DC/DC CONVERTERS
28 VOLT INPUT

SLH SERIES
1.5 WATT

FEATURES

- **Fully qualified to Class H or K**
- **Radiation hardened**
- **-55°C to +125°C operation**
- **16 to 40 VDC input voltage range**
- Fully isolated
- Magnetic feedback
- Variable operating frequency
- Topology – Self Oscillating Flyback
- Inhibit function
- Indefinite short circuit protection



MODELS	
VDC OUTPUT	
SINGLE	DUAL
3.3	±5
5	±12
12	±15
15	

Size (max.): 0.975 x 0.800 x 0.270 inches (24.77 x 20.32 x 6.86 mm)
See Section B8, case A2, for dimensions.
Weight: 12 grams max.
Screening: Standard, Class H, or Class K (MIL-PRF-38534)
Radiation hardness levels O, L, and R
See Section C2 for screening and radiation hardness options, see Section A5 for ordering information.

DESCRIPTION

With a miniature footprint of just 0.8 square inches, the SLH Series™ of 28 V DC/DC converters delivers 1.5 watts of output power while saving significant board area. The wide input voltage range of 16 to 40 VDC accepts the varying voltages of space, military, or aerospace bus power and tightly regulates output voltages to protect downstream components. Single output models feature outputs of 3.3, 5, 12, or 15 volts, and dual output models feature outputs of ±5, ±12 and ±15 volts.

SCREENING AND REPORTS

SLH converters offer three screening options – Standard, Class H, or Class K – and three levels of radiation hardness. See Section C2, Quality Assurance, pages C2-7 through C2-9, for descriptions. Detailed reports on product performance are also available and are listed on page C2-9.

CONVERTER DESIGN

SLH Series DC/DC converters incorporate a flyback topology with a variable frequency of approximately 370 kHz. Feedback provides output voltage regulation. Output voltage is magnetically fed back to the input side of the PWM to regulate output voltage. Regulation is also affected by the load.

Dual models regulate the negative output with magnetic coupling to the positive output. Up to 80% of the load may be on one output providing that the other output carries a minimum of 20% of the total load. The dual models can be used as a single output voltage by connecting the load between positive and negative outputs, leaving the common unconnected resulting in double the output voltage. (ex: SLH2805D can be used as a 10 VDC output.)

When used with Interpoint's STF filter, the combination will meet the requirements of MIL-STD-461C, CE03.

INHIBIT FUNCTION

When an open collector TTL logic low is applied to the inhibit terminal, pin 7, the converter shuts down and lowers the output voltage to near zero and input current to as low 5 mA. Leaving the terminal open or applying an open collector TTL logic high will enable the converter.

PROTECTION FEATURES

All models include a soft-start function to prevent large current draw and minimize overshoot. The converters provide short circuit protection (by restricting the current) and output overload protection.

CONVENIENT PACKAGING

The SLH Series converters are packaged in hermetically sealed metal cases which provide EMI/RFI shielding.

For more information, contact your Interpoint representative listed in Section A5.

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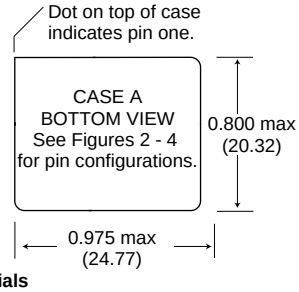
CASES



Materials

Header	Kovar/Nickel/Gold (Case A3, Kovar/Nickel)
Cover	Kovar/Nickel
Pins	Kovar/Nickel/Gold, matched glass seal

Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
±0.01 (0.3) for two decimal places
unless otherwise specified

CAUTION

Heat from reflow or wave soldering may damage the device. Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

FIGURE 1: CASE A MAXIMUM DIMENSIONS

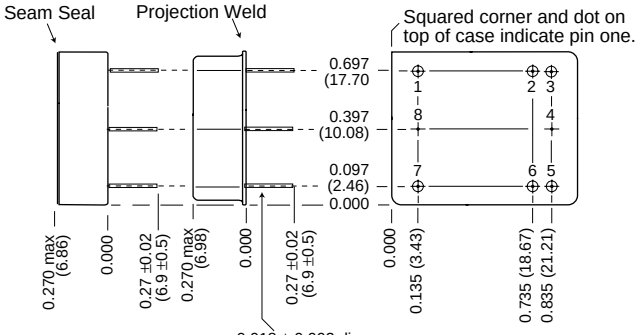


FIGURE 2: CASE A1

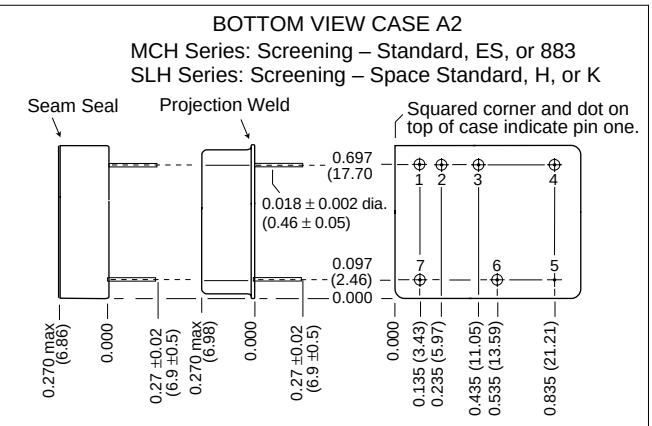


FIGURE 3: CASE A2

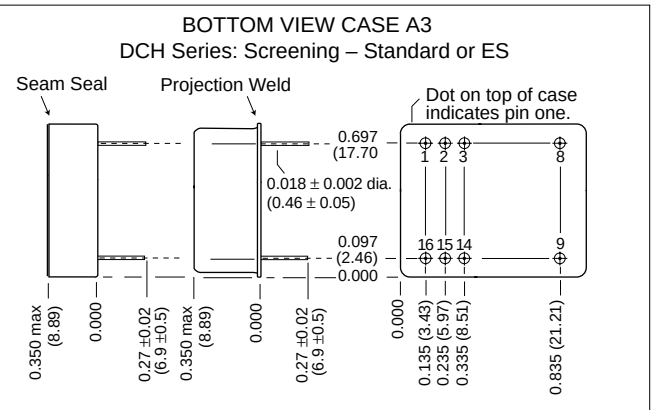


FIGURE 4: CASE A3

Note: Although every effort has been made to render the case drawings at actual size, variations in the printing process may cause some distortion. Please refer to the numerical dimensions for accuracy.

