

1 Watt

4 Pin SIL Package K



- o Ultra-Miniature Size
- o Unregulated Output
- o 1000 VDC Isolation
- o 3000 VDC Isolation add Suffix „H3“
- o Only Single Output
- o Efficiency up to 83%
- o Low Ripple & Noise
- o EMI Complies with EN55022 Class B



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (FULL LOAD)	INPUT CURRENT		%EFF	CAPACITOR LOAD
				NO-LOAD	FULL LOAD		
1KUS3.3N3.3M	3.3 VDC	3.3 VDC	303 mA	25 mA	421 mA	72	220 µF
1KUS3.3N5M		5 VDC	200 mA		394 mA	77	
1KUS3.3N7.2M		7.2 VDC	139 mA		384 mA	79	
1KUS3.3N9M		9 VDC	111 mA	30 mA	404 mA	75	
1KUS3.3N12M		12 VDC	100 mA	45 mA	473 mA	77	
1KUS3.3N15M		15 VDC	67 mA	35 mA	384 mA	79	
1KUS3.3N18M		18 VDC	56 mA		399 mA	76	
1KUS3.3N24M		24 VDC	50 mA	53 mA	461 mA	79	
1KUS5N3.3M	5 VDC	3.3 VDC	303 mA	20 mA	257 mA	78	220 µF
1KUS5N5M		5 VDC	200 mA	25 mA	247 mA	81	
1KUS5N7.2M		7.2 VDC	139 mA	16 mA	241 mA	83	
1KUS5N9M		9 VDC	111 mA	26 mA	250 mA	80	
1KUS5N12M		12 VDC	100 mA	25 mA	300 mA		
1KUS5N15M		15 VDC	67 mA	35 mA	244 mA	82	
1KUS5N18M		18 VDC	56 mA	25 mA	247 mA	81	
1KUS5N24M		24 VDC	50 mA	35 mA	289 mA	83	
1KUS12N3.3M	12 VDC	3.3 VDC	303 mA	15 mA	107 mA	78	220 µF
1KUS12N5M		5 VDC	200 mA	16 mA	105 mA	79	
1KUS12N7.2M		7.2 VDC	139 mA		100 mA	83	
1KUS12N9M		9 VDC	111 mA	15 mA	107 mA	78	
1KUS12N12M		12 VDC	100 mA		125 mA	80	
1KUS12N15M		15 VDC	67 mA		105 mA	79	
1KUS12N18M		18 VDC	56 mA	20 mA	104 mA	80	
1KUS12N24M		24 VDC	50 mA	25 mA	123 mA	81	

SPECIFICATIONS

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

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (FULL LOAD)	INPUT CURRENT		%EFF	CAPACITOR LOAD
				NO-LOAD	FULL LOAD		
1KUS15N3.3M	15 VDC	3.3 VDC	303 mA	15 mA	89 mA	75	220 μ F
1KUS15N5M		5 VDC	200 mA	9 mA	82 mA	81	
1KUS15N7.2M		7.2 VDC	139 mA	12 mA	88 mA	76	
1KUS15N9M		9 VDC	111 mA	10 mA	90 mA	74	
1KUS15N12M		12 VDC	100 mA	13 mA	100 mA	80	
1KUS15N15M		15 VDC	67 mA	15 mA	84 mA	79	
1KUS15N18M		18 VDC	56 mA	12 mA	85 mA	78	
1KUS15N24M		24 VDC	50 mA	10 mA	99 mA	81	
1KUS24N3.3M	24 VDC	3.3 VDC	303 mA	8 mA	54 mA	77	220 μ F
1KUS24N5M		5 VDC	200 mA		52 mA	80	
1KUS24N7.2M		7.2 VDC	139 mA	10 mA	54 mA	77	
1KUS24N9M		9 VDC	111 mA	7 mA			
1KUS24N12M		12 VDC	100 mA	8 mA	62 mA	80	
1KUS24N15M		15 VDC	67 mA		51 mA	81	
1KUS24N18M		18 VDC	56 mA		52 mA	80	
1KUS24N24M		24 VDC	50 mA	9 mA	60 mA	83	
1KUS48N3.3M	48 VDC	3.3 VDC	303 mA	6 mA	29 mA	73	220 μ F
1KUS48N5M		5 VDC	200 mA		28 mA	74	
1KUS48N7.2M		7.2 VDC	139 mA	7 mA	27 mA	77	
1KUS48N9M		9 VDC	111 mA	5 mA			
1KUS48N12M		12 VDC	100 mA		32 mA	77	
1KUS48N15M		15 VDC	67 mA		27 mA	76	
1KUS48N18M		18 VDC	56 mA	8 mA	28 mA	75	
1KUS48N24M		24 VDC	50 mA		31 mA	80	

