

### FEATURES

- 2:1 standard input range: 4.5-9, 9-18, 18-36, 36-75VDC
- Single and bipolar outputs: 3.3, 5, 12, 15, 24, ±5, ±9, ±12, ±15, ±24VDC
- Efficiency up to 82% @ full load
- 1.5KVDC, 3KVDC isolation options
- Industrial standard footprint: SIP8
- OCP and output short circuit protection
- Operating temperature range: -40°C to 85°C
- All material compliance with UL94V-0
- Fully encapsulated, high reliability
- MTBF ≥ 1M hours



### PRODUCT OVERVIEW

The EUC3D modules are highly reliable, and efficient isolated DC/DC converter with industrial potted module technology. Wide temperature range and encapsulated package is ideal for industrial applications. Intended target markets include industrial control, power electronics, instrumentations, medical systems, transportation where power modules must meet rugged environmental requirements, impact size and isolated output voltages are required.

The EUC3D modules provide voltage isolation from input to output up to 3KVDC. The operation temperature range is -40°C to +85°C. These modules are ideal for applications that do not require any heat-sink or forced air cooling.

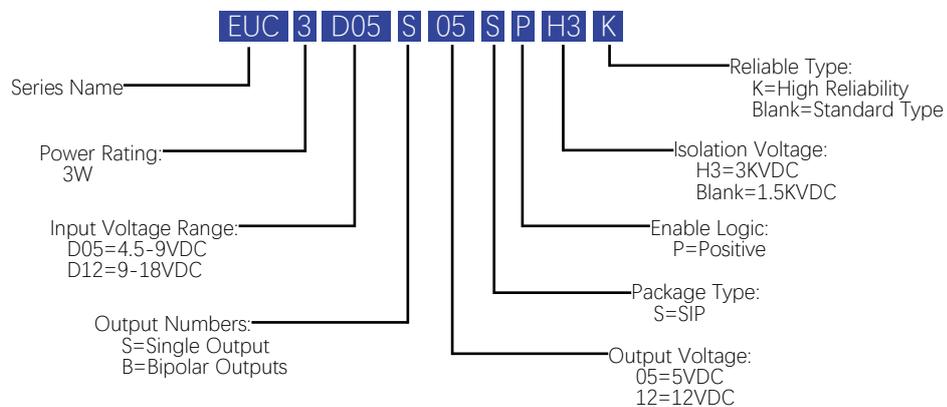
The EUC3D series are designed to safety standards UL62368-1.

Models Selections									
Basic Models	Input Voltage [VDC]	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Ripple & Noise [Typ./Max.] [mVp-p]	Efficiency Typ. [%]	Capacitive Load Max. [μF]	Package [inch]	
EUC3D05S03	5	4.5-9	3.3	758	40/75	69	1800	SIP8	
EUC3D05S05	5	4.5-9	5	600		74	2200		
EUC3D05S12	5	4.5-9	12	250		78	681		
EUC3D05S15	5	4.5-9	15	100		75	470		
EUC3D05S24	5	4.5-9	24	125		77	330		
EUC3D05B05	5	4.5-9	±5	±300		75	±1000		
EUC3D05B09	5	4.5-9	±9	±167		76	±680		
EUC3D05B12	5	4.5-9	±12	±125		78	±470		
EUC3D05B15	5	4.5-9	±15	±100		78	±330		
EUC3D05B24	5	4.5-9	±24	±63		77	±220		
EUC3D12S03	12	9-18	3.3	758		70/100	76		2700
EUC3D12S05	12	9-18	5	600			77		2200
EUC3D12S09	12	9-18	9	333			79		1000
EUC3D12S12	12	9-18	12	250	83		680		
EUC3D12S15	12	9-18	15	200	84		471		
EUC3D12S24	12	9-18	24	125	82		330		
					100/150				

