

50 WATT SINGLE OUTPUT HIGH DENSITY DC/DC CONVERTER

VKA50xS Series

FEATURES

- 18 - 36V & 33 - 75V INPUT RANGE
- SMALL SIZE: 2.28" X 2.4" X 0.50"
- HIGH EFFICIENCY: 87% TYPICAL AT 5V
- 100 μ S TRANSIENT RESPONSE 50-100% LOAD STEP
- 420kHz FIXED-FREQUENCY OPERATION
- OPERATION TO +100°C BASEPLATE TEMP.
- PRIMARY REMOTE ON/OFF, CHOICE OF POS/NEG LOGIC
- ADJUSTABLE OUTPUT VOLTAGE
- REMOTE SENSE
- CONTINUOUS SHORT-CIRCUIT PROTECTION
- THERMAL SHUTDOWN
- SAFETY PER UL1950, EN 60950 AND CSA 22.2 #234
- CASE GROUND PIN

DESCRIPTION

The VKA50xS 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 VKA50xS's proprietary control circuitry responds to 50-100% load steps in 100 μ Seconds 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.

Model	Input Voltage	V _{OUT} (VDC)	I _{OUT} (A)	Efficiency(%) Note (1)	
				Min	Typ
VKA50LS03	24VDC (18-36)	3.3V	10.0	80	81
VKA50LS05		5.0V	10.0	85	86
VKA50LS12		12.0V	4.2	87	88
VKA50LS15		15.0V	3.3	88	89
VKA50LS24		24.0V	2.1	89	90

Model	Input Voltage	V _{OUT} (VDC)	I _{OUT} (A)	Efficiency(%) Note (1)	
				Min	Typ
VKA50MS03	48VDC (33-75)	3.3V	10.0	81	82
VKA50MS05		5.0V	10.0	86	87
VKA50MS12		12.0V	4.2	88	89
VKA50MS15		15.0V	3.3	89	90
VKA50MS24		24.0V	2.1	89	90

AGENCY APPROVALS



COMMON SPECIFICATIONS

Specifications typical at T_{CASE} = +40°C, nominal input voltage, rated output current unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT Voltage Range VKA50LS VKA50MS Maximum Input Current VKA50LS VKA50MS Reflected Ripple Current Input Ripple Rejection No Load Input Current LS/MS Power Dissipation LS/MS No Load Standby, Primary On/Off Disabled LS/MS Inrush Charge VKA50LS VKA50MS Quiescent Operating Current Primary On/Off Disabled	$V_{IN} = 16\text{VDC}$ $V_{IN} = 27\text{VDC}$ Peak - Peak DC to 1KHz $V_{IN} = V_{IN\text{max.}}$	18 33 50	24 48 20 60 50/100 3.6/4.8 0.18/0.4 8	36 75 3.7 2.2 0.520 0.360 12	VDC VDC A A mA dB mA W W mC mC mA
OUTPUT Rated Power Set point Accuracy Line Regulation Load Regulation Output Temperature Drift Output Ripple, p-p Output Current Limit Inception Output Short-Circuit Current (2) Output Overvoltage Limit Transient Response Peak Deviation Settling Time	High Line to Low Line No Load to Rated Load DC to 20MHz BW test 50 to 100% Load Step di/dt = 1.0A/μSec V_{OUT1} 1% of Nominal Output	0	0.02 0.02 ±0.2 1% 125% 2% 100	50 1 0.05 0.05 130% 110% 130%	W % % % %/°C V_{OUT1} Nom I_{OUT1} Nom I_{OUT1} Nom V V_{OUT1} Nom μSec
ISOLATION Input to Output Input to Baseplate Output to Baseplate Resistance Capacitance Leakage Current	Peak Test for 2 Seconds $V_{ISO} = 240\text{VAC}, 60\text{Hz}$	1500 1500 500 10	2000 180		VDC VDC VDC MΩ pF μA, rms
GENERAL Efficiency, Line, Load, Temp. (3) Switching Frequency Remote Sense Compensation Output Voltage Adjust Range-12V & higher(4) Remote On/Off Control Inputs Primary Sink Current-Logic Low Vlow Vhigh Turn-on Time Weight	Open Collector/Drain Within 1% of Rated Output	400	420 -50% / +25% 10.0	440 0.5 1.0 0.4 Open Collector 12.5 85 (3.0)	KHz V V_{OUT1} Nom mA V mSec g (oz.)
TEMPERATURE Operation/Specification Storage Shutdown Temperature Thermal Impedance, case-ambient Lead Solder Temperature	Case Temperature Case Temperature Case Temperature 10 Seconds max	-40 -55 +100	+25 +25 7.1	+100 +125 +115 +300	°C °C °C °C/W °C

() See NOTES on page 3.

