

Standard



Size: 2.4in x 2.28in x 0.5in

Standard with Heatsink ("H" Suffix)



Size: 3.35in x 2.4in x 1.27in

Terminal Block ("T" Suffix)



Size: 3.35in x 2.4in x 1.47in

Terminal Block w/ EMC Filter ("TF1" Suffix)



Size: 4in x 3.5in x 3.5in

OPTIONS

- Pin Length
- Sync Pin
- Case Pin
- Heatsinks
- Thru-Hole Inserts
- Negative Logic Remote On/Off
- Terminal Block
- Terminal Block with Integrated EMC Filter (EN55032 Class A)

APPLICATIONS

- Wireless Network
- Telecom/Datacom
- Industry Control Systems
- Semiconductor Equipment
- Distributed Power Architectures
- Military Applications

FEATURES

- Soft Start
- 2:1 Wide Input Voltage Ranges
- 132~196 Watts output Power
- Single Outputs Ranging from 3.3VDC to 48VDC
- Output Current up to 40A
- High Efficiency up to 93%
- IEC/EN/UL62368-1 Safety Approvals

- No Minimum Load Requirements
- Industry Standard Half-Brick Footprint
- Remote On/Off Control
- Threaded Inserts and Thru-Hole Inserts Available
- Short Circuit, Over Voltage, Over Current, and Over Temperature Protection
- RoHS II & Reach Compliant
- Several Mechanical Options Available

DESCRIPTION

The DCHB150 series of DC/DC power converters provides up to 196 Watts of output power in an industry standard half-brick package and footprint. This series consists of single output models ranging from 3.3VDC to 48VDC with 2:1 wide input voltage ranges. These converters feature high efficiency, and have short circuit, over voltage, over current, and over temperature protection. The DCHB150 series is RoHS compliant and has IEC/EN/UL62368-1 safety approvals. Several different options are available for this series including negative remote on/off control, terminal block, pin length, heatsinks, sync pin, case pin, conformal coating and thru-hole inserts. Please call factory for more details.

MODEL SELECTION TABLE

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise	No Load Input Current	Output Power	Maximum Capacitive Load	Efficiency
			Min Load	Max Load					
DCHB150-12S3.3	12VDC (9-22VDC)	3.3 VDC	0mA	40A	75mVp-p	30mA	132W	121000µF	88%
DCHB150-12S05		5 VDC	0mA	28A	75mVp-p	50mA	140W	56000µF	90%
DCHB150-12S12	12VDC (8.5-22VDC)	12 VDC	0mA	12A	100mVp-p	50mA	144W	10000µF	91%
DCHB150-12S15		15 VDC	0mA	9.5A	100mVp-p	80mA	142.5W	6300µF	91%
DCHB150-12S24		24 VDC	0mA	6A	200mVp-p	60mA	144W	2500µF	90%
DCHB150-12S28		28 VDC	0mA	5A	200mVp-p	60mA	140W	1700µF	91%
DCHB150-12S48		48 VDC	0mA	3A	300mVp-p	80mA	144W	620µF	90%
DCHB150-24S3.3	24VDC (16.5-36VDC)	3.3 VDC	0mA	40A	75mVp-p	20mA	132W	121000µF	90%
DCHB150-24S05		5 VDC	0mA	30A	75mVp-p	30mA	150W	60000µF	91%
DCHB150-24S12		12 VDC	0mA	13A	100mVp-p	35mA	156W	10800µF	92%
DCHB150-24S15		15 VDC	0mA	10A	100mVp-p	35mA	150W	6600µF	92%
DCHB150-24S24		24 VDC	0mA	6.5A	200mVp-p	35mA	156W	2700µF	93%
DCHB150-24S28		28 VDC	0mA	5.5A	200mVp-p	50mA	154W	1900µF	93%
DCHB150-24S48		48 VDC	0mA	3.3A	300mVp-p	50mA	158.4W	680µF	92%
DCHB150-48S3.3	48VDC (33-75VDC)	3.3 VDC	0mA	45A	75mVp-p	20mA	148.5W	136000µF	91%
DCHB150-48S05		5 VDC	0mA	34A	75mVp-p	20mA	170W	68000µF	92%
DCHB150-48S12		12 VDC	0mA	16A	100mVp-p	25mA	192W	13300µF	92%
DCHB150-48S15		15 VDC	0mA	13A	100mVp-p	25mA	195W	8600µF	93%
DCHB150-48S24		24 VDC	0mA	8A	200mVp-p	25mA	192W	3300µF	92%
DCHB150-48S28		28 VDC	0mA	7A	200mVp-p	25mA	196W	2500µF	92%
DCHB150-48S48		48 VDC	0mA	4A	300mVp-p	25mA	192W	830µF	92%
DCHB150-48S53		53 VDC	0mA	3.7A	300mVp-p	25mA	196W	690µF	92%

