

Features

- 2:1 Input Range
- Operating Temperature Range: -40~105°C
- Approved to cURus, UKCA, CE, RoHS & REACH
- Safety Standards to IEC/UL/EN62368-1
- Efficiency up to 93%
- EMC Class A & B
- Single output 9~75V DC
- Available with optional Heatsink



Ideal Power's 43HAE100-Sxy 100W 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 the relevant Efficiency Regulations. These are primarily used in ITE, Video & Audio Industries and customised solutions are available upon request.

Part Number Structure

DIP Type

43HAE100- 48 S 05 - P HS

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Remote On/Off Options	Assembly Options
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12: 9~18
24: 18~36
48: 36~75

S: Single

3P3: 3.3
05: 5
12: 12
15: 15
24: 24
28: 28
48: 48

: 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

: 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

43HAE100-	48	S	05	-	P	TF1	R
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)		Remote On/Off Options	Assembly Options	Conformal Coating Options
	12: 9~36 24: 18~75 48: 43~160	S: Single	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 28: 28 48: 48		<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

1. 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
43HAE100-12S3P3	9 ~ 18	3.3	25	155	90	75700
43HAE100-12S05	9 ~ 18	5	20	150	91	40000
43HAE100-12S12	9 ~ 18	12	8.4	180	91	7000
43HAE100-12S15	9 ~ 18	15	6.7	180	91	4460
43HAE100-12S24	9 ~ 18	24	4.2	90	90	1750
43HAE100-12S28	9 ~ 18	28	3.6	100	90	1280
43HAE100-12S48	9 ~ 18	48	2.1	100	90	430
43HAE100-24S3P3	18 ~ 36	3.3	25	90	91	75700
43HAE100-24S05	18 ~ 36	5	20	150	93	40000
43HAE100-24S12	18 ~ 36	12	8.4	185	93	7000
43HAE100-24S15	18 ~ 36	15	6.7	185	93	4460
43HAE100-24S24	18 ~ 36	24	4.2	85	92	1750
43HAE100-24S28	18 ~ 36	28	3.6	85	92	1280
43HAE100-24S48	18 ~ 36	48	2.1	85	92	430
43HAE100-48S3P3	36 ~ 75	3.3	25	80	91	75700
43HAE100-48S05	36 ~ 75	5	20	90	93	40000
43HAE100-48S12	36 ~ 75	12	8.4	90	93	7000
43HAE100-48S15	36 ~ 75	15	6.7	90	93	4460
43HAE100-48S24	36 ~ 75	24	4.2	40	92	1750
43HAE100-48S28	36 ~ 75	28	3.6	40	92	1280
43HAE100-48S48	36 ~ 75	48	2.1	40	92	430

Input Specifications

Parameter	Conditions		Min	Typ	Max	Unit	
Operating input voltage range	24Vin(nom)		9	12	18	VDC	
	48Vin(nom)		18	24	36		
	110Vin(nom)		36	48	75		
Start-up voltage	24Vin(nom)		--	--	9	VDC	
	48Vin(nom)		--	--	18		
	110Vin(nom)		--	--	36		
Shutdown voltage	24Vin(nom)		7.3	7.7	8.1	VDC	
	48Vin(nom)		15.5	16	16.3		
	110Vin(nom)		32.5	34	35.5		
Start-up time	Constant resistive load	Power up	110Vin(nom)	--	25	--	ms
		Remote ON/OFF	110Vin(nom)	--	25	--	
Input surge voltage	1 second, max.	12Vin(nom)		--	--	36	VDC
		24Vin(nom)		--	--	50	
		48Vin(nom))		--	--	100	
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					
	With a 4.7µF/50V X7R MLCC	3.3Vout, 5Vout	--	75	--	mVp-p
	With a 4.7µF/50V X7R MLCC	12Vout, 15Vout	--	100	--	
	With a 4.7µF/50V X7R MLCC	24Vout, 28Vout	--	200	--	
	With a 2.2µF/100V X7R MLCC	48Vout	--	300	--	
Temperature coefficient			-0.02		+0.02	
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		110	--	140	%
Short circuit protection			Continuous, automatic recovery			

General Specifications

Parameter	Conditions	Min	Typ	Max	Unit
Isolation voltage	1 minute Input to Output Input (Output) to Case	3000	--	--	V AC
		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)
Case material					Metal
Base material					FR4 PCB
Potting material					Silicone (UL94 V-0)
Weight	Module stand alone				97g (3.42oz)
	43HAE100-□□S□□ -T				200g (7.05oz)
	43HAE100-□□S□□ -TF1				287g (10.12oz)
MTBF	MIL-HDBK-217F, Full load				3.311 x 10 ⁵ hrs

