

**FEATURES**

- Industry Standard Footprint
- 1kVDC Isolation
- Dual Isolated Output
- Short Circuit Protection
- Low Profile 24 Pin Case
- Efficiency to 81%
- Power Density 0.90W/cm<sup>3</sup>
- 2:1 Wide Input Range
- 24V & 48V Input
- 12V & 15V Output
- Footprint 4.73cm<sup>2</sup>
- UL 94V-0 Package Materials
- Operating Temperature Range -40°C to 85°C
- Load and Line Regulation <1% on Both Outputs
- No Heatsink Required
- Internal SMD Construction
- Fully Encapsulated
- Custom Solutions Available

**DESCRIPTION**

The NDT series is a range of low profile DC-DC converters offering dual outputs over a 2:1 input voltage range. All parts deliver 3W output power up to 85°C without heatsinking. A flyback oscillator design with isolated feedback is used to give regulation over the full operating range of 25% to 100% of full load. It is strongly recommended that external capacitors be used on input and output to guarantee performance over full load and input voltage range (see application notes for guidance). The plastic case is rated to UL 94V-0 and encapsulant to UL 94V-1 and the connection pins are formed from a tin plated alloy 42 leadframe.

**SELECTION GUIDE<sup>1</sup>**

Order Code	Nominal Input Voltage (V)	Rated Output Voltage (V)	Output Current		Input Current Full Load (mA)	Efficiency <sup>2</sup> (%)	Isolation Capacitance (pF)	MTTF <sup>4</sup> (kHrs)
			Min Load <sup>3</sup> (mA)	Full Load (mA)				
<b>NDTD2412</b>	24	12	±31	±125	156	79	30	2075
<b>NDTD2415</b>	24	15	±25	±100	155	80	30	2080
<b>NDTD4812</b>	48	12	±31	±125	77	81	30	2090
<b>NDTD4815</b>	48	15	±25	±100	77	81	30	2045

**INPUT CHARACTERISTICS<sup>1</sup>**

Parameter	Conditions	MIN	TYP	MAX	Units
Voltage Range	24V input types	18	24	36	VDC
	48V input types	36	48	75	
Reflected Ripple Current	24V input types with 10µF at input		200	250	mA p-p
	48V input types with 10µF at input		125	150	

**OUTPUT CHARACTERISTICS<sup>1</sup>**

Parameter	Conditions	MIN	TYP	MAX	Units
Rated Power				3	W
Voltage Set Point Accuracy	With external input/output capacitors, refer to recommended test circuit		±1	±5	%
Line Regulation	Low line to high line, with external input/output capacitors, refer to recommended test circuit		0.15	0.5	%
Load Regulation	25% load to 100% load, with external input/output capacitors, refer to recommended test circuit		0.2	0.5	%
Ripple	BW = 20Hz to 300kHz With external input/output capacitors, refer to recommended test circuit		15	30	mV rms
Ripple & Noise	BW = DC to 20MHz With external input/output capacitors, refer to recommended test circuit		90	150	mV p-p
Cross Regulation	% voltage change on negative output when positive load varies from 12% to 50% with negative load fixed at 50%		2.1	3.0	%

**ABSOLUTE MAXIMUM RATINGS**

Short circuit protection over temperature range and input voltage range	continuous
Input Voltage, 24V types	40V
Input Voltage, 48V types	80V
Lead temperature 1.5mm from case for 10 seconds	300°C
Minimum Load	25% of rated output

**ISOLATION CHARACTERISTICS<sup>1</sup>**

Parameter	Conditions	MIN	TYP	MAX	Units
Isolation Test Voltage	Flash tested for 1 second	1000			VDC
Resistance	Viso=1KVDC	1			G

**GENERAL CHARACTERISTICS<sup>1</sup>**

Parameter	Conditions	MIN	TYP	MAX	Units
Switching Frequency	100% load V <sub>IN</sub> nominal	100	125	150	kHz
	25% load V <sub>IN</sub> nominal	410	500	590	

**ENVIRONMENTAL<sup>1</sup>**

Parameter	Conditions	MIN	TYP	MAX	Units
Operation		-40		85	°C
Storage		-50		130	°C
Case Temperature Above Ambient	100% Load		28		°C

1 Specifications typical at T<sub>A</sub> = 25°C, nominal input voltage and rated output current unless otherwise specified.  
 2 Measured at full load with external input/output capacitors, refer to test circuit.  
 3 A lower load is entirely safe but higher levels of output ripple will be experienced.  
 4 Calculated using MIL-HDBK-217F with nominal input voltage at full load.

# NDT SERIES

## Isolated 3W Wide Input Dual Output DC-DC Converters

### TERMINOLOGY

#### LINE REGULATION

The percentage change in output voltage between low input voltage and high input voltage, measured with fixed output load

ie. A 5V output part with an output voltage of 5.05V @ high input voltage and 5.03V @ low input voltage would have a line regulation of 0.4%.

$$\text{line regulation} = \frac{V_{\text{OUT}} (\text{Low Input V}) - V_{\text{OUT}} (\text{High Input V})}{V_{\text{OUT}} (\text{Nominal Input V})} \times 100\%$$

Where  $V_{\text{OUT}}$  (Nominal Input V) is 5V.