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION			TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS								
Operating Input Voltage Range	12VDC nominal input models		3.3 & 5VDC models		9	12	22	VDC
			Others		8.5	12	22	
	24VDC nominal input models				16.5	24	36	
	48VDC nominal input models				33	48	75	
Start-Up Voltage	12VDC nominal input models						9	VDC
	24VDC nominal input models						18	
	48VDC nominal input models						34	
Shutdown Voltage	12VDC nominal input models				7.3	7.7	8.1	VDC
	24VDC nominal input models				15.5	16	16.3	
	48VDC nominal input models				31.6	32	32.5	
Input Surge Voltage (1 Sec)	12VDC nominal input models						30	VDC
	24VDC nominal input models						50	
	48VDC nominal input models						100	
Input Current	No Load				See Table			
Sync Pin Signal					-0.3		5.6	VDC
Input Filter ⁽¹⁾					Pi Type			
OUTPUT SPECIFICATIONS								
Output Voltage					See Table			
Voltage Accuracy					-1.0		+1.0	%
Line Regulation	Low line to high line at full load				-0.1		+0.1	%
Load Regulation	No load to full load				-0.1		+0.1	%
Voltage Adjustability	Maximum output deviation is inclusive of remote sense				-20		+10	%
Remote Sense ⁽²⁾	% of Vout(nom)						10	%Vo
Output Power					See Table			
Output Current					See Table			
Minimum Load					0			%
Maximum Capacitive Load					See Table			
Ripple & Noise (20MHz bandwidth)	With a 1μF/25V X7R MLCC and a 22μF/25V POS-CAP		3.3V/5V		See Table			
	With a 1μF/25V X7R MLCC and a 22μF/25V POS-CAP		12V/15V					
	With a 4.7μF/50V X7R MLCC		24V/28V					
	With a 2.2μF/100V X7R MLCC		48V/53V					
Transient Response Recovery Time	25% load step change					200	250	μS
Start-Up Time	Power Up	Constant resistive load				75		mS
	Remote On/Off					75		
Temperature Coefficient					-0.02		+0.02	%/°C
REMOTE ON/OFF CONTROL ⁽³⁾								
Positive Logic (Standard)	DC/DC ON				Open or 3~12VDC			
	DC/DC OFF				Short or 0~1.2VDC			
Negative Logic (Optional)	DC/DC ON				Short or 0~1.2VDC			
	DC/DC OFF				Open or 3~12VDC			
Input Current of CTRL Pin					-0.5		1	mA
Remote OFF Input Current						3		mA
PROTECTION								
Short Circuit Protection					Continuous, Automatic Recovery			
Over Load Protection	% of Iout rated; Hiccup mode				120		150	%
Over Voltage Protection	% of Vout(nom); Hiccup mode				115		130	%
Over Temperature Protection						+120		°C
ENVIRONMENTAL SPECIFICATIONS								
Operating Case Temperature					-40		+115	°C
Maximum Case Temperature							+115	°C
Storage Temperature	Terminal Block Type				-40		+105	°C
	Others				-55		+125	
Thermal Impedance ⁽⁶⁾	Module without Assembly Option					6.1		°C/W
	Only mount on the iron base-plate					2.8		
	With 0.24" Heatsink					5.1		
	With 0.45" Heatsink					4.6		
	With 0.65" Heatsink					3.5		
	With 1" Heatsink					2.7		
Thermal Shock					MIL-STD-810F			
Vibration					MIL-STD-810F			
Relative Humidity					5		95	%
MTBF	MIL-HDBK-217F, Full Load					381,800		