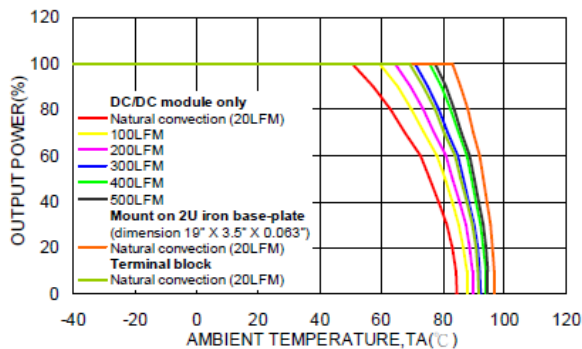
Environmental Specifications

Parameter	Conditions	Min	Typ	Max	Unit
Operating base-plate temperature		-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	--	3.6	--	
	Heat-sink type with 1" Height	--	2.9	--	
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

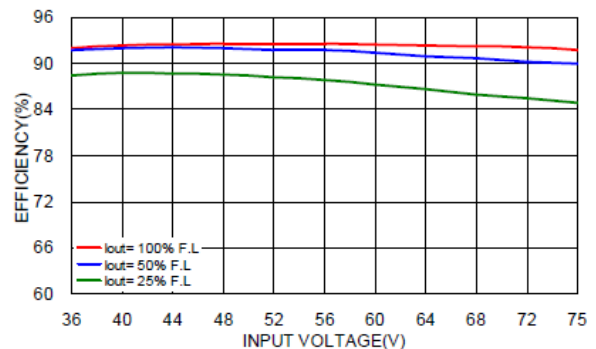
EMC Specifications

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

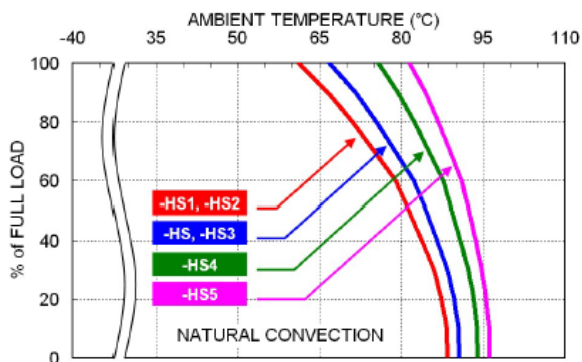
CAUTION: This power module is not internally fused. An input line fuse must always be used.

Characteristic Curve


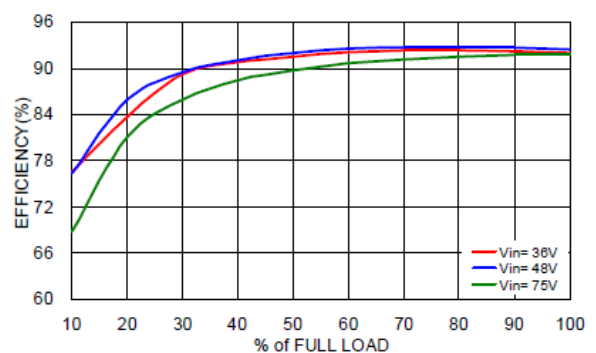
43HAE100-48S05 Derating Curve (See Thermal Considerations)



43HAE100-48S05 Efficiency vs. Input Voltage



43HAE100-48S05 Derating Curve with Heat-sink (See Thermal Considerations)



43HAE100-48S05 Efficiency vs. Output Load

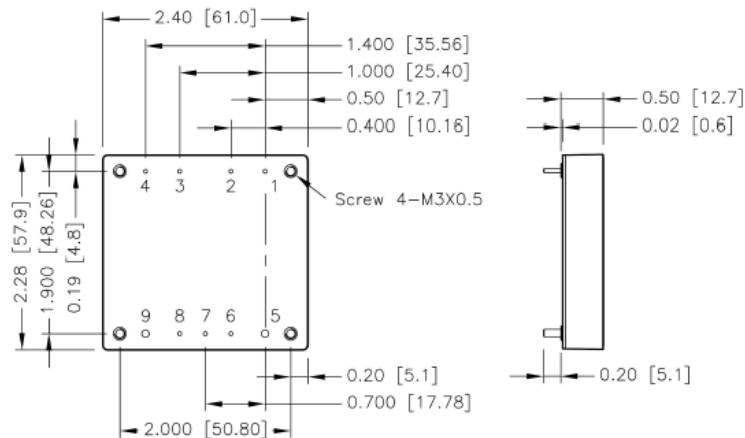
Fuse Consideration

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
43HAE100-12S□□	20	Fast-Acting
43HAE100-24S□□	10	Fast-Acting
43HAE100-48S□□	5	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



