Technical Specification

DUC3D/W Series

3Watts, 3KVDC Isolated DC/DC Converters (SIP8)

FEATURES

- 2:1 & 4:1 input range: 4.5-9/9-36VDC
- Single and bipolar outputs: 3.3, 5, 9, 12, 15, 24, ±5, ±9, ±12, ±15VDC
- Efficiency up to 84% @ full load
- 3KVDC isolation
- 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 DUC3D/W 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 DUC3D/W modules provide voltage isolation from input to output up to 3KVDC. The operation temperature range is -40℃ to +85℃ . These modules are ideal for applications that do not require any heat-sink or forced air cooling.

The DUC3D/W 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]	Efficiency Typ. [%]	Capacitive Load Max. [μF]	Package [inch]
DUC3D05S05	5	4.5-9	5	600	76	2200	0.87"×0.37"×0.47" SIP8
DUC3D05S12	5	4.5-9	12	250	76	680	
DUC3D05S15	5	4.5-9	15	200	77	470	
DUC3D05B05	5	4.5-9	±5	±300	76	±1000	
DUC3D05B12	5	4.5-9	±12	±125	80	±470	
DUC3D05B15	5	4.5-9	±15	±100	81	±330	
DUC3W24S03	24	9-36	3.3	909	73	2200	
DUC3W24S05	24	9-36	5	600	78	2200	
DUC3W24S09	24	9-36	9	300	80	1000	
DUC3W24S12	24	9-36	12	250	82	680	
DUC3W24S15	24	9-36	15	200	82	470	
DUC3W24S24	24	9-36	24	125	84	330	
DUC3W24B05	24	9-36	±5	±300	78	±1000	
DUC3W24B09	24	9-36	±9	±167	80	±680	
DUC3W24B12	24	9-36	±12	±125	81	±470	
DUC3W24B15	24	9-36	±15	±100	82	±330	

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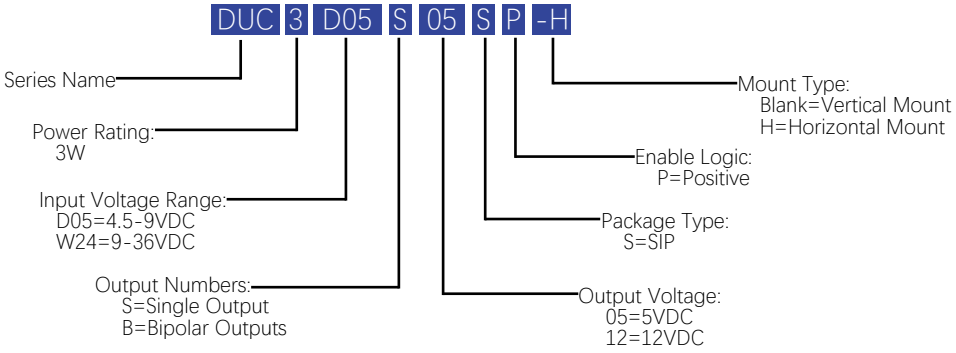
Model Numbering



Absolute Maximum Ratings

Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage	5 Vin type			11	VDC
	24 Vin type			50	VDC
On/Off Remote Control	Referred to -Vin			40	VDC
Remote Control Source Current		0		1.5	mA
Remote Control Sink Current		0		1.5	mA
Operating Environment Temperature		-40		85	°C
Storage Temperature Range		-50		125	°C
Soldering Temperature	Wave soldering < 10s			300	°C
Relative Humidity		5		95	%RH

General Specifications

Parameters	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input to output, 1mA, 1 minute			3000	VDC
Isolation Resistance	Input to output, Viso=500VDC	1			GΩ
Isolation Capacitance	Input to output, 100KHz/1V		80		pF
Case Temperature Above Ambient			15		℃
Remote On/Off Control	Positive Logic, ON state	Open or 3.6 ≤ Vr ≤ 15			VDC
	Positive Logic, OFF state	Short or 0 ≤ Vr ≤ 0.4			VDC
Switching Frequency			300		KHz
Cooling	Free air convection				

Input Specifications

Parameters	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	As shown in the "Models Selections"				
Power Loss @ No Load			0.3		W

Output Specifications

Parameters	Conditions	Min.	Typ.	Max.	Units
Vout Accuracy	Positive output	-3.0		+3.0	%
Line Regulation		-2		+2	%
Load Regulation	10% to 100% load, single output	0		+4	%
Temperature Coefficient		-0.02		+0.02	% of Vout /°C
Output Short Protection	Continuous, auto-recover				
Ripple & Noise ①			50	100	mV Pk-Pk
Minimum Load ②		0			%

Notes

① Ripple & noise is tested with certain filter parameters, please see output ripple & noise in technical notes on page 5 for more details.

