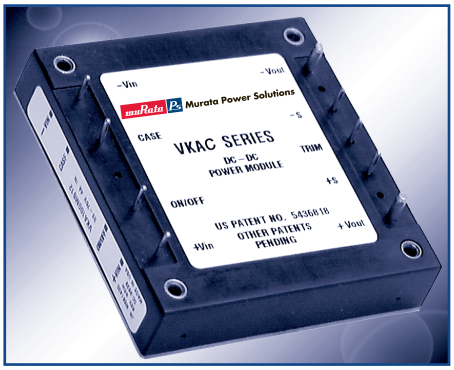
Murata Power Solutions

VKA100xSC

100 Watt Single Output Half Brick DC/DC Converter



- RoHS Compliant
- 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
- Continuout Short-Circuit Protection
- Thermal Shutdown
- Case Ground Pin

The VKA100xSC 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 VKA100xSC's proprietary control circuitry responds to 50-100% load steps in 100mSeconds 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	EFFICIENCY TYP
~~VKA100LS02C~~		~~2.0V~~	~~20.0~~	~~75~~	~~76~~
~~VKA100LS02FC~~		~~2.0V~~	~~30.0~~	~~73~~	~~74~~
~~VKA100LS2V5FC~~		~~2.5V~~	~~30.0~~	~~75~~	~~76~~
~~VKA100LS03C~~		~~3.3V~~	~~20.0~~	~~80~~	~~81~~
~~VKA100LS03FC~~		~~3.3V~~	~~30.0~~	~~80~~	~~81~~
VKA100LS05C	24VDC	5.0V	20.0	85	86
VKA100LS12C		12.0V	8.3	87	88
VKA100LS15C	(18-36)	15.0V	6.7	88	89
VKA100LS24C		24.0V	4.2	89	90
~~VKA100MS02C~~		~~2.0V~~	~~20.0~~	~~76~~	~~77~~
~~VKA100MS02FC~~		~~2.0V~~	~~30.0~~	~~74~~	~~75~~
~~VKA100MS2V5FC~~		~~2.5V~~	~~30.0~~	~~77~~	~~78~~
~~VKA100MS03C~~		~~3.3V~~	~~20.0~~	~~81~~	~~82~~
~~VKA100MS03FC~~		~~3.3V~~	~~30.0~~	~~81~~	~~82~~
VKA100MS05C	48VDC	5.0V	20.0	86	87
VKA100MS12C		12.0V	8.3	88	89
~~VKA100MS15C~~	~~(33-75)~~	~~15.0V~~	~~6.7~~	~~89~~	~~90~~
~~VKA100MS24C~~		~~24.0V~~	~~4.2~~	~~89~~	~~90~~

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.

INPUT

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT					
Voltage Range					
VKA100LS		18	24	36	VDC
VKA100MS		33	48	75	VDC
Maximum Input Current					
VKA100LS	V_{IN} = 16VDC			7.4	A
VKA100MS	V_{IN} = 27VDC			4.4	A
Reflected Ripple Current	Peak - Peak		20		mA
Input Ripple Rejection	DC to 1KHz	50	60		dB
No Load Input Current LS/MS			140/80		mA
No Load	Power Dissipation LS/MS		3.4/3.8		W
Standby, Primary On/Off Disabled LS/MS			0.12/0.24		W
Inrush Charge	V_{IN} = V_{IN}max.				
VKA100LS				0.520	mC
VKA100MS				0.360	mC
Quiescent Operating Current Primary On/Off Disabled			5	12	mA

OUTPUT

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Rated Power		0		100	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 = 0.1A/µSec		2%		V_{OUT}, Nom
Settling Time	V_{OUT}, 1% of Nominal Output		100		µSec

GENERAL

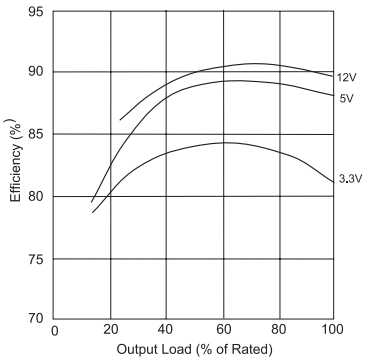
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
ISOLATION					
Input to Output	Peak Test for 2 Seconds	1500			VDC
Input to Baseplate		1500			VDC
Output to Baseplate		500			VDC
Resistance		10			MΩ
Capacitance			2000		pF
Leakage Current	V_{ISO} = 240VAC, 60Hz		180		µA, rms
GENERAL					
Efficiency, Line, Load, Temp. (3)					
Switching Frequency		400	420	440	KHz
Remote Sense Compensation				0.5	V
Output Voltage Adjust Range	12 V & 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
Vhigh0				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

