



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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Powering Communications and Technology



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

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 $\mu$ s
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

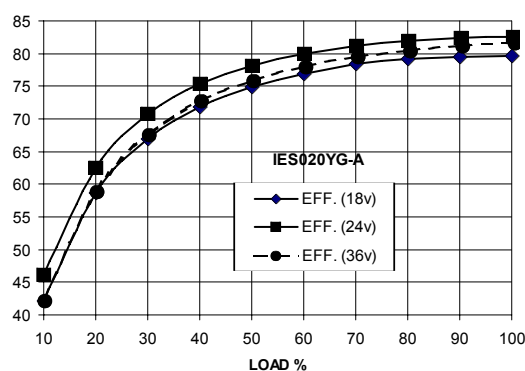
General	
Turn-On Time	10 ms
Remote Shutdown	Positive Logic
Switching Frequency	300 kHz Open Frame / 450 kHz Cased
Isolation	
Input - Output	1500 VDC
Input - Case (24 $V_{in}$ Units)	500 VDC
Output - Case (48 $V_{in}$ Units)	500 VDC
Temperature Coefficient	0.03%/°C
Case Temperature	
Operating Range	-40 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 <sup>6</sup> hrs
Safety	UL, CSA, EN60950
Weight (approx.)	1.2 oz

## IES SERIES 20 WATT

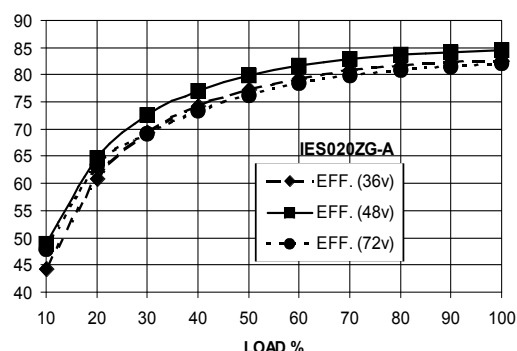
### DESCRIPTION

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.

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.



# IES SERIES 20 WATT

Powering Communications and Technology

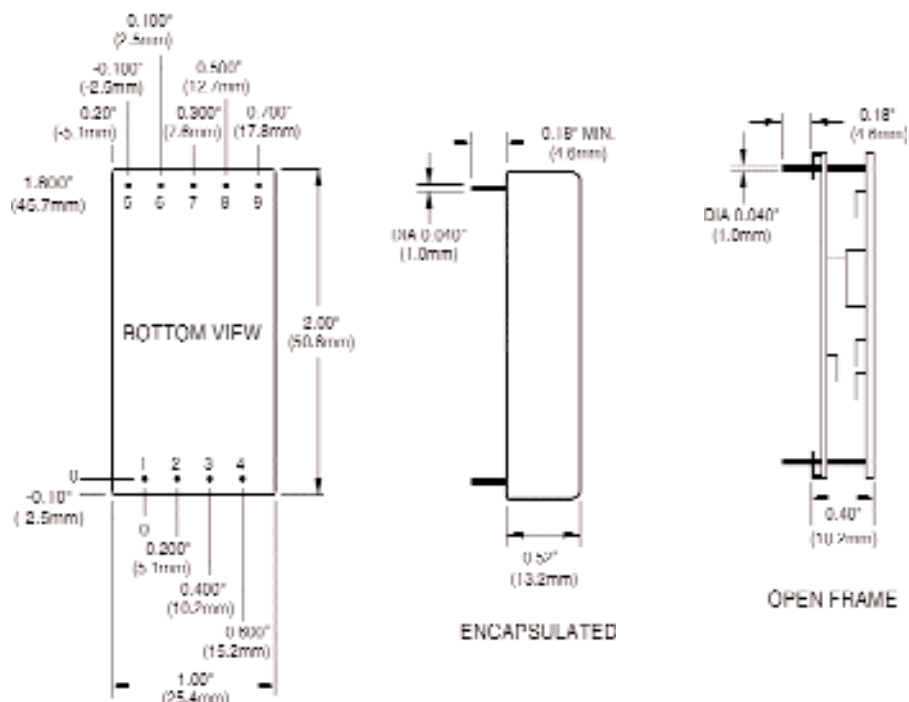
MODELS - (See the last page of Section for options.)

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	+Vin
2	-Vin
3	No Pin
4	Shutdown
5	+Vout
6	-Vout
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

### Powering Communications and Technology

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	
<b>PIN LENGTH AND HEATSINK OPTIONS</b>			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.

**NUCLEAR AND MEDICAL APPLICATIONS** - Power-One products are not authorized for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems without the express written consent of the President of Power-One, Inc.

**TECHNICAL REVISIONS** - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.