

# 0.5 Watt

# 4 Pin SIL Package K



- o Ultra-Miniature Size
- o Unregulated Output
- o 1000 VDC Isolation  
3000 VDC Isolation add Suffix „H3“
- o Only Single Output



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	INPUT CURRENT		OUTPUT CURRENT	%EFF	CAPACITIVE LOAD
			NO LOAD	FULL LOAD	FULL LOAD		
0.5KUS3.3N3.3M	3.3 VDC	3.3 VDC	20 mA	205 mA	152 mA	76	100 µF
0.5KUS3.3N5M		5 VDC	25 mA	216 mA	100 mA	70	
0.5KUS3.3N7.2M		7.2 VDC			69 mA		
0.5KUS3.3N9M		9 VDC			56 mA		
0.5KUS3.3N12M		12 VDC			201 mA	42 mA	
0.5KUS3.3N15M		15 VDC	208 mA	208 mA	33 mA	73	
0.5KUS3.3N18M		18 VDC			28 mA		
0.5KUS3.3N24M		24 VDC			21 mA		
0.5KUS5N3.3M	5 VDC	3.3 VDC	20 mA	132 mA	151.5 mA	76	
0.5KUS5N5M		5 VDC	13 mA	121 mA	100 mA	83	
0.5KUS5N7.2M		7.2 VDC	15 mA	134 mA	69.44 mA	75	
0.5KUS5N9M		9 VDC			128 mA	55.55 mA	
0.5KUS5N12M		12 VDC	18 mA	127 mA	41.67 mA	79	
0.5KUS5N15M		15 VDC	22 mA	130 mA	33.33 mA	77	
0.5KUS5N18M		18 VDC	20 mA	127 mA	27.77 mA	79	
0.5KUS5N24M		24 VDC	25 mA	134 mA	20.83 mA	75	
0.5KUS12N3.3M	12 VDC	3.3 VDC	15 mA	58 mA	151.5 mA	72	
0.5KUS12N5M		5 VDC	10 mA	54 mA	100 mA	78	
0.5KUS12N7.2M		7.2 VDC	15 mA	57 mA	69.44 mA	73	
0.5KUS12N9M		9 VDC			55.56 mA		
0.5KUS12N12M		12 VDC	20 mA	58 mA	41.67 mA	72	
0.5KUS12N15M		15 VDC		61 mA	33.33 mA	69	
0.5KUS12N18M		18 VDC	15 mA	59 mA	27.77 mA	68	
0.5KUS12N24M		24 VDC			20.83 mA	71	

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	INPUT CURRENT		OUTPUT CURRENT	%EFF	CAPACITIVE LOAD
			NO LOAD	FULL LOAD	FULL LOAD		
0.5KUS15N3.3M	15 VDC	3.3 VDC	10 mA	44 mA	151.5 mA	75	100 $\mu$ F
0.5KUS15N5M		5 VDC	8 mA	43 mA	100 mA	78	
0.5KUS15N7.2M		7.2 VDC	12 mA	44 mA	69.44 mA	75	
0.5KUS15N9M		9 VDC			55.55 mA		
0.5KUS15N12M		12 VDC	10 mA		41.67 mA	77	
0.5KUS15N15M		15 VDC	15 mA	48 mA	33.33 mA	70	
0.5KUS15N18M		18 VDC	12 mA	51 mA	27.77 mA	66	
0.5KUS15N24M		24 VDC	10 mA		20.83 mA		
0.5KUS24N3.3M	24 VDC	3.3 VDC	8 mA	31 mA	151.5 mA	69	
0.5KUS24N5M		5 VDC		29 mA	100 mA	73	
0.5KUS24N7.2M		7.2 VDC	10 mA	30 mA	69.44 mA	70	
0.5KUS24N9M		9 VDC			55.55 mA		
0.5KUS24N12M		12 VDC	8 mA		41.67 mA	71	
0.5KUS24N15M		15 VDC	10 mA	29 mA	33.33 mA	73	
0.5KUS24N18M		18 VDC			27.77 mA		
0.5KUS24N24M		24 VDC			20.83 mA		
0.5KUS48N3.3M	48 VDC	3.3 VDC	6 mA	17 mA	151.5 mA	60	
0.5KUS48N5M		5 VDC		16 mA	100 mA	66	
0.5KUS48N7.2M		7.2 VDC		17 mA	69.44 mA	60	
0.5KUS48N9M		9 VDC			55.55 mA		
0.5KUS48N12M		12 VDC		41.67 mA	64		
0.5KUS48N15M		15 VDC		33.33 mA			
0.5KUS48N18M		18 VDC		27.77 mA	62		
0.5KUS48N24M		24 VDC		10 mA		18 mA	20.83 mA

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

**INPUT SPECIFICATIONS**

Input Voltage Range	±10 %
Input Filter	Capacitors
Input Reflected Ripple Current <sup>1)</sup>	20 mA p-p

**OUTPUT SPECIFICATIONS**

Voltage Accuracy	±3%	
Temperature Coefficient	±0.02%/°C	
Capacitive Load <sup>2)</sup>	100 µF	
Ripple and Noise <sup>3)</sup> , 20MHz BW	100 mV p-p	
Line Regulation	±1.2%/1% of Vin Change	
Load Regulation	20% to 100% Load 3.3 V Models	±10% ±20%

## NOTE:

1. Measured Input reflected ripple current with a simulated source inductance of 12 µH.
2. Tested by minimal Vin and constant resistive load.
3. Ripple/Noise is measured with 20 MHz bandwidth.