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INPUT SPECIFICATIONS

Input Voltage Range	±10 %
Max. Input Current	see table
No Load Input Current	see table
Input Filter	Capacitor Type
Input Reflected Ripple Current ¹⁾	20 mA p-p

OUTPUT SPECIFICATIONS

Voltage Accuracy	±3%	
Temperature Coefficient	±0.02%/°C	
Capacitive Load ²⁾	220 µF	
Ripple and Noise ³⁾ , 20MHz BW	100 mV p-p	
Line Regulation	±1.2%/1% of Vin Change	
Load Regulation	20% to 100% 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	6 VDC max.
	5 V	7 VDC max.
	12 V	15 VDC max.
	15 V	18 VDC max.
	24 V	28 VDC max.
	48 V	54 VDC max.
Models Soldering Temperature (1.5 mm from case 10 sec. max.)		+260°C max.

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.

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GENERAL SPECIFICATION		
Efficiency		see table
Isolation Voltage (3 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
Cooling		Natural Convection
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 ⁴⁾		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 ⁵⁾		IEC61000-4-4 Perf. Criteria A
Surge ⁵⁾		IEC61000-4-5 Perf. Criteria A
CS		IEC61000-4-6 Perf. Criteria A
PFMF		IEC61000-4-8 Perf. Criteria A
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		11.68 x 6.00 x 10.15 mm (0.46 x 0.24 x 0.40 Inches)
	48 V	11.68 x 7.50 x 10.15 mm (0.46 x 0.29 x 0.40 Inches)

NOTE:

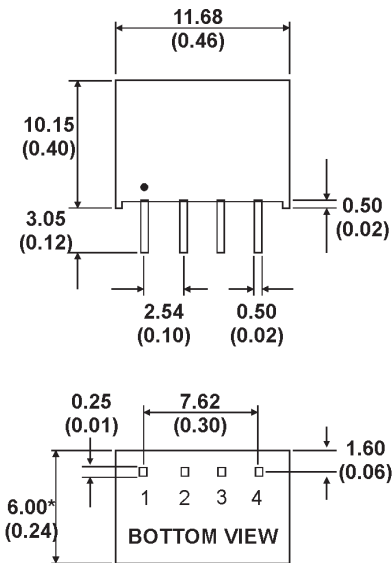
4. Input filter components are required to help meet conducted emission class B, which application refer to the EMI Filter of design & feature configuration.
5. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
The filter capacitor M+R suggest: Nippon-chemi-con KY series, 470 µF/100 V.

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MECHANICAL SPECIFICATIONS

CASE "K"

