

# SGHF2800D 19V-39V Input 15W output DC/DC converters

## Space application

### Design

SGHF2800S and SGHF2800D isolated hybrid DC/DC converter series is a design, based on European components, made to keep robust performance in the harsh space environment. The design complies with the derating rules specified in ECSS-Q-ST-30-11C, up to 80°C, and the qualification and production meet the generic procurement requirements for hybrids ECSS-Q-ST-60-05C.

The converter is switching at a fix frequency, in the range 350kHz-420kHz, and take the advantages of a magnetic feedback (no optocoupler used) resulting in high radiation tolerance levels.

The metal sealed package is designed to dissipate the power reducing the temperature stress on junctions of silicon devices. The case is also flanged to achieve robustness against vibrations.

The design documentation is including worst case, part stress analysis and reliability analysis.



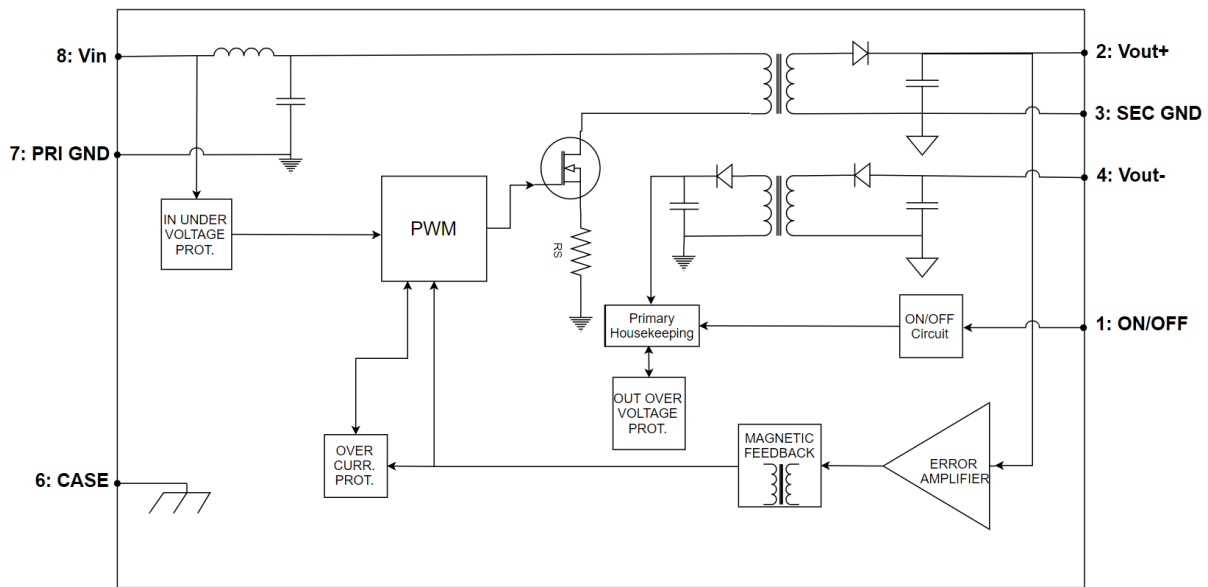
### Features

- Input voltage 19V-39V
- Input fault tolerance 50V
- Operating temperature range: -40°C ÷ +80°C (15W @80°C, within ECSS-Q-ST-30-11C derating rules)
- ON/OFF capability
- Input under-voltage protection with activation hysteresis
- Output over-voltage latching protection
- Overcurrent/short circuit protection
- Radiation tolerance<sup>1</sup>:
  - TID: 50Krad or 100Krad
- Magnetic coupled feedback
- Export restriction free

<sup>1</sup> Radiation tolerance based on components screening and unit level analysis.

