

**OBSOLETE PRODUCT**  
Contact factory for replacement model



# VSX40MD23C

## 40 Watt Dual Output Quarter Brick DC/DC Converter



- 2.5V & 3.3V Dual Output
- 2.3" x 1.5" x 0.5"
- 90% Efficiency
- Low Output Noise
- Input Filtering
- Remote On/Off, Input Side
- Output Voltage Trim, +/-10%
- Fixed Frequency Operation
- -40C° to +100C° Baseplate Temp.
- Output Current Limit, Self-Start
- 1,500 Vdc Isolation, Input to Output
- UL/CUL 1950, EN60 950
- 36 to 75 Vdc Input Models
- Continuous Short Circuit Protection
- Non-latching Protection:
  - Input Undervoltage
  - Input Overvoltage
  - Output Overvoltage
  - Overtemperature
- Output Voltage Tracking at Turn-on and Turn-off
- No Minimum Load Current
- RoHS Compliant

### APPLICATIONS

- Distributed Power Architectures
- Workstations
- EDP Equipment
- Telecommunications

### OPTIONS

- Choice of Remote On/Off logic Configuration
- Heatsink Available for Extended Operation

### ADDITIONAL INFORMATION

- See Application Note DCAN-41 at [www.murata-ps.com](http://www.murata-ps.com)

The VSX40C series are dual output converters having two input ranges, either 18-36V or 36-75V. The units dual asymmetric output voltages are 5V and 3.3V. The converter features an industry-standard quarter-brick size (2.3" x 1.5" x 0.5") coupled with 90% efficiency.

These converters utilize Vx high density technology. This technology has been featured in our highly efficient VKP and VKA series now successfully in use

worldwide. The very high efficiency minimizes the requirement for heat-sinking and the low output ripple minimizes the need for additional filtering. For maximum flexibility, power can be traded between outputs as required. The VSX40C series feature virtually all of the options required by design engineers but not at the competition's typical additional price for each option. This multitude of features are standard on the VSX40C series.



## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage: VSX40MD23C	$V_i$		100	Vdc
I/O Isolation Voltage			1500	Vdc
I/P to case			1500	Vdc
O/P to case			200	Vdc
Operating Case Temperature	T	-40	100	°C

## SPECIFICATIONS, ALL MODELS

Specifications are at  $T_{CASE} = +40^{\circ}C$  nominal input voltage unless otherwise specified.

INPUT	PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
	Operating Input Voltage VSX40MD23C	$V_i$	36	48	75	VDC
	Maximum Input Current ( $V_i=0V$ to $V_i$ max, $I_o=I_o$ max) VSX40MD23C	$I_i$ max			1.5	A
	I/P Reflected Ripple Current				260	mA p-p
	No Load Input Current	$I_{iNL}$		35		mA
	On/Off Activated Input Current	$I_{iQ}$		20		mA

OUTPUT Under any conditions, the voltage of V1 will always be greater or equal to that of V2.	PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	
	Output voltage (Note 1) Over all conditions of I/P voltage, load and temperature)						
	2.5 Vout (V2)	2.5 $V_o$	2.375	–	2.555	Vdc	
	3.3 Vout (V1)	3.3 $V_o$	3.225	–	3.450	Vdc	
	Output Voltage Setpoint ( $V_i=48V$ , $I_{o2}=9A$ , $I_{o3}=6A$ , $T_c=25^{\circ}C$ )						
	2.5 (V2)	2.5 $V_{o,set}$	2.450		2.510	Vdc	
	3.3 (V1)	3.3 $V_{o,set}$	3.310		3.390	Vdc	
	Output Ripple and Noise Voltage (peak-to-peak, 100 MHz BW)						
	2.5 (V2)	–	–	–	60	mv p-p	
	3.3 (V1)	–	–	–	80	mv p-p	
	Output Current (Total module O/P power should not exceed 40 Watts)						
	2.5 (V2)	$I_{o2}$	–	–	16	A	
	3.3 (V1)	$I_{o1}$	–	–	12.12	A	
	Output Current Limit Inception ( $V_o=95\%$ of $V_o$ nom)						
	2.5 (V2)	$I_{o2,cli}$	16.8	18.5	21.0	A	
	3.3 (V1)	$I_{o1,cli}$	12.7	14.0	15.9	A	
	Output Short Ckt Current (Max impedance across short circuit = 65m $\Omega$ )						
	2.5 $V_o$		15	19	22	A	
	3.3 $V_o$		11	13.2	17	A	
	Efficiency ( $V_i=48V$ , $I_{o2}=8A$ , $I_{o3}=6A$ , $T_c=40^{\circ}C$ )	$\eta$	88	90	–	%	
	Dynamic Response ( $\Delta I_o/\Delta t=0.2A/\mu sec$ , $V_i=48V$ , $T_c=25^{\circ}C$ , either O/P) Load change of 50% $I_o$ max; at any operating load up to $I_{o,max}$ or $P_{o,max}$ Peak Deviation outside settling point	–	–	2	–	% $V_o$ nom	