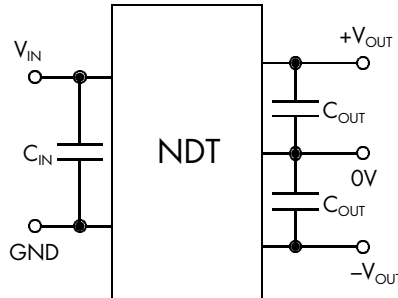
### APPLICATION NOTES

#### EXTERNAL CAPACITANCE

Although these converters will work without external capacitors, they are necessary in order to guarantee the full parametric performance over the full line and load range. All parts have been tested and characterised using the following values and test circuit

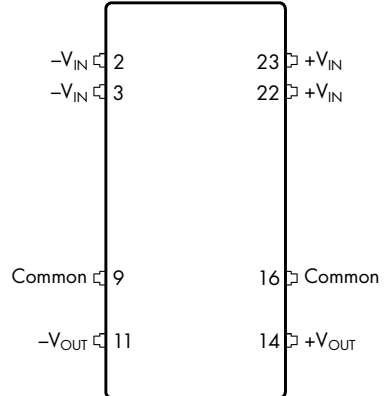
Value	
$C_{\text{IN}}$	$C_{\text{OUT}}$
10 $\mu$ F, 200V	47 $\mu$ F, 25V

#### TEST CIRCUIT



### PIN CONNECTIONS

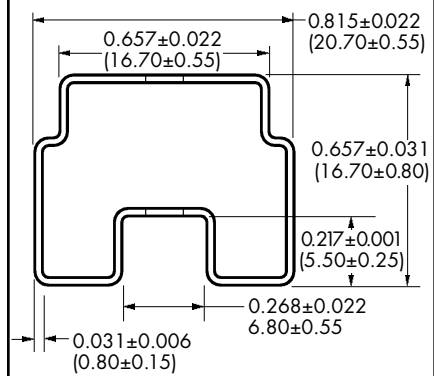
24 Pin DIL (top view)



### PACKAGING DETAILS

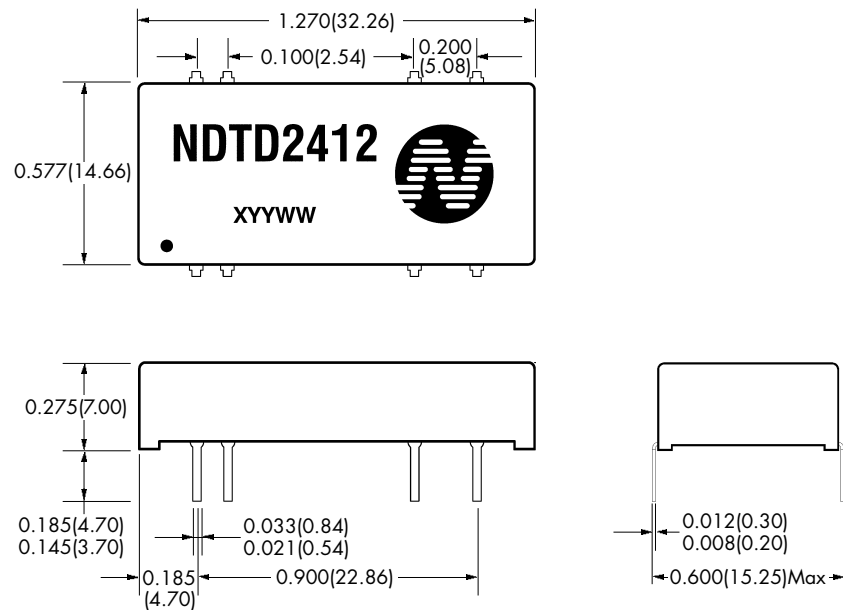
Order Code	Packaging Style	QTY
NDTDXXXX	Tube	15

### TUBE OUTLINE DIMENSIONS



Tube Length: 20.472±0.079(520mm±2mm)  
Tube Material: Antistatic coated clear pvc.

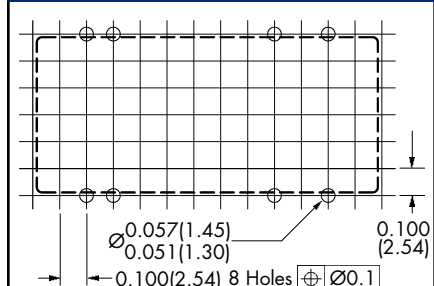
### MECHANICAL DIMENSIONS



Weight: 6.5g

Unless otherwise stated all dimensions in inches ±0.010 (mm ±0.25mm).

### RECOMMENDED FOOTPRINT DETAILS



All pins on a 0.100(2.54) pitch and within 0.010(0.25) of true position.

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