30 Watt MH/MHW Single Series DC/DC Converters



Features

- Up to 30 Watts of Output Power
- 4:1 and 2:1 Input Range
- Rated to 100°C Case Operating Temperature
- 24 & 48 Volt Nominal Inputs, 5, 12, 15, and 24 Volt Outputs
- Five Year Warranty
- Water Washable Design
- Positive or Negative Logic
- Six Sided Shielding
- Output Overvoltage Protection

Description

The Calex MH series are 30 Watt DC/DC converters in a 1.6" x 2" case with a 2:1 and 4:1 input ratio. The input voltage range is 18 to 36 or 9 to 36 VDC for 24 Volt models and 36 to 75 or 18 to 75 for 48 Volt models.

The units are filled with a compound which allows them to withstand a normal water wash after being soldered to a PC board.

General Specifications

All Models			Units
Isolation			
Isolation Voltage	MIN	1544	VDC
Input to Output Capacitance	TYP	500	pF
ON/OFF Function			
Positive Logic HIGH/OPEN - Module ON LOW - Module OFF		Open or >3 VDC Pulled Low < 0.8 V	
Negative Logic HIGH/OPEN - Module OFF LOW - Module ON		Open or >3 VDC Pulled Low < 0.8 V	
Output Voltage Trim			
Trim Range	MIN MAX	-10 +10	%
Environmental			
Case Operating Range (see Derating Curve)	MIN MAX	-40 100	°C
Storage Range	MIN MAX	-55 125	°C
Thermal Impedance (6)	TYP	10	°C/Watt
General			
Unit Weight	TYP	1.1	oz
Chassis Mounting Kit		MS8	
MTBF		> 1 M Hours	
Agency Approvals		UL / IEC60950 CSA 22.2 No. 950 CE MARKED	
Output Overvoltage Protection (OVP) Threshhold OVP Type - Non-latching Open Loop Overvoltage Clamp	MIN MAX	115 135	%

Selection Chart

Model	Input Range VDC		Output VDC	Output mA
	Min	Max		
24S5.6000MH	18	36	5	6000
24S5.6000MHW	9	36	5	6000
24S12.2500MH	18	36	12	2500
24S12.2500MHW	9	36	12	2500
24S15.2000MH	18	36	15	2000
24S15.2000MHW	9	36	15	2000
24S24.1250MH	18	36	24	1250
24S24.1250MHW	9	36	24	1250
48S5.6000MH	36	75	5	6000
48S5.6000MHW	18	75	5	6000
48S12.2500MH	36	75	12	2500
48S12.2500MHW	18	75	12	2500
48S15.2000MH	36	75	15	2000
48S15.2000MHW	18	75	15	2000
48S24.1250MH	36	75	24	1250
48S24.1250MHW	18	75	24	1250

Default ON/OFF logic is positive. Default case connected to -Vin.

OPTIONS:

Add **(-N)** to the model number to order negative ON/OFF logic. (ie. 24S5.6000MH-N, 24S5.6000MHW-N)

Add **(-O)** to the model number to order case connected to -Vout. (ie. 24S5.6000MH-O, 24S5.6000MHW-O)

Add **(-NO)** to the model number to order negative ON/OFF logic and case connected to -Vout. (ie. 24S5.600MH-NO, 4S5.600MHW-NO)

Electrical Characteristics

Unless otherwise specified, all parameters are full load, nominal line, T_A=25°C, and thermal steady state.

Input Parameters (1)						
Model		**24S5.6000MH**	**24S5.6000MHW**	**24S12.2500MH**	**24S12.2500MHW**	**Units**
Voltage Range	MIN MAX	18 36	9 36	18 36	9 36	VDC
Input Current , No Load Full Load	TYP TYP	0.012 1.44	0.012 1.49	0.012 1.40	0.012 1.45	ADC
Efficiency Vin=24VDC, Full Load	TYP	85	82	89	86	%
Switching Frequency	TYP	400				kHz
Maximum Input Overvoltage, 100ms	MAX	40				VDC
Recommended Fuse		(2)				AMPS

Model		**24S15.2000MH**	**24S15.2000MHW**	**24S24.1250MH**	**24S24.1250MHW**	**Units**
Voltage Range	MIN MAX	18 36	9 36	18 36	9 36	VDC
Input Current , No Load Full Load	TYP TYP	0.012 1.40	0.012 1.45	0.012 1.40	0.012 1.45	ADC
Efficiency Vin=24VDC, Full Load	TYP	89	86	89	86	%
Switching Frequency	TYP	400				kHz
Maximum Input Overvoltage, 100ms	MAX	40				VDC
Recommended Fuse		(2)				AMPS