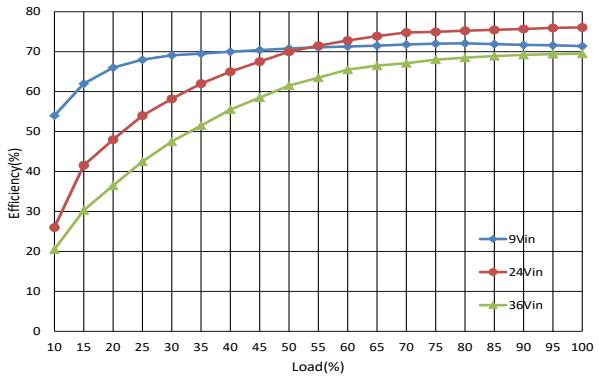
② Operating below 10% load will not harm the converter, but specifications may not be met, such as the output voltage may be higher than rated output voltage.

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

Performance Data

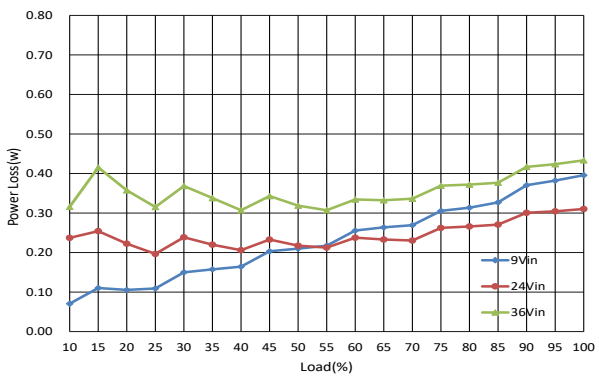
EFFICIENCY VS LOAD

±5Vout Module

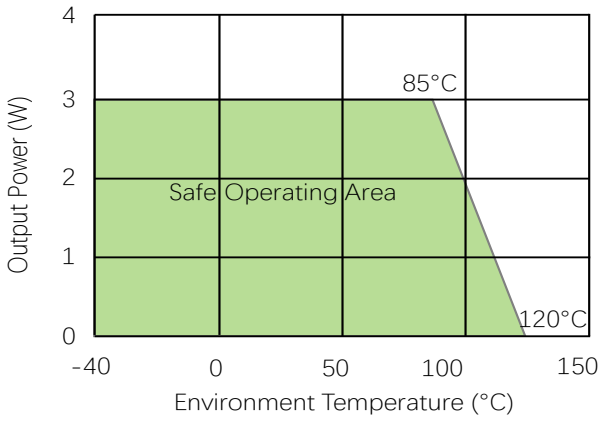


POWER LOSS VS LOAD

±5Vout Module

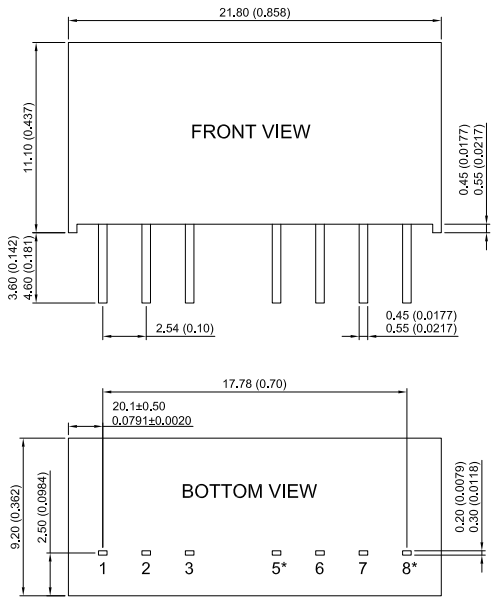


TEMPERATURE DERATING



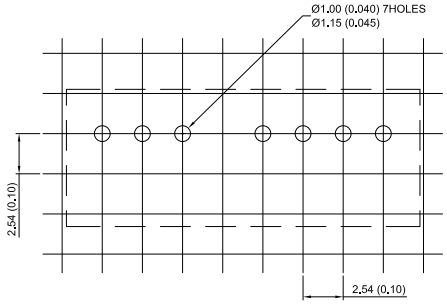
Mechanical Specifications

DUC3D/W TYPE



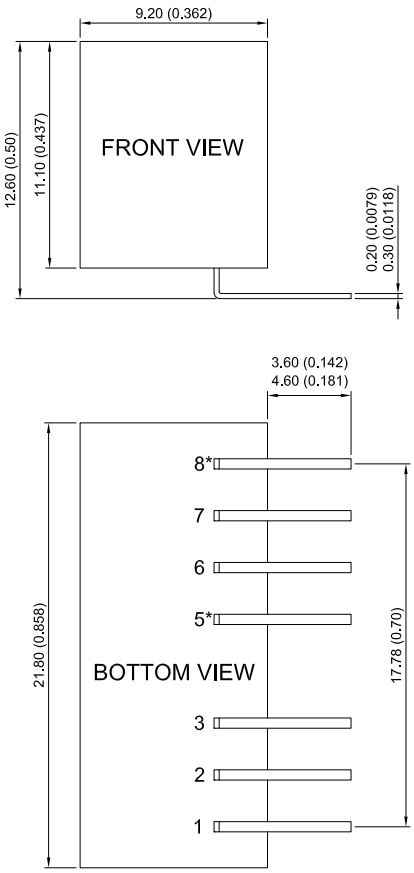
Unless otherwise specified, all dimensions are in mm±0.25 (inches ±0.01).

RECOMMENDED FOOTPRINT DETAILS

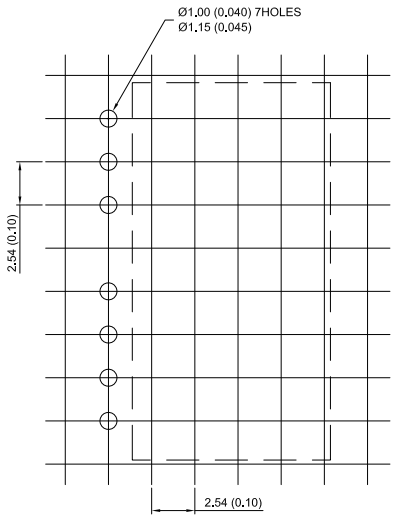


Unless otherwise specified, all dimensions are in mm ±0.5 (inches±0.02).