NOTES:

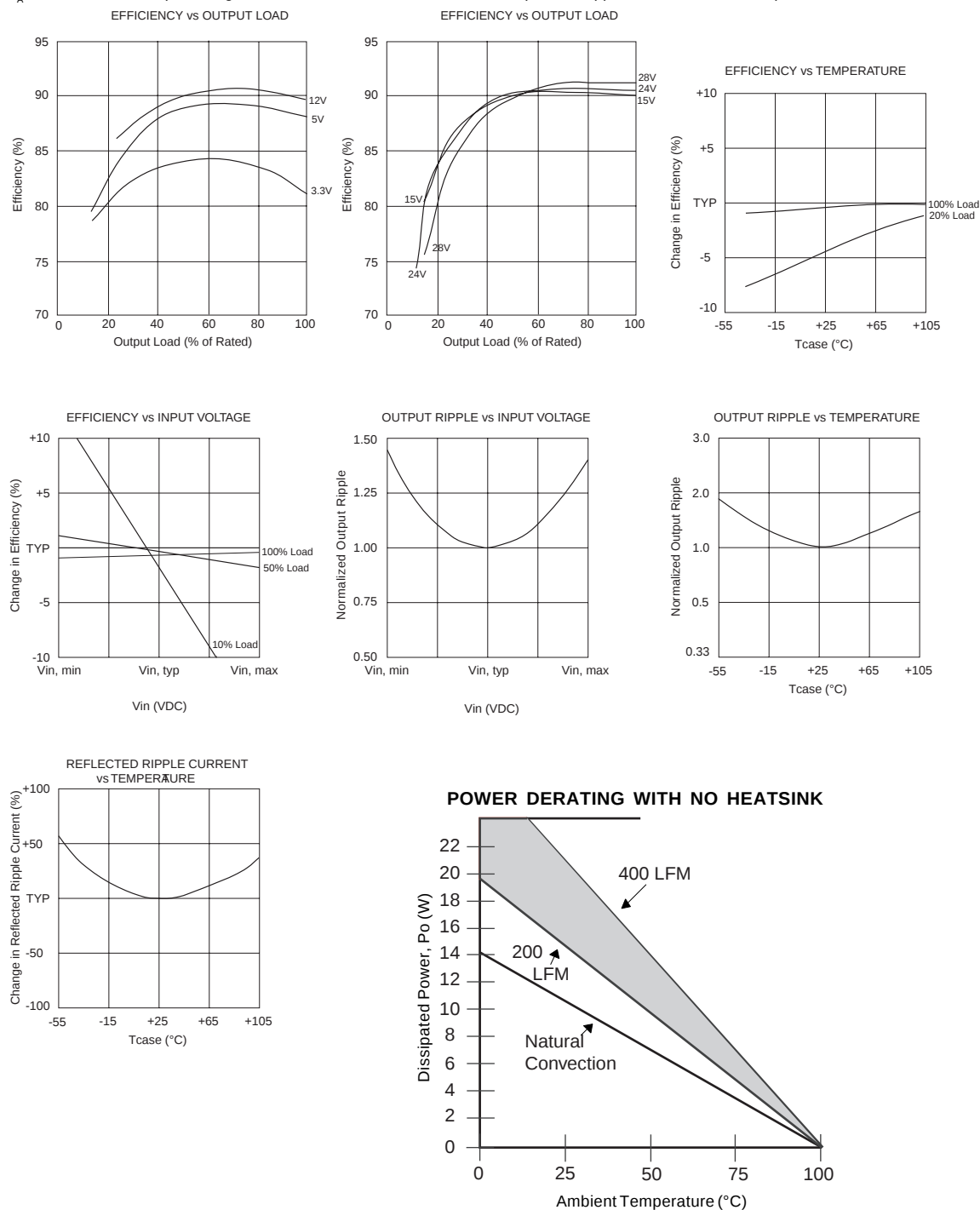
- (1) See Typical Performance Curves, page 3
- (2) Continuous Mode
- (3) See graphs for Efficiency vs. Output Load, V_{IN} , T_{CASE}
- (4) 3.3V Models Limited in Trim Down Range
- (5) Consult Factory for Details