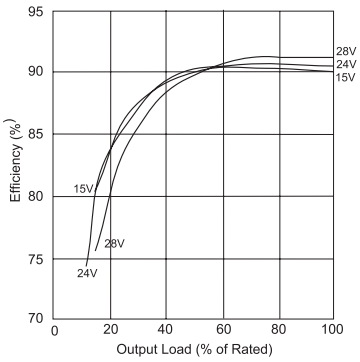
TYPICAL PERFORMANCE CURVES

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

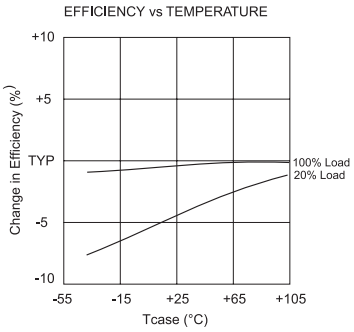
EFFICIENCY vs OUTPUT LOAD



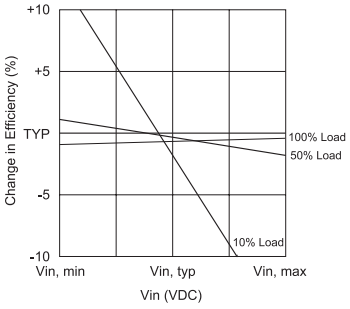
EFFICIENCY vs OUTPUT LOAD



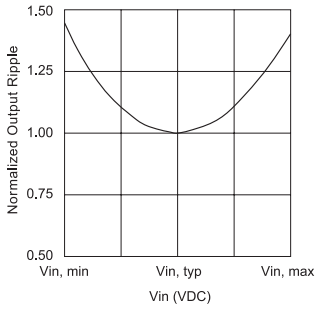
EFFICIENCY vs TEMPERATURE



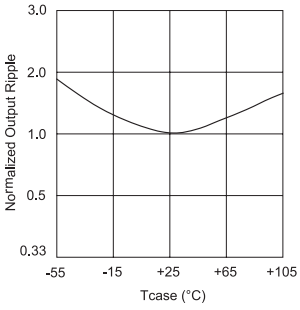
EFFICIENCY vs INPUT VOLTAGE



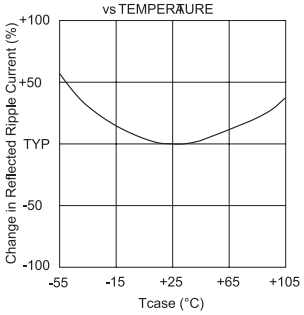
OUTPUT RIPPLE vs INPUT VOLTAGE



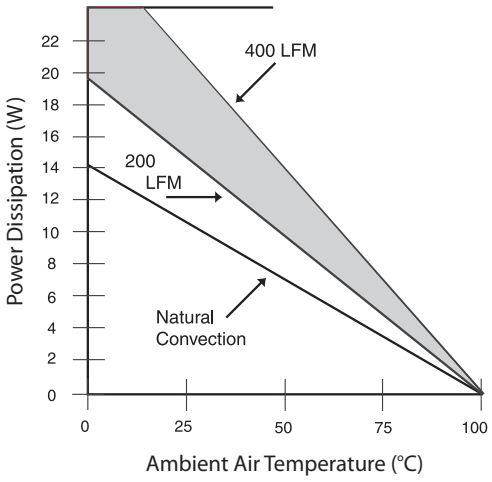
OUTPUT RIPPLE vs TEMPERATURE



REFLECTED RIPPLE CURRENT vs TEMPERATURE



POWER DERATING WTH NO HEATSINK

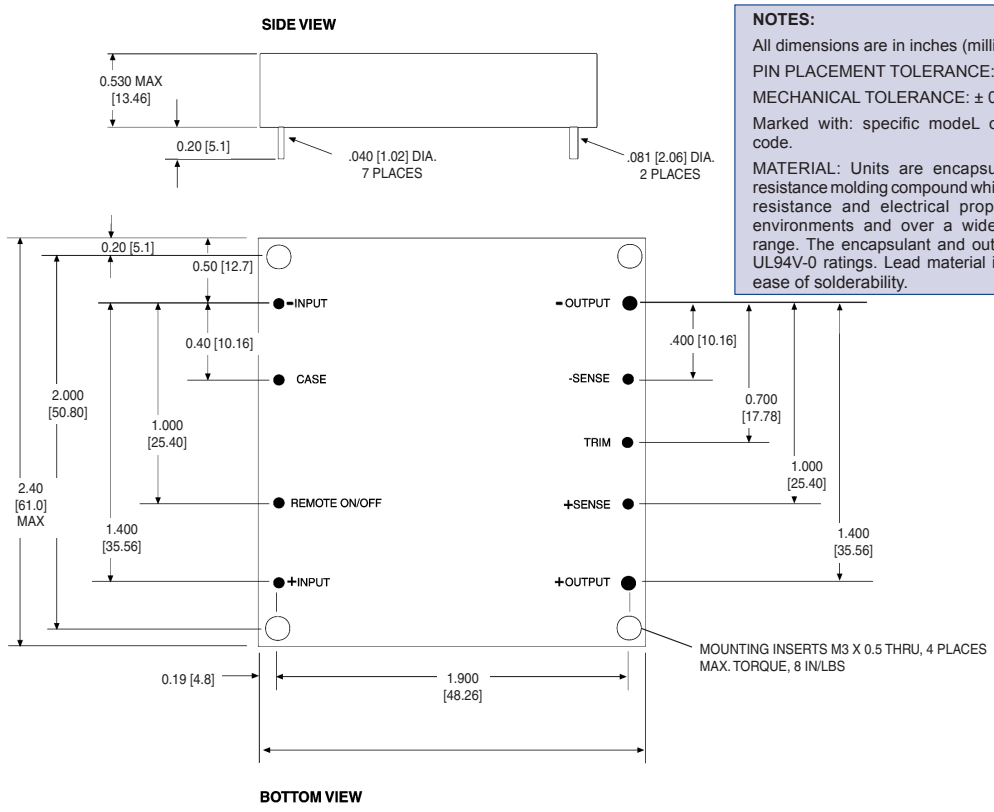


ORDERING INFORMATION

VKA100 xSzz -_ _____

Device Family
Indicates 100 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 $\Delta\%$. 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 and 14001 REGISTERED

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USA: Mansfield (MA), Tel: (508) 339-3000, 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
China: Shanghai, Tel: +86 215 027 3678, email: shanghai@murata-ps.com
Guangzhou, Tel: +86 208 221 8066, email: guangzhou@murata-ps.com
Singapore: Parkway Centre, Tel: +65 6348 9096, email: singapore@murata-ps.com