SGHF2805S 19V-39V Input 15W output DC/DC converters

Space application

Design

APG-SGHF2800S and APG-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-400khz, 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.

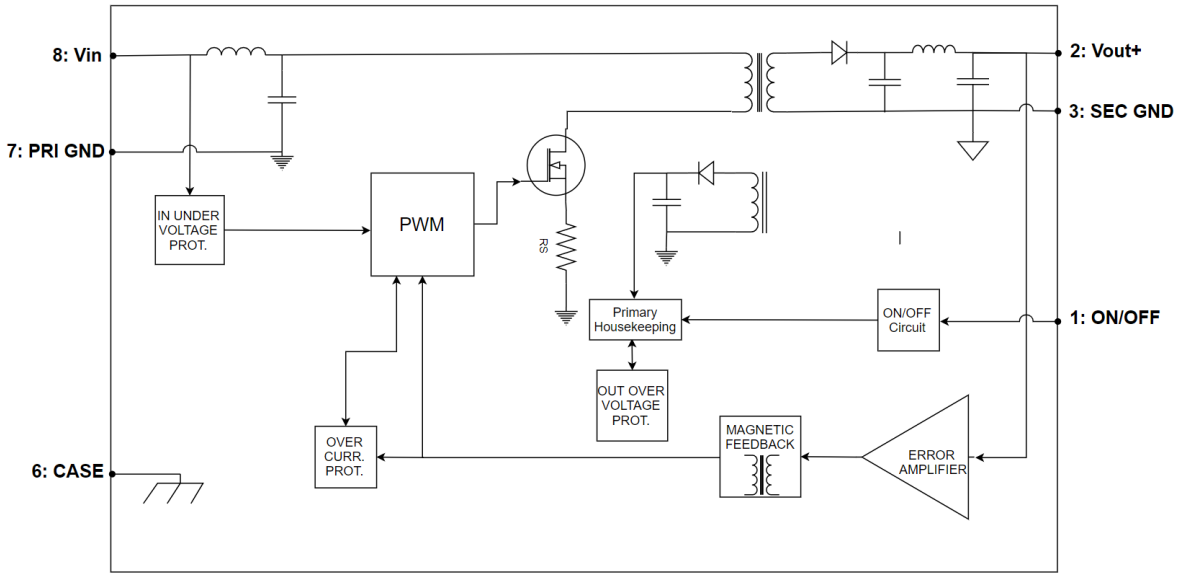
Features

- 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[1]:
  - TID: 50Krad or 100Krad
  - SEE LET 120 MeV-cm2/mg
- Magnetic coupled feedback
- Export restriction free

[1] Radiation tolerance based on components screening and unit level analysis. Unit level screening to be performed.

Block diagram

SGHF2800S:

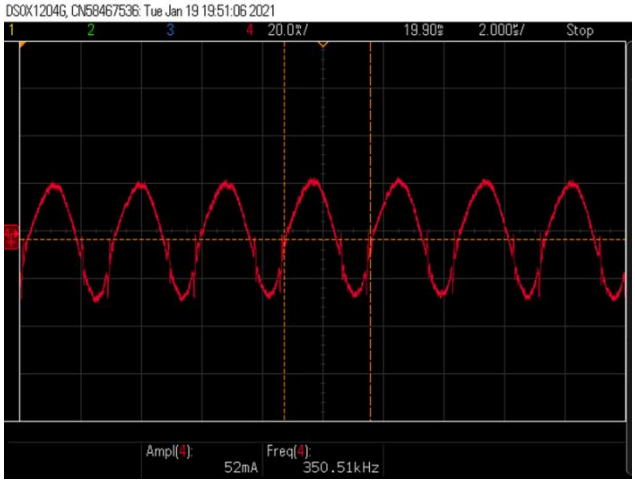


Performances in the range -40°C ÷ +80°C, input voltage 28V, full load; unless otherwise specified.