Models Selections								
Basic Models	Input Voltage [VDC]	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Ripple & Noise [mVp-p] <sup>①</sup>	Efficiency Typ. [%]	Capacitive Load Max. [μF]	Package [inch]
EUC3D12B05	12	9-18	±5	±300	40/75	79	±1000	SIP8
EUC3D12B12	12	9-18	±12	±125		80	±470	
EUC3D12B15	12	9-18	±15	±100		80	±330	
EUC3D24S03	24	18-36	3.3	758		75	2700	
EUC3D24S05	24	18-36	5	600		82	2200	
EUC3D24S12	24	18-36	12	250		84	680	
EUC3D24S15	24	18-36	15	200	100/150	84	470	
EUC3D24S24	24	18-36	24	125		84	330	
EUC3D24B05	24	18-36	±5	±300	40/75	80	±1000	
EUC3D24B09	24	18-36	±9	±167		81	±680	
EUC3D24B12	24	18-36	±12	±125		83	±470	
EUC3D24B15	24	18-36	±15	±100		83	±330	
EUC3D48S03	48	36-75	3.3	758	100/150	76	2700	
EUC3D48S05	48	36-75	5	600	40/75	77	2200	
EUC3D48S12	48	36-75	12	250		81	680	
EUC3D48S15	48	36-75	15	200	85	470		
EUC3D48S24	48	36-75	24	125	70/100	83	330	
EUC3D48B05	48	36-75	±5	±300	100/150	80	±1000	
EUC3D48B12	48	36-75	±12	±125	40/75	83	±470	
EUC3D48B15	48	36-75	±15	±100		83	±330	

Note:  
<sup>①</sup> For output ripple & noise test conditions, please see output ripple & noise in technical notes on page 7 for details.

### Model Numbering



Absolute Maximum Ratings					
Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage	5 Vin type	-0.7		12	VDC
	12 Vin type	-0.7		25	
	24 Vin type	-0.7		50	VDC
	48 Vin type	-0.7		100	
Operating Environment Temperature		-40		85	°C
Storage Temperature Range		-55		105	°C
Soldering Temperature	Wave soldering < 10s			300	°C
Relative Humidity				95	%RH
General Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage (Input to output, 1mA)	Standard mode, test for 1 minute.	1500			VDC
	H5 type, test for 1 minute.	3000			VDC
Isolation Resistance	Input to output, $V_{iso}=500VDC$	1000			MΩ
Isolation Capacitance	Input to output, 100KHz/0.1V		120		pF
Remote On/Off Control	Positive Logic, ON state	Open or $3.5 \leq V_r \leq 12$			VDC
	Positive Logic, OFF state	Short or $0 \leq V_r \leq 0.7$			VDC
Switching Frequency		150	208	300	KHz
Cooling	Free air convection				
Input Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	As shown in the "Models Selections"				
Input Current @ No Load	5V input type		40	85	mA
	12V input type		30	40	mA
	24V input type		20	40	mA
	48V input type		5	15	mA
Input Current @ Min. Line	5V input, 3.3V output		735		mA
	5V input, other outputs		805		mA
	12V input, 3.3V output		278		mA
	12V input, other outputs		314		mA
	24V input, 3.3V output		140		mA
	24V input, other outputs		154		mA
	48V input, 3.3V output		69		mA
	48V input, other outputs		78		mA
Reflected Ripple Current	5V input type		20		mA
	12V input type		20		mA
	24V input type		55		mA
	48V input type		55		mA

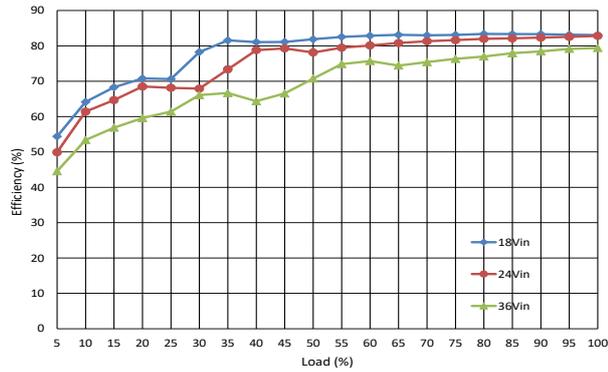
Output Specifications					
Parameters	Conditions	Min.	Typ.	Max.	Units
Vout Accuracy	5% to 100% load, min. line to max. line	-3.0		+3.0	%
Vout Accuracy @ No Load	12V & 48V input, 3.3V output	-8.0		+8.0	%
	Other types	-5.0		+5.0	%
Line Regulation		-0.5		+0.5	%
Load Regulation	5% to 100% load	-1.0		+1.0	%
Temperature Coefficient		-0.03		+0.03	% of Vout /°C
Over Current Protection		110	140		%
Output Short Protection	Continuous, auto-recover				
Dynamic Load Peak Deviation <sup>①</sup>		-5.0		+5.0	%
Dynamic Load Response			0.5	3	ms
Minimum Load <sup>②</sup>		0			%
Notes					
① Load is set from 50%-75%-50% of full load, di/dt=0.1A/μS.					
② Operating below 5% load will not harm the converter, but specifications may not be met, such as the output voltage may be higher than rated output voltage.					

