

Features

- 4:1 Wide Input Range
- Operating Temperature Range: -40~105°C
- Approved to cURus, UKCA, CE, RoHS & REACH
- Safety Standards to IEC/UL/EN62368-1 & EN50121-3-2
- Efficiency up to 91%
- EMC Class A & B
- Single output 9~160V DC
- Available with optional Heatsink



Ideal Power's 43HAE75-xyW 75W Series Pin Connection DC/DC Converters are certified to cURus, UKCA, CE, RoHS, REACH & IEC/UL/EN 62368-1, EN45545-2 Standards and comply with Efficiency Regulations. These are primarily used in ITE, Video & Audio Industries and customised solutions are available upon request.

Part Number Structure

DIP Type

43HAE75-	48	S	05	W	-	P	HS
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range		Remote On/Off Options	Assembly Options
	24: 9~36 48: 18~75 110: 43~160	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 28: 28 48: 48	4:1		<input type="checkbox"/> Negative logic; 0.20" pin length L: Negative logic; 0.145" pin length P: Positive logic; 0.20" pin length S: Positive logic; 0.145" pin length	<input type="checkbox"/> None Heat-sink type HS: 7G-7G-0021A-F; H=0.45" HS1: 7G-0022A-F; H=0.24" HS2: 7G-0023A-F; H=0.24" HS3: 7G-0024A-F; H=0.45" HS4: 7GA0127P01-F; H=0.65" HS5: 7GA0128P01-F; H=1" Through hole type TH: No thread* *The module can't equip Heat-sink with TH option.

Part Number Structure

Wall Mounted Type

43HAE75-	48	S	05	W	-	P	TF1	R
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Remote On/Off Options	Assembly Options	Conformal Coating Options	
	24: 9~36 48: 18~75 110: 43~160	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 28: 28 48: 48	4:1	<input type="checkbox"/> : Negative logic; 0.20" pin length P: Positive logic; 0.20" pin length	T: Without EMC filter TF1: Integrated EMC filter and meets EN55032 Class A can be connected to PE	<input type="checkbox"/> : None R: Conformal Coating	

The terminal block type is only for assembly of 0.20 "pin length.

Models

Model Number	Input Range	Output Voltage	Output Current @Full Load mA	Input Current @No Load mA	Efficiency %	Maximum Capacitor Load μ F
43HAE75-24S3P3W	9	3.3	20	85	87	60600
43HAE75-24S05W	9	5	15	120	88	30000
43HAE75-24S12W	9	12	6.3	185	88	5250
43HAE75-24S15W	9	15	5	185	88	3330
43HAE75-24S24W	9	24	3.2	85	87	1330
43HAE75-24S28W	9	28	2.7	85	87	960
43HAE75-24S48W	9	48	1.6	85	87	330
43HAE75-48S3P3W	18	3.3	20	60	88	60600
43HAE75-48S05W	18	5	15	60	90	30000
43HAE75-48S12W	18	12	6.3	90	90	5250
43HAE75-48S15W	18	15	5	50	89	3330
43HAE75-48S24W	18	24	3.2	50	88	1330
43HAE75-48S28W	18	28	2.7	50	88	960
43HAE75-48S48W	18	48	1.6	50	87	330
43HAE75-110S3P3W	43	3.3	20	10	89	60600
43HAE75-110S05W	43	5	15	10	91	30000
43HAE75-110S12W	43	12	6.3	10	91	5250
43HAE75-110S15W	43	15	5	10	91	3330
43HAE75-110S24W	43	24	3.2	10	90	1330
43HAE75-110S28W	43	28	2.7	10	90	960
43HAE75-110S48W	43	48	1.6	10	90	330