## Block diagram

SGHF2800D:



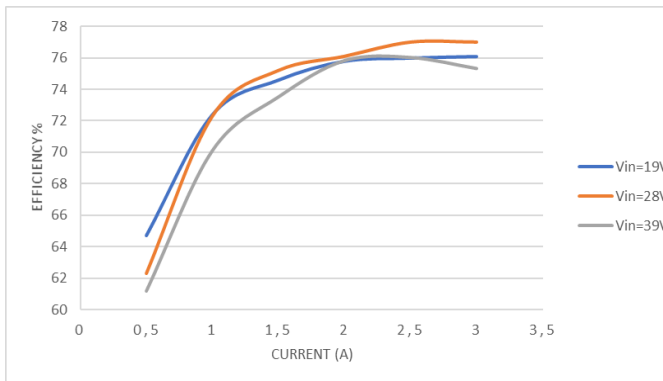
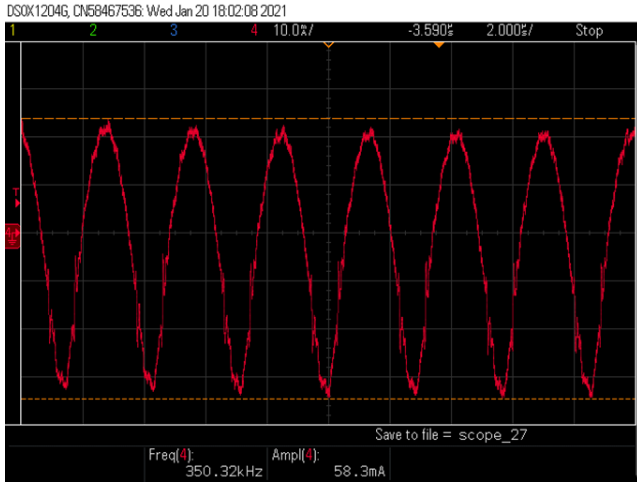
## Electrical characteristics and performances

Performances in the range  $-40^{\circ}\text{C} \div +80^{\circ}\text{C}$ , input voltage 28V, full load; unless otherwise specified.

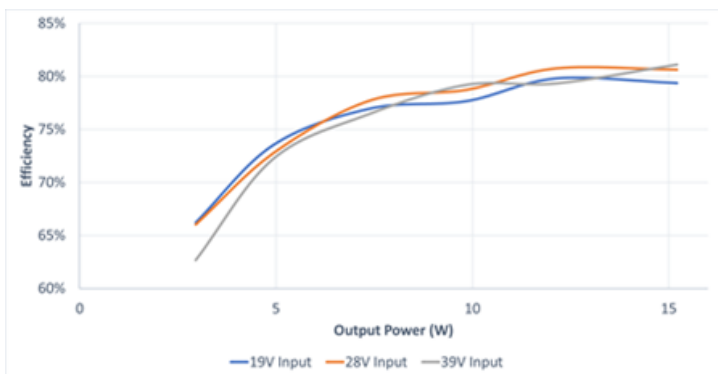
		SGHF2805D			SGHF2812D			
Parameter	Description	Min	Typ	Max	Min	Typ	Max	Unit
<b>Input Section</b>								
Operating input voltage	ECSS-Q-ST-30-11C compliant	19	28	39	19	28	39	V
Fault input voltage tolerance	Continuous	-	-	50	-	-	50	V
Under voltage lockout	ON threshold	15.8	-	16.2	15.8	-	16.2	V
	OFF threshold	14.4	-	15.0	14.4	-	15.0	V
Ripple current	20Hz to 10Mhz	-	50	60	-	50	60	mApp
No load current	On condition no load connected @25°C	-	37	-	-	40	-	mA
OFF condition current		-	2	4	-	2	4	mA
<b>Output Section</b>								

