

KAM10 SERIES

AC - DC POWER MODULE
10W SINGLE & DUAL OUTPUT



FEATURES

- AC/DC POWER MODULE
- UNIVERSAL INPUT 85 ~ 265 VAC
- HIGH EFFICIENCY UP TO 78%
- 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.) |
|-----------|---------------|----------------|----------------|----------------|-------------|-------------|-----------------------|
|-----------|---------------|----------------|----------------|----------------|-------------|-------------|-----------------------|

Single Output Models

| | | | | | | | |
|---------|------------|----------|----------|---------|-----|-----|--------------|
| KAM1003 | 85~265 VAC | 10 WATTS | +3.3 VDC | 3000 mA | 67% | 70% | 7000 μ F |
| KAM1005 | 85~265 VAC | 10 WATTS | + 5 VDC | 2000 mA | 70% | 72% | 7000 μ F |
| KAM1012 | 85~265 VAC | 10 WATTS | + 12 VDC | 840 mA | 75% | 77% | 3500 μ F |
| KAM1015 | 85~265 VAC | 10 WATTS | + 15 VDC | 670 mA | 75% | 77% | 1500 μ F |
| KAM1024 | 85~265 VAC | 10 WATTS | + 24 VDC | 420 mA | 76% | 78% | 470 μ F |

Dual Output Models

| | | | | | | | |
|-----------|------------|----------|-----------------|--------------|-----|-----|--------------------|
| KAM1012D | 85~265 VAC | 10 WATTS | \pm 12 VDC | \pm 420 mA | 75% | 77% | \pm 1000 μ F |
| KAM1015D | 85~265 VAC | 10 WATTS | \pm 15 VDC | \pm 335 mA | 74% | 77% | \pm 470 μ F |
| KAM10503D | 85~265 VAC | 10 WATTS | + 5 / + 3.3 VDC | +0.8 / +2A | 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 | 3,000/4,242 | | | VAC/VDC | |
| Isolation resistance | Input - Output, @ 500VDC | 100 | | | M Ω | |
| Ambient temperature | Operating at V_i nom, I_o nom | -40 | | + 71 | $^{\circ}$ C | |
| Case temperature | Operating at V_i nom, I_o nom | | | + 85 | $^{\circ}$ C | |
| Derating | V_i nom, +5 l to + 71 $^{\circ}$ C | | | 2 | % / $^{\circ}$ C | |
| Storage temperature | Non operational | -40 | | + 100 | $^{\circ}$ C | |
| Relative humidity | V_i nom, I_o nom | 20 | | 95 | % RH | |
| Temperature coefficient | V_i nom, I_o min | | | \pm 0.03 | % / $^{\circ}$ C | |

SPECIFICATION

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

GENERAL

| Characteristics | Conditions | min. | typ. | max. | unit |
|---------------------------|----------------------------|-----------------------|------|-----------|-------|
| MTBF | Bellcore issue 6 @40°C, GB | 3.3V, 5V & 503D | | 1,300,000 | Hours |
| | | 12V & 15V | | 1,340,000 | Hours |
| | | 24V, 12D & 15D | | 1,380,000 | Hours |
| Altitude during operation | IEC 60068-2-13 | | | 4,850 | 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 | lo nom | 85 | | 265 | VAC |
| Input voltage range | Ta min ... Ta max, lo nom | AC in | 85 | 265 | VAC |
| | | DC in | 120 | 375 | VDC |
| Input current | Vi : 115 / 230 VAC, lo nom | | 230 / 150 | | mA |
| Rated input current | Vi : 85 VAC, lo nom | | | 350 | mA |
| Line frequency | Vi nom, lo nom | 47 | | 63 | Hz |
| Inrush current | Vi : 115 / 230 VAC, lo nom | | | 10/18 | A |
| Leakage current | Input - Output | | | 0.25 | mA |

OUTPUT SPECIFICATIONS

| Characteristics | Conditions | min. | typ. | max. | unit |
|---|---------------------------------|--|------|-------|------|
| Output voltage accuracy | Vi nom, lo nom | | | ± 2 | % |
| Minimum load | Vi nom | single output models | 0 | | % |
| | | dual output models (each output) | 20 | | % |
| Line regulation | lo nom, Vi min ... Vi max | | | ± 1 | % |
| Load regulation | Vi nom, lo min ... lo nom | single output models | | ± 2 | % |
| | | dual output models | | ± 2 | % |
| Cross regulation | Asymmetrical load 20% - 100% FL | | | ± 6 | % |
| Hold up time | Vi 115/230 VAC, lo nom | 15/30 | | | ms |
| Turn on time | Vi nom, lo nom | | | 1,000 | ms |
| Rise time | Vi nom, lo nom | | | 150 | ms |
| Fall time | Vi nom, lo nom | | | 150 | ms |
| Transient recovery time | Vi nom, I ~ 0.5 lo nom | | | 1 | ms |
| Ripple & noise | Vi nom, lo nom BW = 20MHz | 3.3V & 5V | | 100 | mV |
| | | 12V, 15V, 24V & dual | | 150 | mV |
| External trim ADJ. Range 1) (for single output only) | lo = 5% ... 100% | - 10 | | + 10 | % |
| Efficiency | Vi nom, lo nom, Po / Pi | Up to 78%, 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 | | | |

