C&D TECHNOLOGIES

Product Data Sheet

60 WATT SINGLE OUTPUT HIGH DENSITY DC/DC CONVERTER

VKA60xS 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 VKA60xS 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 VKA60xS'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
VKA60LS03		3.3V	12.0	80	81
VKA60LS05	24VDC	5.0V	12.0	85	86
VKA60LS12		12.0V	6.0	87	88
VKA60LS15	(18-36)	15.0V	4.0	88	89
VKA60LS24		24.0V	2.5	89	90

Model	Input Voltage	V_{OUT} (VDC)	I_{OUT} (A)	Efficiency(%) Note (1) Min	Typ
VKA60MS03		3.3V	12.0	81	82
VKA60MS05	48VDC	5.0V	12.0	86	87
VKA60MS12		12.0V	6.0	88	89
VKA60MS15	(33-75)	15.0V	4.0	89	90
VKA60MS24		24.0V	2.5	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					
VKA60LS		18	24	36	VDC
VKA60MS		33	48	75	VDC
Maximum Input Current					
VKA60LS	V_{IN} = 16VDC			4.4	A
VKA60MS	V_{IN} = 27VDC			2.6	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.				
VKA60LS				0.520	mC
VKA60MS				0.360	mC
Quiescent Operating Current					
Primary On/Off Disabled			8	12	mA
OUTPUT					
Rated Power		0		60	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			±.02		%/°C
Output Ripple, p-p (4)	DC to 20MHz BW		1%		V_{OUT}, Nom
Output Current Limit Inception				130%	I_{OUT}, Nom
Output Short-Circuit Current (5)	test			110%	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
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

( ) 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

VKA60 xSzz-

Device Family
Indicates 60 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.)

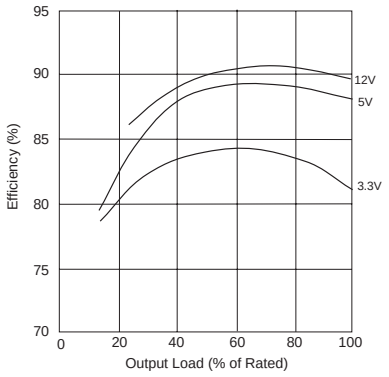
Lead Length
0.200" - No Number
0.145" - (6)
0.110" - (8)

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

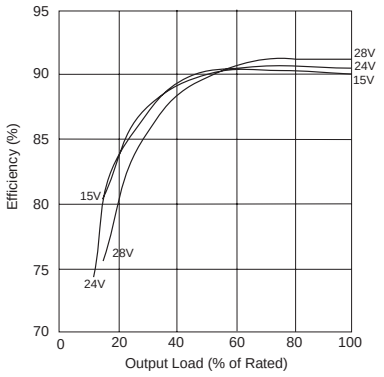
TYPICAL PERFORMANCE CURVES

T_A = +40°C, nominal input voltage, rated load, recommended external components applied, unless otherwise specified.