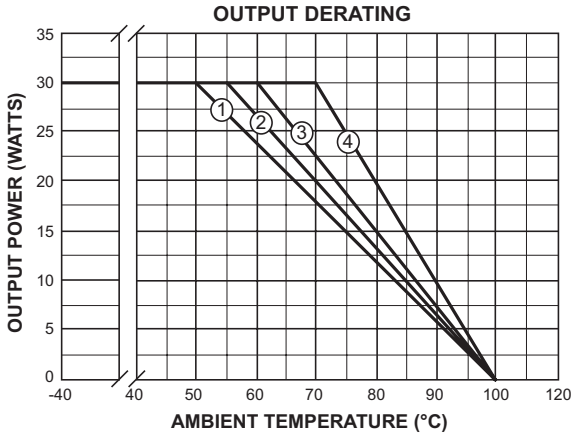
Input Parameters (1)						
Model		**48S5.6000MH**	**48S5.6000MHW**	**48S12.2500MH**	**48S12.2500MHW**	**Units**
Voltage Range	MIN MAX	36 75	18 75	36 75	18 75	VDC
Input Current , No Load Full Load	TYP TYP	12 718	12 744	12 702	12 727	mADC
Efficiency Vin=48VDC, Full Load	TYP	85	82	89	86	%
Switching Frequency	TYP	400				kHz
Maximum Input Overvoltage, 100ms	MAX	80				VDC
Recommended Fuse		(2)				AMPS

Model		**48S15.2000MH**	**48S15.2000MHW**	**48S24.1250MH**	**48S24.1250MHW**	**Units**
Voltage Range	MIN MAX	36 75	18 75	36 75	18 75	VDC
Input Current , No Load Full Load	TYP TYP	12 702	12 727	12 702	12 727	mADC
Efficiency Vin=48VDC, Full Load	TYP	89	86	89	86	%
Switching Frequency	TYP	400				kHz
Maximum Input Overvoltage, 100ms	MAX	80				VDC
Recommended Fuse		(2)				AMPS

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Output Parameters (1)						
Model		**24S5.6000MH**	**24S5.6000MHW**	**24S12.2500MH**	**24S12.2500MHW**	**Units**
Output Voltage		5	5	12	12	VDC
Output Voltage Accuracy	MIN TYP MAX	4.95 5.00 5.05	4.95 5.00 5.05	11.88 12.00 12.12	11.88 12.00 12.12	VDC
Rated Load Range (3)	MIN MAX	0.60 6.00	0.60 6.00	0.25 2.50	0.25 2.50	ADC
Load Regulation 1/4 FL - FL	TYP MAX	0.1 1				%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.02 0.1				%
Load Transient Recovery Time (1) error band = ±1%	TYP	500				µs
Load Transient Overshoot	TYP	150				mV peak
Noise (4) bw = 0 - 20 MHz	TYP	50				mV P-P
Short Circuit Protection, Output to Common		Continuous				

Model		**24S15.2000MH**	**24S15.2000MHW**	**24S24.1250MH**	**24S24.1250MHW**	**Units**
Output Voltage		15	15	24	24	VDC
Output Voltage Accuracy	MIN TYP MAX	14.85 15.00 15.15	14.85 15.00 15.15	23.76 24.00 24.24	23.76 24.00 24.24	VDC
Rated Load Range (3)	MIN MAX	0.20 2.00	0.20 2.00	.125 1.25	.125 1.25	ADC
Load Regulation 1/4 FL - FL	TYP MAX	0.1 1				%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.02 0.1				%
Load Transient Recovery Time (1) error band = ±1%	TYP	500				µs
Load Transient Overshoot	TYP	300				mV peak
Noise (4) bw = 0 - 20 MHz	TYP	50				mV P-P
Short Circuit Protection, Output to Common		Continuous				



① = MHW 5 Vout

② = MH 5 Vout

③ = MHW 12, 15, 24 Vout

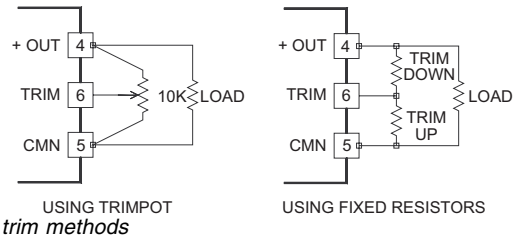
④ = MH 12, 15, 24 Vout

Proper Application Of The Trim Pin

The trim pin is used to adjust the output voltage slightly to compensate for voltage drops in the system's wiring. Figure 4 shows the proper application of the trim pin. Either a 10K trimpot or fixed resistors may be used.

