

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
- 100μS 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 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.

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



Internet: <http://www.cdpowerelectronics.com>

Power Electronics Division, United States
3400 E Britannia Drive, Tucson, Arizona 85706
Phone: 800.547.2537 Fax: 520.770.9369

Power Electronics Division, Europe
C&D Technologies (Power Electronics) Ltd.
132 Shannon Industrial Estate, Shannon, Co. Clare, Ireland
Tel: +353.61.474.133 Fax: +353.61.474.141

COMMON SPECIFICATIONS

Specifications typical at $T_{CASE} = +40^{\circ}\text{C}$, nominal input voltage, rated output current unless otherwise specified.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT					
Voltage Range					
VKA50LS		18	24	36	VDC
VKA50MS		33	48	75	VDC
Maximum Input Current					
VKA50LS	$V_{IN} = 16\text{VDC}$			3.7	A
VKA50MS	$V_{IN} = 27\text{VDC}$			2.2	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	$V_{IN} = V_{IN,max}$				
VKA50LS				0.520	mC
VKA50MS				0.360	mC
Quiescent Operating Current					
Primary On/Off Disabled			8	12	mA
OUTPUT					
Rated Power		0		50	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			± 0.02		$\%/^{\circ}\text{C}$
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%	130%	V
Transient Response	50 to 100% Load Step				$V_{OUT, Nom}$
Peak Deviation	$di/dt = 1.0\text{A}/\mu\text{Sec}$		2%		μSec
Settling Time	$V_{OUT, 1\%}$ of Nominal Output		100		
ISOLATION					
Input to Output	Peak Test for 2 Seconds	1500			VDC
Input to Baseplate		1500			VDC
Output to Baseplate		500			VDC
Resistance		10			M Ω
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				1	V
Vhigh				2	V
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	$^{\circ}\text{C}$

() 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

VKA50 xSzz-

Device Family _____
 Indicates 50 Watt Regulated Unit

Model Number _____
 Selected from Table of Electrical Characteristics

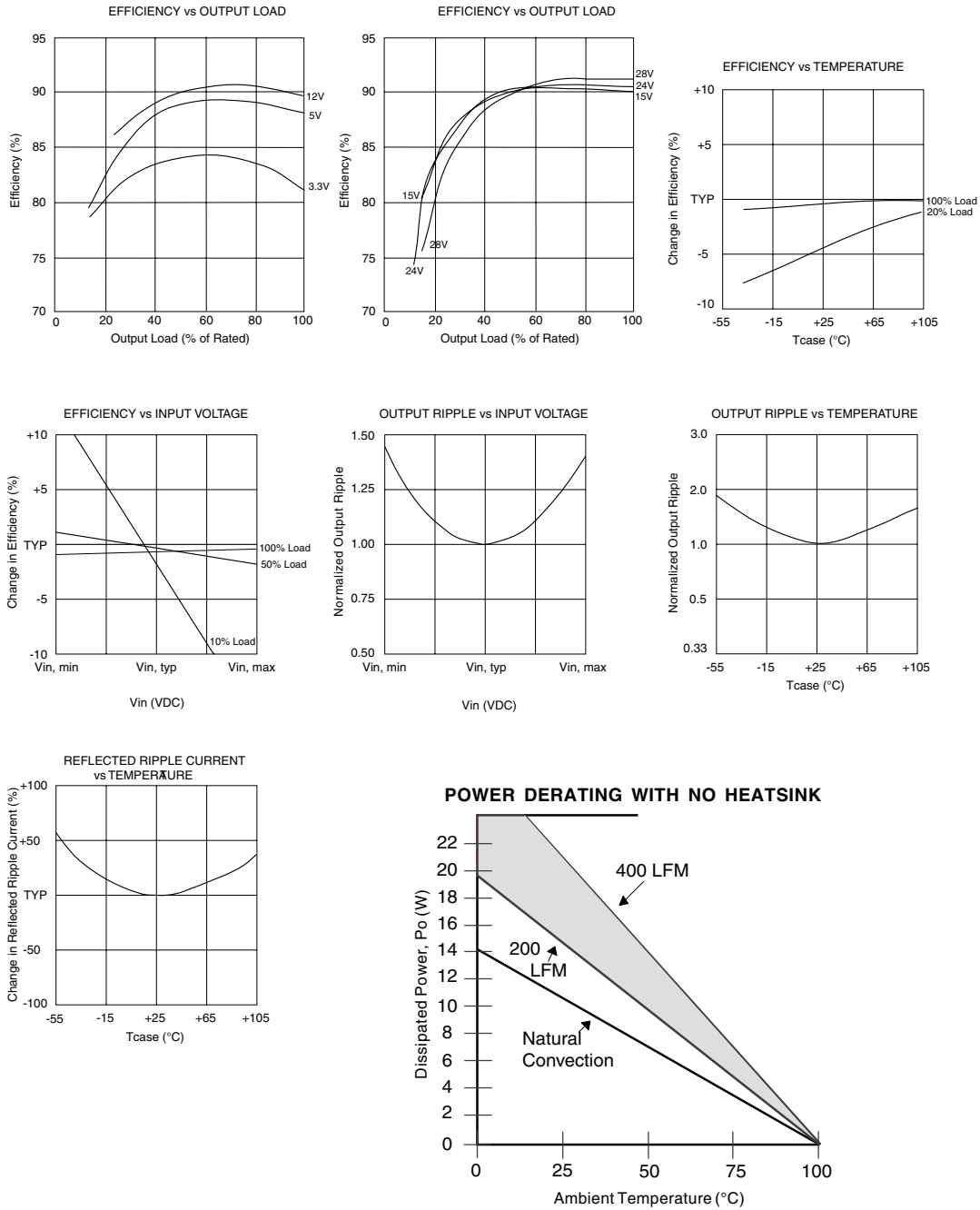
Where:
 x = Input Voltage (L = 24VDC; M = 48VDC)
 zz = Output Voltage (03=3.3V, 05=5V, etc.)