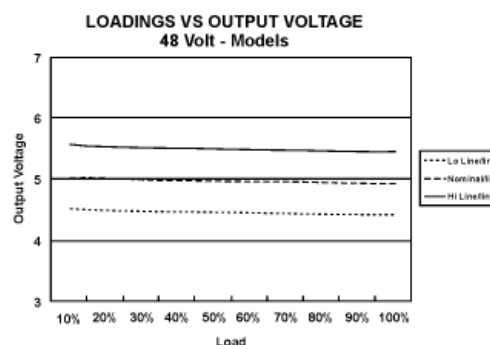
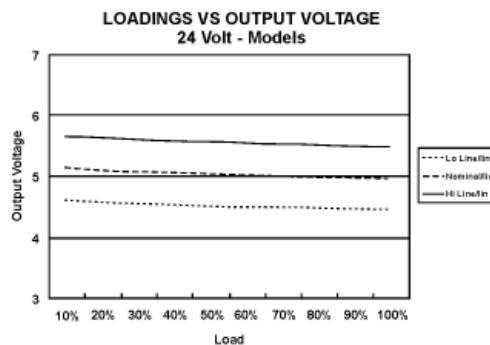
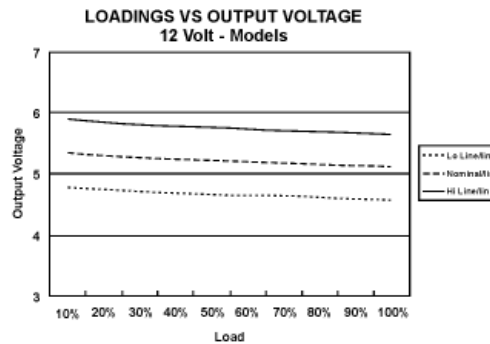
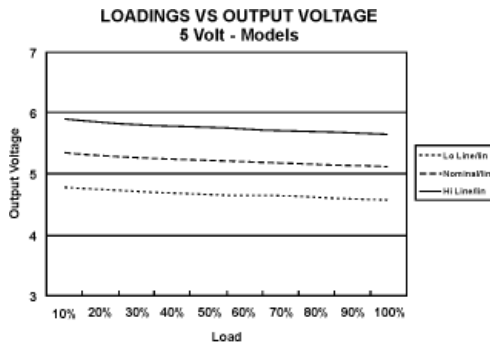


PIN CONNECTIONS	
1	-INPUT
2	+INPUT
3	-OUTPUT
4	+OUTPUT

All Dimensions in mm (Inches).
 Tolerances: Pin Diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 Pin Pitch: ± 0.35 (± 0.014)
 Case: ± 0.5 (± 0.02)
 *The thickness of 48V Input Voltage Model is 7.50 (0.29)

DIAGRAMS & APPLICATION NOTES

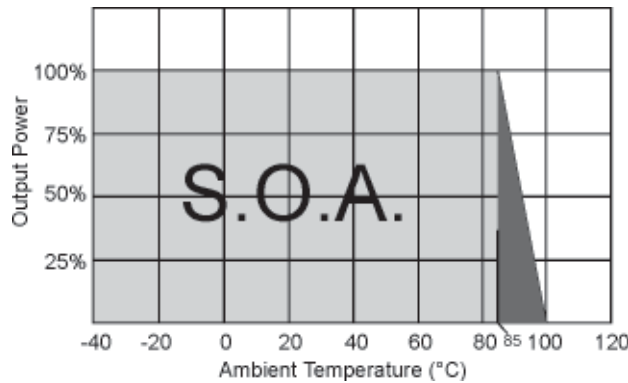
Loading vs Output Voltage



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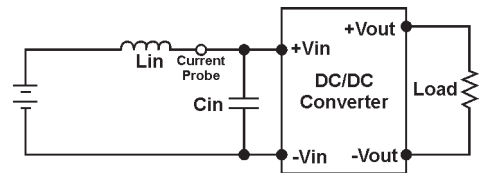
Derating Curve



TEST CONFIGURATIONS

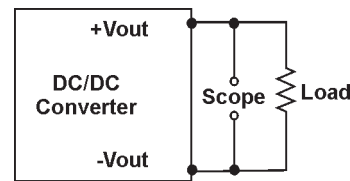
Input Reflected Ripple Current Test Step

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



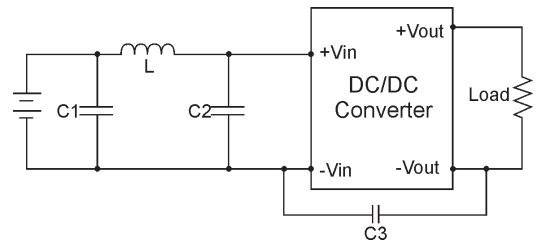
Output Ripple & Noise Measurement Test

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
1KUS3.3NxxM	1210, 2,2 μ F/100 V	18 μ H		
1KUS5NxxM	1210, 2,2 μ F/100 V			
1KUS12NxxM	1210, 2,2 μ F/100 V			
1KUS15NxxM	1210, 2,2 μ F/100 V			
1KUS24NxxM	1210, 2,2 μ F/100 V		1210, 2,2 μ F/100 V	1206, 470 pF/2 kV
1KUS48NxxM	Electrolytic Capacitor, 10 μ F/100 V		1210, 2,2 μ F/100 V	1206, 470 pF/2 kV

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.