FEATURES

- **-55°C to +150°C operation**
- **6 to 20 VDC input voltage range**
- Fully isolated
- Magnetic feedback
- Variable operating frequency
- Topology –
  Self Oscillating Flyback
- Inhibit function

DC/DC CONVERTERS
12 VOLT INPUT

HSH SERIES
1.5 WATT

MODELS
VDC OUTPUT
DUAL
±5



Size (max.): 0.980 x 0.805 x 0.270 inches (24.89 x 20.45 x 6.86 mm)
Weight: 12 grams max.
Screening: HSH Standard or HSH ES

DESCRIPTION

With a miniature footprint of just 0.8 square inches, the HSH Series™ of DC/DC converters delivers 1.5 watts of output power while saving significant board real estate. The wide input voltage range of 6 to 20 VDC accepts the varying voltages of military, industrial, or battery 15V bus power and tightly regulates output voltages to protect downstream components. Transient protection of 40 volts for up to 120 milliseconds.

CONVERTER DESIGN

HSH Series DC/DC converters incorporate a flyback topology with a variable frequency, nominally 370 kHz. Output voltage is magnetically fed back to the input side of the PWM to regulate output voltage.

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. This dual model 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: HSH1205D can be used as a 10 VDC output.)

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.

MIL-STD-461

Use Interpoint's FMSA-461 EMI filter to pass the CE03 requirements of MIL-STD-461C.

CONVENIENT PACKAGING

The HSH Series converters are packaged in hermetically sealed metal cases which provide EMI/RFI shielding and protection from the environment.

ABSOLUTE MAXIMUM RATINGS

Input Voltage
- 6 to 20 VDC

Output Power
- 1.5 W

Lead Soldering Temperature (10 sec per lead)
- 300°C

Storage Temperature Range (Case)
- –65°C to +150°C

INHIBIT

Inhibit – TTL Open Collector
- Logic low (output disabled)
- Referenced to input common
- Logic high (output enabled) open collector

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range
- 6 to 20 VDC continuous, 600 mW max
- 12 to 18 VDC continuous, 1.5 W max

Case Operating Temperature (Tc)
- +125°C to +150°C 1 watt
- –55°C to +125°C 1.5 watt

TYPICAL CHARACTERISTICS

Output Voltage Temperature Coefficient
- 100 ppm/°C typical

Isolation
- 100 megohm minimum at 500 V
- Any pin to case except case pin

Audio Rejection 40 dB, typical

Conversion Frequency (kHz)
- 90 min kHz, Vin=6V, ±Iout=60 mA, Tc=-55 to +125°C

Inhibit Pin Voltage (unit enabled)
- 7 to 8 V

Electrical Characteristics:14 VDC Vin, ±100mA load, unless otherwise specified.

HSH1205D		25°C			+125°C/-55°C[1]			+150°C[1]			
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
OUTPUT VOLTAGE	V_{IN} = 6, I_{OUT} = ±60mA	±4.75	±5	±5.25	±4.75	±5	±5.25	±4.75	±5	±5.25	VDC
	V_{IN} = 16, I_{OUT} = ±60mA	±4.75	±5	±5.25	±4.75	±5	±5.25	±4.75	±5	±5.25	
	V_{IN} = 16, I_{OUT} = ±120mA	±4.75	±5	±5.25	±4.75	±5	±5.25	±4.75	±5	±5.25	
OUTPUT CURRENT[5]	V_{IN} = 12 TO 18 VDC	0	±150	240	0	±150	240	0	±100	160	mA
	V_{IN} = 6 TO 20 VDC	0	±60	96	0	±60	96	0	±60	96	
OUTPUT POWER	V_{IN} = 12 TO 18 VDC	0	—	1.5	0	—	1.5	0	—	1.0	W
	V_{IN} = 6 TO 20 VDC	0	—	0.6	0	—	0.6	0	—	0.6	
OUTPUT RIPPLE VOLTAGE	10 kHz - 2 MHz	—	35	180	—	50	250	—	50	250	mV p-p
INPUT VOLTAGE	NO LOAD TO 1.5 W	12	14	18	12	14	18	—	—	—	VDC
	NO LOAD TO 600 mW	6	14	20	6	14	20	6	14	20	
INPUT CURRENT	NO LOAD	—	5.0	10	—	8	12	—	18	25	mA
	INHIBITED	—	2.4	3.2	—	8	12	—	2.4	3.5	
INPUT RIPPLE[2] CURRENT	10 kHz - 10 MHz	—	—	50	—	—	100	—	—	100	mA p-p
EFFICIENCY		71	74	—	63	67	—	59	—	—	%
START–UP	DELAY	—	3	18	—	3	18	—	3	18	ms
	OVERSHOOT[1]	—	0	100	—	0	150	—	0	150	mV pk
LOAD FAULT[1, 3, 4]	POWER DISSIPATION	—	—	2.2	—	—	2.5	—	—	2.5	W

Notes:
1. Guaranteed by design, not tested.
2. Lin = 2 μH.
3. Maximum duration of short circuit: 25°C-— 90 seconds, 150°C – 5 seconds.
4. Load fault is a short circuit (<50 mohms). Recovery is into resistive full load.
5. Max. spec indicates 80% of the converter's total power, available from either output providing the other output carries a minimum of 20% of the total load.