Input Specifications

Parameter	Conditions		Min	Typ	Max	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
	110Vin(nom)		43	110	160		
Start up voltage	24Vin(nom)		--	--	9	VDC	
	48Vin(nom)		--	--	18		
	110Vin(nom)		--	--	43		
Shutdown voltage	24Vin(nom)		7.3	7.7	8.1	VDC	
	48Vin(nom)		15.5	16	16.3		
	110Vin(nom)		33.0	34.5	36.0		
Start up time	Constant resistive load	Power up	110Vin(nom)	--	60	--	ms
		Others		--	25	--	
	Remote ON/OFF	110Vin(nom)	--	60	--		
		Others		--	25	--	
Input surge voltage	3 second, max.	24Vin(nom)	--	--	50	VDC	
		48Vin(nom)	--	--	100		
		110Vin(nom))	--	--	185		
Input filter	Pi type						
Remote ON/OFF	Referred to –Vin pin	Negative logic	DC-DC ON	Short or 0 ~ 1.2VDC			
		(standard)	DC-DC OFF	Open or 3 ~ 12 VDC			
		Positive logic	DC-DC ON	Open or 3 ~ 12 VDC			
		(standard)	DC-DC OFF	Short or 0 ~ 1.2VDC			
		Input current of Ctrl pin		-0.5		1	mA
Remote off input current			3		mA		

Output Specifications

Parameter	Conditions		Min	Typ	Max	Unit
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	% of Vout(nom) If remote sense is not being used, Sense pins should be connected to corresponding polarity OUTPUT pins.			--	10	
Ripple and noise	Measured by 20MHz bandwidth					mVp-p
	With a 4.7µF/50V X7R MLCC	3.3Vout, 5Vout	--	75	100	
	With a 4.7µF/50V X7R MLCC	12Vout, 15Vout	--	100	125	
	With a 4.7µF/50V X7R MLCC	24Vout, 28Vout	--	200	250	
	With a 2.2µF/100V X7R MLCC	48Vout	--	300	350	
Temperature coefficient			-0.02	--	+0.02	%/°C
Transient response recovery time	25% load step change		--	200	250	µs
Over voltage protection	% of Vout(nom); Hiccup mode		115	--	130	
Overload protection	% of Iout rated; Hiccup mode	110Vin(nom)	--	150	--	%
		Others	110	--	140	
Short circuit protection	Continuous, automatic recovery					

General Specifications

Parameter	Conditions		Min	Typ	Max	Unit	
Isolation voltage	1 minute (Reinforced insulation)	110Vin(nom)	Input to Output	3000	--	--	V AC
			Input (Output) to Case	1500	--	--	
	1 minute	Others	Input to Output	3000	--	--	V DC
			Input (Output) to Case	1600	--	--	
Isolation resistance	500VDC		1	--	--	GΩ	
Isolation capacitance			--	--	2500	pF	
Switching frequency			270	300	330	kHz	
Safety approvals	IEC/ EN/ UL 62368-1				UL:E193009 CB:UL(Demko)		
Standard approvals	EN50155 EN45545-2						
Case material		24Vin(nom) and 48Vin(nom) 110Vin(nom)	Aluminum base-plate with plastic case			Metal	
Base material		24Vin(nom) and 48Vin(nom)				FR4 PCB	
Potting material						Silicone (UL94 V-0)	
Weight		Module stand alone				97g (3.42oz)	
		43HAE75-□□S□□W -T				200g (7.05oz)	
		43HAE75-□□S□□W -TF1				287g (10.12oz)	
MTBF	MIL-HDBK-217F, Full load				3.362 x 10 ⁵ hrs		

Environmental Specifications

Parameter	Conditions		Min	Typ	Max	Unit
Operating base-plate temperature	Base-plate		-40	--	+105	°C
Maximum case temperature			--	--	105	°C
Over temperature protection			--	115		
Storage temperature range	Terminal block type		-40	--	+105	°C
	Others		-55	--	+125	
Thermal impedance	Module without assembly options		--	6.7	--	°C/W
	Heat-sink type with 0.24" Height		--	5.4	--	
	Heat-sink type with 0.45" Height		--	4.7	--	
	Heat-sink type with 0.65" Height		--	3.7	--	
	Heat-sink type with 1" Height		--	3.0	--	
Thermal shock					MIL-STD-810F	
Shock					EN61373, MIL-STD-810F	
Vibration					EN61373, MIL-STD-810F	
Relative humidity					5% to 95% RH	

