power-one®

Powering Communications and Technology

IES SERIES
20 WATT

DESCRIPTION

IES DC/DC converters provide up to 20 Watts of output power in an industry standard package. With 88% efficiency and a maximum case temperature of 100°C, the IES is well suited for the most demanding telecom, networking, and industrial applications. The IES features 1500 VDC isolation, short circuit, and overtemperature protection.

FEATURES

- 20W Standard Package
- 100°C Case Operation
- 3.3V Output Available
- Open Frame or Encapsulated
- 88% Efficiency at 5V
- Wide Range Input
- 1500V Isolation
- Short Circuit Protection

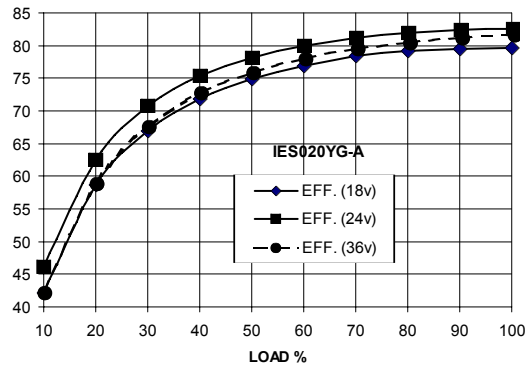
TECHNICAL SPECIFICATIONS

Input	
Voltage Range	
24 VDC Nominal	16 - 36 VDC
48 VDC Nominal	36 - 72 VDC
Input Undervoltage Lockout	<34V or <17V
UVLO Hysteresis	1V Nom.
Reflected Ripple	25 mA
Input Reverse Voltage Protection	Shunt Diode

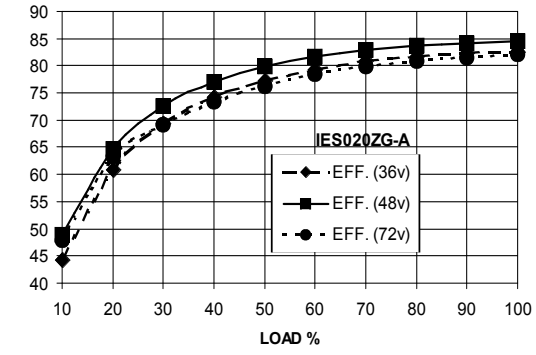
Output	
Setpoint Accuracy	±1%
Line Regulation V_{in} Min. - V_{in} Max., I_{out} Rated	0.2% V_{out}
Load Regulation I_{out} Min. - I_{out} Max., V_{in} Nom.	0.5% V_{out}
Minimum Output Current	10 %
Dynamic Regulation, Loadstep	25% I_{out}
Pk Deviation	4% V_{out}
Settling Time	500 µs
Voltage Trim Range	±10%
Short Circuit / Overcurrent Protection	Shutdown / Hiccup
Current Limit Threshold Range, % of I_{out} Rated	110 - 140%
OVP Trip Range	115 - 140% V_{out} Nom.
OVP Type	Second Control Loop, Self-Recovering

General	
Turn-On Time	10 ms
Remote Shutdown	Positive Logic
Switching Frequency	300 kHz Open Frame / 450 kHz Cased
Isolation	
Input - Output	1500 VDC
Input - Case (24 V_{in} Units)	500 VDC
Output - Case (48 V_{in} Units)	500 VDC
Temperature Coefficient	0.03%/°C
Case Temperature	
Operating Range	-40 To +100°C
Storage Range	-40 To +125°C
Humidity Max., Non-Condensing	95%
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
MTBF† (Bellcore TR-NWT-000332)	1.9 x 10^6 hrs
Safety	UL, CSA, EN60950
Weight (approx.)	1.2 oz

Efficiency vs. Load (24V Input)



Efficiency vs. Load (48V Input)



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.