		SGHF2805D			SGHF2812D			
Parameter	Description	Min	Typ	Max	Min	Typ	Max	Unit
<b>Voltage positive output</b>	-40°C ÷ +80°C	4.92	5.00	5.08	11.90	12.00	12.10	V
<b>Power</b>	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)	0	-	15	0	-	15	W
<b>Current positive output</b>	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)	0	-	3	0	-	1.25	A
<b>Current negative output</b>	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)	0	-	1.5	0	-	0.62	A
<b>Ripple voltage</b>	Switching frequency	-	70	90	-	60	80	mVpp
<b>Spikes</b>	High frequency	-	-	100	-	-	100	mVpp
<b>Line regulation (pos. out)</b>	19V to 39V input	-	1	5	-	1	5	mV
<b>Load regulation (pos. out)</b>	0A to 3A load	-	10	20	-	10	20	mV
<b>Load step positive output</b>	Half to full load	-	80	100	-	60	80	mV
	Recovery time	-	300	400	-	250	300	µsec
<b>Start up overshoot pos. out.</b>	0V to 28V	-	-	100	-	-	400	mV
<b>Start up rise time</b>	0V to nominal output voltage	-	-	20	-	-	20	msec
<b>Load fault power dissipation</b>	Overload	-	-	8	-	-	8	W
<b>Functions</b>								
<b>Inhibit</b>	OFF (PIN 1 grounded to PRI_GND)	0	-	1.5	0	-	1.5	V
	ON (high impedance on PIN1)	Open collector or unconnected			Open collector or unconnected			-
<b>Overvoltage Protection</b>	Activation above nominal output voltage (load positive output from 1.5W to 15W)	110	-	125	110	-	125	%
<b>Other data</b>								
<b>Efficiency</b>	@ 25°C	75			80			%
<b>Capacitive load (per output)</b>		-	-	300	-	-	100	µF
<b>Switching frequency</b>	Fix frequency	360	-	420	360	-	420	kHz
<b>Isolation</b>	500V DC (case temperature 25 °C)	100	-	-	100	-	-	MΩ
<b>Storage temperature</b>		-65	-	155	-65	-	155	°C
<b>Soldering temperature</b>		-	-	300	-	-	300	°C
<b>Weight</b>		-	-	40	-	-	40	g

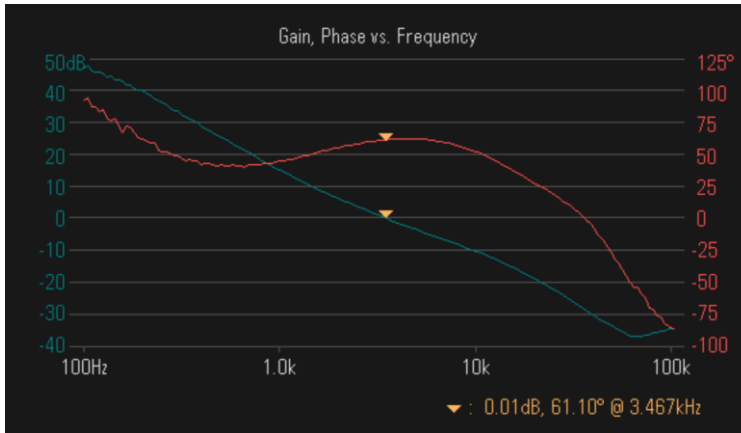
**Typical input ripple current @ switching frequency;  
28V In; 15W Out (50m amp/div)**



