



## PRODUCT OVERVIEW

The VKA75xSC 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 today's telecommunication and electronic data processing applications. The output is fully isolated from the input, allowing for a variety of polarity and grounding configurations.

The VKA75xSC's proprietary control circuitry responds to 50-100% load steps in 100mSec-onds 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.

## FEATURES

- RoHS Compliant
- 18-36 V & 33 - 75V Input Range
- High Efficiency: 87% Typical at 5V
- 100mS 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
- Continuous Short-Circuit Protection
- Thermal Shutdown
- Case Ground Pin
- UL/CUL 60950, VDE EN60950

## PRODUCT SELECTION CHART

| MODEL      | INPUT VOLTAGE | VOUT (VDC) | IOUT (A) | EFFICIENCY |     |
|------------|---------------|------------|----------|------------|-----|
|            |               |            |          | MIN        | TYP |
| VKA75LS02C | 18-36Vdc      | 2.0V       | 15.0     | 75         | 76  |
| VKA75LS03C | 18-36Vdc      | 3.3V       | 15.0     | 80         | 81  |
| VKA75LS05C | 18-36Vdc      | 5.0V       | 15.0     | 85         | 86  |
| VKA75LS12C | 18-36Vdc      | 12.0V      | 6.3      | 87         | 88  |
| VKA75LS15C | 18-36Vdc      | 15.0V      | 5.0      | 88         | 89  |
| VKA75LS24C | 18-36Vdc      | 24.0V      | 3.1      | 89         | 90  |
| VKA75MS02C | 33-75Vdc      | 2.0V       | 15.0     | 76         | 77  |
| VKA75MS03C | 33-75Vdc      | 3.3V       | 15.0     | 81         | 82  |
| VKA75MS05C | 33-75Vdc      | 5.0V       | 15.0     | 86         | 87  |
| VKA75MS12C | 33-75Vdc      | 12.0V      | 6.3      | 88         | 89  |
| VKA75MS15C | 33-75Vdc      | 15.0V      | 5.0      | 89         | 90  |
| VKA75MS24C | 33-75Vdc      | 24.0V      | 3.1      | 89         | 90  |

## THROUGH-HOLE SOLDERING INFORMATION

These devices are intended for wave soldering or manual soldering.

**They are not intended to be subject to surface mount processes under any circumstances.**

The normal wave soldering process can be used with these devices where the device is subjected to a maximum wave temperature of 260°C for a period of no more than 10 seconds. Within this time and temperature range, the integrity of the device's plastic body will not be compromised and internal temperatures within the converter will not exceed 175°C. Care should be taken to control manual soldering limits identical to that of wave soldering.



For full details go to  
[www.murata-ps.com/rohs](http://www.murata-ps.com/rohs)