High Density - Board Mounted Power Division

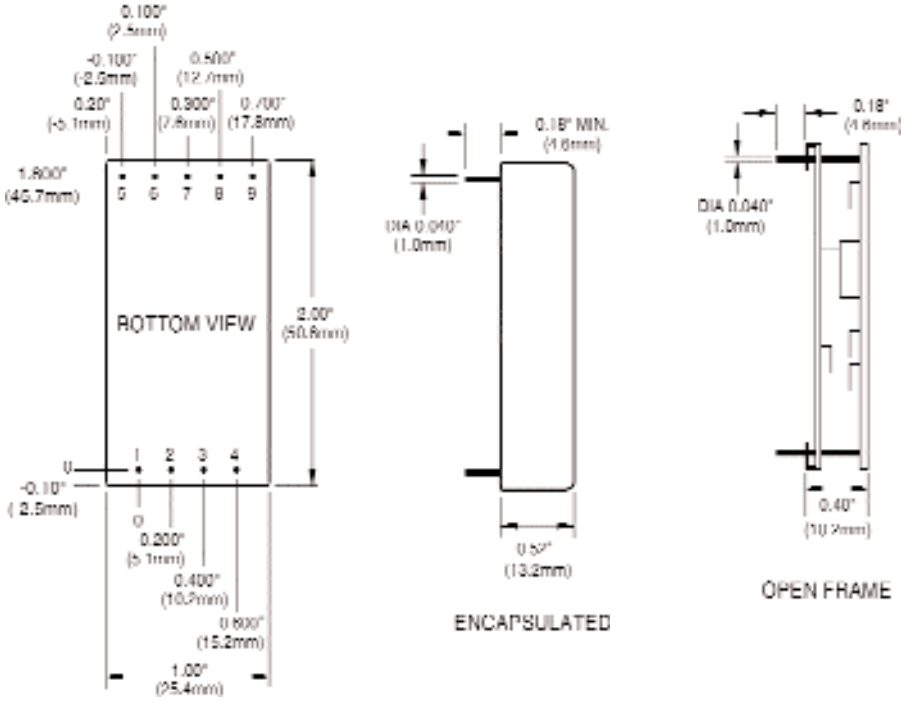
IES SERIES
20 WATT

MODELS - (See the last page of Section for options.)

Selection Chart							
Model	**Vin (Volts)**	**Vin Range (Volts)**	**Iin Max.* (Amps)**	**Vout (Volts)**	**Iout Rated (Amps)**	**Ripple & Noise Pk-Pk (mV)**	**Efficiency Typ. ****
IES020YG-A	24	16 - 36	1.23	5.0	4.0	75	87%
IES013ZE-A	48	36 - 72	0.45	3.3	4.0	150	83%
IES020ZG-A	48	36 - 72	0.65	5.0	4.0	75	87%

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

MECHANICAL DRAWING



Thermal Impedance		
	Encapsulated Modules	Open Frame Modules
Natural Convection	15.4 °C/W	14.9 °C/W
100 LFM	12.2 °C/W	11.3 °C/W
200 LFM	9.3 °C/W	8.3 °C/W
300 LFM	7.4 °C/W	6.8 °C/W
400 LFM	6.4 °C/W	5.4 °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	$-V_{in}$
3	No Pin
4	Shutdown
5	$+V_{out}$
6	$-V_{out}$
7	Trim
8	No Pin
9	No Pin

Tolerances	
Inches:	(Millimeters)
.XX ± 0.020	.X ± 0.5
.XXX ± 0.010	.XX ± 0.25
Pin:	
± 0.002	± 0.05
Case:	
+ 0.04, - 0.00	+ 1.0, - 0.00

(Dimensions as listed unless otherwise specified.)

OPTIONS

When ordering equipment options, use the following suffix information. Select the option(s) that you prefer and add them to the model number. Example ordering options are located below the options table.

OPTIONS	SUFFIX	APPLICABLE SERIES	REMARKS
Negative Logic	N	HAS, HBD, HBS, HES, HLS, LES, QBS, QES, QLS, TES, TQD	TTL "Low" Turns Module ON TTL "High" Turns Module OFF
Lucent Compatible Trim	T	HAS, HBD, HBS, HES, HLS, QBS, QES, QLS	
Terminal Strip	TS	XWS, XWD, XWT	
Trim	1	IAS, LES	
Enable	2	IAD, IAS, LES, SMS	
Trim and Enable	3	IAS, LES	
Current Share	4	SMS	
Headerless	Y	Encapsulated EWS, IWS, OWS	
PIN LENGTH AND HEATSINK OPTIONS			Standard Pin Length is 0.180" (4.6mm)
0.110" (2.8mm) Pin Length	8	All Units (Except SMS)	
0.150" (3.8mm) Pin Length	9	All Units (Except SMS)	
0.24" (6.1mm) Horizontal Heatsink	1H	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All Units (Except DIP, HLS, HLD, QLS, SIP, SM TLD, and TKD Packages)	Includes Thermal Pad

Example Options:
HBS050ZG-ANT3V = HBS050ZG-A with negative logic, Lucent compatible trim, and 0.95” vertical heatsink.
LES015YJ-3N = LES015YJ with optional trim and enable, negative logic.
QBS066ZG-AT8 = QBS066ZG-A with Lucent compatible trim and 0.110” pin length.