SPECIFICATIONS

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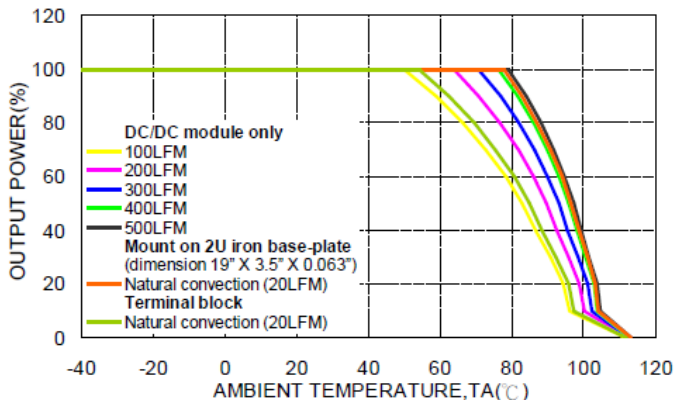
SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
GENERAL SPECIFICATIONS						
Efficiency	Nominal input voltage and full load		See Table			
Switching Frequency			225	250	275	kHz
Isolation Voltage	1 minute	Input to Output	3000			VDC
		Input (Output) to Case	1600			
Isolation Resistance	500VDC		1			GΩ
Isolation Capacitance					2500	pF
PHYSICAL SPECIFICATIONS						
Weight	Standard		3.70oz (105g)			
	"T" suffix models		8.29oz (235g)			
	"TF1" suffix models		10.12oz (287g)			
Dimensions (L x W x H)	Standard		2.4x2.28x0.5 inches (61x57.9x12.7 mm)			
	"T" suffix models		3.35x2.4x1.27 inches (85x61x32.3 mm)			
	"TF1" suffix models		4x3.5x3.5 inches (101.6x88.9x88.9 mm)			
Case Material			Metal			
Base Material			FR4 PCB			
Potting Material			Silicone (UL94 V-0)			
SAFETY & EMC CHARACTERISTICS						
Safety Approvals			IEC/EN/UL62368-1 ⁽⁴⁾		CB: UL (Demko)	
EMI ⁽⁵⁾	EN55032	"TF1" suffix models	Class A			
		Other models; with external components	Class A, Class B			
EMS	EN55024					
ESD	EN61000-4-2	Air ±8KV and Contact ±6KV	Perf. Criteria A			
Radiated Immunity	EN61000-4-3	20V/m	Perf. Criteria A			
Fast Transient ⁽⁶⁾	EN61000-4-4	±2KV	Perf. Criteria A			
Surge ⁽⁶⁾	EN61000-4-5	EN55024 ±2KV	Perf. Criteria A			
Conducted Immunity	EN61000-4-6	10Vr.m.s	Perf. Criteria A			
Power Frequency Magnetic Field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A			

NOTES

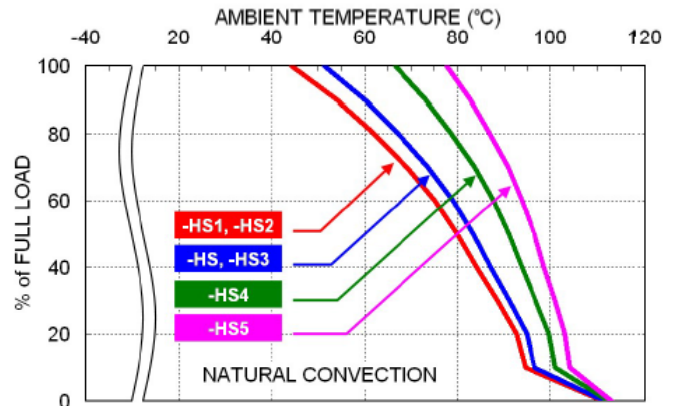
- (1) Input Source Impedance: These converters will meet all listed specifications without external components assuming that the source voltage has very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the converter. Since real-world voltage sources have finite impedance, performance can be improved by adding an external filter capacitor. We recommend Nippon chemi-con KY series, 100μF/100V, ESR 110mΩ.
 - (2) If remote sense is not being used, Sense pins should be connected to corresponding polarity OUTPUT pins.
 - (3) Referred to -Vin pin
 - (4) This product is Listed to applicable standards and requirements by UL.
 - (5) Connecting four screw bolts to shield plane will help to reduce the EMI.
 - (6) With 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220μF/100V)
- CAUTION:** This power converter is not internally fused. An input line fuse must always be used
Due to advances in technology, specifications subject to change without notice.

