C&D TECHNOLOGIES
Power Solutions

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# VKA75xS

## 75 Watt Single Output Half Brick DC/DC Converter




- 18-36 V & 33 - 75V Input Range
- High Efficiency: 87% Typical at 5V
- 100µS Transient Response 50-100% Load Step
- 420 kHz Fixed-Frequency Operation
- Remote Sense
- Operation to +100°C Baseplate Temperature
- Primary Remote On/Off, Choice of Pos/Neg Logic
- Adjustable Output Voltage
- Continuout Short-Circuit Protection
- Thermal Shutdown
- Case Ground Pin
- UL/CUL 60950, VDE EN60950

The VKA75xS Series DC/DC converters present an economical and practical solution for distributed power system architectures which require high power density and efficiency while maintaining system modularity and upgradeability. With the ability to operate over a wide input voltage range of 18 to 36 and 33 to 75 volts, these modules are ideal for use in battery backup applications common in todays' telecommunication and electronic data processing applications. The output is fully isolated from the input, allowing for a variety of polarity and grounding configurations.

The VKA75xS's proprietary control circuitry responds to 50-100% load steps in 100µSeconds to within 1% nominal Vout.

The patented fixed frequency architecture combined with surface mount technology results in a compact, efficient and reliable solution to DC/DC conversion requirements.

## PRODUCT SELECTION CHART

| MODEL | INPUT VOLTAGE | VOUT (VDC) | IOUT (A) | EFFICIENCY | |
|---|---|---|---|---|---|
| | | | | MIN | TYP |
| VKA75LS02 | | 2.0V | 15.0 | 75 | 76 |
| VKA75LS03 | | 3.3V | 15.0 | 80 | 81 |
| VKA75LS05 | 24VDC | 5.0V | 15.0 | 85 | 86 |
| VKA75LS12 | | 12.0V | 6.3 | 87 | 88 |
| VKA75LS15 | (18-36) | 15.0V | 5.0 | 88 | 89 |
| VKA75LS24 | | 24.0V | 3.1 | 89 | 90 |
| VKA75MS02 | | 2.0V | 15.0 | 76 | 77 |
| VKA75MS03 | | 3.3V | 15.0 | 81 | 82 |
| VKA75MS05 | 48VDC | 5.0V | 15.0 | 86 | 87 |
| VKA75MS12 | | 12.0V | 6.3 | 88 | 89 |
| VKA75MS15 | (33-75) | 15.0V | 5.0 | 89 | 90 |
| VKA75MS24 | | 24.0V | 3.1 | 89 | 90 |

# SPECIFICATIONS, ALL MODELS

**Specifications are at $T_{CASE}$ = +40°C nominal input voltage unless otherwise specified.**

## INPUT

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **INPUT** | | | | | |
| Voltage Range | | | | | |
| VKA75LS | | 18 | 24 | 36 | VDC |
| VKA75MS | | 33 | 48 | 75 | VDC |
| Maximum Input Current | | | | | |
| VKA75LS | $V_{IN}$ = 16VDC | | | 5.5 | A |
| VKA75MS | $V_{IN}$ = 27VDC | | | 3.3 | A |
| Reflected Ripple Current | Peak - Peak | | 20 | | mA |
| Input Ripple Rejection | DC to 1KHz | 50 | 60 | | dB |
| No Load Input Current LS/MS | | | 50/100 | | mA |
| Power Dissipation LS/MS | | | | | |
| No Load | | | 3.6/4.8 | | W |
| Standby, Primary On/Off Disabled LS/MS | | | 0.18/0.4 | | W |
| Inrush Charge | $V_{IN}$ = $V_{IN}$max. | | | | |
| VKA75LS | | | | 0.520 | mC |
| VKA75MS | | | | 0.360 | mC |
| Quiescent Operating Current | | | | | |
| Primary On/Off Disabled | | | 8 | 12 | mA |

