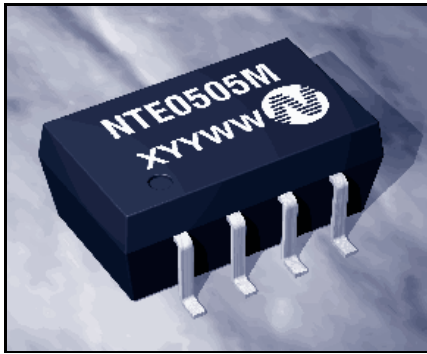




## FEATURES

- Wide Temperature Performance at Full 1 Watt Load, -40°C to 85°C
- Lead Frame Technology
- CECC00802 Reflow (280°C)
- Single Isolated Output
- 1kVDC Isolation
- Efficiency to 78%
- Power Density 1.8W/cm<sup>3</sup>
- 3.3V, 5V & 12V Input
- 3.3V, 5V, 9V, 12V and 15V Output
- Footprint Over Pins 1.64cm<sup>2</sup>
- UL 94V-0 Package Material
- No Heatsink Required
- Internal SMD Construction
- Toroidal Magnetics
- Plastic Encapsulated
- MTTF up to 2.9 Million Hours
- Custom Solutions Available
- Multi Layer Ceramic Capacitors
- Lead Free Compatible

## DESCRIPTION

The NTE 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 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. The co-planarity of the pin 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> |
|------------------------|-----------------------|----------------|----------------|-----------------------------|------------|-----------------------|-------------------|
| OrderCode <sup>5</sup> | (V)                   | (V)            | (mA)           | (mA)                        | (%)        | (pF)                  | kHrs              |
| NTE0303M               | 3.3                   | 3.3            | 303            | 410                         | 73         | 30                    | 1234              |
| NTE0305M               | 3.3                   | 5              | 200            | 390                         | 78         | 35                    | 632               |
| NTE0503M               | 5                     | 3.3            | 303            | 270                         | 74         | 40                    | 619               |
| NTE0505M               | 5                     | 5              | 200            | 294                         | 68         | 35                    | 2418              |
| NTE0505ME              | 5                     | 5              | 200            | 260                         | 77         | 40                    | 419               |
| NTE0509M               | 5                     | 9              | 111            | 267                         | 75         | 43                    | 1174              |
| NTE0512M               | 5                     | 12             | 83             | 260                         | 77         | 42                    | 634               |
| NTE0515M               | 5                     | 15             | 66             | 256                         | 78         | 44                    | 360               |
| NTE1205M               | 12                    | 5              | 200            | 124                         | 67         | 47                    | 621               |
| NTE1209M               | 12                    | 9              | 111            | 114                         | 73         | 77                    | 488               |
| NTE1212M               | 12                    | 12             | 83             | 113                         | 74         | 88                    | 360               |
| NTE1215M               | 12                    | 15             | 66             | 111                         | 75         | 95                    | 252               |

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, 3.3V input types | 2.97 | 3.30 | 3.63 | V      |
|                          | Continuous operation, 5V input types   | 4.5  | 5    | 5.5  |        |
|                          | Continuous operation, 12V input types  | 10.8 | 12   | 13.2 |        |
| Reflected Ripple Current |                                        |      | 30   | 47   | mA p-p |

## 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>3</sup> | 10% load to rated load, 0303M, 0305M, 0503M, 0505ME |     | 10   | 14  | %      |
|                              | 10% load to rated load, 5V output types             |     | 12.8 | 15  |        |
|                              | 10% load to rated load, 9V output types             |     | 8.3  | 9.0 |        |
|                              | 10% load to rated load, 12V output types            |     | 6.8  | 7.5 |        |
|                              | 10% load to rated load, 15V output types            |     | 6.3  | 7.0 |        |
| Ripple and Noise             | BW=DC to 20MHz, 0303M, 0305M, 0503M, 0505ME types   |     | 40   | 60  | mV p-p |
|                              | BW=DC to 20MHz, 5V output types                     |     | 62   | 85  |        |
|                              | BW=DC to 20MHz, 9V output types                     |     | 49   | 75  |        |
|                              | BW=DC to 20MHz, 12V output types                    |     | 39   | 65  |        |
|                              | BW=DC to 20MHz, 15V output types                    |     | 38   | 76  |        |

## ABSOLUTE MAXIMUM RATINGS

|                                                 |         |
|-------------------------------------------------|---------|
| Short circuit duration <sup>4</sup>             | 1second |
| Internal power dissipation                      | 600mW   |
| Lead temperature 1.5mm from case for 10 seconds | 300°C   |
| Input Voltage V <sub>IN</sub> , NTE03 types     | 5.5V    |
| Input Voltage V <sub>IN</sub> , NTE05 types     | 7V      |
| Input voltage V <sub>IN</sub> , NTE12 types     | 15V     |

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

2 See derating curve.

3 12V input types have typically 3% less load regulation change.

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

5 If components are required in tape and reel format suffix order code with -R, e.g. NTE0505M-R  
All specifications typical at T<sub>A</sub>=25°C, nominal input voltage and rated output current unless otherwise specified.