DERATING CURVES

DCHB150-48S05 Derating Curve

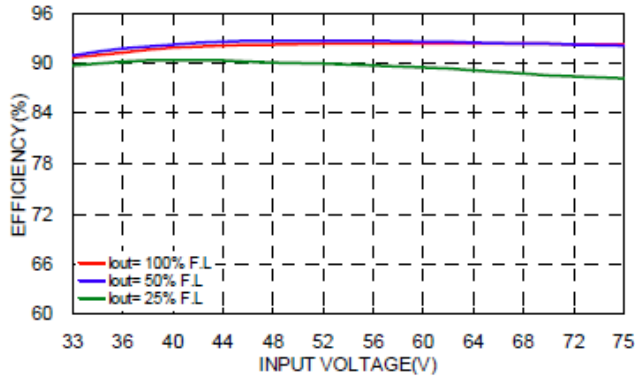


DCHB150-48S05 Derating Curve With Height Heat-Sink

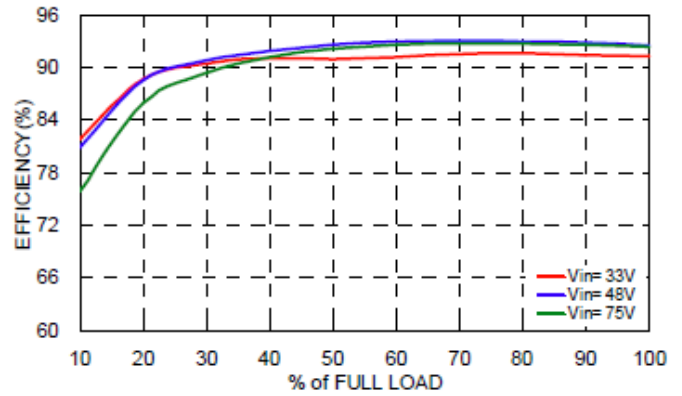


EFFICIENCY GRAPHS

DCHB150-48S05 Efficiency vs. Input Voltage

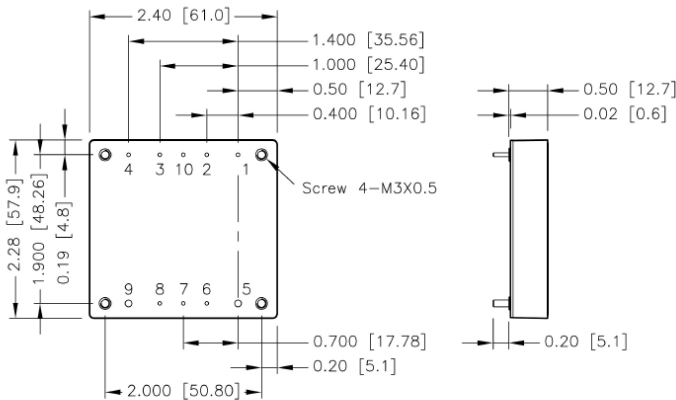


DCHB150-48S05 Efficiency vs. Output Load



MECHANICAL DRAWINGS

Standard Model



BOTTOM VIEW

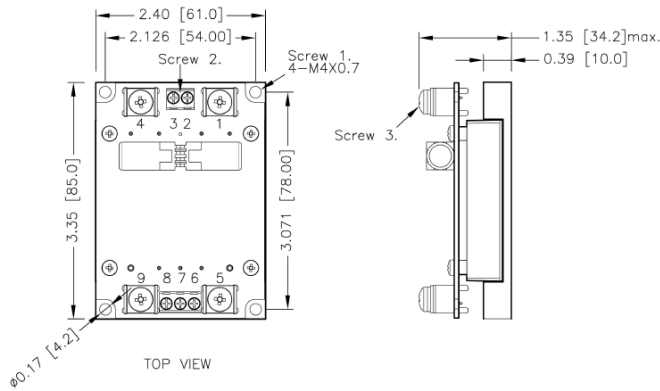
- All dimensions in inch (mm)
- Tolerance: $x.xx \pm 0.02$ ($x.x \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
- Pin pitch tolerance ± 0.01 (0.25)
- Pin dimension tolerance ± 0.004 (0.1)

The screw locked torque: MAX 5.0kgf-cm (0.49N-m)

PIN CONNECTION

PIN	DEFINE	DIAMETER
1	-Vin	0.04 Inch
2	Case (option)	0.04 Inch
3	Ctrl	0.04 Inch
4	+Vin	0.04 Inch
5	-Vout	0.08 Inch
6	-Sense	0.04 Inch
7	Trim	0.04 Inch
8	+Sense	0.04 Inch
9	+Vout	0.08 Inch
10	Sync (option)	0.04 Inch