## OUTPUT

| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **OUTPUT** | | | | | |
| Rated Power | | 0 | | 75 | W |
| Set point Accuracy | | | 1 | | % |
| Line Regulation | High Line to Low Line | | 0.02 | 0.05 | % |
| Load Regulation | No Load to Rated Load | | 0.02 | 0.05 | % |
| Output Temperature Drift | | | ±.02 | | %/°C |
| Output Ripple, p-p | DC to 20MHz BW | | 1% | | $V_{OUT}$, Nom |
| Output Current Limit Inception | | | | 130% | $I_{OUT}$, Nom |
| Output Short-Circuit Current (2) | test | | | 110% | $I_{OUT}$, Nom |
| Output Overvoltage Limit | | | 125% | 135% | V |
| Transient Response | 50 to 100% Load Step | | | | |
| Peak Deviation | di/dt = 1.0A/µSec | | 2% | | $V_{OUT}$, Nom |
| Settling Time | $V_{OUT}$, 1% of Nominal Output | | 100 | | µSec |

## GENERAL

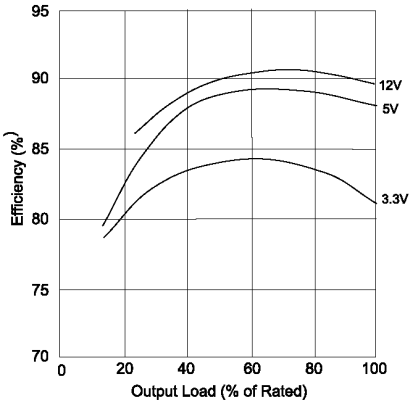
| PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **ISOLATION** | | | | | |
| Input to Output | Peak Test for 2 Seconds | 1500 | | | VDC |
| Input to Baseplate | | 1500 | | | VDC |
| Output to Baseplate | | 500 | | | VDC |
| Resistance | | 10 | | | MΩ |
| Capacitance | | | 2000 | | pF |
| Leakage Current | $V_{ISO}$ = 240VAC, 60Hz | | 180 | | µA, rms |
| **GENERAL** | | | | | |
| Efficiency, Line, Load, Temp. (3) | | | | | |
| Switching Frequency | | 400 | 420 | 440 | KHz |
| Remote Sense Compensation | | | | 0.5 | V |
| Output Voltage Adjust Range | 12V & higher(4) | | -50% / +25% | | $V_{OUT}$, Nom |
| Remote On/Off Control Inputs | | | | | |
| Primary | Open Collector/Drain | | | | |
| Sink Current-Logic Low | | | | 1.0 | mA |
| Vlow | | | | 0.4 | V |
| Vhigh | | | | Open Collector | |
| Turn-on Time | Within 1% of Rated Output | | 10.0 | 12.5 | mSec |
| Weight | | | | 85 (3.0) | g (oz.) |
| **TEMPERATURE** | | | | | |
| Operation/Specification | Case Temperature | -40 | +25 | +100 | °C |
| Storage | Case Temperature | -55 | +25 | +125 | °C |
| Shutdown Temperature | Case Temperature | +100 | | +115 | °C |
| Thermal Impedance, case-ambient | | | 7.1 | | °C/W |
| Lead Solder Temperature | 10 Seconds max | | | +300 | °C |

**NOTES:** (1) See Typical Performance Curves, page 3
(2) Continuous Mode
(3) See graphs for Efficiency vs. Output Load, $V_{IN}$, $T_{CASE}$
(4) 3.3V Models Limited in Trim Down Range
(5) Consult Factory for Details

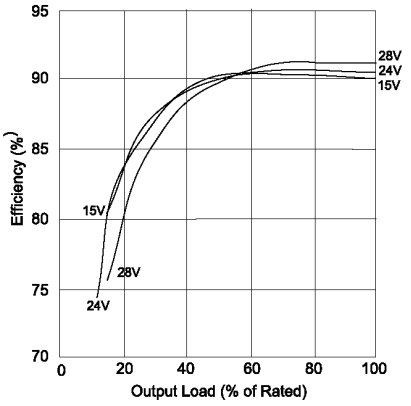
## TYPICAL PERFORMANCE CURVES

$T_{CASE}$ = +40°C nominal input voltage unless otherwise specified.

