                   | 287                   |       |
| NMA0515     | 226                    | 188                   | 158                   |       |
| NMA1205     | 675                    | 559                   | 464                   | kHrs  |
| NMA1209     | 452                    | 375                   | 314                   |       |
| NMA1212     | 292                    | 243                   | 204                   |       |
| NMA1215     | 184                    | 154                   | 129                   |       |

# NMA SERIES

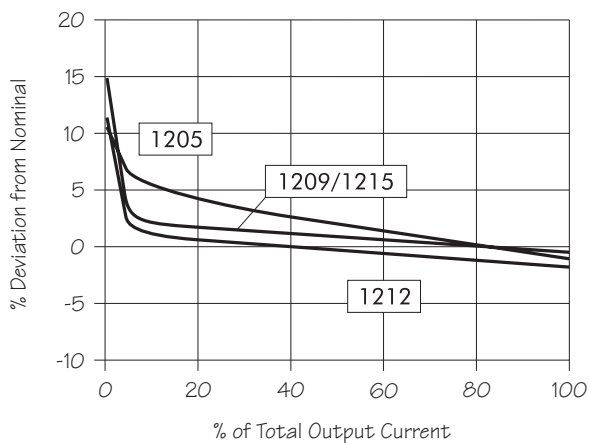
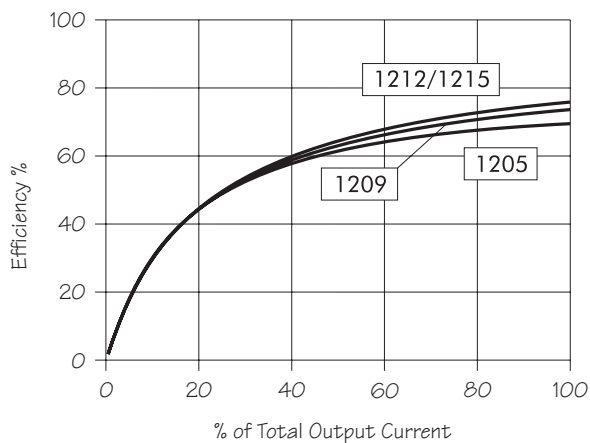
## Isolated 1W Dual Output DC-DC Converters