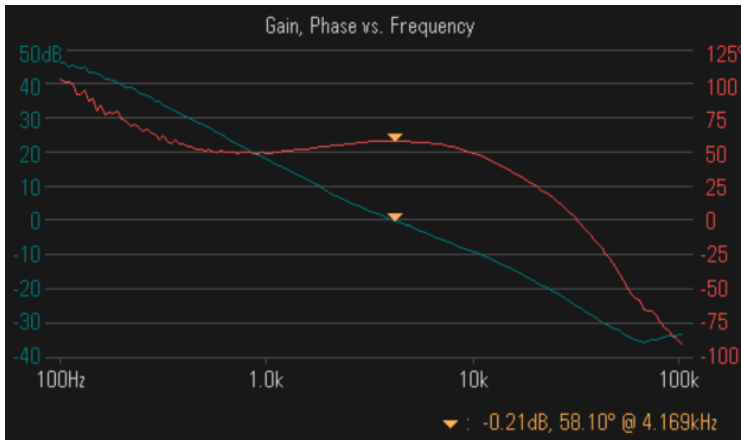
**Efficiency dual out 5V @ 25°C**



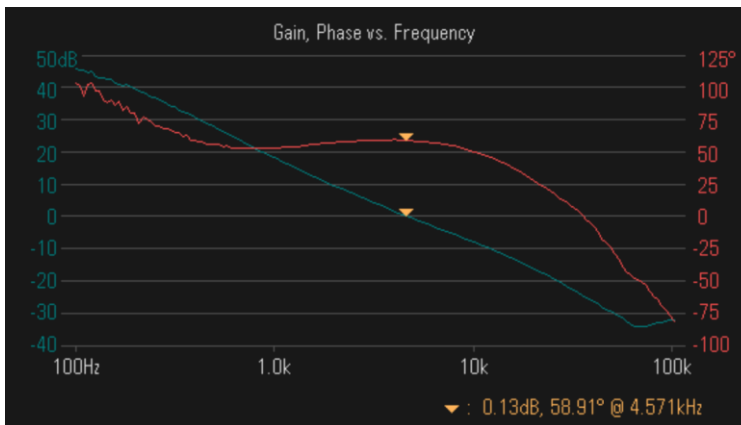
**Efficiency dual out 12V @ 25°C**



**Stability @5W output**

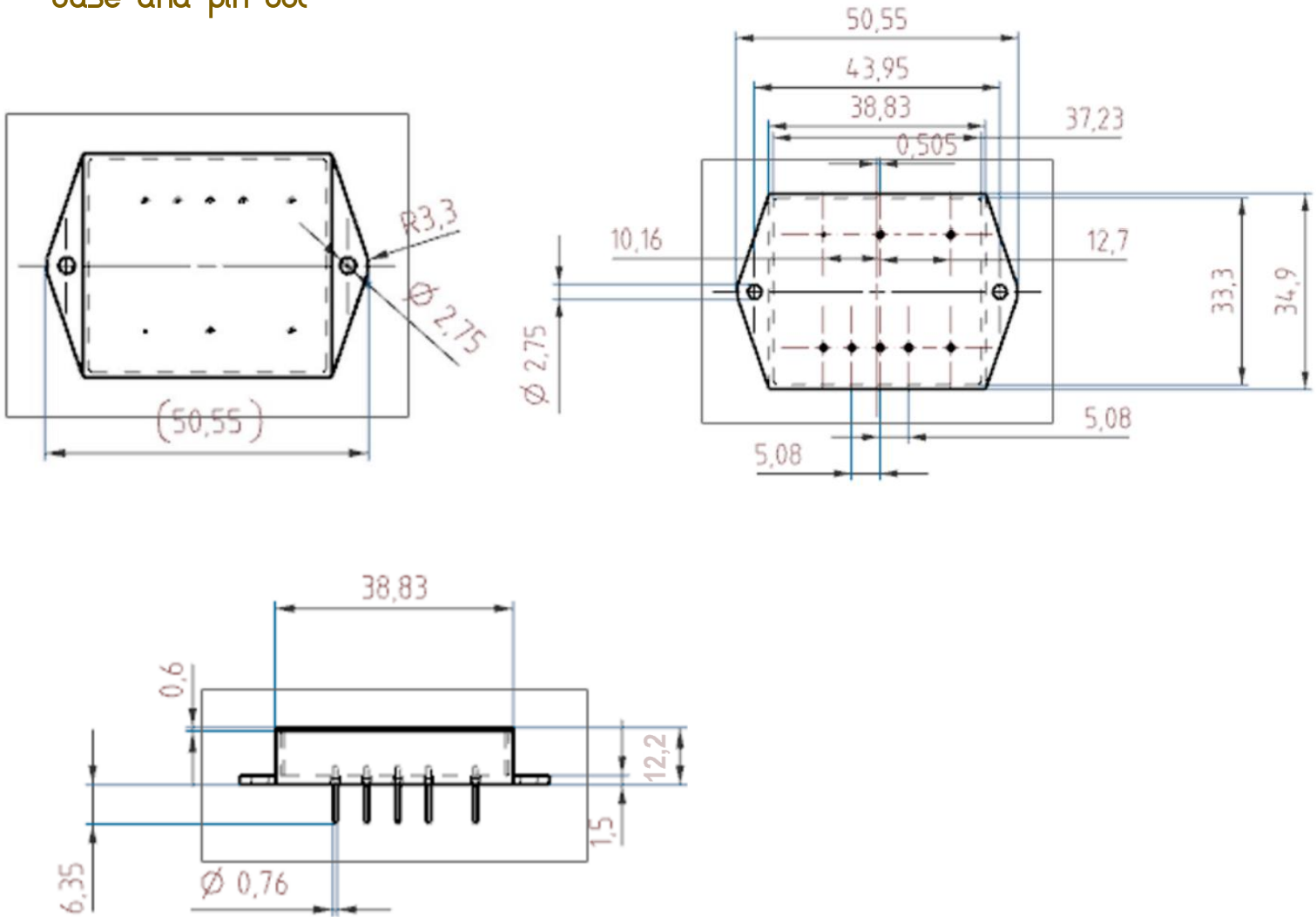


**Stability @10W output**



**Stability @10W output**

## Case and pin out



### Case Dimension in mm

Tolerance: +/-0.13 for three decimal places; +/-0.3 for two decimal places

### Soldering

Heat from may damage the device. Solder pins individually with heat application not exceeding 300°C for 10 seconds.

### Materials:

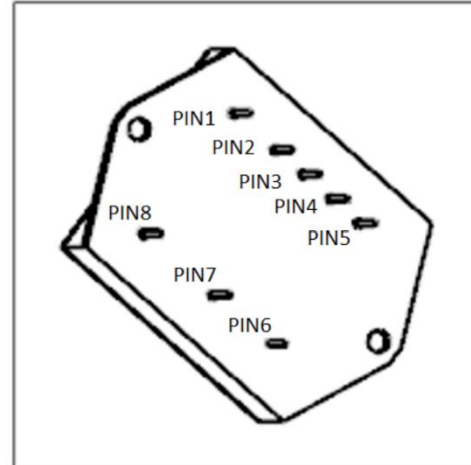
Header: Steel/Nickel/Gold

Cover: Steel/Nickel/Gold