BOTTOM VIEW

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

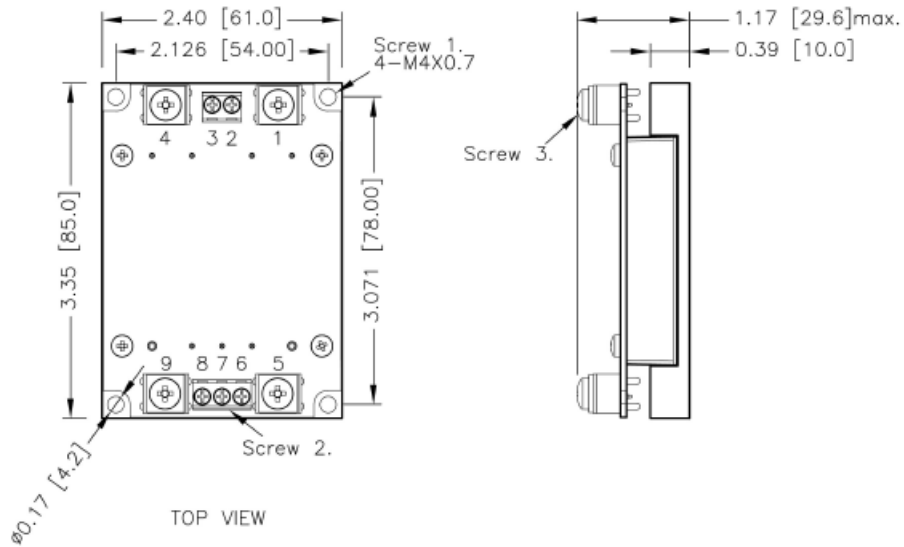
Pin Connection

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

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

Terminal Block Type Option

43HAE100-□□S□□-T



Pin Connection

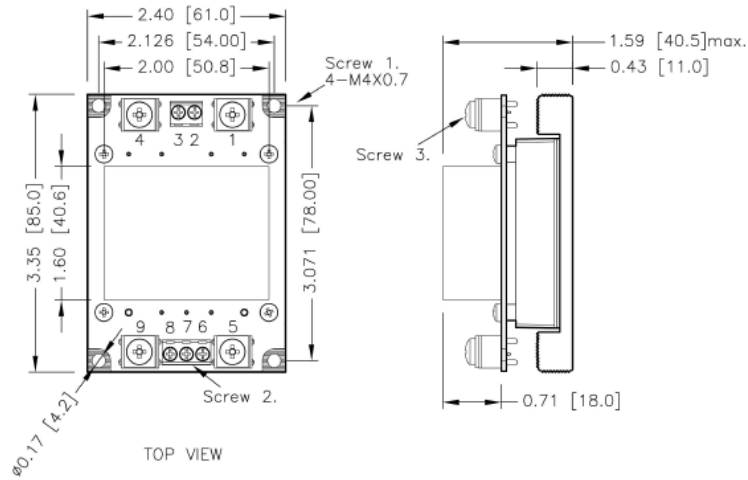
TERMINAL CONNECTION : -T

Pin	Define
1	-Vin
2	Case
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. 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

Terminal Block Type Option (Continued)

