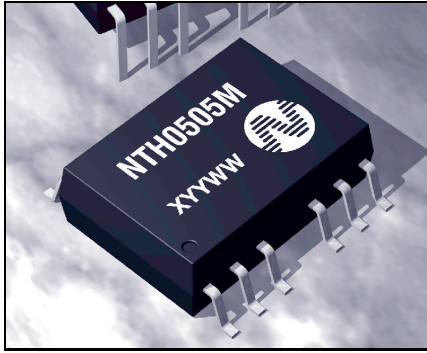




## FEATURES

- Wide Temperature Performance at Full 2 Watt Load, -40°C to 85°C
- Lead Frame Technology
- CECC00802 Reflow (280°C)
- Dual Isolated Output
- 1kVDC Isolation
- Efficiency to 84%
- Power Density 1.54W/cm<sup>3</sup>
- 5V & 12V Input
- 5V, 9V, 12V and 15V Output
- Footprint Over Pins 3.16cm<sup>2</sup>
- UL 94V-0 Package Material
- No Heatsink Required
- Internal SMD Construction
- MTF up to 2.1 Million Hours
- Custom Solutions Available
- Multi Layer Ceramic Capacitors
- Lead Free Compatible

## DESCRIPTION

The NTH series of miniature surface mounted DC-DC Converters employ leadframe technology and transfer moulding techniques to bring all of the benefits of IC style packaging to hybrid circuitry. The component lead termination of this product range is lead-free compatible, therefore the converter can be soldered in a lead-free soldering process. The devices are fully compatible with CECC00802 to 280°C which allows them to be placed and reflowed with IC's, thus reducing time and cost in production. Co-planarity of the lead positions is based upon IEC 191-6:1990. The devices are suitable for all applications where high volume production is envisaged.

## SELECTION GUIDE

|                         | Nominal Input Voltage | Output Voltage | Output Current | Input Current at Rated Load | Efficiency | Isolation Capacitance | MTTF <sup>1</sup> |
|-------------------------|-----------------------|----------------|----------------|-----------------------------|------------|-----------------------|-------------------|
| Order Code <sup>5</sup> | (V)                   | (V)            | (mA)           | (mA)                        | (%)        | (pF)                  | kHrs              |
| <b>NTH0505M</b>         | 5                     | 5              | ±200           | 500                         | 80         | 24                    | 1547              |
| <b>NTH0509M</b>         | 5                     | 9              | ±111           | 494                         | 81         | 28                    | 663               |
| <b>NTH0512M</b>         | 5                     | 12             | ±83            | 488                         | 82         | 30                    | 338               |
| <b>NTH0515M</b>         | 5                     | 15             | ±67            | 476                         | 84         | 33                    | 187               |
| <b>NTH1205M</b>         | 12                    | 5              | ±200           | 208                         | 80         | 35                    | 490               |
| <b>NTH1209M</b>         | 12                    | 9              | ±111           | 201                         | 83         | 55                    | 343               |
| <b>NTH1212M</b>         | 12                    | 12             | ±83            | 198                         | 84         | 63                    | 229               |
| <b>NTH1215M</b>         | 12                    | 15             | ±67            | 198                         | 84         | 66                    | 148               |

## 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 | 5V input types                        |      | 50  |      | mA p-p |
|                          | 12V input types                       |      | 70  |      |        |

## OUTPUT CHARACTERISTICS

| Parameter                    | Conditions                                         | MIN  | TYP | MAX | Units  |
|------------------------------|----------------------------------------------------|------|-----|-----|--------|
| Rated Power <sup>2</sup>     | T <sub>A</sub> = -40°C to 85°C                     |      |     | 2.0 | W      |
| Output Voltage Accuracy      | NTH0505                                            | -5.0 |     | 7.5 | %      |
|                              | All other variants                                 | -5.0 |     | 5.0 |        |
| Line regulation              | High V <sub>IN</sub> to low V <sub>IN</sub>        |      | 1.0 | 1.2 | %/%    |
| Load Regulation <sup>3</sup> | 10% load to rated load, 5V output types            |      | 5.0 | 10  | %      |
|                              | 10% load to rated load, 9V, 12V & 15V output types |      | 3.0 | 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 |        |

