75 Watt HE Single Series DC/DC Converters

Description

The 75 watt single HE series DC/DC converters provide precisely regulated dc outputs. All outputs are fully isolated from the inputs, allowing the output to be used with positive or negative polarity and various grounding options. The HE series meets the most rigorous requirements in an industry standard case size for industrial process control and telecom applications.

Standard features include remote sensing, output trim, and remote on/off. Threaded-through holes are provided to allow easy mounting or to add a heat sink for extended temperature use.

Selection Chart

Model	V in nom VDC	I in ADC	V out VDC	I out ADC
12S3.15HE	12	5.03	3.3	15
12S5.15HE	12	7.35	5	15
24S3.15HE	24	2.52	3.3	15
24S5.15HE	24	3.63	5	15
24S12.6HE	24	3.59	12	6.25
24S15.5HE	24	3.55	15	5
24S24.3HE	24	3.55	24	3.13
48S3.15HE	48	1.24	3.3	15
48S5.15HE	48	1.80	5	15
48S12.6HE	48	1.78	12	6.25
48S15.5HE	48	1.76	15	5
48S24.3HE	48	1.76	24	3.13

NOTES:
Efficiencies up to 88%.
Default ON/OFF logic is positive.
Add -N to the model number to order negative ON/OFF logic.

Features

- Small Size 2.4" x 2.28" x 0.55"
- Industry Standard Pinout
- Excellent Thermal Performance with Metal Baseplate
- High Efficiency
- Volt-seconds Clamp and Fast Over Voltage Clamp
- Pulse-by-pulse Current Limiting, Short Circuit Frequency Foldback, Dead Short Shutdown
- Over-temperature Protection
- Auto-softstart
- Low Noise
- Planar Magnetics
- Constant Frequency for Normal Operation
- More than 2:1 Input Voltage Range
- Remote Sense
- Remote ON/OFF
- Super Energy Saving, 2 mA Input Idle Current
- Output Trim with Very Low Temperature Coefficient
- Water Washable, Wide Humidity Applications
- Shock & Vibration Damping
- Low Cost
- Undervoltage Lockout
- Input Reverse Voltage Protection
- 5 Year Warranty

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Unless otherwise stated, these specifications apply for ambient temperature T_A=23 ±2°C, nominal input voltage, and rated full load. (1)

Input Parameters							
Model		**12S3.15HE**			**12S15.5HE**		**Units**
Voltage Range	MIN TYP MAX	9 12 18					VDC
Input Ripple Rejection (120Hz)	TYP	60					dB
Undervoltage Lockout		Yes					
Input Reverse Voltage Protection		Yes					
Input Current No Load 100% Load	TYP TYP	15 5.03			15 7.35		mA/A
Inrush Current	MAX	0.5					A^2S
Reflected Ripple, 12µH Source Impedance (2)	TYP	20					mA P-P
Efficiency	TYP	82			85		%
Switching Frequency	TYP	440					kHz
Maximum Input Overvoltage 100 ms Maximum	MAX	25					VDC
Recommended Fuse		(3)					AMPS
Model		**24S3.15HE**	**24S5.15HE**	**24S12.6HE**	**24S15.5HE**	**24S24.3HE**	**Units**
Voltage Range	MIN TYP MAX	18 24 36					VDC
Input Ripple Rejection (120Hz)	TYP	60					dB
Undervoltage Lockout		Yes					
Input Reverse Voltage Protection		Yes					
Input Current No Load 100% Load	TYP TYP	12 2.52	12 3.63	12 3.59	12 3.55	12 3.55	mA A
Inrush Current	MAX	0.5					A^2S
Reflected Ripple, 12µH Source Impedance (2)	TYP	20					mA P-P
Efficiency	TYP	82	86	87	88	88	%
Switching Frequency	TYP	440					kHz
Maximum Input Overvoltage* 100 ms Maximum	MAX	50					VDC
Recommended Fuse		(3)					AMPS
Model		**48S3.15HE**	**48S5.15HE**	**48S12.6HE**	**48S15.5HE**	**48S24.3HE**	**Units**
Voltage Range	MIN TYP MAX	36 48 75					VDC
Input Ripple Rejection (120Hz)	TYP	60					dB
Undervoltage Lockout		Yes					
Input Reverse Voltage Protection		Yes					
Input Current No Load 100% Load	TYP TYP	12 1.24	12 1.80	12 1.78	12 1.76	12 1.76	mA A
Inrush Current	MAX	0.5					A^2S
Reflected Ripple, 12µH Source Impedance (2)	TYP	20					mA P-P
Efficiency	TYP	83	87	88	89	89	%
Switching Frequency	TYP	440					kHz
Maximum Input Overvoltage* 100 ms Maximum	MAX	85					VDC
Recommended Fuse		(3)					AMPS