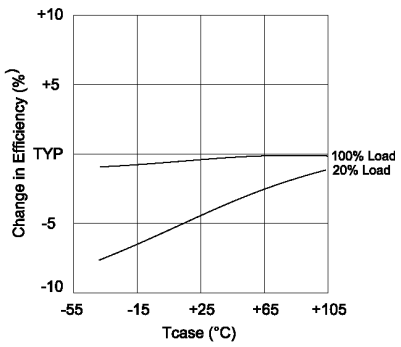
EFFICIENCY vs OUTPUT LOAD



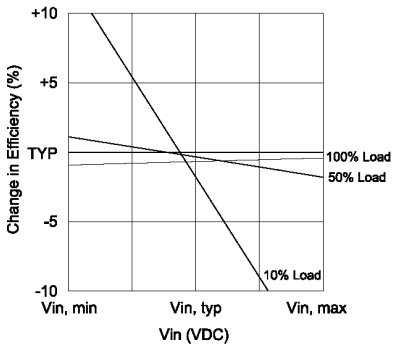

EFFICIENCY vs OUTPUT LOAD



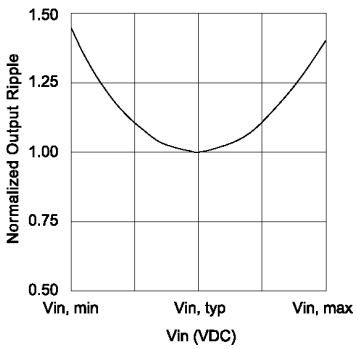

EFFICIENCY vs TEMPERATURE



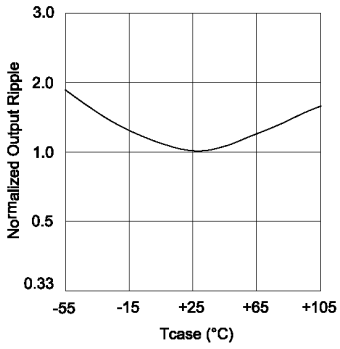

EFFICIENCY vs INPUT VOLTAGE



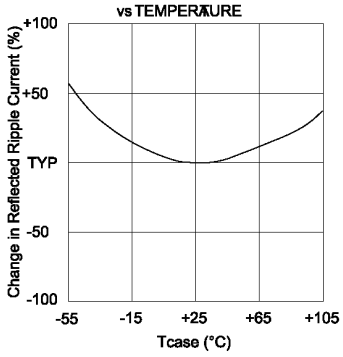

OUTPUT RIPPLE vs INPUT VOLTAGE



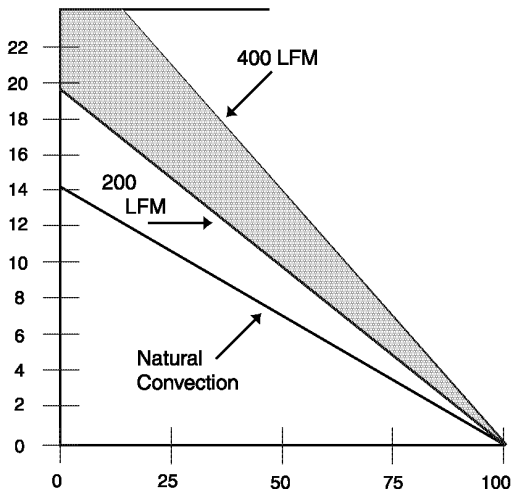

OUTPUT RIPPLE vs TEMPERATURE




REFLECTED RIPPLE CURRENT vs TEMPERATURE




POWER DERATING WTH NO HEATSINK

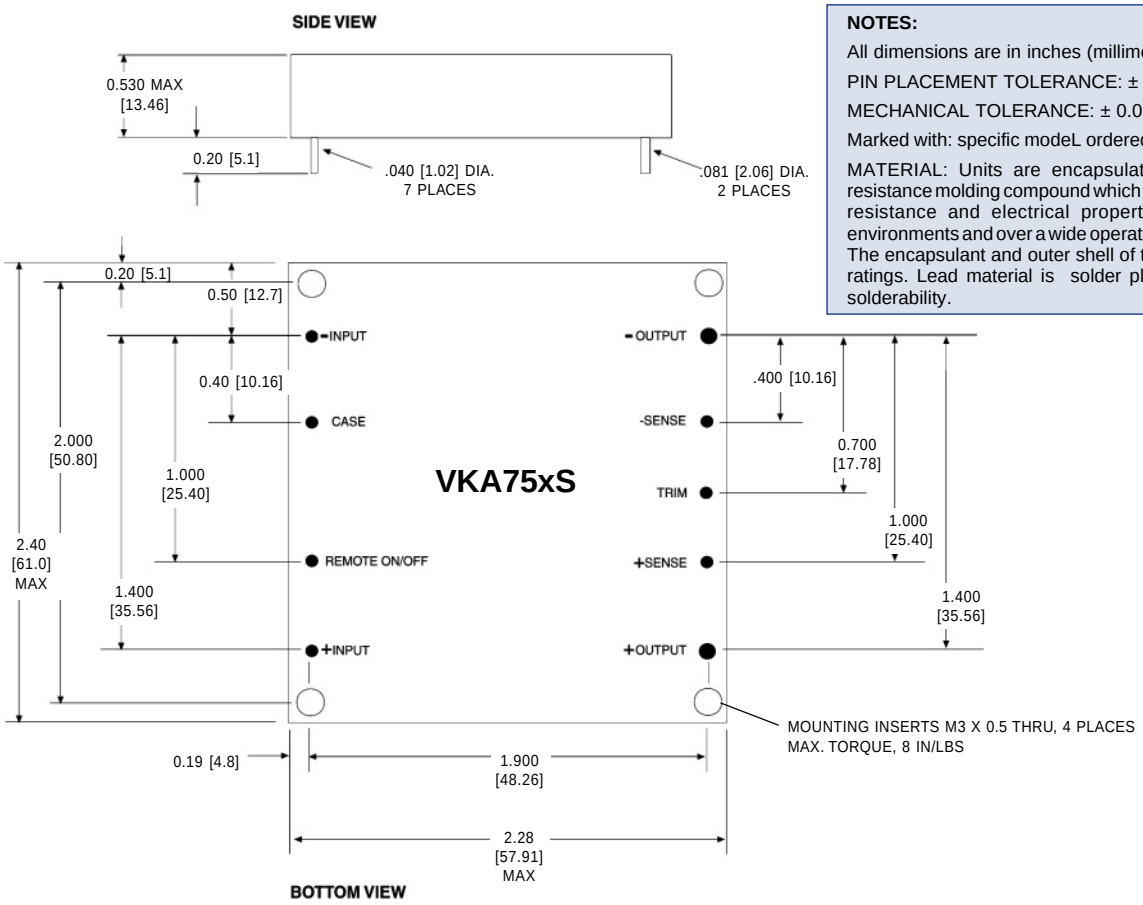



## ORDERING INFORMATION

VKA75 xSzz -

Device Family
Indicates 75 Watt Regulated Unit
Model Number
Selected from Table of Electrical Characteristics
Where:
x = Input Voltage (L = 24VDC; M = 48VDC)
zz = Output Voltage (03=3.3V, 05=5V, etc.)
Lead Length
0.200" - No Number
0.145" - (6)
0.110" - (8)
Remote On-Off Logic:
Positive - No Number
Negative - (1)

# MECHANICAL




**NOTES:**

All dimensions are in inches (millimeters).

PIN PLACEMENT TOLERANCE: ± 0.005"

MECHANICAL TOLERANCE: ± 0.015"

Marked with: specific modeL ordered, date code, job code.

MATERIAL: Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance and electrical properties in high humidity environments and over a wide operating temperature range. The encapsulant and outer shell of the unit have UL94V-0 ratings. Lead material is solder plated to allow ease of solderability.

## OUTPUT ADJUST VOLTAGE

This feature allows the user to accurately adjust the module's output voltage set point to a specified level. This is achieved by connecting a resistor or potentiometer from the TRIM terminal to either the +Vout terminal (for increased Vout) or the -Vout terminal (for decreased Vout). The formulae below describe the trim resistor value to obtain a Vout change of Δ%. Vo is output voltage prior to adjustment (3.3V, 5V, 12V, 15V, or 24V).

$$\text{Radj - up} = \left( \frac{Vo(100 + \Delta\%)}{1.225\Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) \text{k}\Omega$$

$$\text{Radj - down} = \left( \frac{100}{\Delta\%} - 2 \right) \text{k}\Omega$$

## OVP NOTE

Special attention should be given to the peak voltage deviation during a dynamic load step when trimming the output above the original set point to avoid tripping the overvoltage protection circuit. Should an OVP condition occur, the converter will go into a latch condition and must be externally reset before it will return to normal operation.


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