All specifications are tested at 25 °C ambient temperature, nominal input voltage, rated output current conditions unless otherwise specified.

### Performance Data

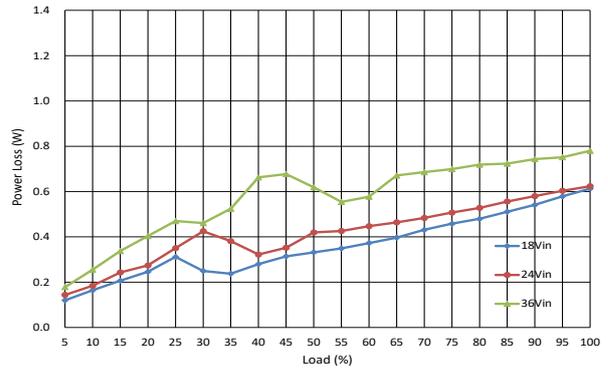
EFFICIENCY VS LOAD

EUC3D24S05 Module

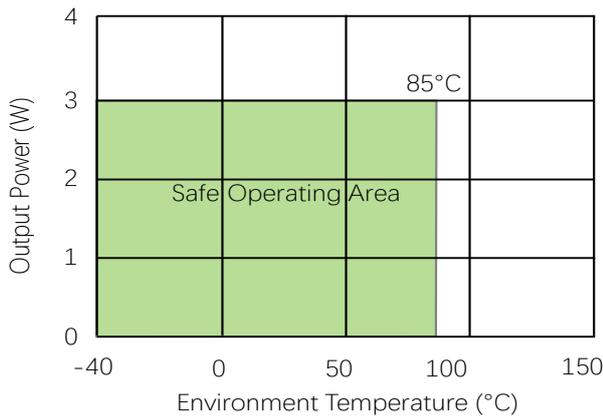


POWER LOSS VS LOAD

EUC3D24S05 Module

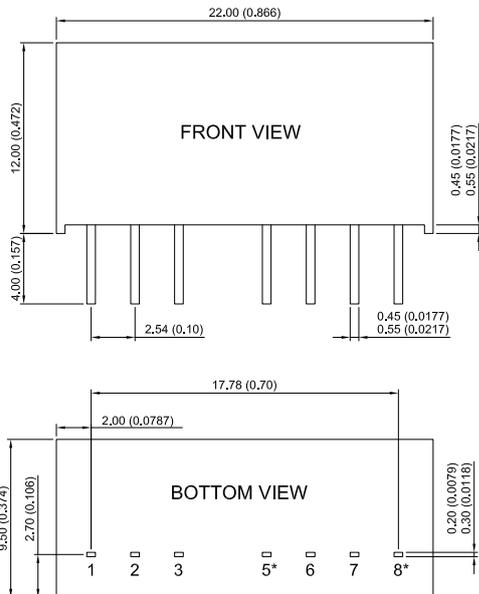


TEMPERATURE DERATING

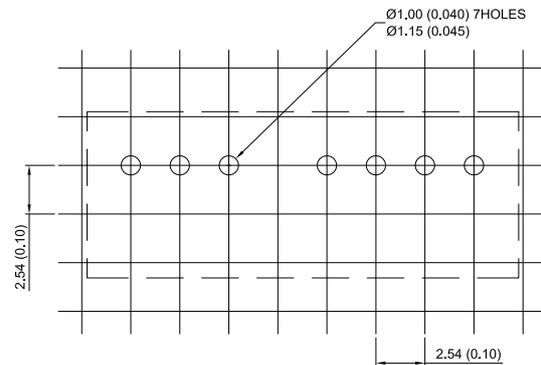


### Mechanical Specifications

#### MECHANICAL DIMENSIONS



#### RECOMMENDED FOOTPRINT DETAILS



Unless otherwise specified, all dimensions are in mm  $\pm 0.5$  (inches  $\pm 0.02$ ).

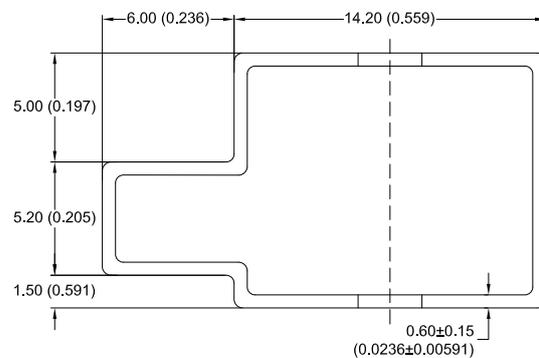
\*Pin can not connect with any external circuit.  
Unless otherwise specified, all dimensions are in mm  $\pm 0.25$  (inches  $\pm 0.01$ ).