DCHB150-xxSxx-T

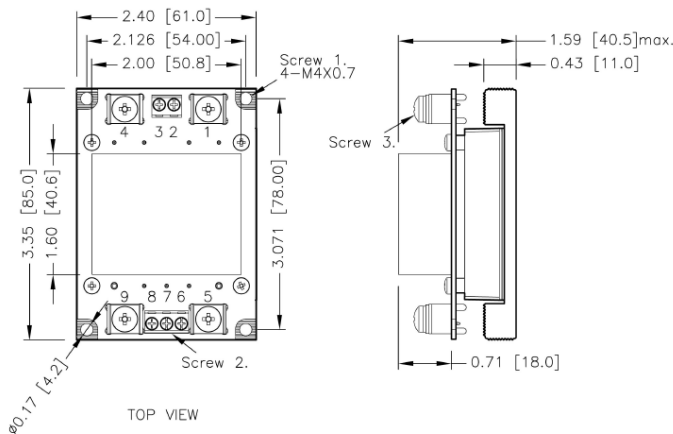


TERMINAL CONNECTION

NO.	DEFINE
1	-Vin
2	NC
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

1. All dimensions in inch (mm)
2. Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
3. The screw 1 locked torque: MAX 11.2kgf-cm(1.10N-m)
4. The screw 2 locked torque: MAX 5.2kgf-cm(0.51N-m)
5. The screw 3 locked torque: MAX 16.8kgf-cm(1.65N-m)
6. Screw 2 : M2.6
Screw 3: M5

DCHB150-xxSxx-TF1



TERMINAL CONNECTION

NO.	DEFINE
1	-Vin
2	NC
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

1. All dimensions in inch (mm)
2. Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
3. The screw 1 locked torque: MAX 11.2kgf-cm(1.10N-m)
4. The screw 2 locked torque: MAX 5.2kgf-cm(0.51N-m)
5. The screw 3 locked torque: MAX 16.8kgf-cm(1.65N-m)
6. Screw 2 : M2.6
Screw 3: M5

FUSE CONSIDERATION

This power module is not internally fused. An input line fuse must always be used.

This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture.

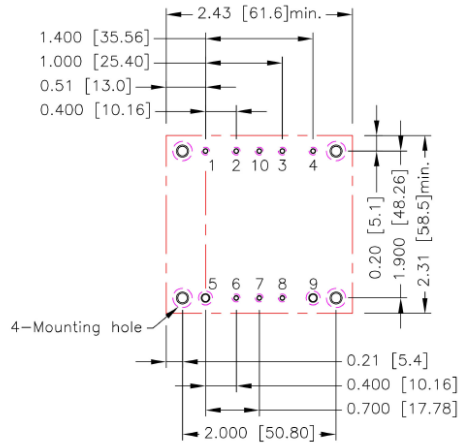
To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.

Suggested input line fuse below :

Model	Fuse Rating (A)	Fuse Type
12VDC nominal input models	25	Fast-Acting
24VDC nominal input models	15	Fast-Acting
48VDC nominal input models	10	Fast-Acting

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

RECOMMENDED PAD LAYOUT



All dimensions in inch[mm]

Pad size(lead free recommended)

Through hole 1,2,3,4,6,7,8,10: $\Phi 0.051[1.30]$ Through hole 5,9: $\Phi 0.091[2.30]$

Through hole of mounting: $\Phi 0.126[3.20]$

Top view pad 1,2,3,4,6,7,8,10: $\Phi 0.064[1.63]$ Top view pad 5,9: $\Phi 0.113[2.88]$

Top view pad of mounting: $\Phi 0.157[4.00]$ Bottom view pad 1,2,3,4,6,7,8,10:

$\Phi 0.102[2.60]$ Bottom view pad 5,9: $\Phi 0.181[4.60]$

Bottom view pad of mounting: $\Phi 0.252[6.40]$

THERMAL CONSIDERATION

The power module operates in a variety of thermal environments.

However, sufficient cooling should be provided to help ensure reliable operation of the unit.

Heat is removed by conduction, convection, and radiation to the surrounding Environment.

Proper cooling can be verified by measuring the point as the figure below.

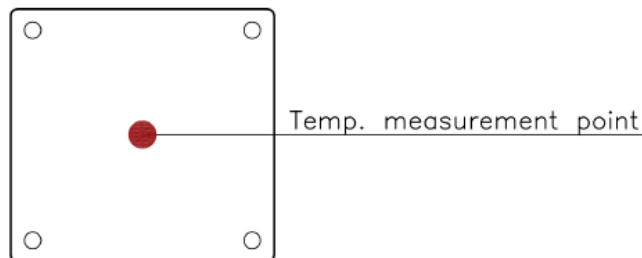
The temperature at this location should not exceed "Maximum case temperature".

When Operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature".

You can limit this Temperature to a lower value for extremely high reliability.

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

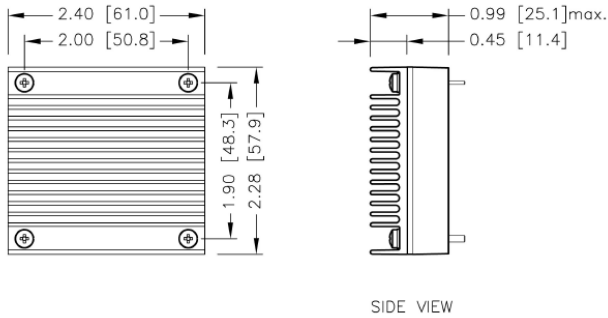
- Thermal test condition with vertical direction by natural convection (20LFM).
- The iron base-plate dimension is 19" X 3.5" X 0.063" (The height is EIA standard 2U).
- The heat-sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F, 7GA0127P01-F, 7GA0128P01-F.



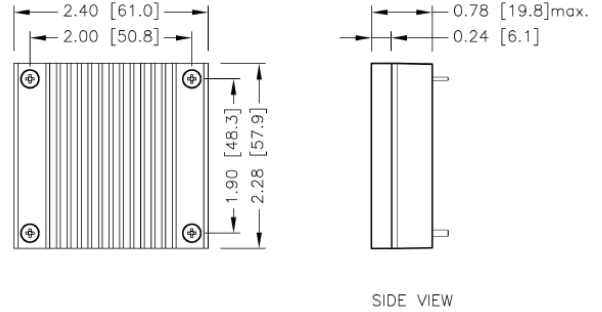
BASE PLATE

HEATSINK OPTIONS

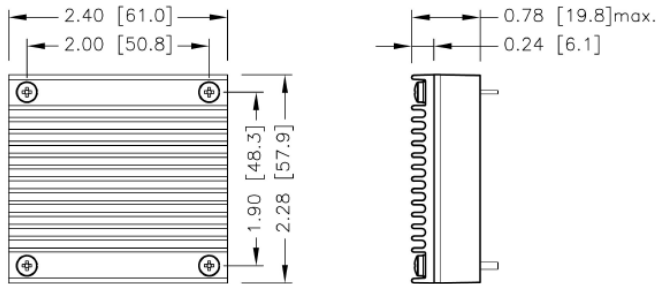
-H Suffix (7G-0021A-F)



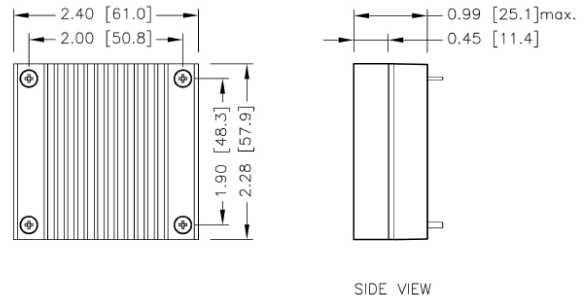
-H1 Suffix (7G-0022A-F)



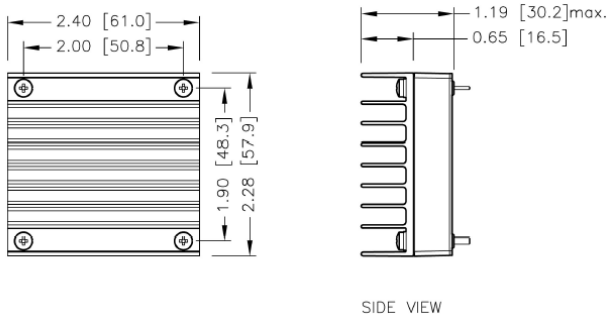
-H2 Suffix (7G-0023A-F)



