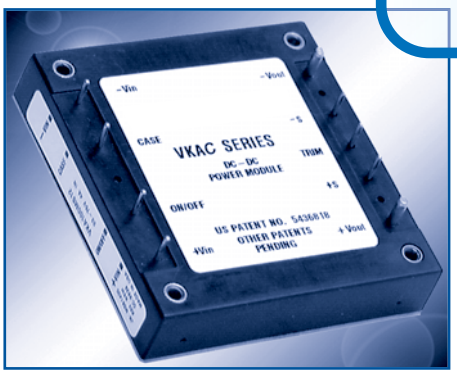
Murata Power Solutions

OBSOLETE PRODUCT

Contact Factory for Replacement Model

VKA50xSC

50 Watt Single Output Half Brick DC/DC Converter



- RoHS Compliant
- 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

The VKA50xSC 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 VKA50xSC'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. Safety per UL1950, EN 60950 and CSA 22.2 #234.

PRODUCT SELECTION CHART

MODEL	INPUT VOLTAGE	VOUT (VDC)	IOUT (A)	EFFICIENCY	
				MIN	TYP
VKA50LS03C		3.3V	10.0	80	81
VKA50LS05C	24VDC	5.0V	10.0	85	86
VKA50LS12C		12.0V	4.2	87	88
VKA50LS15C	(18-36)	15.0V	3.3	88	89
VKA50LS24C		24.0V	2.1	89	90
VKA50MS03C		3.3V	10.0	81	82
VKA50MS05C	48VDC	5.0V	10.0	86	87
VKA50MS12C		12.0V	4.2	88	89
VKA50MS15C	(33-75)	15.0V	3.3	89	90
VKA50MS24C		24.0V	2.1	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.

RoHS COMPLIANT 2002/95/EC

For full details go to www.murata-ps.com/rohs

ISO9001 CERTIFIED

SPECIFICATIONS, ALL MODELS

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

	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT	**INPUT**					
	Voltage Range					VKA50LS
	18	24	36	VDC		VKA50MS
	33	48	75	VDC		
	Maximum Input Current					
	VKA50LS	V_{IN} = 16VDC			3.7	A
	VKA50MS	V_{IN} = 27VDC			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

	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
OUTPUT	**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		0.2	0.5	%
	Output Temperature Drift			±.02		%/°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				
	Peak Deviation	di/dt = 1.0A/µSec		2%		V_{OUT}, Nom
	Settling Time	V_{OUT}, 1% of Nominal Output		100		µSec

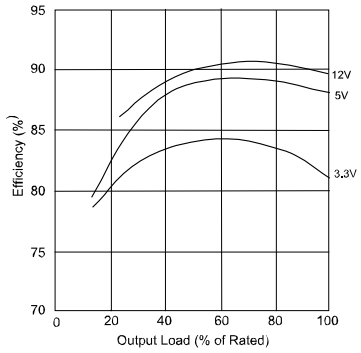
	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
GENERAL	**ISOLATION**					
	Input to Output	Peak Test for 2 Seconds	1500			VDC
	Input to Baseplate		1500			VDC
	Output to Baseplate		500			VDC
	Resistance		10			MΩ
	Capacitance			2000		pF
	Leakage Current	V_{ISO} = 240VAC, 60Hz		180		µA, rms
	GENERAL					
	Efficiency, 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