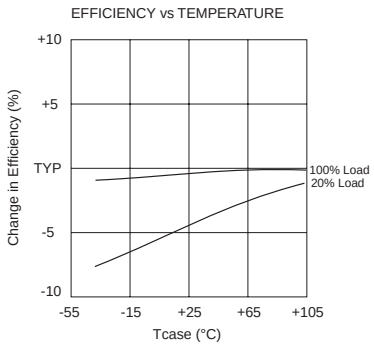
EFFICIENCY vs OUTPUT LOAD



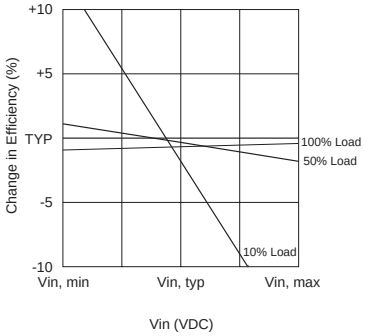
EFFICIENCY vs OUTPUT LOAD



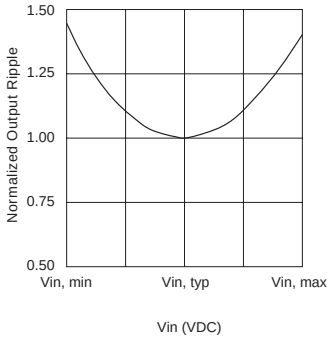
EFFICIENCY vs TEMPERATURE



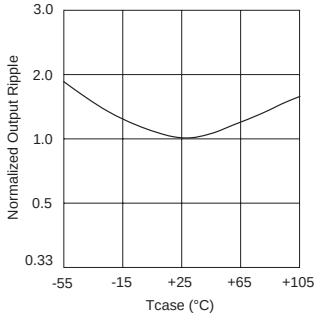
EFFICIENCY vs INPUT VOLTAGE



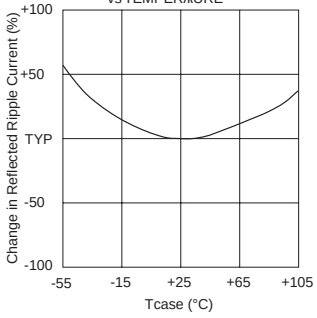
OUTPUT RIPPLE vs INPUT VOLTAGE



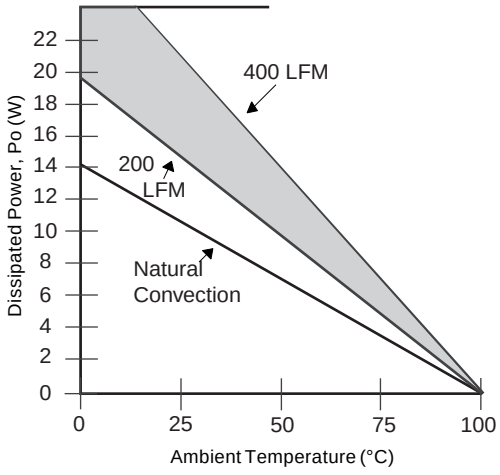
OUTPUT RIPPLE vs TEMPERATURE



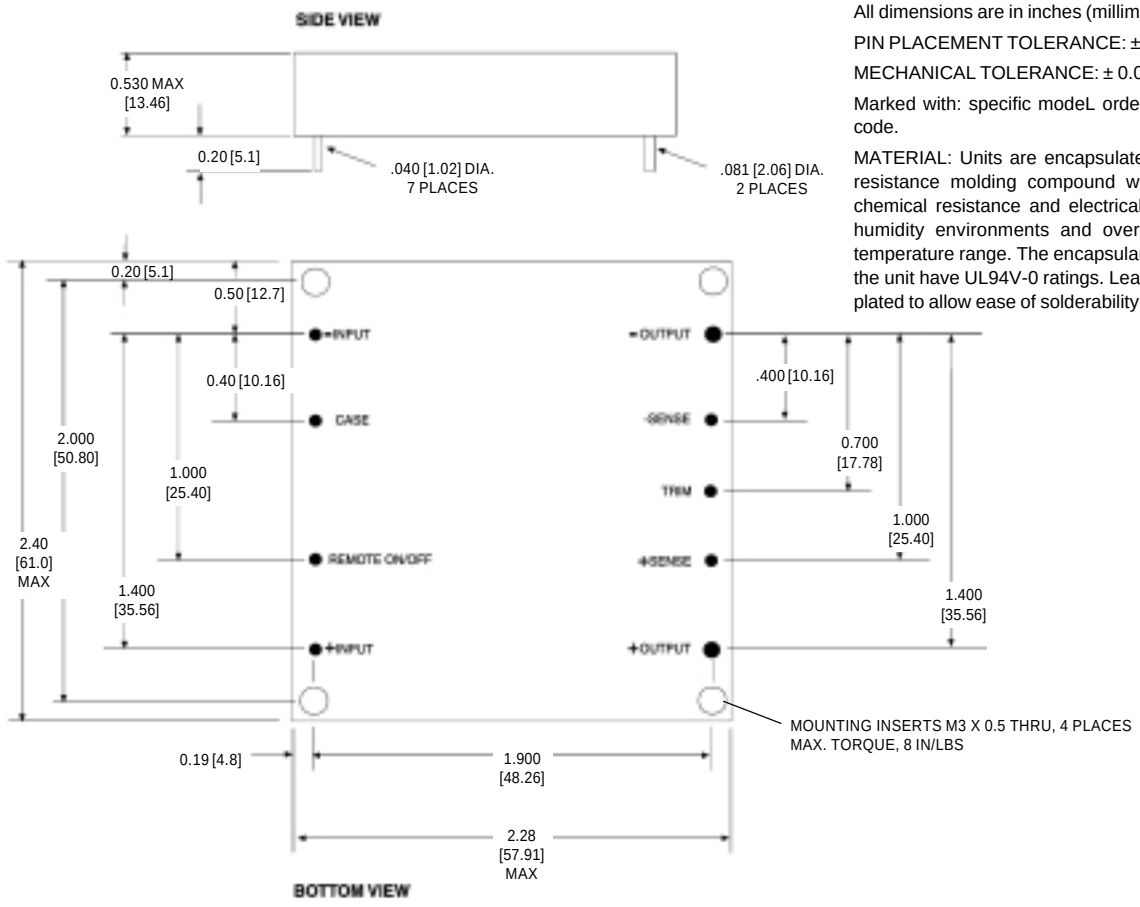
REFLECTED RIPPLE CURRENT vs TEMPERATURE



POWER DERATING WITH NO HEATSINK



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 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 +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 $\Delta\%$. V_O is output voltage prior to adjustment (3.3V, 5V, 12V, 15V, 24V or 28V).

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

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

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.

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

C&D Technologies, (NCL)
Tanners Drive Blakelands North
Milton Keynes MK14 5BU UK
Tel: +44 (0)1908 615232 Fax: +44 (0)1908 617545

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