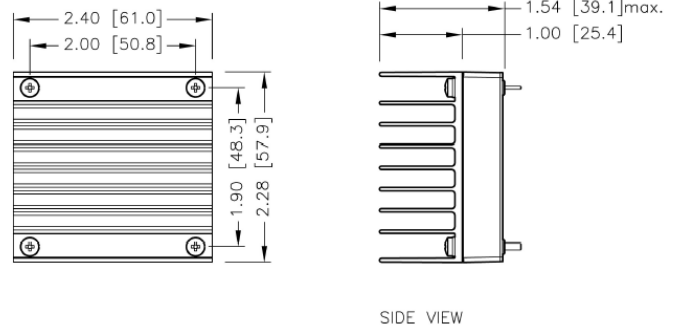
-H3 Suffix (7G-0024A-F)



-H4 Suffix (7GA0127P01-F)



-H5 Suffix (7GA0128P01-F)



1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]

OUTPUT VOLTAGE ADJUSTMENT

Output voltage is adjustable for 10% trim up or -20% trim down of nominal output voltage by connecting an external resistor between the Trim pin and either the +Sense or -Sense pins.

With an external resistor between the Trim and -Sense pin, the output voltage set point decreases.

With an external resistor between the Trim and +Sense pin, the output voltage set point increases.

Maximum output deviation is +10% inclusive of remote sense.

The external Trim resistor needs to be at least 1/8W of rated power.

Trim Up Equation

$$R_U = \left(\frac{V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{100 + 2\Delta\%}{\Delta\%} \right) k\Omega$$

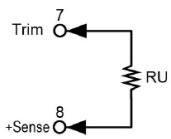
Trim Down Equation

$$R_D = \left(\frac{100}{\Delta\%} - 2 \right) k\Omega$$

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below. Trim-up

Trim-up



3.3V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.630
RU (k Ω)	170.082	85.388	57.156	43.041	34.571	28.925	24.892	21.867	19.515	17.633

5V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50
RU (k Ω)	310.245	156.163	104.803	79.122	63.714	53.442	46.105	40.602	36.322	32.898

12V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20
RU (k Ω)	887.388	447.592	300.993	227.694	183.714	154.395	133.452	117.745	105.528	95.755

15V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50
RU (k Ω)	1134.735	572.490	385.075	291.367	235.143	197.660	170.886	150.806	135.188	122.694

24V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40
RU (k Ω)	1876.776	947.184	637.320	482.388	389.429	327.456	283.190	249.990	224.168	203.510

28V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	28.28	28.56	28.84	29.12	29.40	29.68	29.96	30.24	30.52	30.80
RU (k Ω)	2206.571	1113.714	749.429	567.286	458.000	385.143	333.102	294.071	263.714	239.429

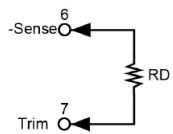
48V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	48.48	48.96	49.44	49.92	50.40	50.88	51.36	51.84	52.32	52.80
RU (k Ω)	3855.551	1946.367	1309.973	991.776	800.857	673.578	582.665	514.480	461.447	419.020

53V Models

ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	53.53	54.06	54.59	55.12	55.65	56.18	56.71	57.24	57.77	58.3
RU (k Ω)	4267.796	2154.531	1450.109	1097.898	886.571	745.687	645.055	569.582	510.880	463.918

