

## FEATURES

- New Sub-Miniature SIP & DIP Package Styles
- 3kVDC Isolation
- Efficiency up to 82%
- Wide Temperature performance at full 1 Watt load, -40°C to 85°C
- Increased Power Density to 1.35W/cm<sup>3</sup>
- UL 94V-0 Package Material
- Reduced Footprint at 0.98cm<sup>2</sup>
- Dual Output from a Single Input Rail
- Industry Standard Pinout
- Power Sharing on Output
- 3.3V, 5V & 12V Input
- 3.3V, 5V, 9V, 12V and 15V Output
- No Heatsink Required
- Internal SMD Construction
- Fully Encapsulated with Toroidal Magnetics
- No External Components Required
- MTTF up to 1.6 Million hours
- No Electrolytic or Tantalum Capacitors

## DESCRIPTION

The NKA sub-miniature series of industrial temperature range DC-DC converters are the standard building blocks for on-board distributed power systems. The series offers smaller package size, improved efficiency, lower output ripple and 3kVDC isolation capability through the use of state of the art packaging and technology. 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.

## SELECTION GUIDE

	Nominal Input Voltage	Output Voltage	Output Current	Input Current at Rated Load	Efficiency	Isolation Capacitance	MTTF <sup>1</sup>
OrderCode <sup>†</sup>	(V)	(V)	(mA)	(mA)	(%)	(pF)	kHrs
<b>NKA0303S</b>	3.3	3.3	±163	407	74	20	195
<b>NKA0305S</b>	3.3	5	±100	383	79	22	1121
<b>NKA0312S</b>	3.3	12	±42	390	78	31	375
<b>NKA0315S</b>	3.3	15	±33	384	79	32	206
<b>NKA0503S</b>	5	3.3	±163	259	77	20	205
<b>NKA0505S</b>	5	5	±100	285	70	21	1697
<b>NKA0505SE</b>	5	5	±100	249	80	26	1557
<b>NKA0509S</b>	5	9	±55	263	76	25	682
<b>NKA0512S</b>	5	12	±42	255	78	28	343
<b>NKA0515S</b>	5	15	±33	253	79	29	188
<b>NKA1205S</b>	12	5	±100	112	74	33	559
<b>NKA1209S</b>	12	9	±55	106	79	48	375
<b>NKA1212S</b>	12	12	±42	104	81	55	243
<b>NKA1215S</b>	12	15	±33	102	82	60	154

<sup>†</sup> For DIP package style replace suffix S with D, eg NKA0312D.

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	3.3	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	3.3V input types		30	60	mA p-p
	All other types		20	35	

## OUTPUT CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Rated Power <sup>2</sup>	T <sub>A</sub> = -40°C to 120°C			1	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, 0312 & 0315		8	14	%
	10% load to rated load, 3.3V output types		10	15	
	10% load to rated load, 5V output types		10	12	
	10% load to rated load, 9V output types		6.5	8	
	10% load to rated load, 12V output types		6	8.5	
	10% load to rated load, 15V output types		6	7	
Ripple and Noise	BW=DC to 20MHz, 0312 & 0315		25	60	mV p-p
	BW=DC to 20MHz, 3.3V output types		40	80	
	BW=DC to 20MHz, 5V output types		50	75	
	BW=DC to 20MHz, 9V output types		40	65	
	BW=DC to 20MHz, 12V output types		40	60	
	BW=DC to 20MHz, 15V output types		40	60	

## 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> , NKA03 types	5.5V
Input voltage V <sub>IN</sub> , NKA05 types	7V
Input voltage V <sub>IN</sub> , NKA12 types	15V

<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.

All specifications typical at T<sub>A</sub>=25°C, nominal input voltage and rated output current unless otherwise specified.

# NKA SERIES

## Isolated Sub-Miniature 1W Dual Output DC-DC Converters

### ISOLATION CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Isolation Test Voltage	Flash tested for 1 second	3000			VDC
Resistance	Viso=1000VDC		10		G

### GENERAL CHARACTERISTICS

Parameter	Conditions	MIN	TYP	MAX	Units
Switching Frequency	3.3V input types		95		kHz
	All other types		120		kHz

### TEMPERATURE CHARACTERISTICS

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		21		°C
Cooling	Free air convection				