SPECIFICATION

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

APPROVALS AND STANDARDS

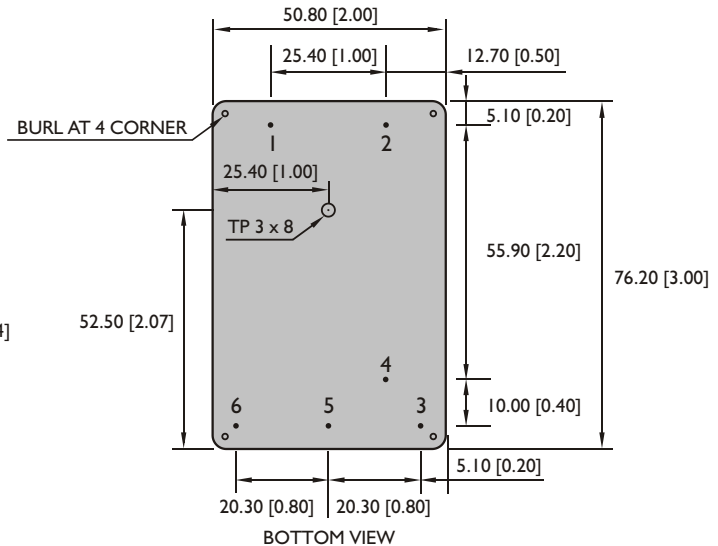
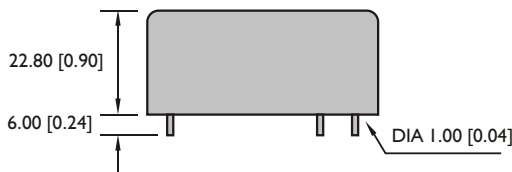
| | |
|----------------------|---|
| UL / cUL | UL 60950-1, Recognized |
| TUV | EN 60950-1 |
| CE | EN 61000-6-3, EN 55032 Class B, EN 61000-3-2, EN 61000-3-3 EN 61000-6-2, EN 55024, EN 61000-4-2, EN 61000-4-3 EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8 EN 61000-4-11, EN 61204-3 |
| Vibration 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) |

PHYSICAL CHARACTERISTICS

| | |
|------------------|---|
| 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 |

MECHANISM & PIN CONFIGURATION

mm [inch]



| GENERAL TOLERANCE | |
|----------------------------|-------------|
| 0.00[0.00] - 30.00[1.18] | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72] | ±0.50[0.02] |

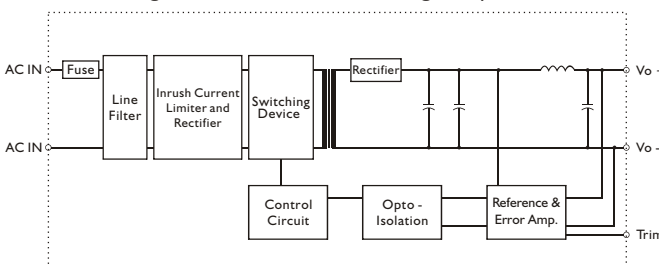
PIN ASSIGNMENT

GENERAL

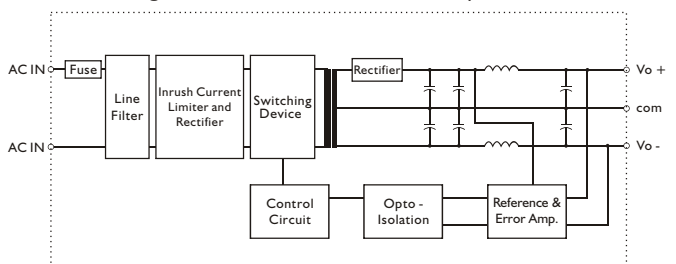
| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|-------|-------|-------|--------|--------|------|
| SINGLE | AC IN | AC IN | Vo - | Trim | NO PIN | Vo + |
| DUAL 12D, 15D | AC IN | AC IN | Vo - | NO PIN | com | Vo + |
| 503D | AC IN | AC IN | +3.3V | NO PIN | com | +5V |