Trim-Down

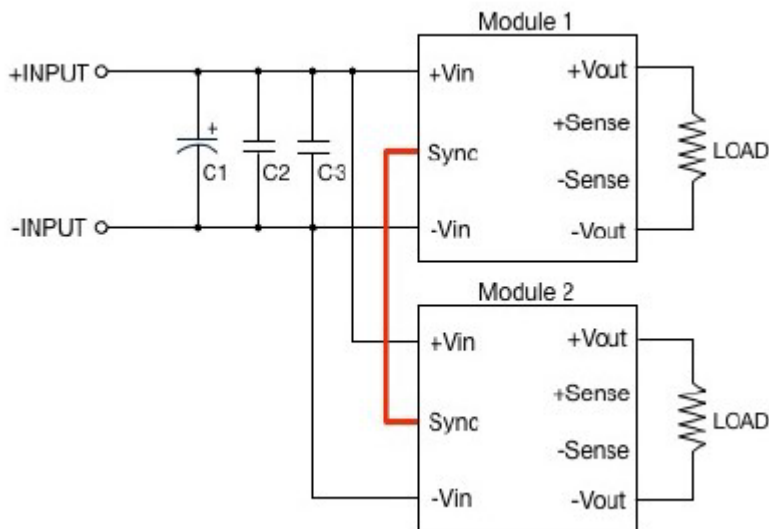


All Models

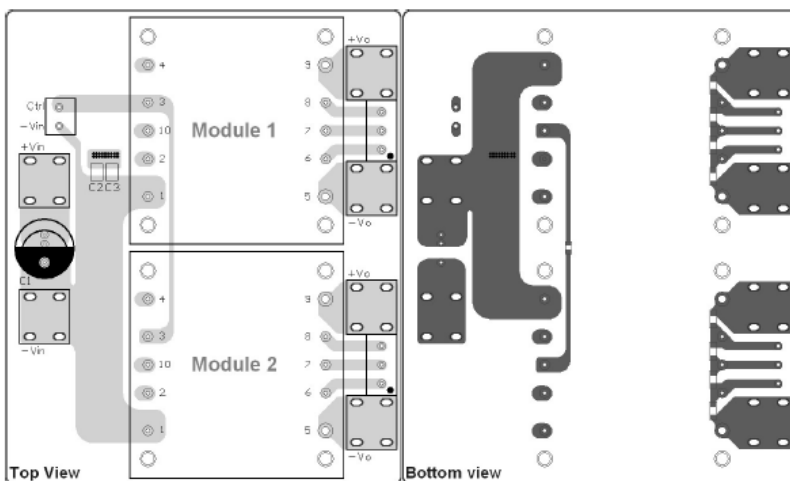
ΔV (%)	1	2	3	4	5	6	7	8	9	10
RD (k Ω)	98.000	48.000	31.333	23.000	18.000	14.667	12.286	10.500	9.111	8.000
ΔV (%)	11	12	13	14	15	16	17	18	19	20
RD (k Ω)	7.091	6.333	5.692	5.143	4.667	4.250	3.882	3.556	3.263	3.000

SYNCHRONOUS PIN

Multiple module can be synchronized together simply by connecting the module SYNC pins together.



Synchronous Circuits



Recommended Layout

"Y" Suffix Models

Component	Value	Voltage	Reference
C1	220 μ F	100V	Nippon Chemi-Con KY-Series
C2, C3	2.2 μ F	100V	1812 MLCC

- Care should be taken to ensure the ground potential differences between modules are minimized.
- All of the modules in this configuration will be synchronized to the highest frequency module.
- Up to three modules can be synchronized using this technique.

MODEL NUMBER SETUP

DIP Type

DCHB	150	-	24	S	12	P
Series Name	Output Power		Input Voltage	Output Quantity	Output Voltage	Remote On/Off & Pin Length
	150: 150 Watts		12: 8.5~22 VDC 9~22 VDC 24: 16.5~36 VDC 48: 33~75 VDC	S: Single	3.3: 3.3 VDC 05: 5 VDC 12: 12 VDC 15: 15 VDC	None: positive Logic, 0.200" pin length S: positive Logic, 0.145" pin length R: negative Logic, 0.200" pin length RL: negative Logic, 0.145" pin length

					24: 24 VDC 28: 28 VDC 48: 48 VDC 53: 53 VDC	
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Y	C	TH	H
Sync Pin	Case Pin	Thru-Hole Inserts ⁽¹⁾	Heatsink
Blank: No Pin SY: sync pin	Blank: No Pin CP: case pin	None: threaded inserts TH: No Thread	None: no heatsink H: 0.45" vertical 7G-0021A-F H1: 0.24" horizontal 7G-0022A-F H2: 0.24" vertical 7G-0023A-F H3: 0.45" horizontal 7G-0024A-F H4: 0.65" 7GA0127P01-F H5: 1" 7GA0128P01-F

Wall Mounted Type

DCHB	150	-	24	S	12	P
Series Name	Output Power		Input Voltage	Output Quantity	Output Voltage	Ctrl and Pin Options
	150: 150 Watts		12: 8.5~22 VDC 9~22 VDC 24: 16.5~36 VDC 48: 33~75 VDC	S: Single	3.3: 3.3 VDC 05: 5 VDC 12: 12 VDC 15: 15 VDC 24: 24 VDC 28: 28 VDC 48: 48 VDC 53: 53 VDC	None: positive Logic, 0.200" pin length R: negative Logic, 0.200" pin length

TF1	R
Assembly Options	Conformal Coating Options
T: Without EMC Filter TF1: Integrated EMC filter and meets EN55032 Class A can be connected to PE	None: None T: Conformal Coating

NOTES

1. The module can't equip Heat-Sink with TH option
2. No Y and C function for terminal block type, and terminal block type only for 0.200" pin length.

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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