Pin:

Material: Copper alloy

Finish: Tin 3 $\mu$ m (min.) over nickel 1 $\mu$ m (min.)

#### TUBE OUTLINE DIMENSIONS



Tube length: 520mm  $\pm 2$ mm (20.47)

Tube quantity: 23pcs

Unless otherwise specified, all dimensions are in mm  $\pm 0.5$  (inches  $\pm 0.02$ ).

PIN Connections			
Single Output		Bipolar Outputs	
Pin	Function	Pin	Function
1	GND	1	GND
2	Vin	2	Vin
3	CTRL	3	CTRL
5*	NC	5*	NC
6	+Vout	6	+Vout
7	-Vout	7	Common
8*	NC	8	-Vout

### Technical Notes

#### INPUT FUSING

Certain applications may require fuse at the inputs of power conversion components. Fuses should also be used when there is possibility of sustained input voltage reversal which is not current limited. The EUC3D modules are not internally fused. We strongly recommend a fast blow fuse to be used in the ungrounded input supply line.

For safety agency approvals, the installer must install the converter in compliance with the end user safety standard.

#### OUTPUT RIPPLE & NOISE

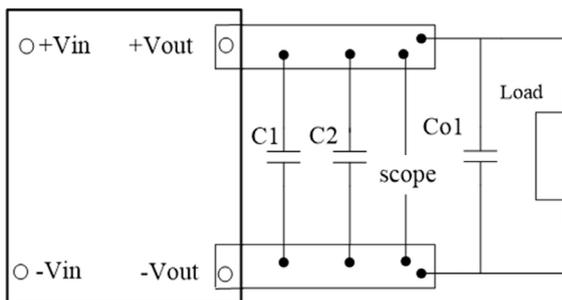


Figure 1: Single Output Type

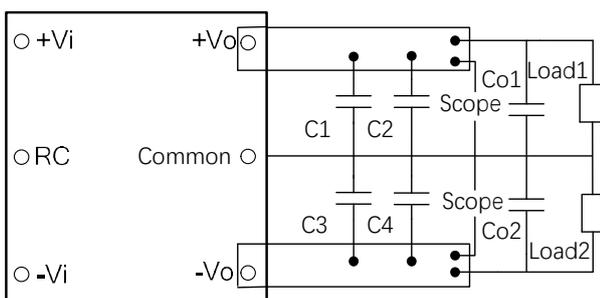


Figure 2: Bipolar Outputs Type

These EUC3D modules output ripple and noise is measured at the rated input voltage and output current, along with 10uF and 0.1uF MLCC are used in parallel with appropriate voltage ratings. The oscilloscope bandwidth is set to 20MHz. External output capacitors are required to reduce

the ripple & noise. The output capacitors should be low ESR and appropriate frequency response with appropriate voltage ratings, and must be located as close to the converters as possible, also particular load and layout must be taken into consideration.

#### ISOLATION VOLTAGE

EUC3D modules are 100% production tested at their specified isolation voltage. Parts can be expected to withstand the specified test voltage several times. But it is well known that repeated high-voltage isolation testing will degrade isolation capability which is depending on materials, construction and environment. Thus, the number of tests should be strictly limited and we strongly advise against repeated high voltage isolation testing.

#### PIN 3 (CTRL)

Module Power Remote Control or called ON/OFF pin is for the user to control the power output. EUC3D series adpot positive logic control. Recommend to use optocoupler to control remote pin as below.

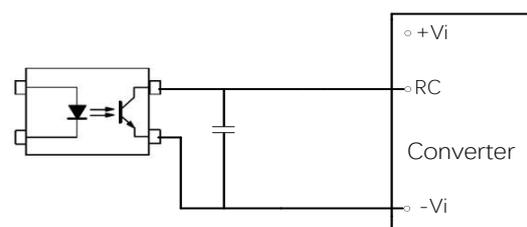


Figure 3: Remote Control Circuit

Remote Control Pin can be connected in parallel for multiple converters which with the same Remote Control characters. However, when several converters share the same remote control circuit, the total sink and source current must be taken into consideration, and make sure that the optocoupler has enough drive capability. To reduce external PCB trace interference, it is

### Technical Notes

recommended to add high frequency bypass capacitor between RC pin and  $-V_i$ , recommended capacitor value is 100-1000pF.



This product is subject to the following operating requirements and the Life and Safety Critical Application Sales Policy:

Refer to: <http://www.densitypower.com>

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