CIRCUIT SCHEMATIC

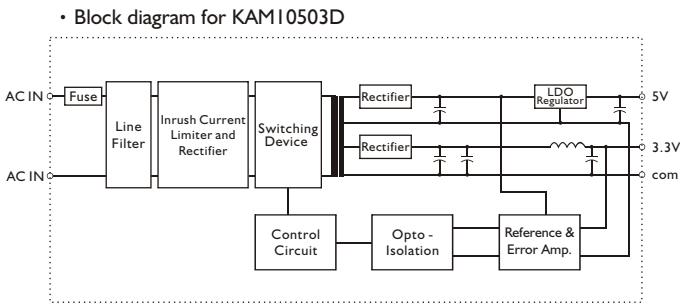
• Block diagram for KAM10 series with single output



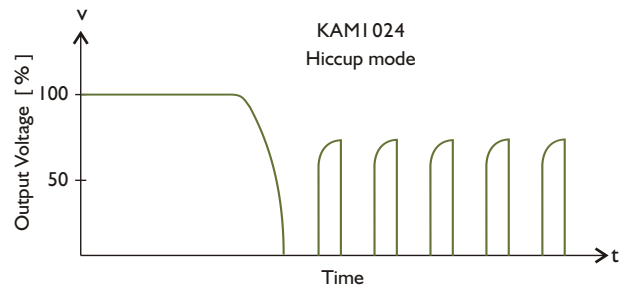
• Block diagram for KAM10 series with dual output



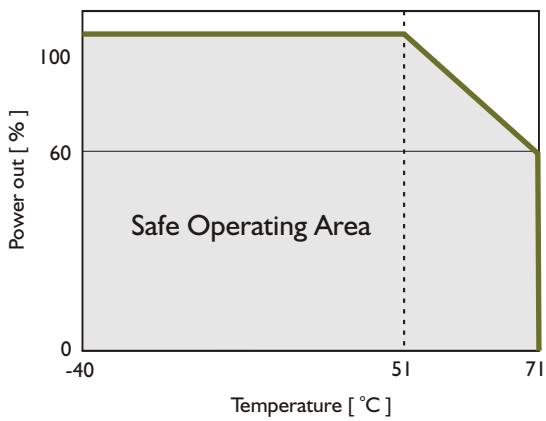
CIRCUIT SCHEMATIC



TYP. CURRENT LIMITED CURVE



DERATING CURVE



TYP. EFFICIENCY CURVE

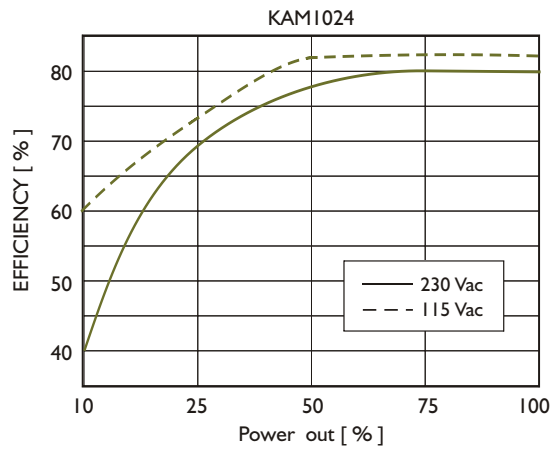


Fig. 1 Trim connection (For single output only)

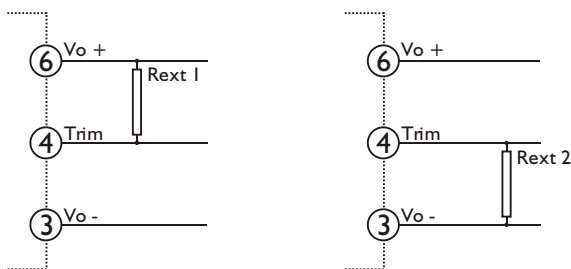


Table 1 Typical resistor values for various output voltage adjustment settings and max continuous power

| Type | Rext 1 | | Rext 2 | | Max continuous power |
|---------|------------|-------------|------------|-------------|----------------------|
| | Vo nom -5% | Vo nom -10% | Vo nom +5% | Vo nom +10% | |
| KAM1003 | 180KΩ | 56KΩ | 100KΩ | 20KΩ | 10W |
| KAM1005 | 39KΩ | 15KΩ | 9.1KΩ | 2.2KΩ | 10W |
| KAM1012 | 51KΩ | 20KΩ | 10KΩ | 2KΩ | 10W |
| KAM1015 | 150KΩ | 68KΩ | 20KΩ | 4.7KΩ | 10W |
| KAM1024 | 130KΩ | 56KΩ | 12KΩ | 2KΩ | 10W |