### typical characteristics<sup>1</sup>

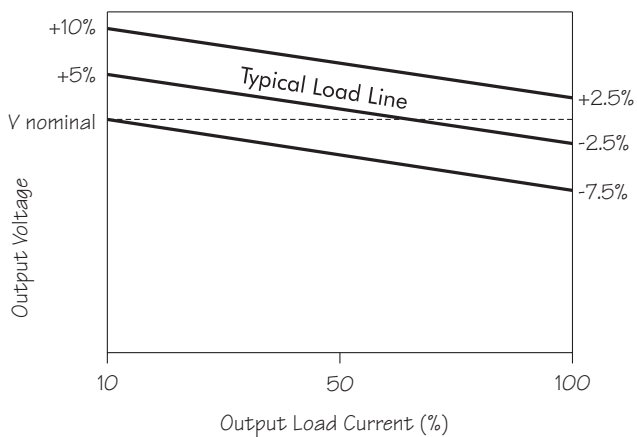
#### NMA05 series



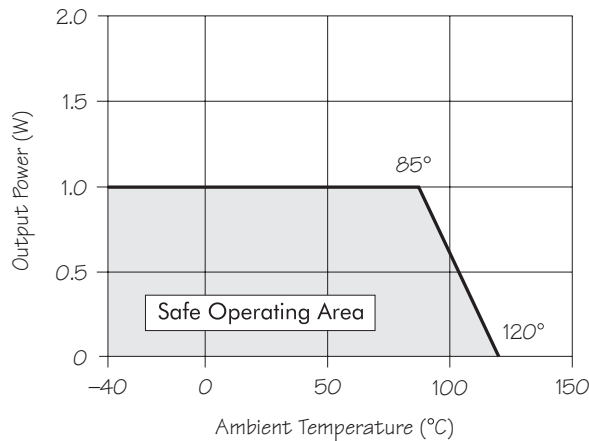
#### NMA12 series



### tolerance envelope



### temperature derating graph



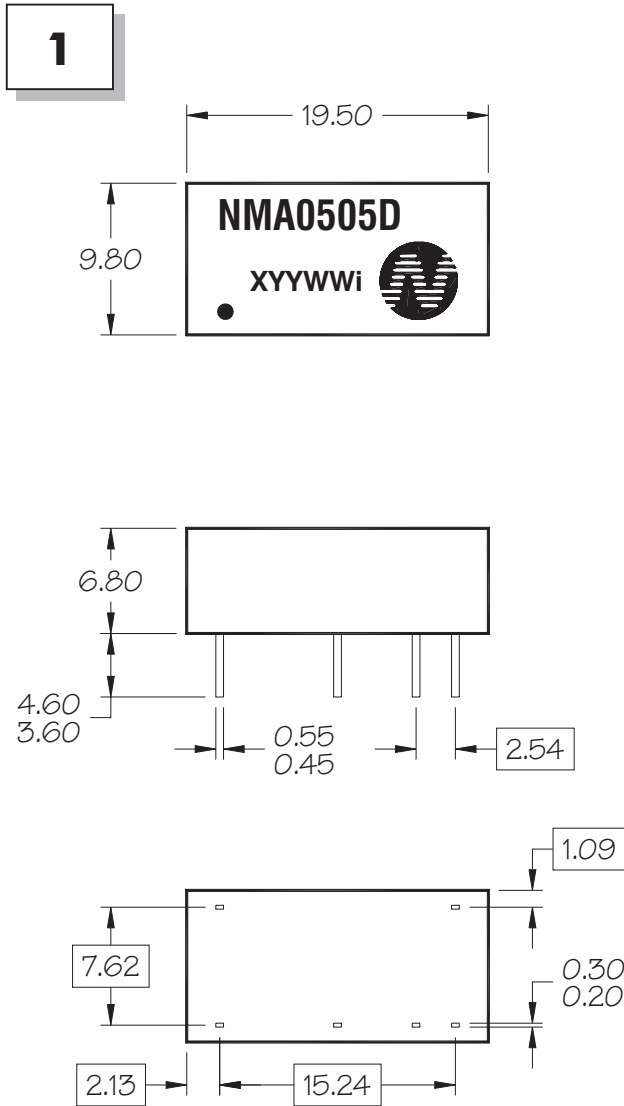
<sup>1</sup> All data taken at  $T_A=25^\circ\text{C}$ .

# NMA SERIES

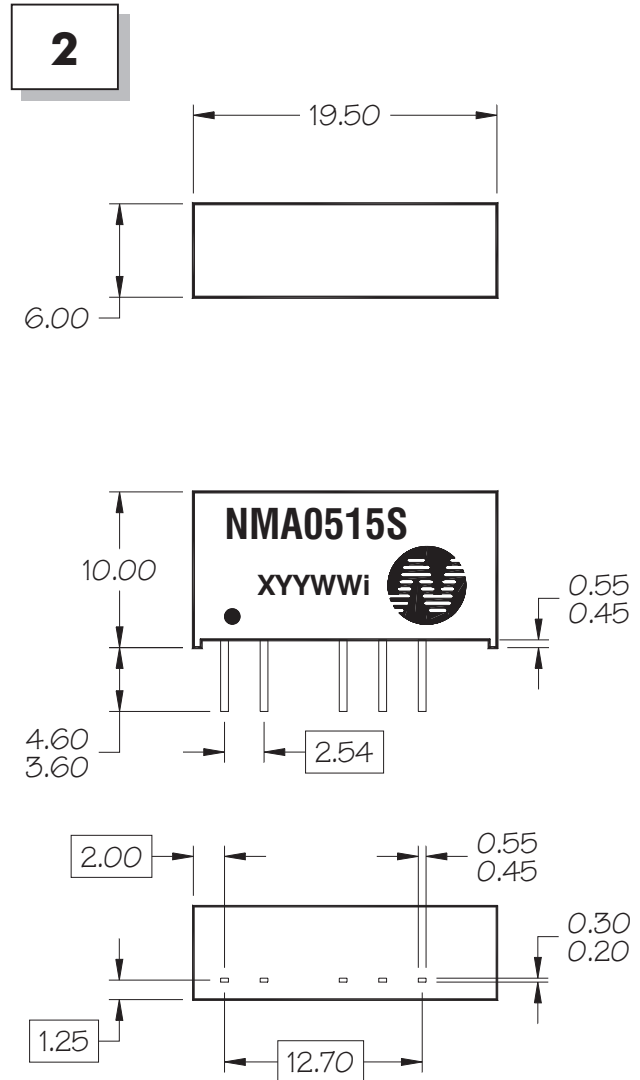
## Isolated 1W Dual Output DC-DC Converters

### outline dimensions<sup>1</sup>

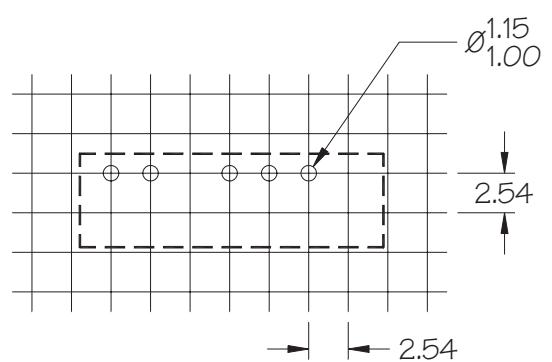
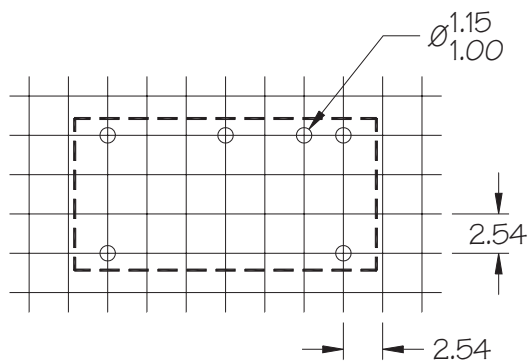
#### 14 Pin DIP Package style



#### 7 Pin SIP package style



### recommended footprint details



<sup>1</sup> All dimensions in mm XX.XX  $\pm 0.25$ mm.  
All pins on a 2.54mm pitch and within  $\pm 0.25$ mm of true position.