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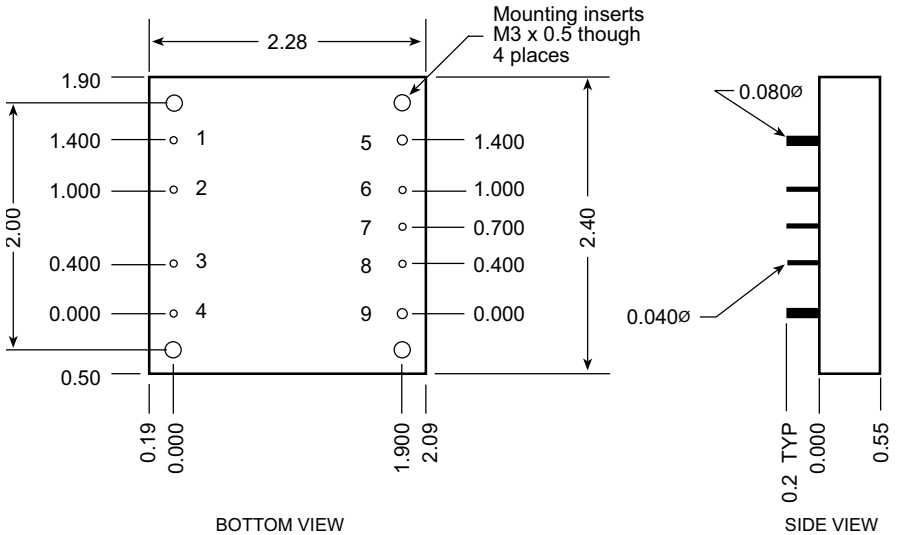
Output Parameters							
Model		**12S3.15HE 24S3.15HE 48S3.15HE**	**12S5.15HE 24S5.15HE 48S5.15HE**	**24S12.6HE 48S12.6HE**	**24S15.5HE 48S15.5HE**	**24S24.3HE 48S24.3HE**	**Units**
Output Voltage		3.3	5	12	15	24	VDC
Output Voltage Setpoint Accuracy	MAX	±1					%
Turn On Overshoot	TYP	0					%
Temperature Coefficient	TYP MAX	0.005 0.01	0.003 0.005				%/°C
Noise (8)	MAX	75	75	150	150	250	mV P-P
RMS Noise	TYP	20	20	60	60	100	mV RMS
Load Current (4)	MIN MAX	5 100					% I out rated
Load Transient Overshoot (7)	TYP	2.5					%
Load Transient Recovery Time (6)	TYP	100					µSec
Load Regulation (5) Min-Max Load	TYP MAX	0.02 0.2					%
Line Regulation Vin = Min-Max	TYP MAX	0.01 0.1					%
Overvoltage Protection (OVP) Threshhold OVP Type - Non-latching Open Loop Overvoltage Clamp	TYP MAX	120 135					%
Output Current Limit V out=90% of V out-nom	TYP	120					%
Output Short Circuit Protection V out = 0.25 V	TYP MAX	140 150					%