## ABSOLUTE MAXIMUM RATINGS

|                                                 |          |
|-------------------------------------------------|----------|
| Short circuit duration <sup>4</sup>             | 1 second |
| Internal power dissipation                      | 550mW    |
| Lead temperature 1.5mm from case for 10 seconds | 300°C    |
| Input Voltage V <sub>IN</sub> , NTH05 types     | 7V       |
| Input voltage V <sub>IN</sub> , NTH12 types     | 15V      |

## ISOLATION CHARACTERISTICS

| Parameter              | Conditions                | MIN  | TYP | MAX | Units |
|------------------------|---------------------------|------|-----|-----|-------|
| Isolation Test Voltage | Flash tested for 1 second | 1000 |     |     | VDC   |
| Resistance             | Viso=500VDC               | 1    | 10  |     | GΩ    |

## GENERAL CHARACTERISTICS

| Parameter           | Conditions          | MIN | TYP | MAX | Units |
|---------------------|---------------------|-----|-----|-----|-------|
| Switching Frequency | All 5V input types  |     | 95  |     | kHz   |
|                     | All 12V input types |     | 90  |     |       |

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

<sup>2</sup> See derating curve.

<sup>3</sup> 12V input types have typically 3% less load regulation change.

<sup>4</sup> Supply voltage must be discontinued at the end of the short circuit duration.

<sup>5</sup> If components are required in tape and reel format suffix order code with -R, e.g. NTH0505M-R. All specifications typical at T<sub>A</sub>=25°C, nominal input voltage and rated output current unless otherwise specified.

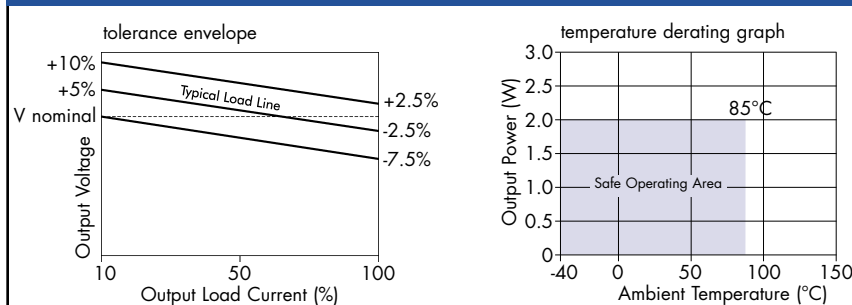
# NTH SERIES

## Isolated 2W Dual Output SM DC-DC Converters

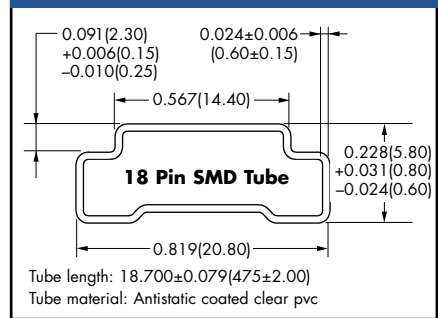
### TEMPERATURE CHARACTERISTICS

| Parameter                      | Conditions           | MIN | TYP | MAX | Units |
|--------------------------------|----------------------|-----|-----|-----|-------|
| Specification                  | All output types     | -40 |     | 85  | °C    |
| Storage                        |                      | -55 |     | 125 | °C    |
| Case Temperature above ambient | All 5V output types  |     | 30  |     | °C    |
|                                | All 12V output types |     | 25  |     | °C    |
| Cooling                        | Free Air Convection  |     |     |     |       |