EMC Specifications

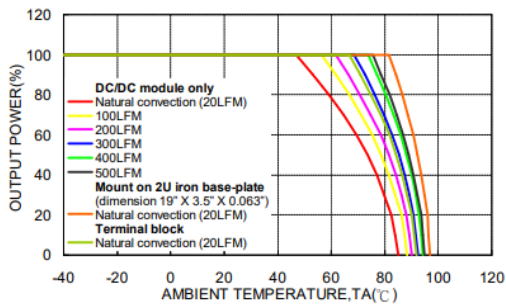
Parameter	Conditions		Level
EMI	EN55032, EN50121-3-2	43HAE75-□□S□□W-TF1	Class A
		Other models; with external components	Class A, Class B
*Connecting four screw bolts to shield plane will help to reduce the EMI.			
EMS	EN55024 and EN50121-3-2		
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV	Perf. Criteria A
	43HAE75-24S□□W	With 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V)	
	43HAE75-48S□□W		
	43HAE75-110S□□W	With 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KXJ series, 150µF/200V)	
Surge	EN61000-4-5	± 2kV	Perf. Criteria A
	43HAE75-24S□□W	With 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KY series, 220µF/100V)	
	43HAE75-48S□□W		
	43HAE75-110S□□W	With 2 pcs of aluminum electrolytic capacitor (Nippon Chemi-con KXJ series, 150µF/200V)	
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

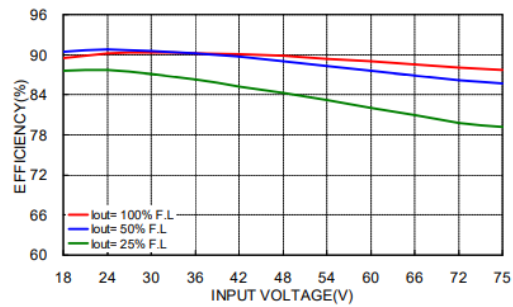
Input source impedance: The power module will operate as specifications without external components, assuming that the source voltage has a very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. Since real-world voltage source has finite impedance, performance can be improved by adding external filter capacitor. The HAE75-24S00W recommended 4.7µF/50V X7R MLCC or Nippon Chemi-con KY series, 68µF /100V or better capacitor.

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

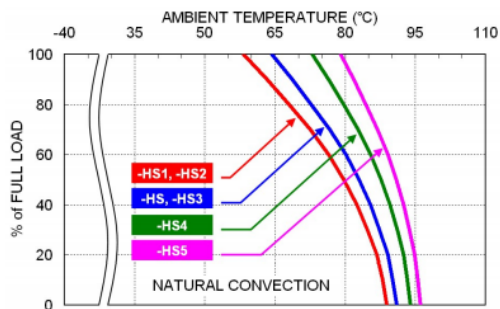
Characteristic Curve



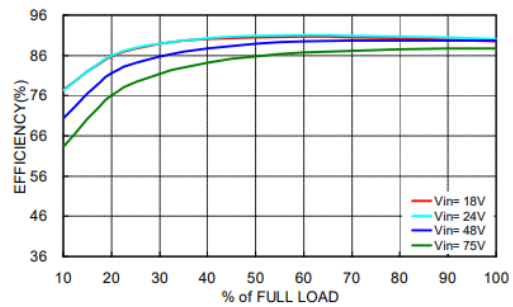
43HAE75-48S05W Derating Curve (See Thermal Considerations)



43HAE75-48S05W Efficiency vs. Input Voltage



43HAE75-48S05W Derating Curve with Heat-sink (See Thermal Considerations)



43HAE75-48S05W Efficiency vs. Output Load

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.

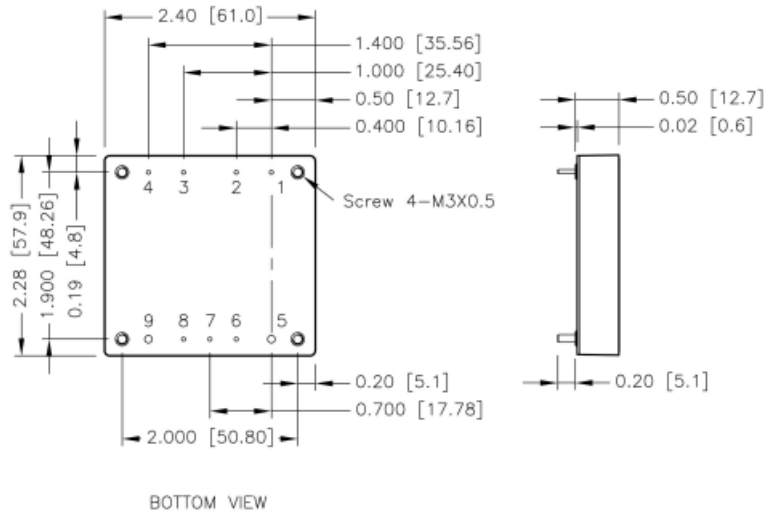
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
43HAE75-24S□□W	15	Fast-Blow
43HAE75-48S□□W	8	Fast-Blow
43HAE75-110S□□W	3.15	Slow-Blow