43HAE100-□□S□□-TF1

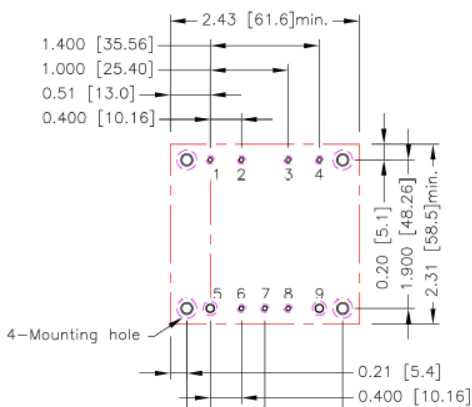


Pin Connection

TERMINAL CONNECTION : -T

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

Recommended Pad Layout

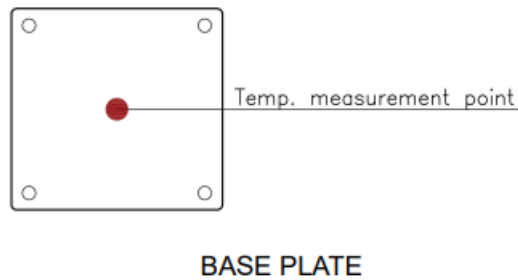


All dimensions in inch[mm]
 Pad size(lead free recommended)
 Through hole 1,2,3,4,6,7,8: $\Phi 0.051$ [1.30]
 Through hole 5,9: $\Phi 0.091$ [2.30]
 Through hole of mounting: $\Phi 0.126$ [3.20]
 Top view pad 1,2,3,4,6,7,8: $\Phi 0.064$ [1.63]
 Top view pad 5,9: $\Phi 0.113$ [2.88]
 Top view pad of mounting: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

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.

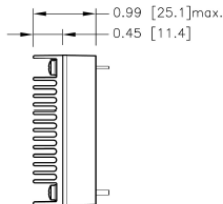
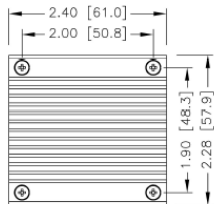
- Thermal test condition with vertical direction by natural convection (20LFM).
- The Heat-sink is optional and P/N: 7G-0021A-F, 7G-0022A-F, 7G-0023A-F, 7G-0024A-F, 7GA0127P01-F, 7GA0128P01-F.



Heat-Sink Type Options

43HAE100-□□S□□ -HS

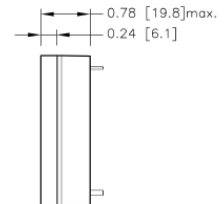
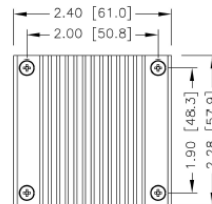
7G-0021A-F



SIDE VIEW

43HAE100-□□S□□ -HS1

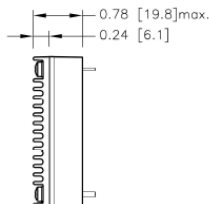
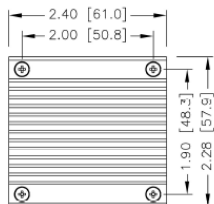
7G-0022A-F



SIDE VIEW

43HAE100-□□S□□ -HS2

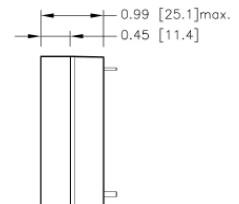
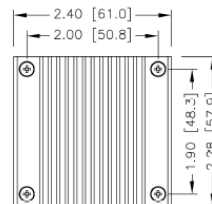
7G-0023A-F



SIDE VIEW

43HAE100-□□S□□ -HS3

7G-0024A-F

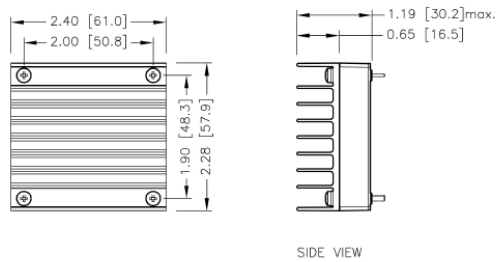


SIDE VIEW

Heat-Sink Type Options (Continued)

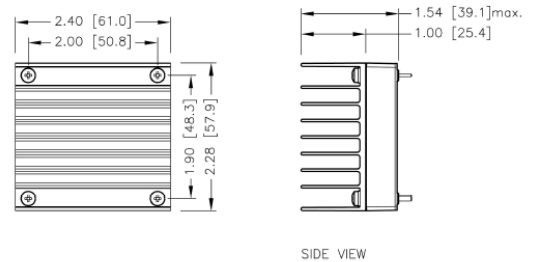
43HAE100-□□S□□ -HS4

7GA0127P01-F



43HAE100-□□S□□ -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

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

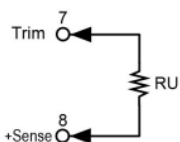
Trim Down Equation

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

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

Trim Up (Continued)
□□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

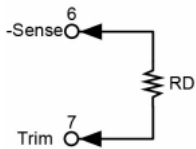
ΔV (%)	1	2	3	4	5	6	7	8	9	10
Vout (V)	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40
RU (kΩ)	1876.776	947.184	637.320	482.388	389.429	327.456	283.190	249.990	224.168	203.510

□□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