HAS60 DC-DC Series Data Sheet
60-Watt Half-Brick

RoHS Compliant

Features

- RoHS lead solder exemption compliant
- Industry standard half-brick
- Low-cost design
- Open-frame packaging
- 100 °C baseplate operation
- 24 V and 48 V inputs
- Optional enable logic
- 1500 V isolation

Description

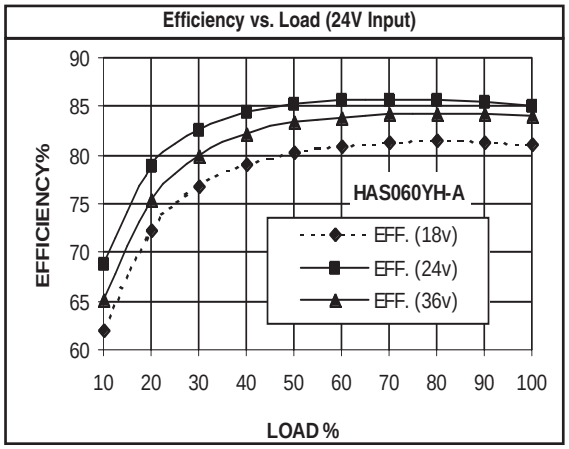
HAS dc-dc converters are low-cost, industry standard, half-brick converters. The HAS features 2:1 input voltage, excellent efficiency, and open-frame packaging technology. The HAS operates over a range of -40 °C to 100 °C and has a built-in input pi filter that helps to ensure low noise operation. Available in several input and output combinations, the HAS is designed for industrial, telecom, and networking applications.

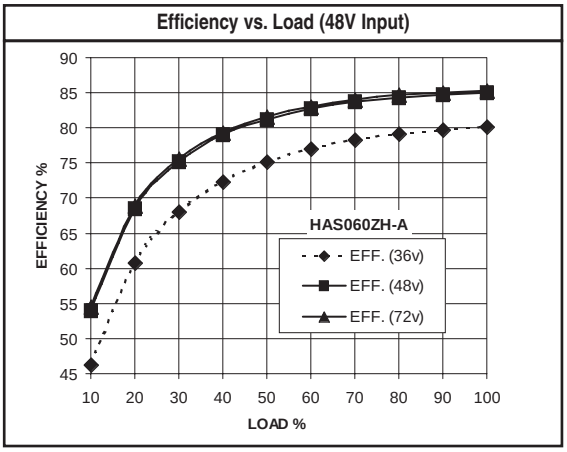
Technical Specifications

Input	
Voltage Range	
24 VDC Nominal	18 - 36 VDC
48 VDC Nominal	36 - 72 VDC
Reflected Ripple	25 mA
Input Reverse Voltage Protection	Shunt Diode

Output	
Setpoint Accuracy	±1%
Line Regulation V_{in} Min. - V_{in} Max., I_{out} Rated	±0.2% V_{out}
Load Regulation I_{out} Min. - I_{out} Max., V_{in} Nom.	±0.2% V_{out}
Remote Sense Headroom	0.5 VDC
Minimum Output Current	10 % I_{out} Rated
Dynamic Regulation, Loadstep	25% I_{out}
Pk Deviation	4% V_{out}
Settling Time	500 µs
Voltage Trim Range	±10%
Short Circuit / Overcurrent Protection	Hiccup
Current Limit Threshold Range, % of I_{out} Rated	110 - 140%
OVP Trip Range	115 - 140% V_{out} Nom.
Remote Shutdown Reference	V_{in} Negative
Shutdown Pin Current, Sourced at Off	10 mA Max.

General	
Turn-On Time	10 ms
Remote Shutdown	Positive or Negative Logic
Switching Frequency	500 kHz
Isolation	
Input - Output	1500 VDC
Input - Case	1050 VDC
Output - Case	500 VDC
Temperature Coefficient	0.03%/°C
Case Temperature	
Operating Range	-40 To +100 °C
Storage Range	-40 To +125 °C
Thermal Shutdown Range	105 To 115 °C
Humidity Max., Non-Condensing	95%
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
MTBF† (Bellcore TR-NWT-000332)	2.5 x 10^6 h
Safety	UL, cUL, TUV
Weight (approx.)	1.4 oz





Notes

† MTBF predictions may vary slightly from model to model.

