

### Applications

- Telecommunications
- Data communications
- Wireless communications
- Servers, workstations

### Benefits

- High efficiency – no heat sink required
- Can replace two single output quarter-bricks

### Features

- RoHS lead solder exemption compliant
- Delivers up to 6 A @ 5 V
- Operates from – 55 °C to 85 °C ambient
- Survives 1000 g mechanical shock, MIL-STD-883E
- High reliability: MTBF 3.4 million hours, calculated per Telcordia TR-332, Method I Case 1
- Low weight: 0.53 oz (15 g)
- Low profile: 0.274" (6.96 mm)
- Extremely small footprint: 0.896" x 2.30" (2.06 in<sup>2</sup>)
- High efficiency – no heat sink required
- On-board input differential LC-filter
- Extremely low output and input ripple
- Start-up into pre-biased output
- No minimum load required
- 2,000 VDC I/O Isolation
- Input Voltage Transient – 50 V for 100 ms
- Meets Basic Insulation requirements of EN60950
- Does not use opto-isolators
- Fixed-frequency operation
- Fully protected
- Remote output sense
- Output voltage trim range: +10%/-20%
- Positive or negative logic ON/OFF option
- UL 60950-1/CSA 22.2 No. 60950-1-07 Second Edition, IEC 60950-1: 2005, and EN 60950-1:2006
- Meets conducted emissions requirements of FCC Class B and EN55022 Class B with external filter
- All materials meet UL94, V-0 flammability rating

### Description

ASQ28 Series DC-DC converters are ideally suited for aerospace applications where high-reliability, low profile, and low weight are critical. They are designed for reliable operation in harsh thermal and mechanical environments.

In high-ambient temperature applications the ASQ28 Series 6A converters provide thermal performance that exceeds competing DC-DC converters that have a higher nominal rating and much larger package size. This is accomplished using patent-pending circuit, packaging, and processing techniques to achieve ultra-high efficiency, excellent thermal management and a very low body profile. Coupled with Power-One's use of 100% automation for assembly, this results in a product with extremely high quality and reliability.

### Electrical Specifications

Conditions:  $T_A = 25^\circ\text{C}$ , Airflow = 300 LFM (1.5 m/s),  $V_{in} = 28\text{ VDC}$ , All output voltages, unless otherwise specified.

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
<b>ABSOLUTE MAXIMUM RATINGS</b>					
Input Voltage	Continuous	0		45	VDC
Operating Ambient Temperature		-55		85	$^\circ\text{C}$
Storage Temperature		-55		125	$^\circ\text{C}$
<b>INPUT CHARACTERISTICS</b>					
Operating Input Voltage Range		18	28	45	VDC
Input Under Voltage Lockout	Non-latching				
Turn-on Threshold		16	17	17.5	VDC
Turn-off Threshold		15	16	16.5	VDC
<b>ISOLATION CHARACTERISTICS</b>					
I/O Isolation		2000			VDC
Isolation Capacitance:			260		pF
Isolation Resistance		10			M $\Omega$
<b>FEATURE CHARACTERISTICS</b>					
Switching Frequency			415		kHz
Output Voltage Trim Range <sup>1</sup>	Industry-std. equations	-20		+10	%
Remote Sense Compensation <sup>1</sup>	Percent of $V_{OUT(NOM)}$			+10	%
Output Over-Voltage Protection	Non-latching	117	125	140	%
Auto-Restart Period	Applies to all protection features		100		ms
Turn-On Time			4		ms
<b>ON/OFF Control (Positive Logic)</b>					
Converter Off		-20		0.8	VDC
Converter On		2.4		20	VDC
<b>ON/OFF Control (Negative Logic)</b>					
Converter Off		2.4		20	VDC
Converter On		-20		0.8	VDC

#### Additional Notes:

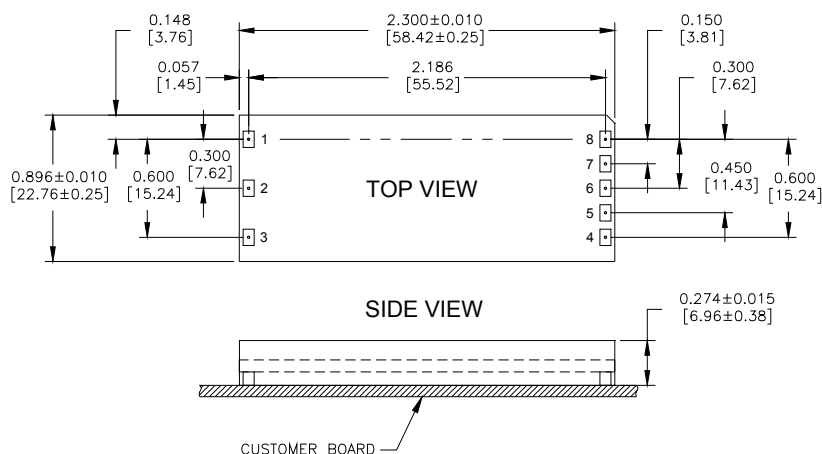
1.  $V_{out}$  can be increased up to 10% via the sense leads or up to 10% via the trim function, however total output voltage trim from all sources should not exceed 10% of  $V_{OUT(NOM)}$ , in order to insure specified operation of over-voltage protection circuitry.