Other applications for the TRIM function can be found in the CALEX application note, "Applying the Remote Sense and Trim Functions on DC/DC Converters."

Use one resistor for either trim up or trim down. The values can range from infinity to zero ohms with zero ohms providing the most trim.



Output trim methods

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Output Parameters (1)						
Model		**48S5.6000MH**	**48S5.6000MHW**	**48S12.2500MH**	**48S12.2500MHW**	**Units**
Output Voltage		5	5	12	12	VDC
Output Voltage Accuracy	MIN TYP MAX	4.95 5.00 5.05	4.95 5.00 5.05	11.88 12.00 12.12	11.88 12.00 12.12	VDC
Rated Load Range (3)	MIN MAX	0.60 6.00	0.60 6.00	0.25 2.50	0.25 2.50	ADC
Load Regulation 1/4 FL - FL	TYP MAX	0.1 1				%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.02 0.1				%
Load Transient Recovery Time (5) error band = ±1%	TYP	500				µs
Load Transient Overshoot	TYP	150				mV peak
Noise (4) bw = 0 - 20 MHz	TYP	50				mV P-P
Short Circuit Protection, Output to Common		Continuous				

Model		**48S15.2000MH**	**48S15.2000MHW**	**48S24.1250MH**	**48S24.1250MHW**	**Units**
Output Voltage		15	15	24	24	VDC
Output Voltage Accuracy	MIN TYP MAX	14.85 15.00 15.15	14.85 15.00 15.15	23.76 24.00 24.24	23.76 24.00 24.24	VDC
Rated Load Range (3)	MIN MAX	0.20 2.00	0.20 2.00	.125 1.25	.125 1.25	ADC
Load Regulation 1/4 FL - FL	TYP MAX	0.1 1				%
Line Regulation Vin = Min-Max VDC	TYP MAX	0.02 0.1				%
Load Transient Recovery Time (5) error band = ±1%	TYP	500				µs
Load Transient Overshoot	TYP	300				mV peak
Noise (4) bw = 0 - 20 MHz	TYP	50				mV P-P
Short Circuit Protection, Output to Common		Continuous				

NOTES:

(1) Refer to the CALEX Application Notes for the definition of terms, measurement circuits, and other information.

(2) See CALEX Application Notes to determine the correct fuse. A fuse is required only for system protection, but must be used for reverse voltage protection of the input.

(3) Below the minimum rated load, the output may exhibit noise performance degradation. Operation with less than the minimum rated load will not damage unit, and DC regulation is not significantly affected.

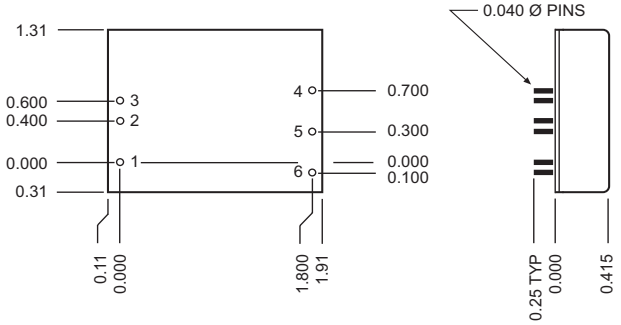
(4) Noise is measured per CALEX Application Notes. Output noise is measured with a 10 µF tantalum capacitor and a 0.01µF ceramic capacitor connected across the output pins.

(5) Load Transient Overshoot is the output voltage peak amplitude referenced to the final value due to a step load change of 50-75% occuring only on the measured output. "Load Transient Overshoot" and "Dynamic Response" are the same specification. Load Transient Recovery Time is the time for the output to return to within the specified voltage error band centered about the final value. "Load Transient Recovery Time" and "Transient Response" are the same specification.

(6) The case thermal impedance is specified as the case temperature rise over ambient per package watt dissipated.

(7) Specifications subject to change without notice.

(8) Water Washability - Calex DC/DC converters are designed to withstand most solder/wash processes. Careful attention should be used when assessing the applicability in your specific manufacturing process. Converters are not hermetically sealed.



BOTTOM VIEW SIDE VIEW

Mechanical tolerances
unless otherwise noted:
X.XX dimensions: ±0.020 inches
X.XXX dimensions: ±0.005 inches

Pin	Function
1	ON/OFF
2	-INPUT
3	+INPUT
4	+OUTPUT
5	-OUTPUT
6	TRIM