Specifications typically at 25 °C, normal line, and full load, unless otherwise stated.

Soldering Conditions: I/O pins, 260 °C, ten seconds; fully compatible with commercial wave-soldering equipment.

Safety: Agency approvals may vary from model to model. Please consult factory for specific model information.

Units are water-washable and fully compatible with commercial spray or immersion post wave-solder washing equipment.

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Model Selection

MODEL	INPUT VOLTAGE (VOLTS)	INPUT VOLTAGE RANGE (VOLTS)	MAXIMUM INPUT CURRENT (AMPS)*	OUTPUT VOLTAGE (VOLTS)	RATED OUTPUT CURRENT (AMPS)	RIPPLE & NOISE pk-pk (mV)	TYPICAL EFFICIENCY**
HAS050YG-A	24	18-36	3.5	5	10	150	81%
HAS050YH-A	24	18-36	3.4	12	4.2	100	84%
HAS060ZH-A	48	36-75	2	12	5	150	85%

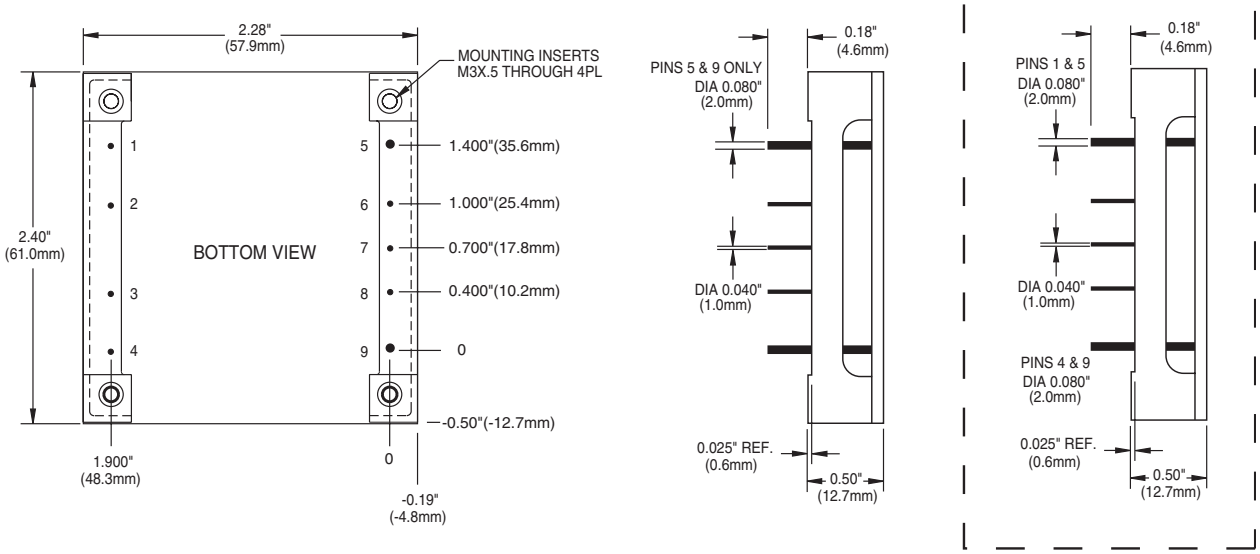
NOTES:

* Maximum input current at minimum input voltage, maximum rated output power.

** At nominal V_{in}, rated output.

Model numbers highlighted in yellow or shaded are not recommended for new designs.

Mechanical Drawing



Thermal Impedance	
Natural Convection	7.9 °C/W
100 LFM	6.8 °C/W
200 LFM	4.9 °C/W
300 LFM	3.6 °C/W
400 LFM	3.0 °C/W

Note:
Thermal impedance data is dependent on many environmental factors. The exact thermal performance should be validated for specific application.

Pin	Function
1	$-V_{in}$
2	Case
3	On/Off
4	$+V_{in}$
5	$-V_{out}$
6	-Sense
7	Trim
8	+Sense
9	$+V_{out}$

Tolerances	
Inches:	(Millimeters)
.XX ± 0.020	.X ± 0.5
.XXX ± 0.010	.XX ± 0.25
Pin:	
± 0.002	± 0.05

(Dimensions as listed unless otherwise specified.)