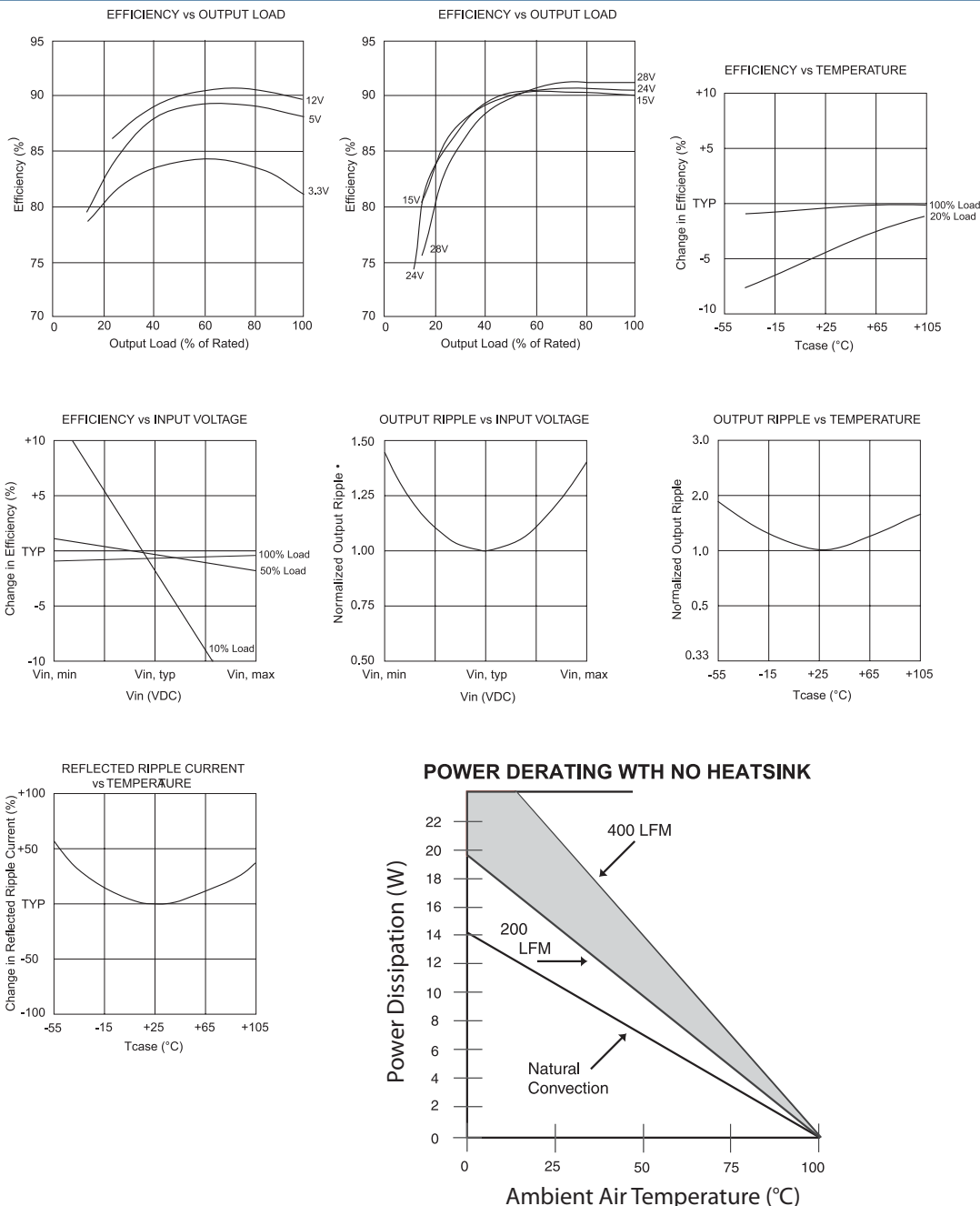
### SPECIFICATIONS, ALL MODELS

Specifications are at  $T_{CASE} = +40^{\circ}\text{C}$  nominal input voltage unless otherwise specified.

| INPUT   | PARAMETER                         | CONDITIONS                             | MIN  | TYP         | MAX            | UNITS                       |
|---------|-----------------------------------|----------------------------------------|------|-------------|----------------|-----------------------------|
|         | INPUT                             |                                        |      |             |                |                             |
|         | Voltage Range                     |                                        |      |             |                | VDC                         |
|         | VKA75LS                           |                                        | 18   | 24          | 36             | VDC                         |
|         | VKA75MS                           |                                        | 33   | 48          | 75             | VDC                         |
|         | Maximum Input Current             |                                        |      |             |                | A                           |
|         | VKA75LS                           | $V_{IN} = 16\text{VDC}$                |      |             | 5.5            | A                           |
|         | VKA75MS                           | $V_{IN} = 27\text{VDC}$                |      |             | 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                          |
|         | No Load                           | Power Dissipation LS/MS                |      | 3.6/4.8     |                | W                           |
|         | Standby, Primary On/Off Disabled  | LS/MS                                  |      | 0.18/0.4    |                | W                           |
|         | Inrush Charge                     | $V_{IN} = V_{INmax.}$                  |      |             |                | mC                          |
|         | VKA75LS                           |                                        |      |             | 0.520          | mC                          |
|         | VKA75MS                           |                                        |      |             | 0.360          | mC                          |
|         | Quiescent Operating Current       |                                        |      | 8           | 12             | mA                          |
|         | Primary On/Off Disabled           |                                        |      |             |                |                             |
| 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                  |      | 0.2         | 0.5            | %                           |
|         | Output Temperature Drift          |                                        |      | $\pm 0.2$   |                | $^{\circ}\text{C}$          |
|         | Output Ripple, p-p                | DC to 20MHz BW                         |      | 1%          |                | $V_{OUT}$ Nom               |
|         | Output Current Limit Inception    |                                        |      | 130%        | 150%           | $I_{OUT}$ Nom               |
|         | Output Short-Circuit Current (2)  | test                                   |      | 120%        | 150%           | $I_{OUT}$ Nom               |
|         | Output Overvoltage Limit          |                                        |      | 125%        | 135%           | V                           |
|         | Transient Response                | 50 to 100% Load Step                   |      |             |                | $V_{OUT}$ Nom               |
|         | Peak Deviation                    | $di/dt = 1.0\text{A}/\mu\text{Sec}$    |      | 2%          |                | $V_{OUT}$ Nom               |
|         | Settling Time                     | $V_{OUT}$ 1% of Nominal Output         |      | 100         |                | $\mu\text{Sec}$             |
| 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   |             |                | $M\Omega$                   |
|         | Capacitance                       |                                        |      | 2000        |                | pF                          |
|         | Leakage Current                   | $V_{ISO} = 240\text{VAC}, 60\text{Hz}$ |      | 180         |                | $\mu\text{A}, \text{rms}$   |
|         | 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           | $^{\circ}\text{C}$          |
|         | Storage                           | Case Temperature                       | -55  | +25         | +125           | $^{\circ}\text{C}$          |
|         | Shutdown Temperature              | Case Temperature                       | +100 |             | +115           | $^{\circ}\text{C}$          |
|         | Thermal Impedance, case-ambient   |                                        |      | 7.1         |                | $^{\circ}\text{C}/\text{W}$ |
|         | Lead Solder Temperature           | 10 Seconds max                         |      |             | +300           | $^{\circ}\text{C}$          |

- 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<sub>CASE</sub> = +40°C nominal input voltage unless otherwise specified.