NOTE: 1. Worst case voltage conditions occur with full load drawn from one output only, zero being drawn from the other. For worst case voltages at less extreme loading conditions, consult the factory.

GENERAL	PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
	<b>Isolation Specifications</b>					
	Isolation Capacitance	–	–	1000	–	pF
	Isolation Resistance	–	10	–	–	MΩ
<b>Feature Specifications</b>						
	Remote On/Off (open collector equivalent, signal referenced to -Vin terminal)					
	VSX40MD23C Preferred Logic (negative)					
	Logic Low - Module On					
	Logic High - Module Off					
	VSX40MD23-1C - Optional Logic (positive)					
	Logic Low - Module Off					
	Logic High - Module On					
	Logic Low: At Von/off = 0V	Von/off	0	–	50	Vdc
		Ion/off		–	200	μA
	Turn On Time (Vo within 1% of steady state)					
	From Application of Vin	–	–	7	10	mSecs
	From Remote On/Off Activation)	–	–	3	4	mSecs
	Input Undervoltage Lockout (Turn Off & Turn On Voltages Track)					
	Turn On	–	30	33	36	Vdc
	Turn Off	–	27	30	33	Vdc
	Input Overvoltage Lockout (Turn Off & Turn On Voltages Track)					
	Turn Off	–	76	80	84	Vdc
	Turn On	–	74.5	78.5	82.5	Vdc
	Output Overvoltage Set Point (Non-latching independent control loop)					
	2.5 Vo		2.7	2.9	3.2	Vdc
	3.3 Vo		3.6	3.9	4.2	Vdc
	Overtemperature Shutdown	Tc	105	115	125	°C
	Hysteresis			10		°C
	Weight					
	VSX40MD23C, VSX40MD23-1C			67		Grams
	VSX40MD23-UC, VSX40MD23-1UC					
	Output Trim					
	Tie Trim to +2.5 Vo for trim down	2.5 V2	–	-10	–	%
		3.3 V1	–	-10	–	%
	Tie Trim to O/P RTN for trim up	2.5 V2	–	10	–	%
		3.3 V1	–	10	–	%

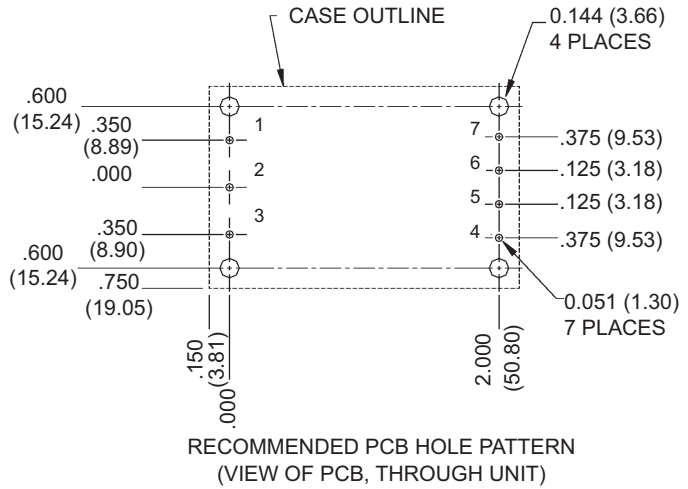
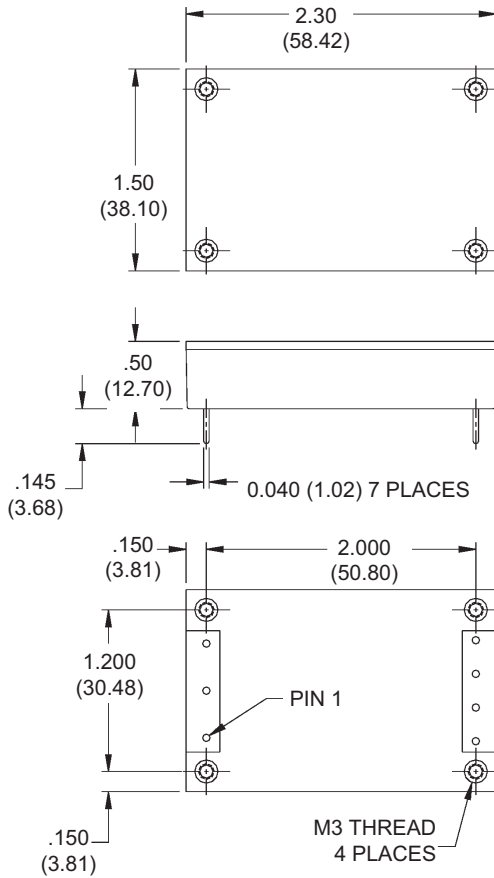
## ORDERING INFORMATION

