

KAM I 5 SERIES

AC - DC POWER MODULE
13 ~ 15W UL / cUL / TUV / CE



FEATURES

- AC/DC POWER MODULE
- UNIVERSAL INPUT 85 ~ 265 VAC
- HIGH EFFICIENCY UP TO 82%
- SHORT CIRCUIT PROTECTION
- INTERNAL INPUT FILTER
- 3 YEARS WARRANTY



MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)	CAPACITOR LOAD (max.)
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Single Output Models

KAM1503	85~265 VAC	13 WATTS	+3.3 VDC	4000 mA	70%	73%	7000 μ F
KAM1505	85~265 VAC	15 WATTS	+ 5 VDC	3000 mA	74%	76%	7000 μ F
KAM1512	85~265 VAC	15 WATTS	+ 12 VDC	1250 mA	80%	82%	3500 μ F
KAM1515	85~265 VAC	15 WATTS	+ 15 VDC	1000 mA	80%	82%	1500 μ F
KAM1524	85~265 VAC	15 WATTS	+ 24 VDC	625 mA	80%	82%	470 μ F

Dual Output Models

KAM1512D	85~265 VAC	15 WATTS	$\pm$ 12 VDC	$\pm$ 625 mA	79%	81%	$\pm$ 1000 μ F
KAM1515D	85~265 VAC	15 WATTS	$\pm$ 15 VDC	$\pm$ 500 mA	78%	80%	$\pm$ 470 μ F
KAM15503D	85~265 VAC	15 WATTS	+ 5 / + 3.3 VDC	+ 1 A / + 3 A	72%	74%	3500 μ F

SPECIFICATION

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

GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
Switching frequency	V_i nom, I_o nom		100		KHz
Isolation voltage	Input - Output	3000/4242			VAC/VDC
Isolation resistance	Input - Output, @ 500VDC	100			M Ω
Ambient temperature	Operating at V_i nom, I_o nom	-40		+ 71	°C
Case temperature	Operating at V_i nom, I_o nom			+ 85	°C
Derating	V_i nom, +51 to + 71°C			2	% / °C
Storage temperature	Non operational	-40		+ 100	°C
Relative humidity	V_i nom, I_o nom	20		95	% RH
Temperature coefficient	V_i nom, I_o min			$\pm$ 0.03	% / °C

SPECIFICATION

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GENERAL

Characteristics	Conditions	min.	typ.	max.	unit
MTBF	Bellcore issue 6 @40°C, GB		3.3V, 5V & 503D models	1220000	Hours
			12V, 15V & 24V models	1250000	Hours
			12D & 15D models	1230000	Hours
Altitude during operation	IEC 60068-2-13			4850	m
Dimension		L76.2 x W50.8 x H22.8			mm
Cooling	Free air convection				

INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Rated input voltage	Io nom	85		265	VAC
Input voltage range	Ta min ... Ta max, Io nom	85		265	VAC
		120		375	VDC
Input current	Vi : 115 / 230 VAC, Io nom		310 / 190		mA
Rated input current	Vi : 85 VAC, Io nom			500	mA
Line frequency	Vi nom, Io nom	47		63	Hz
Inrush current	Vi : 115 / 230 VAC, Io nom			10/18	A
Leakage current	Input - Output			0.25	mA

OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy	Vi nom, Io nom			± 2	%
Minimum load	Vi nom	0			%
	dual output models (each output)	20			%
Line regulation	Io nom, Vi min ... Vi max			± 1	%
Load regulation	Vi nom, Io min ... Io nom			± 2	%
	dual output models			± 2	%
Cross regulation	Asymmetrical load 20% / 100% FL			± 6	%
Hold up time	Vi : 115 / 230 VAC, Io nom	15/30			ms
Turn on time	Vi nom, Io nom			1000	ms
Rise time	Vi nom, Io nom			150	ms
Fall time	Vi nom, Io nom			150	ms
Transient recovery time	Vi nom, I ~ 0.5 Io nom			1	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz			100	mV
	3.3V & 15V models			150	mV
External trim ADJ. Range I) (for single output only)	Io = 5% ... 100%	- 10		+ 10	%
Efficiency	Vi nom, Io nom, Po / Pi	Up to 82%, See model list and typ efficiency curve			

NOTE 1 : Pls refer to Fig 1 & Table 1 for connection and resistance recommended.