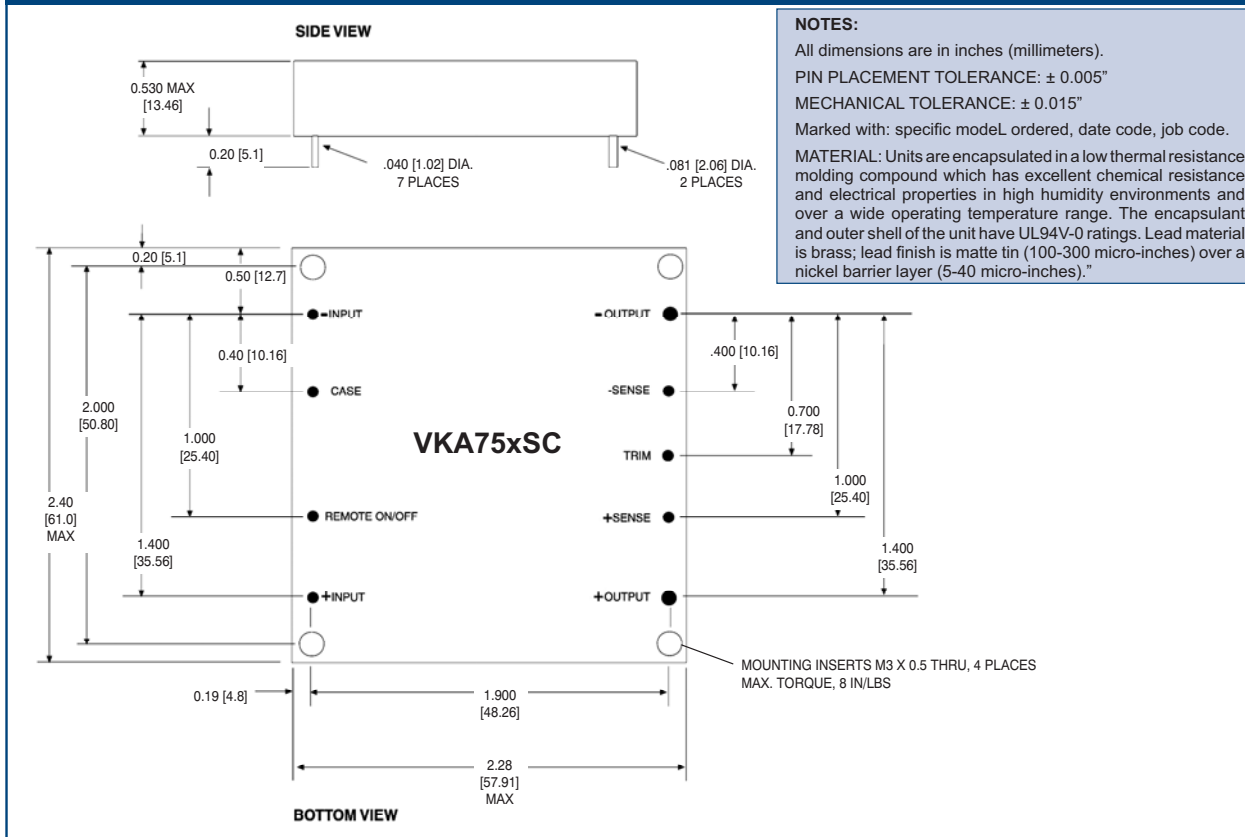
**ORDERING INFORMATION**

|                                                   |       |      |   |
|---------------------------------------------------|-------|------|---|
| Device Family                                     | VKA75 | xSzz | C |
| 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)                                    |       |      |   |
| RoHS Compliant                                    |       |      |   |

Not all model configurations are available. The following are the defined and active models:

VKA75LS05-1C  
VKA75LS05C  
VKA75LS12-1C  
VKA75LS12C  
VKA75LS15C  
VKA75LS24C  
VKA75MS03C  
VKA75MS05C  
VKA75MS12C  
VKA75MS24C

## MECHANICAL



### 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  $\Delta\%$ . Vo is output voltage prior to adjustment (3.3V, 5V, 12V, 15V, or 24V).

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

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

### 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.