75 Watt HD Dual Series DC/DC Converters

Features

- Small size 2.4" x 2.28" x 0.55"
- Excellent thermal performance with metal baseplate
- Non-latching over voltage shutdown
- Pulse-by-pulse current limiting, short circuit foldback
- Over-temperature protection
- Auto-softstart
- Low noise
- Constant frequency for normal operation.
- 2:1 input voltage range
- Positive logic primary remote ON/OFF
- Very low temperature coefficient
- Water Washable
- Trimmable output voltages
- Low cost
- 5 Year Warranty

Description

The HD Dual Series DC/DC family provides two independent and precisely regulated low output voltage converters in one package reducing cost and saving board space. The HD Series meets rigorous requirements in an industry standard ½ brick package, and is well suited for telecom and industrial applications.

Both outputs are rated for a maximum of 10 Amps, thus providing many possible output load combinations with a total output power of 75 Watts. The remote trim function on each output can be used to compensate for voltage drops between the converter and the load at higher currents.

The HD Series includes a primary remote on/off for power conservation. The HD package features threaded-through holes to allow for easy mounting or the addition of a heat sink for extended temperature operation.

Selection Chart				
Model	Input Range VDC		V out VDC		I out ADC *
	Min	Max	V1	V2	
24D5.3R3HD	18	36	5	3.3	10
24D3.2R5HD	18	36	3.3	2.5	10

* The output currents are the maximum ratings of each of the outputs. It is up to the user to keep the total power output at or below the 75 Watt rating of the package.

** For other output voltages and 48 Volt input models contact the factory.

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

Input Parameters				
Model		24D5.3R3HD	24D3.2R5HD	Units
Voltage Range	MIN TYP MAX	18 24 36		VDC
Input Overvoltage 100 mSec	MAX	50		VDC
Input Ripple Rejection (120Hz)	TYP	50		dB
Undervoltage Lockout		Yes		
Input Reverse Voltage Protection		Yes		
Input Current No Load	TYP	12	12	mA
100% Load	TYP	3.85	3.91	A
Inrush Current	MAX	0.5		$A^2 S$
Reflected Ripple, 12µH Source Impedance (4)	TYP	20		mA P-P
Efficiency	TYP	81	80	%
Switching Frequency	TYP	360		kHz
Recommended Fuse		(3)		AMPS

NOTES:

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

(2) Full Load is defined as the main output operating at 10 Amps. The auxiliary output is loaded to bring output power to 75 Watts, or loaded to 10 Amps maximum.

(3) This unit is not fused and needs to be fused by the user. Refer to the CALEX Application Notes for information on fusing. For inrush current, refer to the specifications above.

(4) Place a 33 uF capacitor between the two "Input" pins. Then place the current sensor in series with a 12 µH inductor between the capacitor and the source (current sensor is located between the converter input pins and the 12µH inductor). The reflected ripple current is measured over a 5 Hz to 20 MHz bandwidth. Noise should be minimized in the measurement.

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

(6) Optimum performance is obtained when this power supply is operated within the minimum to maximum load specifications. No damage to the 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. At no load the converter's V1 output voltage may fall out of regulation, typically rising to the OVP limit. A load current of between 0.5% to 1% of maximum rated load on any of the outputs will usually suffice to bring V1 within regulation.

(7) Load Transient Recovery Time is defined as the time for the output to settle from a 50 to 75% or 25% step load change to a 1% error band of output voltage(rise time of step = 2µSec).

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

(9) Load regulation is defined as the output voltage change when changing load current from maximum to minimum. The voltage is measured at the output pin.

(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 margin.

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) Thermal impedance is tested with the converter mounted vertically and facing another printed circuit board 1/2 inch away. If converter is mounted horizontally with no obstructions, thermal impedance is approximately 7 °C/W.

(12) Minimum load is defined as 10% of maximum load. Calex Mfg. Co. Inc. does not guarantee performance for loads less than the minimum. Loads less than the minimum shall not damage the unit.

(13) 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.

(14) 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.

(15) Torque fasteners into threaded mounting inserts at 12 in. oz. or less. Greater torque may result in damage to unit and void the warranty.

