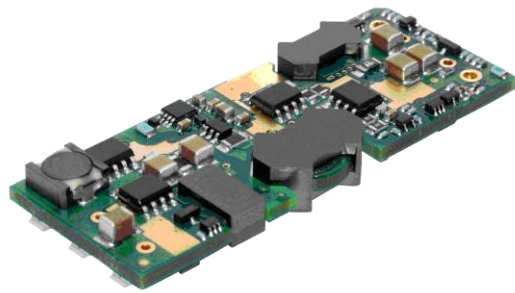


# ASQ28S06050

## Eighth-Brick DC-DC Converter

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 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 Bel Power Solutions use of 100% automation for assembly, this results in a product with extremely high quality and reliability.



### Key Features & Benefits

- 18 to 45 VDC Input; 6A @ 5 VDC Output
- 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
- 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
- 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
- All materials meet UL94, V-0 flammability rating
- Approved to the latest edition of the following standards: UL/CSA60950-1, IEC60950-1 and EN60950-1.
- RoHS lead-free solder and lead-solder-exempted products are available

### Applications

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



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## 1. ELECTRICAL SPECIFICATIONS

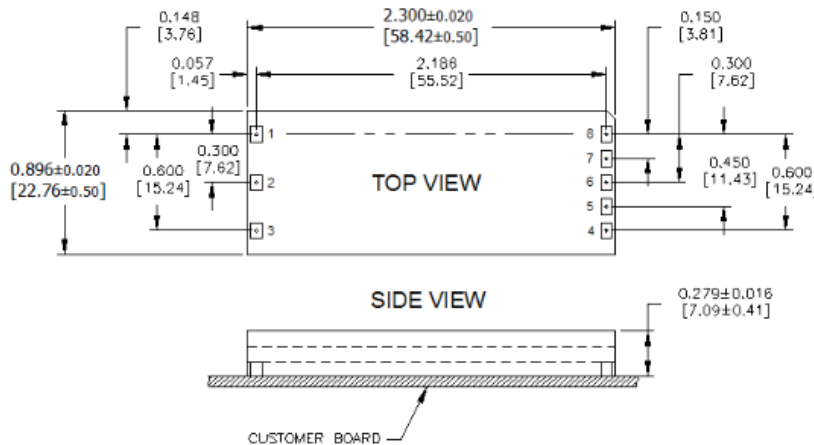
Conditions:  $T_A = 25\text{ }^\circ\text{C}$ , Airflow = 300 LFM (1.5 m/s),  $V_{in} = 28\text{ VDC}$ ,  $V_{out} = 5\text{ VDC}$  unless otherwise specified.

PARAMETER	NOTES	MIN	TYP	MAX	UNITS
<b>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
ON/OFF Control (Positive Logic)	Converter Off	-20		0.8	VDC
	Converter On	2.4		20	VDC
ON/OFF Control (Negative Logic)	Converter Off	2.4		20	VDC
	Converter On	-20		0.8	VDC
<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		mA <sub>PK-PK</sub>

<sup>1</sup>  $V_{out}$  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.

<b>Output Characteristics</b>					
Output Voltage Set Point (no load)		4.950	5.000	5.050	VDC
Output Regulation	Over Line		±2	±5	mV
	Over Load		±2	±5	mV
Output Voltage Range	Over line, load and temperature	4.925		5.075	VDC
Output Ripple and Noise (25MHz bandwidth)	Full load + 10 µF tantalum + 1 µF ceramic		45	80	mV <sub>PK-PK</sub>
External Load Capacitance	Plus full load (resistive)			10,000	µF
Output Current Range		0		6	ADC
Current Limit Inception	Non-latching		8	10	ADC
Peak Short-Circuit Current	Non-latching. Short=10mΩ		10		A
RMS Short-Circuit Current	Non-latching			2	Arms
<b>Dynamic Response</b>					
Load Change 25% of I <sub>out</sub> Max, di/dt = 0.1 A/µS	Co = 1 µF ceramic		100		mV
	Co = 47 µF tant. + 1 µF ceramic		80		mV
Setting Time to 1%			200		µs
<b>Efficiency</b>					
100% Load			88		%
50% Load			88		%
<b>Mechanical Characteristics</b>					
Dimensions		0.896" x 2.30" x 0.274"			
Weight			15		g
			0.53		oz

## 2. MECHANICAL PARAMETERS



ASQ28S Pinout (Surface Mount)

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

### 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]

## 3. ORDERING INFORMATION

Product Series	Input Voltage	Mounting Scheme	Rated 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>
1/8 <sup>th</sup> 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.

For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

**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.