

Features

- Industry-standard package
- 100°C case operation
- Optional trim and enable
- Wide-range input voltage
- 1500V isolation
- Short-circuit protection

Description

QES single output dc-dc converters provide up to 66 watts of output power in an industry-standard, quarter-brick package. The QES converters feature open-frame packaging, along with planar magnetics and a high efficiency topology to provide maximum useable power with minimal thermal constraints. The QES is suited to telecom, networking, and industrial applications, and is fully compatible with production board washing processes.

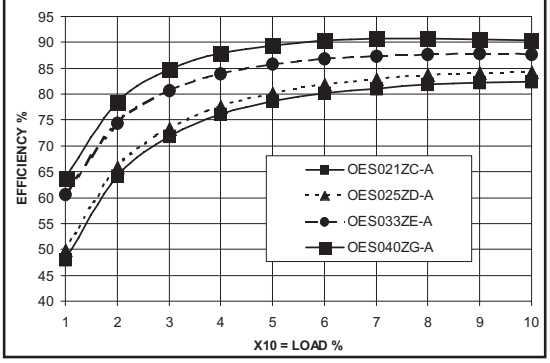
Technical Specifications

Input	
Voltage Range	
24 VDC Nominal	18 - 36 VDC
48 VDC Nominal	36 - 75 VDC
Input Reverse Input Current	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}
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 And Overcurrent Protection	Shutdown
Short Circuit Current Limit	200% I_{out}
Current Limit Threshold Range, % of I_{out} Rated	110 - 140%
OVP Trip Range	115 - 140% V_{out} Nom.
UVP Trip Range	70 - 90% V_{out} Nom.
OVP/UVP Type	Latching

General	
Turn-On Time	30 ms
Remote Shutdown	Positive or Negative Logic
Remote Shutdown Reference	V_{in} Negative
Switching Frequency	300 kHz
Isolation	
Input - Output	1500 VDC
Input - Case	1050 VDC
Output - Case	1050 VDC
Temperature Coefficient	±0.02%/°C
Case Temperature	
Operating Range	-40 To +100°C
Storage Range	-40 To +125°C
Thermal Shutdown Range	105 to 115°C
Vibration, 3 Axes, 5 Min Each	5 g, 10 - 55 Hz
MTBF† (Bellcore TR-NWT-000332)	2.5 X 10^6 hrs
Safety	UL, cUL, TUV
Weight (Approx.)	1.7 oz

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.

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**
QES050YE-A	24	18-36	3.3	3.3	15	100	85%
QES066YE-A	24	18-36	4.4	3.3	20	100	85%
QES036ZB-A	48	36-75	1.4	1.8	20	75	76%
QES038ZD-A	48	36-75	1.4	2.5	15	100	85%
QES050ZD-A	48	36-75	1.8	2.5	20	100	83%
QES050ZE-A	48	36-75	1.6	3.3	15	100	86%
QES066ZE-A	48	36-75	2.2	3.3	20	100	86%

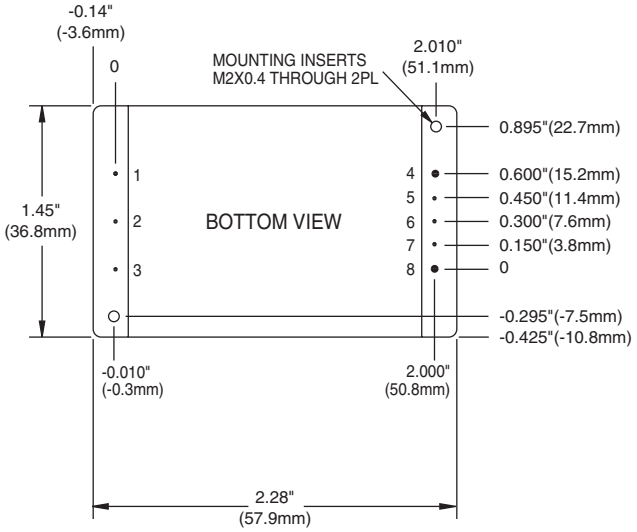
NOTES:

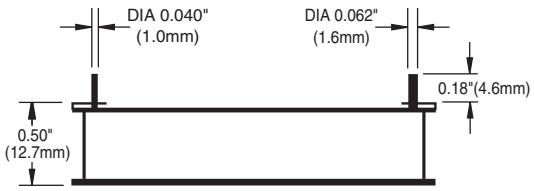
* Maximum input current at minimum input voltage, maximum rated output power.

** 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	10.1 °C/W
100 LFM	8.0 °C/W
200 LFM	5.4 °C/W
300 LFM	4.4 °C/W
400 LFM	3.4 °C/W

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

Pin	Function	Pin Diameter
1	$-V_{in}$	0.040"
2	On/Off	0.040"
3	$+V_{in}$	0.040"
4	$-V_{out}$	0.062"
5	-Sense	0.040"
6	Trim	0.040"
7	+Sense	0.040"
8	$+V_{out}$	0.062"

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.)

This page is offered as a reference. Consult factory for actual availability of options. When ordering equipment options, use the following suffix information. Select preferred option(s) and add the suffix to the model number. Ordering option examples are located below the options table.

OPTION	SUFFIX	APPLICABLE SERIES	REMARKS
Negative Logic	N	HAS, HBD, HBS, HES, HLS, HLD, 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	
Trim	1	IAS, LES	
Enable	2	IAD, IAS, LES, SMS	
Trim and Enable	3	IAS, LES	
Pin Length and Heatsink Options			Standard Pin Length is 0.180" (4.6mm)
0.110" (2.8mm) Pin Length	8	All Leaded Models	
0.150" (3.8mm) Pin Length	9	All Leaded Models	
0.24" (6.1mm) Horizontal Heatsink	1H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.24" (6.1mm) Vertical Heatsink	1V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Horizontal Heatsink	2H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.45" (11.4mm) Vertical Heatsink	2V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Horizontal Heatsink	3H	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, TLD, and TKD Packages)	Includes Thermal Pad
0.95" (24.1mm) Vertical Heatsink	3V	All 1/4-Bricks, 1/2-Bricks, 3/4-Bricks, Full-Bricks (Except HLS, HLD, QLS, 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 designed, intended for use in, or 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 respective divisional 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.