BOTTOM VIEW

SIDE VIEW

Pin	Function
1	-INPUT
2	CASE
3	ON/OFF
4	+INPUT
5	-OUTPUT
6	-SENSE
7	TRIM
8	+SENSE
9	+OUTPUT

General Specifications			
All Models			**Units**
Remote ON/OFF Function			
HIGH Logic Level or Leave Pin Open	MAX	3.0	VDC
External Leakage Current for Logic High	MAX	10	µA
Input Diode Protection Voltage	MAX	50	VDC
LOW Logic Level or Tie ON/OFF Pin to -Input	MIN	1.0	VDC
Sinking Current for Logic Low	MAX	500	µA
Open Circuit Voltage (10) Positive Logic Negative Logic	 TYP TYP	 2.3 1.5	 VDC VDC
Output Resistance	TYP	3	k Ohm
Idle Current (Module is OFF)	TYP	2	mADC
Turn-on Time to 1% error	TYP	20	mSec
Positive Logic		HIGH - Module ON LOW - Module OFF	
Negative Logic		HIGH - Module OFF LOW - Module ON	
Output Voltage Remote Sensing			
Maximum Voltage Drops on Leads	MAX	0.5	VDC
Line Regulation Under Remote Sensing	TYP MAX	0.02 0.1	%
Load Regulation Under Remote Sensing	TYP MAX	0.05 0.2	%
Output Voltage Trim			
Trim Range	MIN MAX	-10 +10	% of Vout
Input Resistance	TYP	10	kohm
Open Circuit Voltage	TYP	2.5	V
Sense and Trim Limit			
Maximum Output Voltage	TYP	110	% of Vout
Isolation			
Input to Output Isolation* 10µA Leakage V nom =12 V, 24 V V nom = 48 V	 MAX MAX	 700 1500	 VDC VDC
Input to Output Resistance	TYP	10	M ohm
Input to Output Capacitance	TYP	1800	pF
Environmental			
Calculated MTBF, Bellcore Method 1, Case 1		10^6	Hr
Baseplate Operating Temperature Range	MIN MAX	-40 100	°C
Storage Temperature	MIN MAX	-40 120	°C
Thermal Impedance	TYP	7	°C/W
Thermal Shutdown Baseplate Temperature (Auto Restart)	MIN TYP	100 110	°C
General			
Unit Weight	TYP	4/114	oz/g
Case Dimension		2.4" x 2.28" x 0.55"	
Approvals (pending)		UL1950, CUL, EN60950 (TUV)	
Chassis Mounting Kit		MS20	

* Absolute Maximum Ratings. Caution: Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device (see Note 1).

NOTES:

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

(2) 33 µF capacitor connected to two "Input" pins. Then place current sensor in series with 12 µH inductor between 33 µF and source. The reflected ripple current is measured over 5 Hz to 20 MHz bandwidth.

(3) Refer to the CALEX Application Notes for information on fusing.

(4) Optimum performance is obtained when this power supply is operated within the minimum to maximum load specifications. No damage to module will occur, when the output is operated at less than minimum load, but the output voltage may contain a low frequency component that may exceed output noise specifications.

(5) Load regulation is defined as the output voltage change when changing load current from maximum to minimum.

(6) Load Transient Recovery Time is defined as the time for the output to settle from a 50 to 75% step load change to a 1% error band (rise time of step = 2µSec).

(7) Load Transient Overshoot is defined as the peak overshoot during a transient as defined in the Note 6 above.

(8) Noise is measured per the CALEX Application Notes. Output noise is measured with a 10µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor connected across the output to CMN. Measurement bandwidth is 0-20 MHz.

(9) When an external On/Off switch is used, such as open collector switch, logic high requires the switch to be high-impedance. Switch leakage currents greater than 10 uA may be sufficient to trigger the ON/Off to the logic-low state.

(10) Most switches would be suitable for logic On/Off control, in case there is a problem, you can make following estimations and then leave some margins.

When open collector is used for logic high, "Open Circuit Voltage at On/Off Pin", "Output Resistance" and "External Leakage Current Allowed for Logic High" are used to estimate the high impedance requirement of open collector.

When switch is used for logic low, "Open Circuit Voltage at On/Off Pin", "Output Resistance" and "LOW Logic Level" are used to estimate the low impedance requirement of switch.

(11) Specifications subject to change without notice.