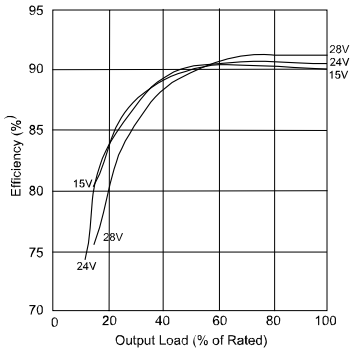
TYPICAL PERFORMANCE CURVES

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

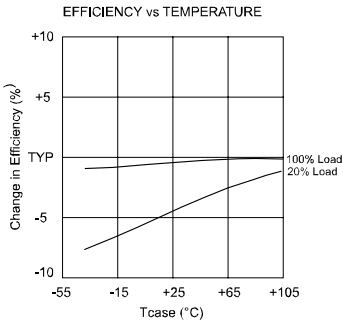
EFFICIENCY vs OUTPUT LOAD



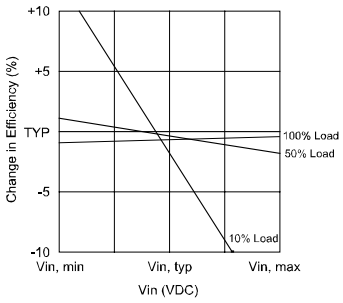
EFFICIENCY vs OUTPUT LOAD



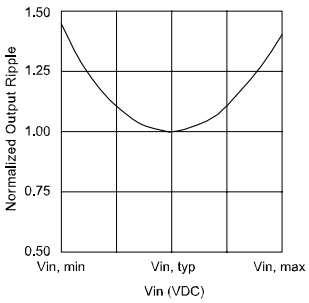
EFFICIENCY vs TEMPERATURE



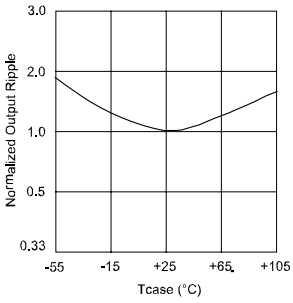
EFFICIENCY vs INPUT VOLTAGE



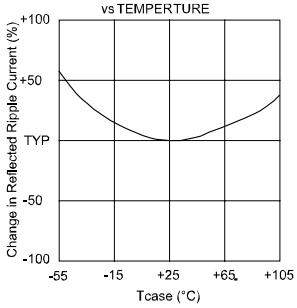
OUTPUT RIPPLE vs INPUT VOLTAGE



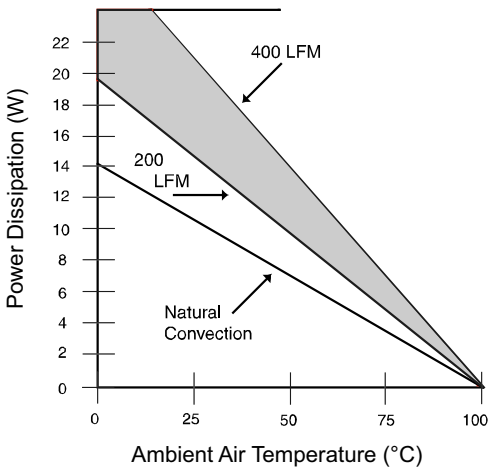
OUTPUT RIPPLE vs TEMPERATURE



REFLECTED RIPPLE CURRENT vs TEMPERTURE



POWER DERATING WTH NO HEATSINK



ORDERING INFORMATION

VKA50 xSzz ___ ___ C

Device Family
- Indicates 50 Watt Regulated Unit

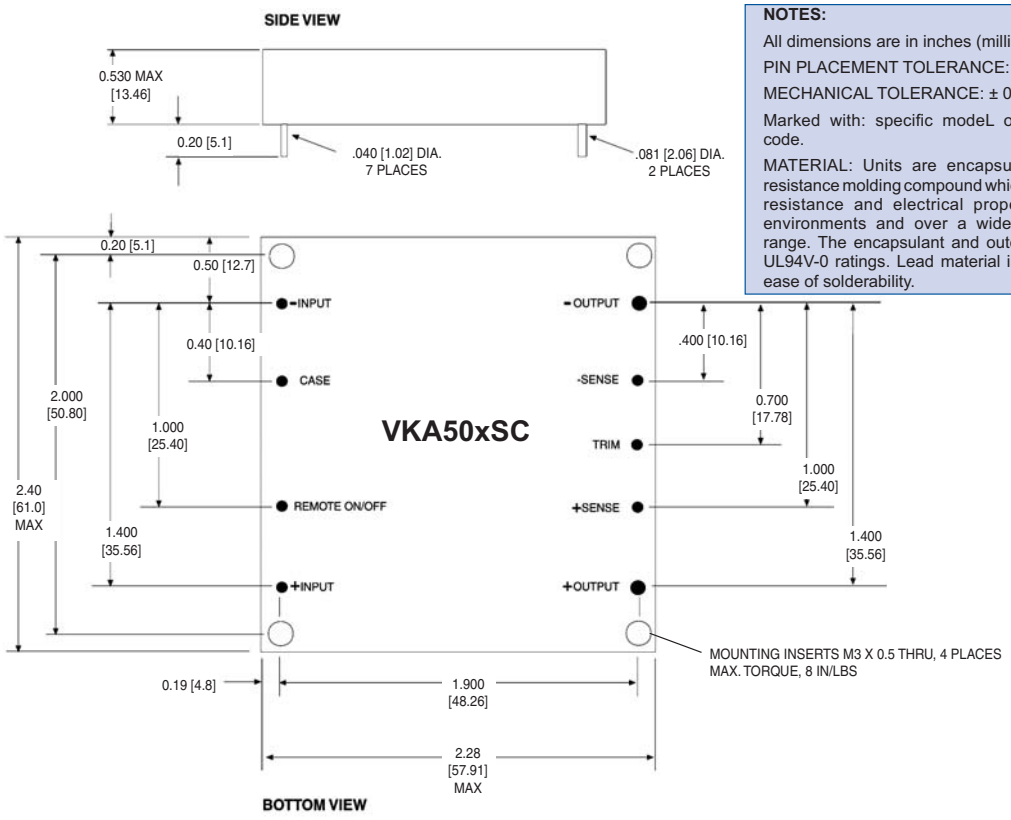
Model Number
- Selected from Table of Electrical Characteristics
- Where:
  - x = Input Voltage (L = 24VDC; M = 48VDC)
  - zz = Output Voltage (03=3.3V, 05=5V, etc.)

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

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

RoHS Compliant

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

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

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

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.

Murata Power Solutions

Murata Power Solutions, Inc.
11 Cabot Boulevard, Mansfield, MA 02048-1151 U.S.A.
Tel: (508) 339-3000 (800) 233-2765 Fax: (508) 339-6356
www.murata-ps.com email: sales@murata-ps.com ISO 9001 REGISTERED
07/28/08

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USA: Tucson (Az), Tel: (800) 547 2537, email: sales@murata-ps.com
Canada: Toronto, Tel: (866) 740 1232, email: toronto@murata-ps.com
UK: Milton Keynes, Tel: +44 (0)1908 615232, email: mk@murata-ps.com
France: Montigny Le Bretonneux, Tel: +33 (0)1 34 60 01 01, email: france@murata-ps.com
Germany: München, Tel: +49 (0)89-544334-0, email: munich@murata-ps.com
Japan: Tokyo, Tel: 3-3779-1031, email: sales_tokyo@murata-ps.com
Osaka, Tel: 6-6354-2025, email: sales_osaka@murata-ps.com
Website: www.murata-ps.jp
China: Shanghai, Tel: +86 215 027 3678, email: shanghai@murata-ps.com
Guangzhou, Tel: +86 208 221 8066, email: guangzhou@murata-ps.com