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

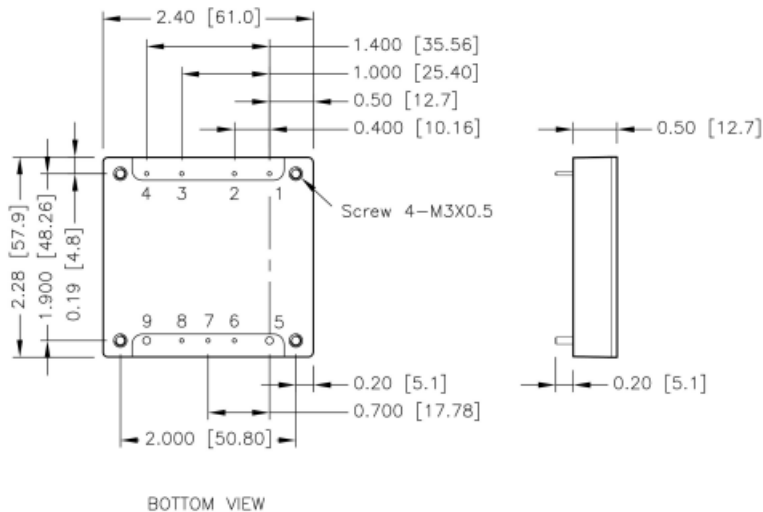
Mechanical Drawing

43HAE75-24S□□W, 43HAE75-48S□□W



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

43HAE75-110S□□W



- The screw locked torque: MAX 3.5kgf-cm/0.34N-m

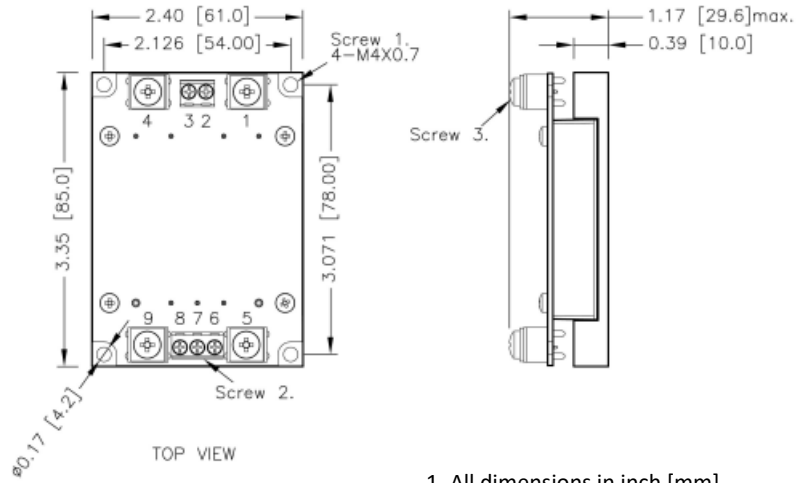
1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

Pin Connection

Pin	Define	Diameter
1	- Vin	0.04 Inch
2	Case	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

Mechanical Drawing

43HAE75-□□S□□W -T



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. Screw 1 locked torque: MAX 11.2kgf-cm/ 1.10N-m
4. Screw 2 locked torque: MAX 5.2kgf-cm/ 0.51N-m
5. Screw 3 locked torque: MAX 12.0kgf-cm/ 1.18N-m