DUC3D/W-H TYPE



RECOMMENDED FOOTPRINT DETAILS



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

*Pin can not connect with any external circuit.

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 DUC3D/W 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

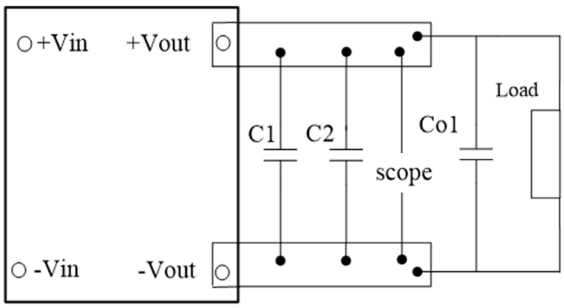


Figure 1· Single Output Type

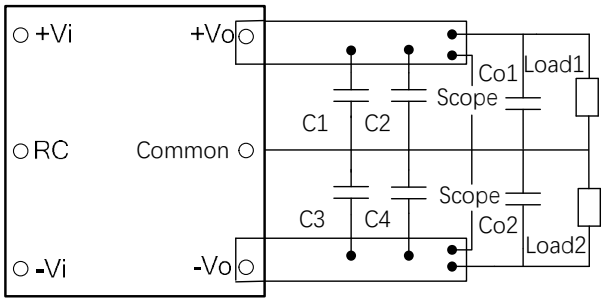


Figure 2· Bipolar Outputs Type

These DUC3D/W 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

DUC3D/W 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. DUC3D/W series adpot positive logic control. Recommend to use optocoupler to control remote pin as below.

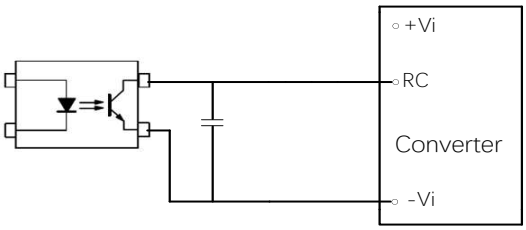


Figure 3· Remote Control Circuit

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 -Vi, recommended capacitor value is 100-1000pF.