ORDERING INFORMATION

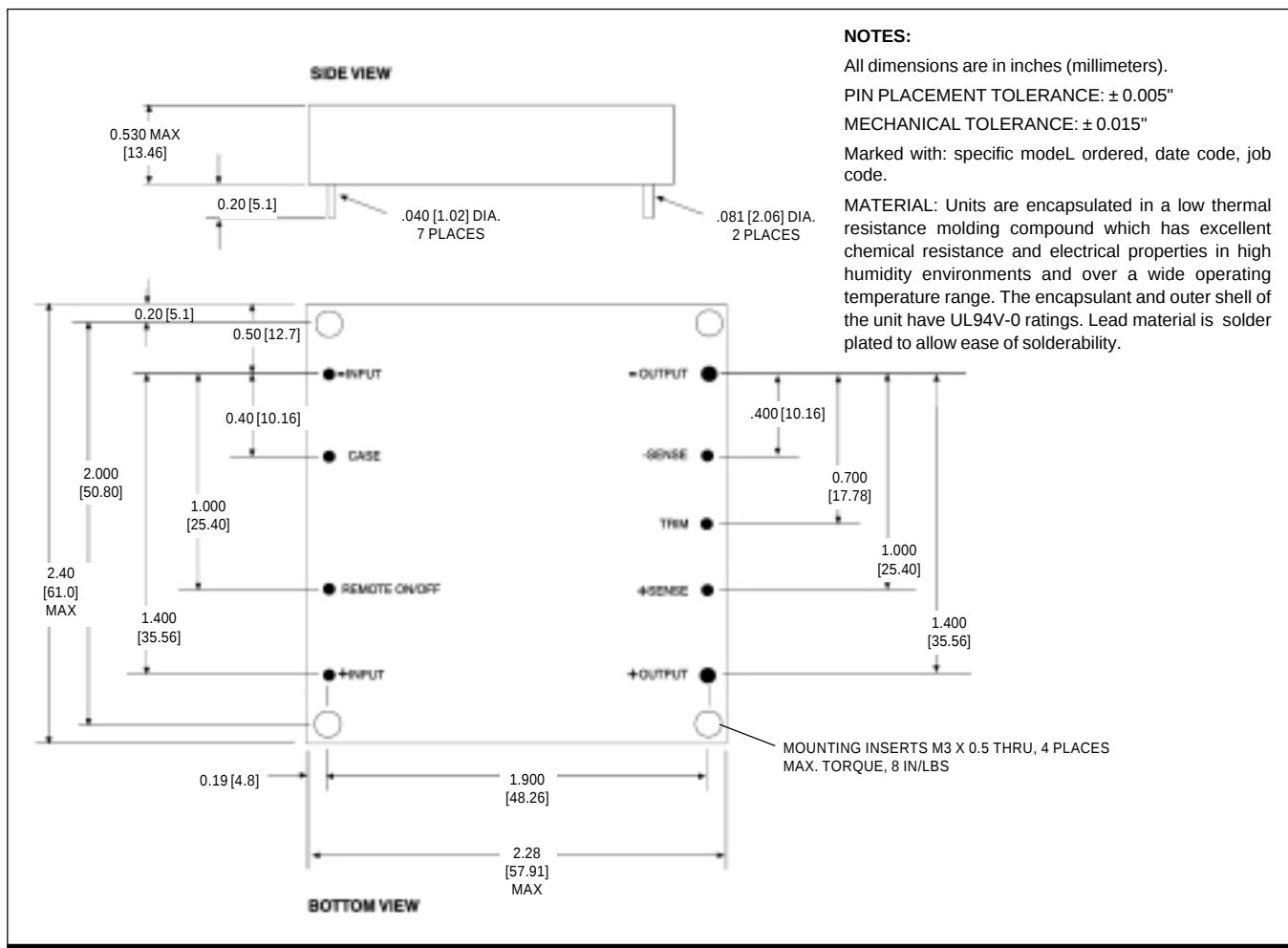
Device Family **VKA50 xSzz-**
 Indicates 50 Watt Regulated Unit
 Model Number _____
 Selected from Table of Electrical Characteristics
 Where:
 x = Input Voltage (L = 24VDC; M = 48VDC)
 zz = Output Voltage (03=3.3V, 05=5V, etc.)
 Lead Length _____
 0.200" - No Number
 0.145" - (6)
 0.110" - (8)
 Remote On-Off Logic: _____
 Positive - No Number
 Negative - (1)

TYPICAL PERFORMANCE CURVES

$T_A = +40^\circ\text{C}$, nominal input voltage, rated load, recommended external components applied, unless otherwise specified.



MECHANICAL



OUTPUT VOLTAGE ADJUST

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 +V_{out} terminal (for increased V_{out}) or the -V_{out} terminal (for decreased V_{out}). The formulae below describe the trim resistor value to obtain a V_{out} change of $\Delta\%$. V_o is output voltage prior to adjustment (3.3V, 5V, 12V, 15V, 24V or 28V).

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

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

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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