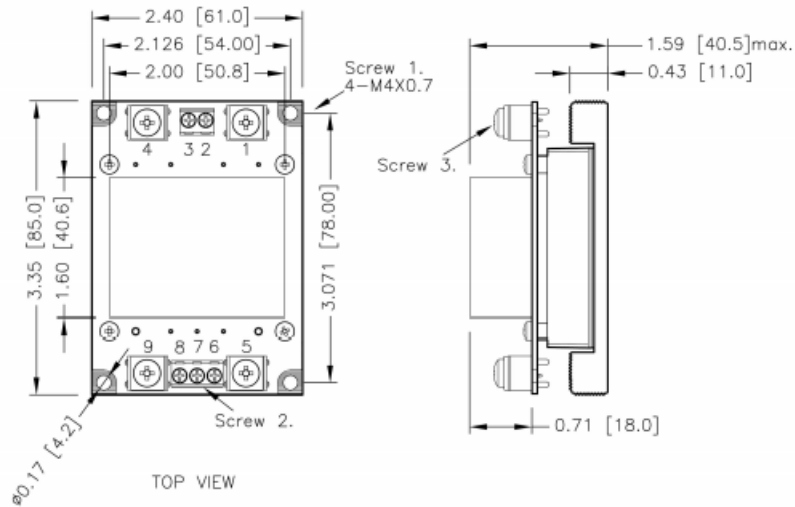
Pin Connection

TERMINAL CONNECTION : -T

Pin	Define
1	- Vin
2	Case/NC
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

Mechanical Drawing

43HAE75-□□S□□W -TF1



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. Screw 1 locked torque: MAX 11.2kgf-cm/ 1.10N-m
4. Screw 2 locked torque: MAX 5.2kgf-cm/ 0.51N-m
5. Screw 3 locked torque: MAX 12.0kgf-cm/ 1.18N-m

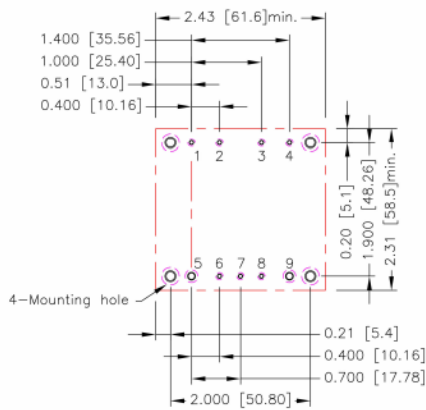
Pin Connection

TERMINAL CONNECTION : -T

Pin	Define
1	- Vin
2	NC
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

DC - DC

Recommended Pad Layout

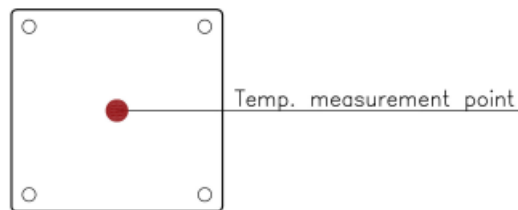


All dimensions in inch[mm]
 Pad size(lead free recommended)
 Through hole 1,2,3,4,6,7,8: $\Phi 0.051[1.30]$
 Through hole 5,9: $\Phi 0.091[2.30]$
 Through hole of mounting: $\Phi 0.126[3.20]$
 Top view pad 1,2,3,4,6,7,8: $\Phi 0.064[1.63]$
 Top view pad 5,9: $\Phi 0.113[2.88]$
 Top view pad of mounting: $\Phi 0.157[4.00]$
 Bottom view pad 1,2,3,4,6,7,8: $\Phi 0.102[2.60]$
 Bottom view pad 5,9: $\Phi 0.181[4.60]$
 Bottom view pad of mounting: $\Phi 0.252[6.40]$

Thermal Considerations

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.

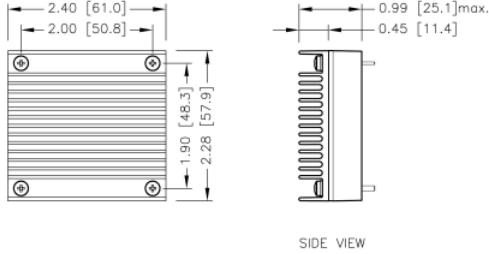
- Thermal test condition with vertical direction by natural convection (20LFM).
- The Heat-sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F, 7GA0127P01-F, 7GA0128P01-F.