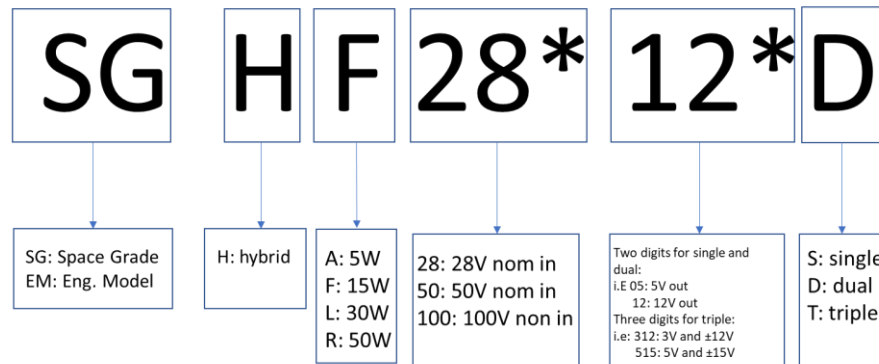
Pins: Iron-Nickel Alloy 52/Gold compression glass seal; Gold Plating of 1.27-3.81  $\mu\text{m}$  included in pin diameter

Seal Hole:  $2 \pm 0.05$  glass

PIN number	Function
1	ON/OFF
2	+Vout
3	SEC_GND
4	-Vout (or NC is case of single output)
5	OV ERROR SIGNAL
6	CASE
7	PRI_GND
8	Vin



### Ordering information:



For customization of the product (input voltage range, output voltages, etc.) please contact [info@aerospacepg.com](mailto:info@aerospacepg.com).

For reliability figures please contact [info@aerospacepg.com](mailto:info@aerospacepg.com).



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