# NTE SERIES

## Isolated 1W Single Output SM DC-DC Converters

### ISOLATION CHARACTERISTICS

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

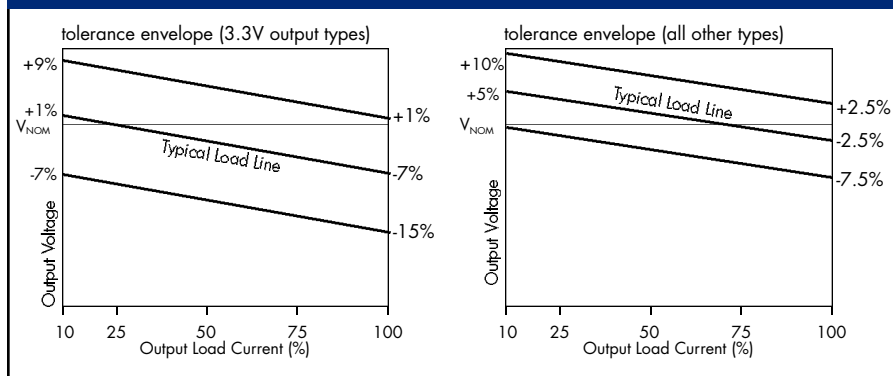
### GENERAL CHARACTERISTICS

| Parameter           | Conditions   | MIN | TYP | MAX | Units |
|---------------------|--------------|-----|-----|-----|-------|
| Switching Frequency | All variants |     | 110 |     | kHz   |

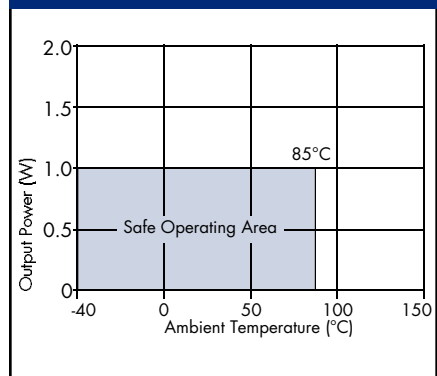
### TEMPERATURE CHARACTERISTICS

| Parameter                      | Conditions                  | MIN | TYP | MAX | Units |
|--------------------------------|-----------------------------|-----|-----|-----|-------|
| Specification                  | All output types            | -40 |     | 85  | °C    |
| Storage                        |                             | -55 |     | 125 | °C    |
| Case Temperature above ambient | 0303M, 0305M, 0503M, 0505ME |     | 30  |     | °C    |
|                                | 0505M, 1205M                |     | 40  |     |       |
|                                | All other output types      |     | 40  |     |       |
| Cooling                        | Free air convection         |     |     |     |       |

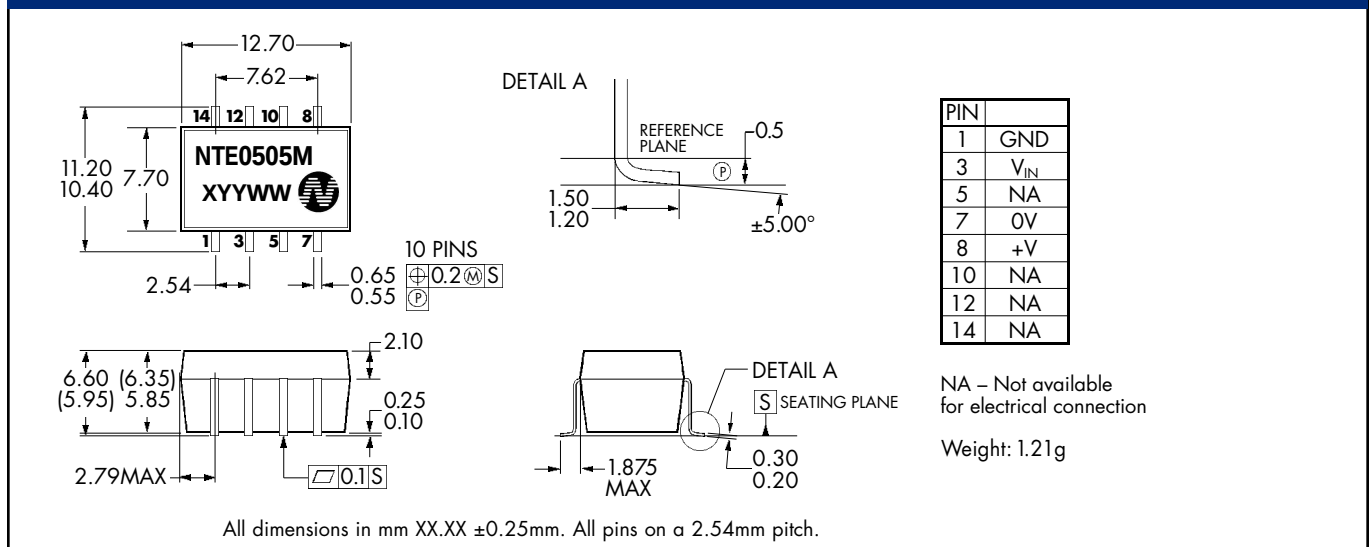
### PERFORMANCE CHARACTERISTICS



### TEMPERATURE DERATING



### MECHANICAL DIMENSIONS



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