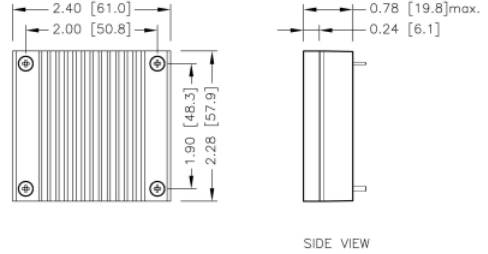
BASE PLATE

Mechanical Drawing
43HAE75-□□S□□W -HS

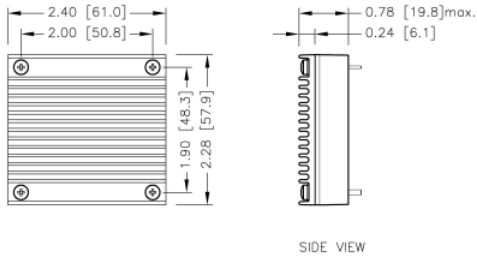
7G-0021A-F


43HAE75-□□S□□W -HS1

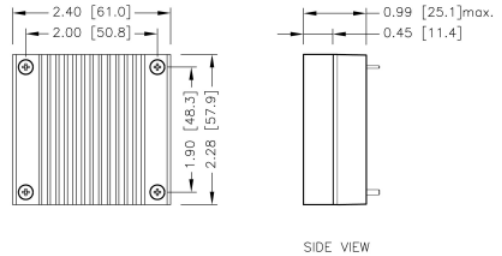
7G-0022A-F


43HAE75-□□S□□W -HS2

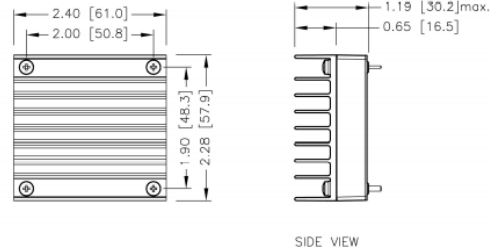
7G-0023A-F


43HAE75-□□S□□W -HS3

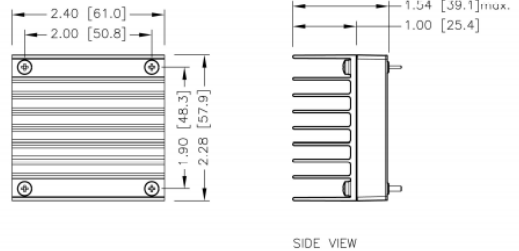
7G-0024A-F


43HAE75-□□S□□W -HS4

7GA0127P01-F


43HAE75-□□S□□W -HS5

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

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

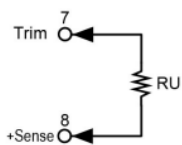
■ Trim Down Equation

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

Trim Up

EXTERNAL OUTPUT TRIMMING

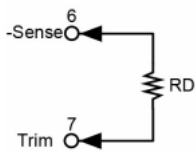
Output can be externally trimmed by using the method shown below.



□□S3P3W										
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 (kΩ)	170.082	85.388	57.156	43.041	34.571	28.925	24.892	21.867	19.515	17.633
□□S05W										
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 (kΩ)	310.245	156.163	104.803	79.122	63.714	53.442	46.105	40.602	36.322	32.898
□□S12W										
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 (kΩ)	887.388	447.592	300.993	227.694	183.714	154.395	133.452	117.745	105.528	95.755
□□S15W										
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 (kΩ)	1134.735	572.490	385.075	291.367	235.143	197.660	170.886	150.806	135.188	122.694
□□S24W										
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 (kΩ)	1876.776	947.184	637.320	482.388	389.429	327.456	283.190	249.990	224.168	203.510

Trim Up (Continued)

□□S28W										
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 (kΩ)	2206.571	1113.714	749.429	567.286	458.000	385.143	333.102	294.071	263.714	239.429
□□S48W										
	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 (kΩ)	3855.551	1946.367	1309.973	991.776	800.857	673.578	582.665	514.480	461.447	419.020

Trim Down


□□S□□W										
ΔV (%)	1	2	3	4	5	6	7	8	9	10
RD (kΩ)	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 (kΩ)	7.091	6.333	5.692	5.143	4.667	4.250	3.882	3.556	3.263	3.000