**ABSOLUTE SPECIFICATIONS**

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input Surge Voltage (100 mS)	3.3 V	0 VDC to 6 VDC
	5 V	0 VDC to 7 VDC
	12 V	0 VDC to 15 VDC
	15 V	0 VDC to 18 VDC
	24 V	0 VDC to 28 VDC
	48 V	0 VDC to 54 VDC
Soldering Temperature (1.5 mm from case 10 sec.)		+260°C

## NOTE:

Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.  
Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

<b>GENERAL SPECIFICATION</b>		
Efficiency		see table
Isolation Voltage (60 sec) add Suffix "H3"	Input/Output	1000 VDC 3000 VDC
Isolation Resistance		1000 Mohms
Isolation Capacitance		60 pF
Switching Frequency		variable 80 kHz
Operating Temperature Range		-40°C to +85°C (see Derating Curve)
Case Temperature		+100°C max.
Storage Temperature Range		-40°C to +125°C
Humidity		95% rel H
Reliability Calculated MTBF (MIL-HDBK-217F)		>1.121 Mhrs
Safety Standard (designed to meet)		IEC60950-1
Radiated Emissions		EN55022 Class B
Conducted Emissions <sup>6)</sup>		EN55022 Class B
ESD (Electrostatic Discharge)		IEC61000-4-2 Perf. Criteria A
RS (Radiated, Radio-Frequency, Electromagnetic Field)		IEC61000-4-3 Perf. Criteria A
EFT <sup>7)</sup>		IEC61000-4-4 Perf. Criteria A
Surge <sup>7)</sup>		IEC61000-4-5 Perf. Criteria A
CS		IEC61000-4-6 Perf. Criteria A
PFMF		IEC61000-4-8 Perf. Criteria A
Cooling		Natural Convection
Case Material		Non-Conductive Black Plastic (UL94V-0 rated)
Pin Material		0.5 mm Alloy42 Solder-coated
Potting Material		Epoxy (UL94V-0 rated)
Weight		1.5 g
Dimensions	48 V	11.68 x 6.00 x 10.15 mm (0.46 x 0.24 x 0.40 Inches) 11.68 x 7.50 x 10.15 mm (0.46 x 0.29 x 0.40 Inches)

## NOTE:

6. Input filter components are required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.

7. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5

The filter capacitor M+R suggest:

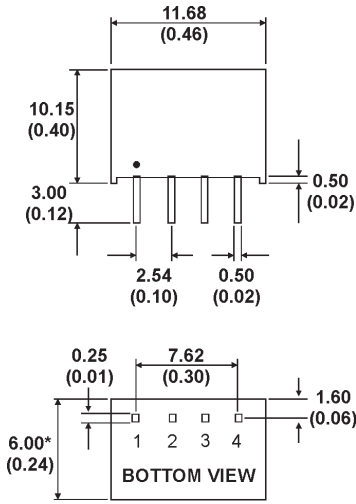
Nippon-chemi-con KY series, 470 µF/100 V.

**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

**MECHANICAL SPECIFICATIONS**

CASE "K"



PIN CONNECTIONS	
1	-INPUT
2	+INPUT
3	-OUTPUT
4	+OUTPUT

All Dimensions in mm (Inches).

Tolerances: Pin Diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )

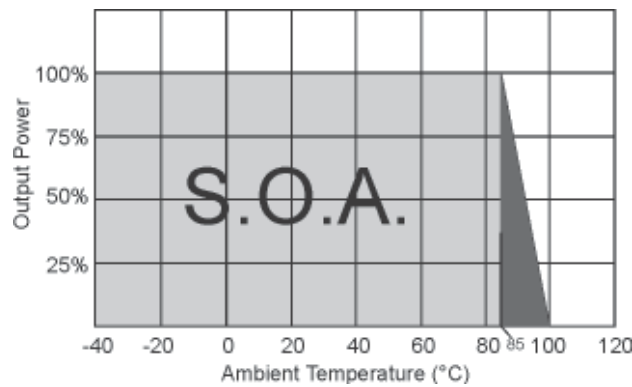
Pin Pitch:  $\pm 0.35$  ( $\pm 0.014$ )

Case:  $\pm 0.5$  ( $\pm 0.02$ )

\*The thickness of 48V Input Voltage Model is 7.50 (0.29)