CRANE AEROSPACE & ELECTRONICS
interpoint A CRANE CO. COMPANY

PIN OUT

Pin	Dual Output
1	Positive Input
2	Input Common
3	Positive Output
4	Output Common
5	Case Ground
6	Negative Output
7	Inhibit

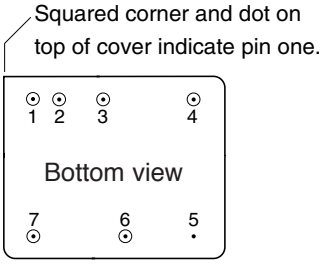
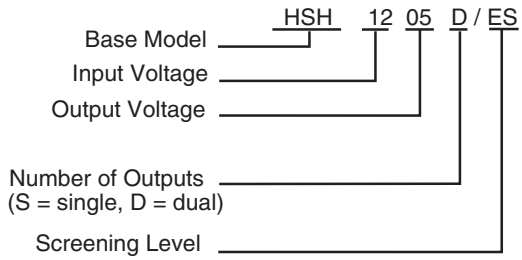
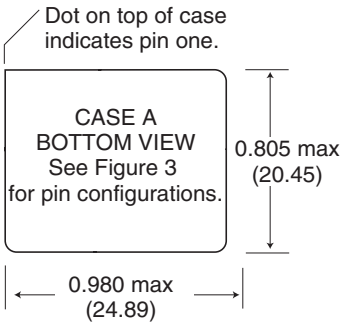


FIGURE 1: PIN OUT

MODEL NUMBERING KEY





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 2: CASE A MAXIMUM DIMENSIONS

BOTTOM VIEW CASE A2
HSH Series: Screening – Standard or ES

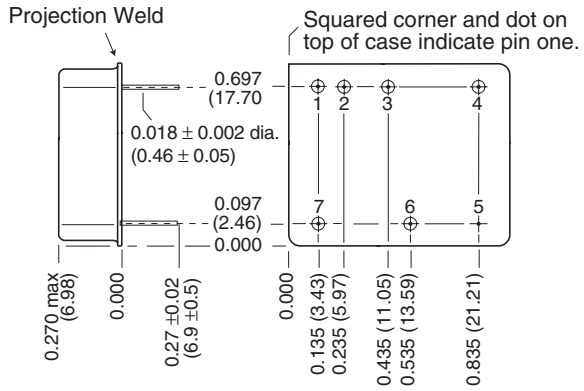


FIGURE 3: CASE A2

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.

ENVIRONMENTAL SCREENING

TEST	HSH STANDARD	HSH /ES
PRE-CAP INSPECTION		
Method 2017, 2032	yes	yes
TEMPERATURE CYCLE (10 times)		
Method 1010, Cond. C, -65°C to 150°C	no	no
Method 1010, Cond. B, -55°C to 125°C	no	yes
CONSTANT ACCELERATION		
Method 2001, 3000 g	no	no
Method 2001, 500 g	no	yes
BURN-IN		
24 hours at 150°C case (typical)	yes	no
96 hours at 150°C case (typical)	no	yes
FINAL ELECTRICAL TEST MIL-PRF-38534, Group A		
Subgroups 1, 2, 4, 5: +25°C, +125°C	yes	yes
HERMETICITY TESTING		
Fine Leak, Method 1014, Cond. A	no	yes
Gross Leak, Method 1014, Cond. C	no	yes
Gross Leak, Dip (1 x 10^{-3})	yes	no
FINAL VISUAL INSPECTION		
Method 2009	yes	yes

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

Contact Information:

Interpoint USA
Phone: 1-800-822-8782
+425-882-3100
Email: power@intp.com

www.interpoint.com

Interpoint UK
Phone: +44-1252-872266
Email: poweruk@intp.com

Interpoint France
Phone: +33-134285455
Email: powerfr@intp.com

HSH1205D Rev C (25°C eff.). This revision supercedes all previous releases.
All technical information is believed to be accurate, but no responsibility is assumed for errors or omissions. Interpoint reserves the right to make changes in products or specifications without notice. HSH Series is a trademark of Interpoint. Copyright © 2003-2004 Interpoint Corporation. All rights reserved.

CRANE AEROSPACE & ELECTRONICS
interpoint A CRANE CO. COMPANY