<p>Device Family _____ VSX40</p> <p>VSX40MD23 (Quarter Brick, 40 Watt DC/DC)</p> <p>Logic: No Number = Preferred Logic (Negative); _____ - 1</p> <p>1 = Optional Logic (Positive)</p> <p>Package _____ U C</p> <p>No Letter = Encapsulated; U = Unencapsulated</p> <p>RoHS Compliant _____</p>	<table border="1"> <thead> <tr> <th>Model Numbers</th> </tr> </thead> <tbody> <tr> <td>VSX40MD23C</td> </tr> <tr> <td>VSX40MD23-UC</td> </tr> <tr> <td>VSX40MD23-1C</td> </tr> <tr> <td>VSX40MD23-1UC</td> </tr> </tbody> </table>	Model Numbers	VSX40MD23C	VSX40MD23-UC	VSX40MD23-1C	VSX40MD23-1UC
Model Numbers						
VSX40MD23C						
VSX40MD23-UC						
VSX40MD23-1C						
VSX40MD23-1UC						

# MECHANICAL

Dimensions are in inches (millimeters).

Tolerances: x.xx in.  $\pm$  0.02 in.  
x.xxx in.  $\pm$  0.01 in.



Pinout Key	
1	+Vin
2	On/Off
3	-Vin
4	+2.5 Vout
5	O/P RTN
6	Trim
7	+3.3 Vout

### NOTES:

- 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.
- IMPORTANT:** When utilizing the PEM nuts for board mounting, it is required to follow guidelines in application note DCAN-41 available on the web at [www.murata-ps.com](http://www.murata-ps.com).



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](http://www.murata-ps.com) email: [sales@murata-ps.com](mailto:sales@murata-ps.com) ISO 9001 & ISO 14001 REGISTERED

Murata Power Solutions, Inc. makes no representation that the use of its products in the circuits described herein, or the use of other technical information contained herein, will not infringe upon existing or future patent rights. The descriptions contained herein do not imply the granting of licenses to make, use, or sell equipment constructed in accordance therewith. Specifications are subject to change without notice.  
 © 2009 Murata Power Solutions, Inc.

- USA:** Mansfield (MA), Tel: (508) 339 3000, email: [sales@murata-ps.com](mailto:sales@murata-ps.com)
- Canada:** Toronto, Tel: (866) 740 1232, email: [toronto@murata-ps.com](mailto:toronto@murata-ps.com)
- UK:** Milton Keynes, Tel: +44 (0)1908 615232, email: [mk@murata-ps.com](mailto:mk@murata-ps.com)
- France:** Montigny Le Bretonneux, Tel: +33 (0)1 34 60 01 01, email: [france@murata-ps.com](mailto:france@murata-ps.com)
- Germany:** München, Tel: +49 (0)89-544334-0, email: [ped.munich@murata-ps.com](mailto:ped.munich@murata-ps.com)
- Japan:** Tokyo, Tel: 3-3779-1031, email: [sales\\_tokyo@murata-ps.com](mailto:sales_tokyo@murata-ps.com)  
Osaka, Tel: 6-6354-2025, email: [sales\\_osaka@murata-ps.com](mailto:sales_osaka@murata-ps.com)
- China:** Shanghai, Tel: +86 215 027 3678, email: [shanghai@murata-ps.com](mailto:shanghai@murata-ps.com)  
Guangzhou, Tel: +86 208 221 8066, email: [guangzhou@murata-ps.com](mailto:guangzhou@murata-ps.com)
- Singapore:** Parkway Centre, Tel: +65 6348 9096, email: [singapore@murata-ps.com](mailto:singapore@murata-ps.com)