CONTROL AND PROTECTION

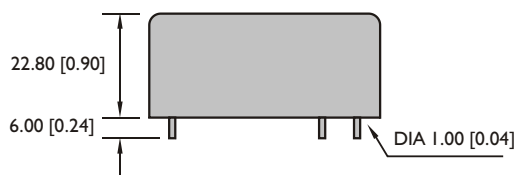
Characteristics	Conditions	min.	typ.	max.	unit
Input fuse			T2A / 250VAC internal		
Internal surge voltage protection	IEC 61000-4-5		Varistor		
Output short circuit			Hiccup mode		

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

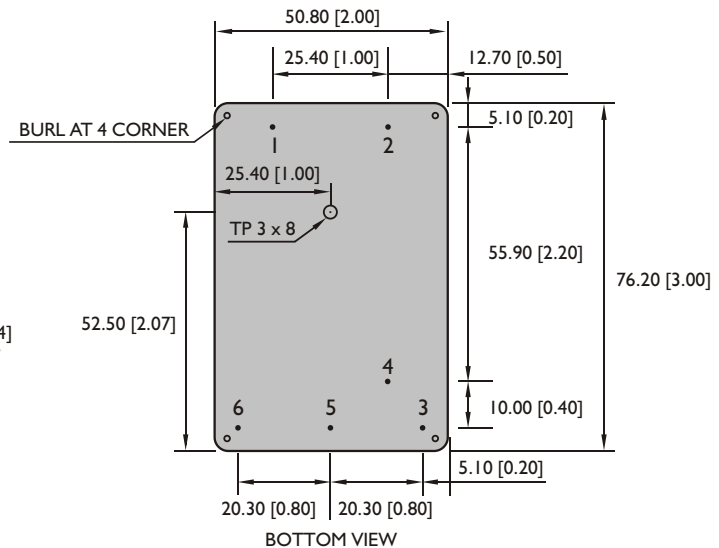
UL / cUL	UL 60950-1, Recognized
TUV	EN 60950-1, CB scheme
CE	EN 61000-6-3, EN 55022 Class B, EN 61000-3-2, EN 61000-3-3 EN 61000-6-2, EN 55024, EN 61000-4-2, EN 61000-4-3 EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8 EN 61000-4-11, EN 61204-3
Vibration resistance	meet IEC 60068-2-6 (10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)
Shock resistance	meet IEC 60068-2-27 (15G, 11ms, 3 axes, 6 Faces, 3 times for each Face)

Case size	76.2 x 50.8 x 22.8mm (3 x 2 x 0.90 inches)
Case material	Plastic
Weight	160g
Potting material	Epoxy

mm [inch]



GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	$\pm 0.30[0.01]$
30.00[1.18] - 120.00[4.72]	$\pm 0.50[0.02]$



GENERAL							
PIN NO.		1	2	3	4	5	6
SINGLE		AC IN	AC IN	Vo -	Trim	NO PIN	Vo +
DUAL	12D, 15D	AC IN	AC IN	Vo -	NO PIN	com	Vo +
	503D	AC IN	AC IN	+3.3V	NO PIN	com	+5V

• Block diagram for KAM15 series with single output

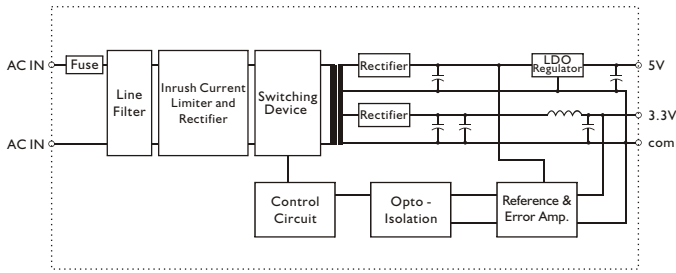
The diagram shows a power supply circuit for a single output. It starts with two AC input lines (AC IN) entering a Fuse. The output of the fuse goes to a Line Filter, then to an Inrush Current Limiter and Rectifier block. This is followed by a Switching Device. The output of the switching device is connected to a transformer. The secondary of the transformer is connected to a Rectifier, which is then connected to a filter capacitor. The output of the filter capacitor is connected to the positive output terminal (Vo +). The negative output terminal (Vo -) is connected to the common ground. A Control Circuit is connected to the Switching Device and the transformer. The Control Circuit is also connected to an Opto - Isolation block, which is connected to a Reference & Error Amp. block. The Reference & Error Amp. block is connected to the transformer and the filter capacitor. A Trim pin is also shown.

