

# VSX40MD23

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



- 2.5V & 3.3V Dual Output
- 2.3" x 1.5" x 0.5"
- 89% 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

### 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.cdpowerelectronics.com](http://www.cdpowerelectronics.com)

The VSX40 Series are dual output converters with a 36-75V input. The industry quarter-pak size of 2.3" x 1.5" x 0.5" coupled with 89% efficiency is an industry high-density breakthrough.

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 89% 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 VSX40 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 VSX40 series.

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage: VSX40MD23	$V_i$		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 VSX40MD23	$V_i$	36	48	75	VDC
	Maximum Input Current ( $V_i=0V$ to $V_i$ max, $I_o=I_o$ max) VSX40MD23	$I_i$ 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)	$I_{o3}$	–	–	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)	$I_{o3,cli}$	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	89	–	%	
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)						
	VSx40MD23 Preferred Logic (negative)						
	Logic Low - Module On						
	Logic High - Module Off						
	VSX40MD23-1 - 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	VO2OV clamp	2.7	2.9	3.2	Vdc	
	3.3 Vo	VO3OV clamp	3.6	3.9	4.2	Vdc	
	Overtemperature Shutdown	Tc	105	115	125	°C	
	Hysteresis			10		°C	
	Weight						
	VSX40MD23, VSX40MD23-1			67		Grams	
	VSX40MD23-U, VSX40MD23-1U						
	Output Trim						
	Tie Trim to +2.5 Vo for trim down	2.5 Vo	VO <sub>2</sub> td	–	-10	–	%
		3.3 Vo	VO <sub>3</sub> td	–	-10	–	%
	Tie Trim to O/P RTN for trim up	2.5 Vo	VO <sub>2</sub> td	–	10	–	%
		3.3 Vo	VO <sub>3</sub> td	–	10	–	%