### PERFORMANCE CHARACTERISTICS



### TUBE OUTLINE DIMENSIONS

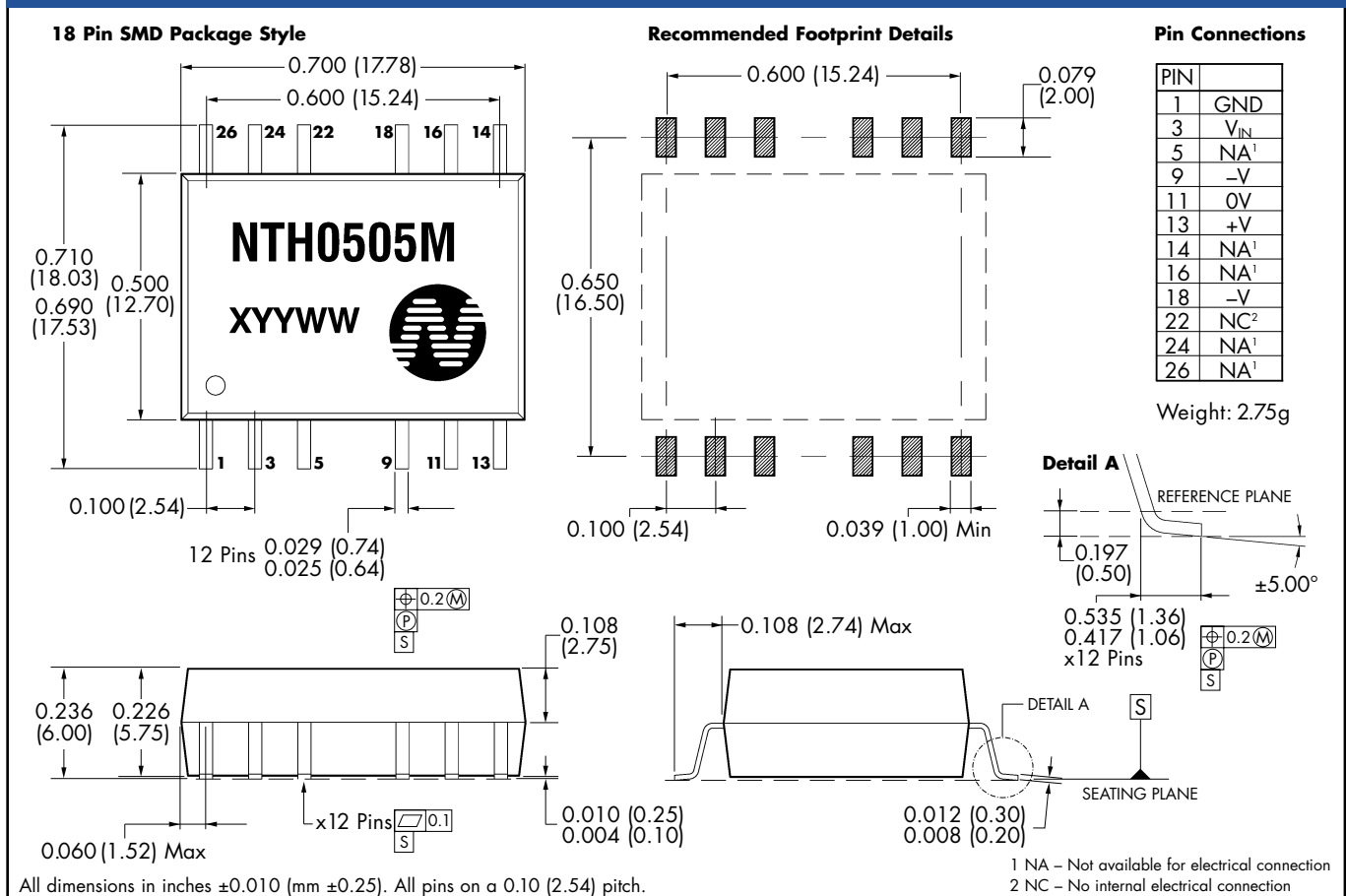


### PACKAGING DETAILS

| Order Code | Packaging Style | QTY |
|------------|-----------------|-----|
| NTHXXXXM   | Tube            | 25  |
| NTHXXXXM-R | Tape & Reel     | 400 |

Tape & Reel to IEC 286-3 Specifications. For tape and reeling packaging details refer to: [www.dc-dc.com/cd/products/application\\_notes.htm](http://www.dc-dc.com/cd/products/application_notes.htm)

### MECHANICAL DIMENSIONS



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