**DIAGRAMS & APPLICATION NOTES**

**Derating Curve**

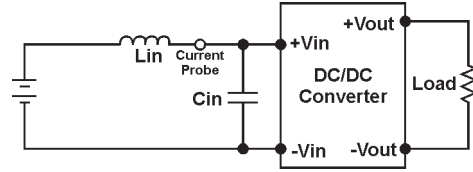


**SPECIFICATIONS**

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

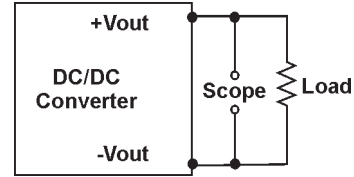
**Input Reflected Ripple Current Test Step**

Input reflected ripple current is measured through a source inductor  $L_{in}$  (12  $\mu$ H) and a source capacitor  $C_{in}$  (47  $\mu$ F, ESR <1.0 Ohm at 100 kHz) at nominal input and full load.



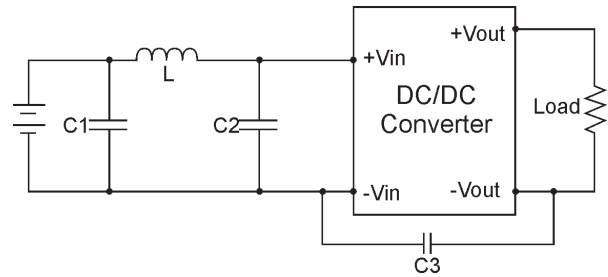
**Output Ripple & Noise Measurement Test**

The Scope measurement bandwidth is 20 MHz.



**EMI Filter**

Input filter components (C1, L, C2, C3) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

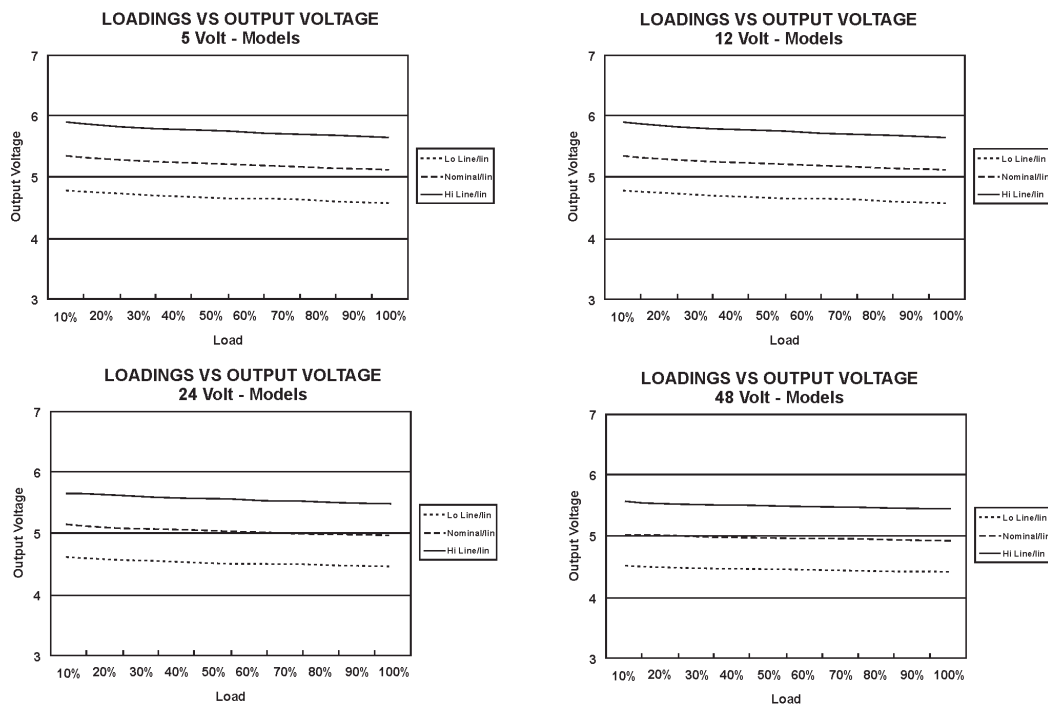


EMI FILTER				
	C1	L	C2	C3
0.5KUS3.3NxM	1210, 2,2 $\mu$ F/100 V	18 $\mu$ H		
0.5KUS5NxM	1210, 2,2 $\mu$ F/100 V			
0.5KUS12NxM	1210, 2,2 $\mu$ F/100 V			
0.5KUS15NxM	1210, 2,2 $\mu$ F/100 V		1210, 2,2 $\mu$ F/100 V	1206, 470 pF/2 kV
0.5KUS24NxM	1210, 2,2 $\mu$ F/100 V			
0.5KUS48NxM	Electrolytic Capacitor, 10 $\mu$ F/100 V			

## SPECIFICATIONS

All Specifications Typical At Nominal Line, Full Load, and 25°C Unless Otherwise Noted

### Loading vs Output Voltage



**NOTICE:**

The information in this document has been carefully checked. However, no responsibility is assumed for inaccuracies! Specifications can be changed without notice. The latest and most complete information can be found on our website.