### PIN CONNECTIONS - 14 PIN DIP

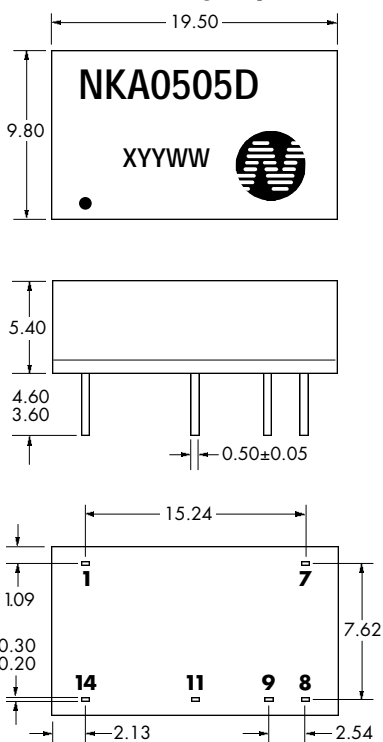
1	7	8	9	11	14
GND	NC	0V	+V	-V	V <sub>IN</sub>

### PIN CONNECTIONS - 6 PIN SIP

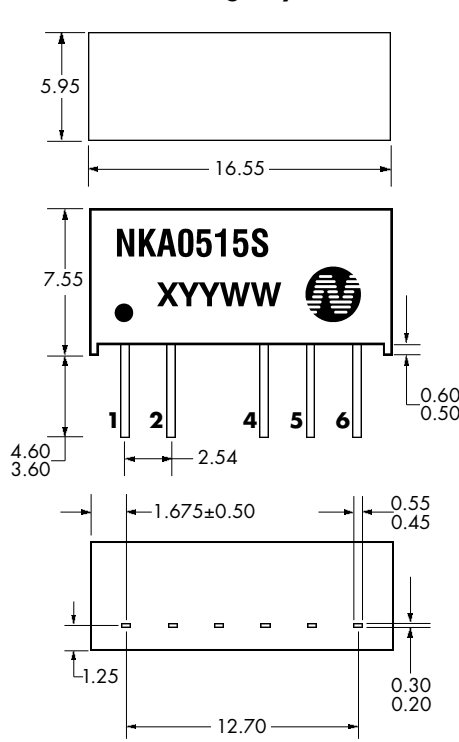
1	2	4	5	6
V <sub>IN</sub>	GND	-V	0V	+V

### MECHANICAL DIMENSIONS

#### 14 Pin DIP Package Style



#### 6 Pin SIP Package Style



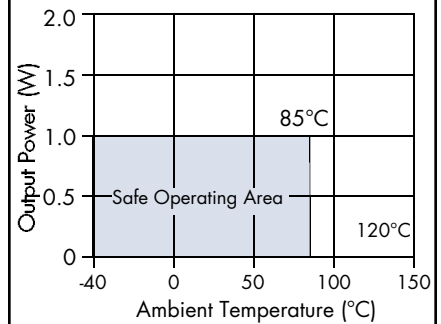
All dimensions in mm XX.XX ±0.25mm. All pins on a 2.54mm pitch and within ±0.25mm of true position.

Weight: 1.4g (SIP) 1.9g (DIP)

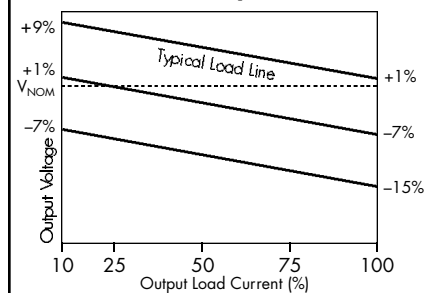
### TEMPERATURE CHARACTERISTICS

#### Temperature Derating Graph

NKA0303D/S, 0305D/S, 0505DE/SE types only

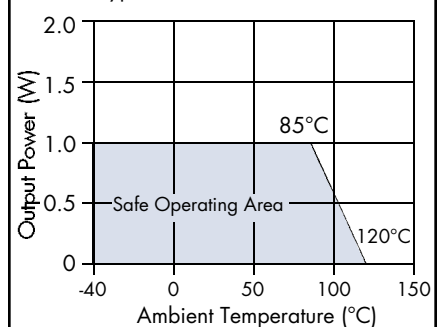


#### Tolerance Envelope

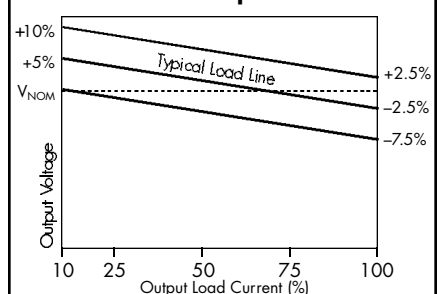


#### Temperature Derating Graph

All other types



#### Tolerance Envelope



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