• Block diagram for KAM15 series with dual output

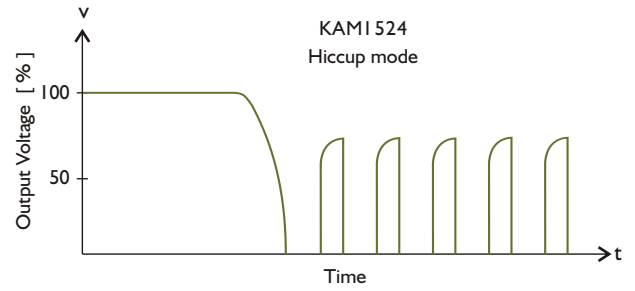
The diagram shows a power supply circuit for a dual output. It starts with two AC input lines (AC IN) entering a Fuse. The output of the fuse goes to a Line Filter, then to an Inrush Current Limiter and Rectifier block. This is followed by a Switching Device. The output of the switching device is connected to a transformer. The secondary of the transformer is connected to two separate Rectifier blocks. The output of the first rectifier is connected to a filter capacitor, which is then connected to the positive output terminal (Vo +). The output of the second rectifier is connected to a filter capacitor, which is then connected to the negative output terminal (Vo -). A Control Circuit is connected to the Switching Device and the transformer. The Control Circuit is also connected to an Opto - Isolation block, which is connected to a Reference & Error Amp. block. The Reference & Error Amp. block is connected to the transformer and the filter capacitors. A Trim pin is also shown.

CIRCUIT SCHEMATIC

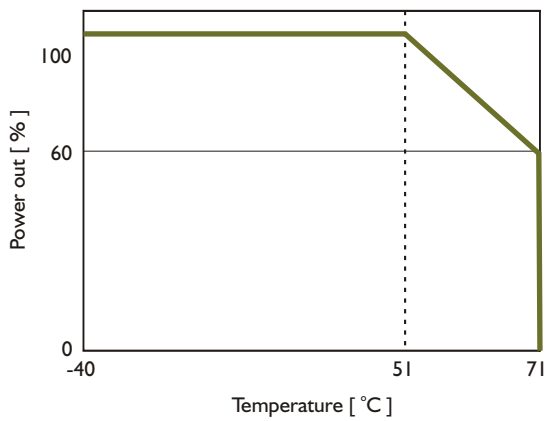
• Block diagram for KAM15503D



TYP. CURRENT LIMITED CURVE



DERATING CURVE



TYP. EFFICIENCY CURVE

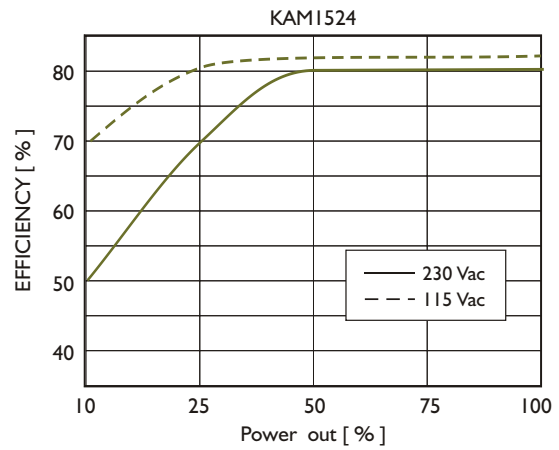


Fig. 1 Trim connection (For single output only)

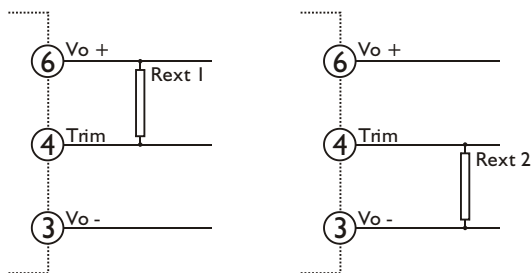


Table 1 Typical resistor values for various output voltage adjustment settings and max continuous power

Type	Rext 1		Rext 2		Max continuous power
	Vo nom -5%	Vo nom -10%	Vo nom +5%	Vo nom +10%	
KAM1503	180KΩ	56KΩ	100KΩ	20KΩ	13W
KAM1505	39KΩ	15KΩ	9.1KΩ	2.2KΩ	15W
KAM1512	51KΩ	20KΩ	10KΩ	2KΩ	15W
KAM1515	150KΩ	68KΩ	20KΩ	4.7KΩ	15W
KAM1524	130KΩ	56KΩ	12KΩ	2KΩ	15W