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eco#: 060615-3, 061207-3, 070612-5

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

Output Parameters (V1)				
Model		**24D5.3R3HD**	**24D3.2R5HD**	**Units**
Output Voltage		5	3.3	VDC
Output Voltage Setpoint Accuracy	MAX	±1		%
Turn On Overshoot	TYP	0		%
Temperature Coefficient	TYP MAX	0.003 0.01		%/°C
Noise & Ripple (5)	TYP MAX	50 100	33 66	mV P-P
Load Current (6) (12)	MIN MAX	1.0 10.0		A
Load Transient Overshoot (8)	TYP	4		%
Load Transient Recovery Time (7)	TYP	100		µSec
Load Regulation (9) Min-Max Load	TYP MAX	0.5 1		%
Line Regulation Vin = Min-Max	TYP MAX	0.1 0.5		%
Overvoltage Protection (OVP) Threshhold OVP Type - Non-latching Open Loop Overvoltage Clamp	TYP	130		%
Output Current Limit V out=90% of V out-nom	TYP	120		%
Output Short Circuit Current V out = 0.25 V	TYP	175		%

Output Parameters (V2)				
Model		24D5.3R3HD	24D3.2R5HD	**Units**
Output Voltage		3.3	2.5	VDC
Output Voltage Setpoint Accuracy	MAX	±3.0		%
Turn On Overshoot	TYP	0		%
Temperature Coefficient	TYP MAX	0.02 0.05		%/°C
Noise & Ripple (5)	TYP MAX	33 66	25 50	mV P-P
Load Current (6)	MIN MAX	0.2 10.0		A
Load Transient Overshoot (8)	TYP	4		%
Load Regulation (9) Min-Max Load	TYP MAX	0.5 1		%
Line Regulation Vin = Min-Max	TYP MAX	0.5 1		%

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General Specifications

All Models			Units
Primary Remote ON/OFF Function			
HIGH Logic Level for ON	MIN	3.0	VDC
External Leakage Current Allowed for Logic High (14)	MAX	10	µA
Input Diode Protection Voltage	MAX	50	VDC
LOW Logic Level or Tie ON/OFF Pin to -Input	MAX	1.0	VDC
Sinking Current for Primary Logic Level	MAX	500	µA
Open Circuit Voltage at Primary On/Off Pin (10) Positive Logic Negative Logic	TYP TYP	2.3 1.5	VDC VDC
Output Resistance (10)	TYP	3	k Ohm
Idle Current (Module is OFF)	TYP	2	mADC
Turn-on Time to 1% error	TYP	20	mSec
Remote ON/OFF Logic		HIGH - Module ON LOW - Module OFF	
Output Voltage Trim			
Trim Range	MIN MAX	±5	% of Vout
Input Resistance	TYP	10	k Ohm
Open Circuit Voltage	TYP	2.5	V
Trim Limit			
Maximum Output Voltage	MAX	105	% of Vout
Isolation			
Input to Output Isolation 10µA Leakage	MAX	700	VDC
Input to Output Resistance	MIN	10	Mohm
Input to Output Capacitance	TYP	1800	pF
Environmental			
Calculated MTBF, Bellcore Method 1, Case 1		>1,000,000	Hr
Baseplate Operating Temperature Range	MIN MAX	-40 100	°C
Storage Temperature	MIN MAX	-40 120	°C
Thermal Impedance (11)	TYP	7	°C/W
General			
Unit Weight	TYP	4/114	oz/g
Chassis Mounting Kit		MS25	
Case Dimension		2.4" x 2.28" x 0.55"	
Agency Approvals		UL60950 pending	
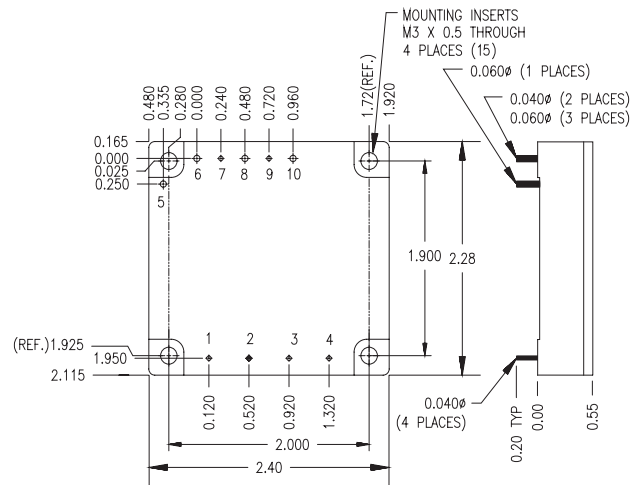
Mechanical tolerances unless otherwise noted:

X.XX dimensions: ±0.020 inches

X.XXX dimensions: ±0.005 inches

Pin	Function	Pin	Function
1	CASE	6	+ V2
2	- INPUT	7	V2 TRIM
3	+ INPUT	8	- V1
4	ON/OFF	9	V1 TRIM
5	- V2	10	+ V1