Lead Length _____
 0.200" - No Number
 0.145" - (6)
 0.110" - (8)

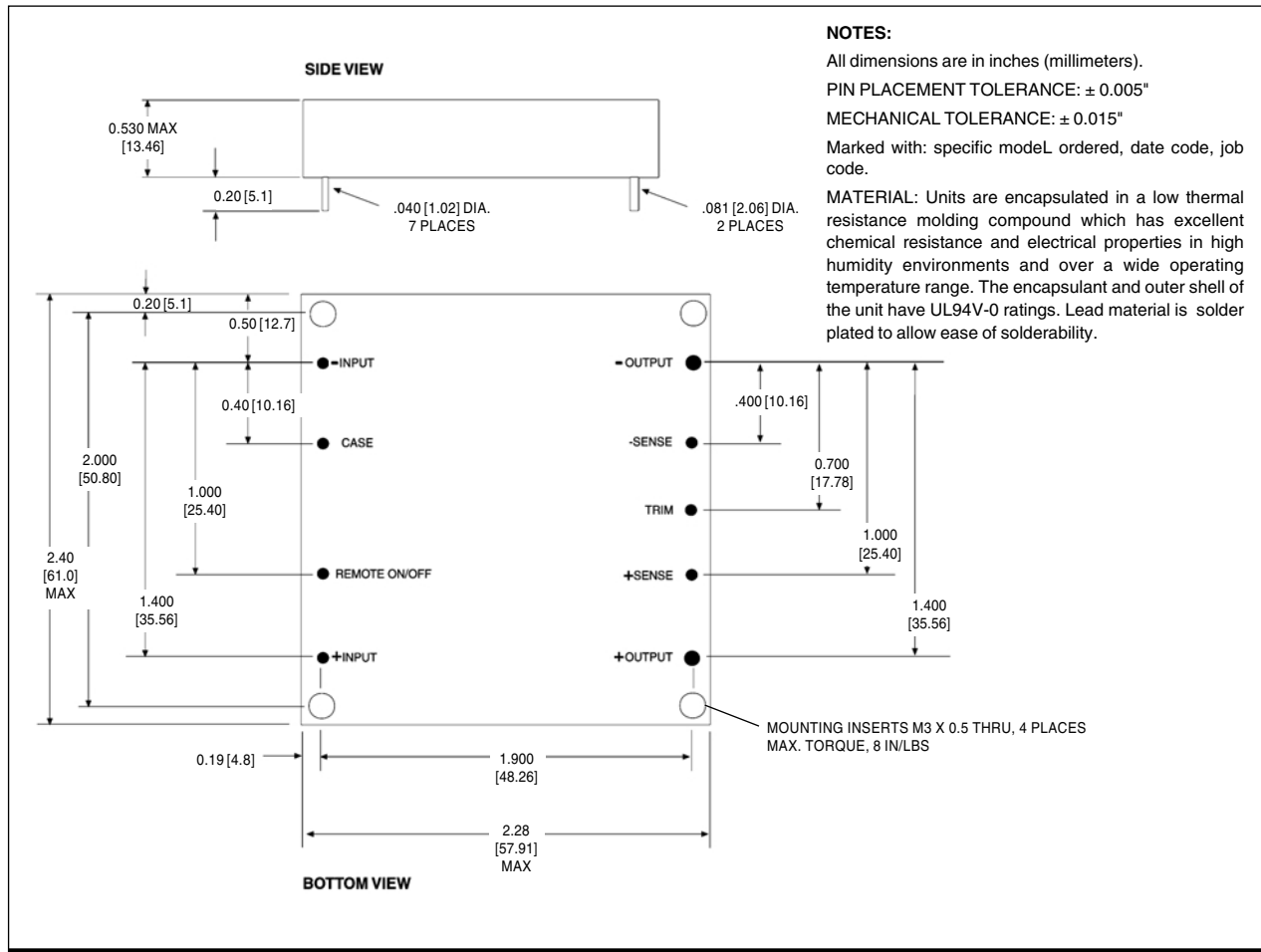
Remote On-Off Logic: _____
 Positive - No Number
 Negative - (1)

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 Δ%. 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.