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SPACE PRODUCTS

ELEMENT EVALUATION TEST PERFORMED (COMPONENT LEVEL)	STANDARD (O)		CLASS H		CLASS K	
	M/S	P	M/S	P	M/S	P
Element Electrical	yes	no	yes	yes	yes	yes
Element Visual	no	no	yes	yes	yes	yes
Internal Visual	no	no	yes	no	yes	no
Temperature Cycling	no	no	no	no	yes	yes
Constant Acceleration	no	no	no	no	yes	yes
Interim Electrical	no	no	no	no	yes	no
Burn-in	no	no	no	no	yes	no
Post Burn-in Electrical	no	no	no	no	yes	no
Steady State Life	no	no	no	no	yes	no
Voltage Conditioning /Aging	no	no	no	no	no	yes
Visual Inspection	no	no	no	no	no	yes
Final Electrical	no	no	yes	yes	yes	yes
Wire Bond Evaluation*	no	no	yes	yes	yes	yes
SEM	no	no	no	no	yes	no
SLAM™/C-SAM: Input capacitors only (Add'l test, not req. by H or K)	no	no	no	yes	no	yes

Notes
- M/S Active components (Microcircuit and Semiconductor Die)
- P Passive components
- * Not applicable to EMI filters that have no wirebonds

Definitions
Element Evaluation: Component testing/screening per MIL-STD-883 as determined by MIL-PRF-38534
SEM: Scanning Electron Microscopy
SLAM™: Scanning Laser Acoustic Microscopy
C-SAM: C - Mode Scanning Acoustic Microscopy

Applies to the following products:

SMFLHP Series
SMFL Series
SMHP Series (O&H only)
SMTR Series
SSP Series
SMHF Series
SMSA Series
SLH Series
SLIM Module
SFME120 EMI Filter
SFME28 EMI Filter
SFCS EMI Filter
SFMC EMI Filter
STF EMI Filter

QA SCREENING
SPACE PRODUCTS

ENVIRONMENTAL SCREENING TEST PERFORMED (END ITEM LEVEL)	STANDARD (O)	CLASS H	CLASS K
Non-destruct bond pull* Method 2023	no	no	yes
Pre-cap inspection Method 2017, 2032	yes	yes	yes
Temperature cycle Method 1010, Cond. C	yes	yes	yes
Constant acceleration Method 2001, 3000 g	yes	yes	yes
PIND Test Method 2020, Cond. B	no	no	yes
Radiography Method 2012	no	no	yes
Pre burn-in test	yes	yes	yes
Burn-in, Method 1015, 125°C 96 hours 160 hours 2 x 160 hour (includes mid BI test)	 yes no no	 no yes no	 no no yes
Final electrical test MIL-PRF-38534, Group A	yes	yes	yes
Hermeticity test Fine Leak, Method 1014, Cond. A Gross Leak, Method 1014, Cond. C	 yes yes	 yes yes	 yes yes
Final visual inspection Method 2009	yes	yes	yes

Test methods are referenced to MIL-STD-883 as determined by MIL-PRF-38534.

Note
* Not applicable to EMI filters that have no wirebonds.

Applies to the following products:

SMFLHP Series
SMFL Series
SMHP Series (O&H only)
SMTR Series
SSP Series
SMHF Series
SMSA Series
SLH Series
SLIM Module
SFME120 EMI Filter
SFME28 EMI Filter
SFCS EMI Filter
SFMC EMI Filter
STF EMI Filter

RADIATION HARDNESS LEVELS
FOR DC/DC CONVERTERS AND LINE INPUT MODULES[1]

PRODUCT LEVEL AVAILABILITY	ENVIRONMENTAL SCREENING LEVELS		
RADIATION HARDNESS LEVELS	STANDARD (O)	CLASS H	CLASS K
O: Standard, no radiation guarantee For system evaluation, electrically and mechanically comparable to H and K level.	OO	HO	Not available
L: Radiation hardened – Tested lots Up to 50 k Rads (Si) total dose No SEU guarantee	Not available	HL	KL
R: Radiation hardened – Tested lots Up to 100 k Rads (Si) total dose SEU guarantee up to 40 MeV	Not available	HR	KR

L and R are referenced to MIL-PRF-38534, appendix G, Radiation Hardness Assurance (RHA) levels.

Note
1. Interpoint's **EMI filters** are designed exclusively with passive components providing maximum tolerance for space environment requirements.

Applies to the following products:

SMFLHP Series (levels O and L only)
SMFL Series (levels O and L only)
SMTR Series
SSP Series
SMHF Series
SMSA Series
SLH Series
SLIM Series Modules

REPORTS: INCLUDED WITH PURCHASE OF PRODUCT HL, KL, HR, or KR
1. Radiation Susceptibility Analysis
2. Electrical/Thermal Stress Analysis and Derating Report
3. MTBF Report
4. FMEA Report

OO option: Select reports available as separate purchases.