### Electrical Specifications (continued)

Conditions:  $T_A = 25^\circ\text{C}$ , Airflow = 300 LFM (1.5 m/s),  $V_{in} = 28\text{ VDC}$ ,  $V_{out} = 5\text{ VDC}$  unless otherwise specified.

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
<b>INPUT CHARACTERISTICS</b>					
Maximum Input Current	6 ADC, 5 VDC Out @ 18 VDC In			1.9	ADC
Input Stand-by Current	$V_{in} = 28\text{ V}$ , converter disabled		2.6		mADC
Input No Load Current (0 load on the output)	$V_{in} = 28\text{ V}$ , converter enabled		88		mADC
Input Reflected-Ripple Current	25 MHz bandwidth		6		$\text{mA}_{\text{PK-PK}}$
<b>OUTPUT CHARACTERISTICS</b>					
Output Voltage Set Point (no load)		4.950	5.000	5.050	VDC
Output Regulation					
Over Line			$\pm 2$	$\pm 5$	mV
Over Load			$\pm 2$	$\pm 5$	mV
Output Voltage Range	Over line, load and temperature	4.925		5.075	VDC
Output Ripple and Noise - 25MHz bandwidth	Full load + 10 $\mu\text{F}$ tantalum + 1 $\mu\text{F}$ ceramic		45	80	$\text{mV}_{\text{PK-PK}}$
External Load Capacitance	Plus full load (resistive)			10,000	$\mu\text{F}$
Output Current Range		0		6	ADC
Current Limit Inception	Non-latching		8	10	ADC
Peak Short-Circuit Current	Non-latching. Short=10m $\Omega$		10		A
RMS Short-Circuit Current	Non-latching			2	Arms
<b>DYNAMIC RESPONSE</b>					
Load Change 25% of $I_{out\text{ Max}}$ , $di/dt = 0.1\text{ A}/\mu\text{S}$	$C_o = 1\text{ }\mu\text{F}$ ceramic		100		mV
$di/dt = 5\text{ A}/\mu\text{S}$	$C_o = 47\text{ }\mu\text{F}$ tant. + 1 $\mu\text{F}$ ceramic		80		mV
Setting Time to 1%			200		$\mu\text{s}$
<b>EFFICIENCY</b>					
100% Load			88		%
50% Load			88		%

## Physical Information



**ASQ28S Pinout (Surface Mount)**

### ASQ28S Platform Notes

- All dimensions are in inches [mm]
- Connector Material: Copper
- Connector Finish: Tin/Lead over Nickel
- Converter Weight: 0.53 oz [15 g]
- Recommended Surface-Mount Pads:  
Min. 0.080" X 0.112" [2.03 x 2.84]  
Max. 0.092" X 0.124" [2.34 x 3.15]

Pad/Pin Connections	
Pad/Pin #	Function
1	Vin (+)
2	ON/OFF
3	Vin (-)
4	Vout (-)
5	SENSE(-)
6	TRIM
7	SENSE(+)
8	Vout (+)

## Converter Part Numbering Scheme

Product Series	Input Voltage	Mounting Scheme	Rated Load Current	Output Voltage		ON/OFF Logic	Maximum Height [HT]	Pin Length [PL]	Special Features
<b>ASQ</b>	<b>28</b>	<b>S</b>	<b>06</b>	<b>050</b>	-	<b>N</b>	<b>S</b>	<b>0</b>	<b>0</b>
One-Eighth Brick Format	18-45 V	S ⇒ Surface Mount	6 A	050 ⇒ 5 V		N ⇒ Negative P ⇒ Positive	<u>SMT</u> S ⇒ 0.289"	<u>SMT</u> 0 ⇒ 0.00"	0 ⇒ STD SMC Tin/Lead over Nickel

The example above describes P/N ASQ28S06050-NS00: 18-45 V input, surface mount, 6 A @ 5 V output, negative ON/OFF logic, a maximum height of 0.289", and with SMC Tin/Lead over Nickel. Please consult factory regarding availability of a specific version.

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

**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.

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