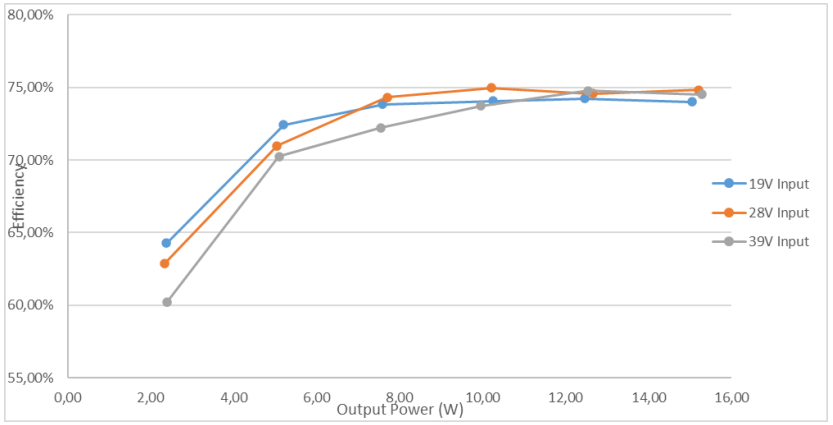
		SGHF2805S			
Parameter	**Description**	**Min**	**Typ**	**Max**	**Unit**
Input Section					
Operating input voltage	ECSS-Q-ST-30-11C compliant	19	28	39	V
Fault input voltage tolerance	Continuous	-	-	50	V
Under voltage lockout	ON threshold	15.8	16.0	16.2	V
	OFF threshold	14.4	14.7	15.0	V
Ripple current	20Hz to 10Mhz	-	50	60	mApp
No load current	On condition no load connected @25°C	-	37	-	mA
OFF condition current		-	1	3	mA
Output Section					
Voltage positive output	-40°C ÷ +80°C	4.92	5.00	5.08	V
Power	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)	0	-	15	W
Current positive output	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)	0	-	3	A
Current negative output	-40°C ÷ +80°C (ECSS-Q-ST-30-11C compliant)		N/A		A
Ripple voltage	Switching frequency	-	15	30	mVpp
Spikes	High frequency	-	-	100	mVpp
Line regulation	19V to 39V input	-	1	5	mV
Load regulation	0A to 3A load	-	10	20	mV
Load step positive output	Half to full load	-	80	100	mV
	Recovery time	-	300	400	µsec
Start up overshot pos. out.	0V to 28V	-	100	150	mV
Start up rise time	0V to nominal output voltage	-	20	25	msec
Load fault power dissipation	Overload	-	-	8	W
Functions					
	OFF (PIN 1 grounded to PRI_GND)	0	-	1.5	V
Inhibit	ON (high impedance on PIN1)		Open collector or unconnected		
Overvoltage Protection	Activation above nominal output voltage	115	120	125	%
Over voltage Error status	Normal operation: 0V (PRI_GND)		OV tripped: 9.5V to11V		
Other data					
Efficiency	@ 25°C		75		%

SGHF2805S					
Parameter	**Description**	**Min**	**Typ**	**Max**	**Unit**
Capacitive load (per output)		-	-	300	µF
Switching frequency	Fix frequency	350	-	400	kHz
Isolation	500V DC (case temperature 25 °C)	100	-	-	MΩ
Storage temperature		-65	-	155	°C
Soldering temperature		-	-	300	°C
Weight		-	-	40	g

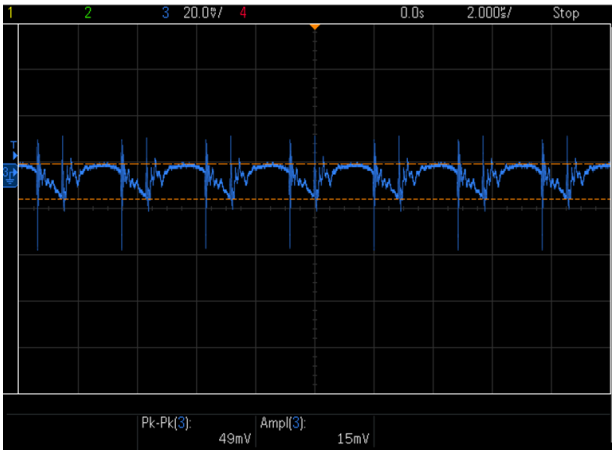
Typical input ripple current @ switching frequency;
28V In; 15W Out



Efficiency 5V single output

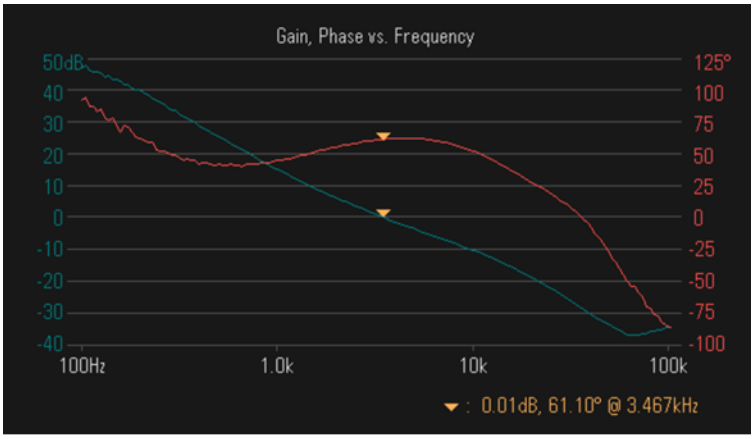


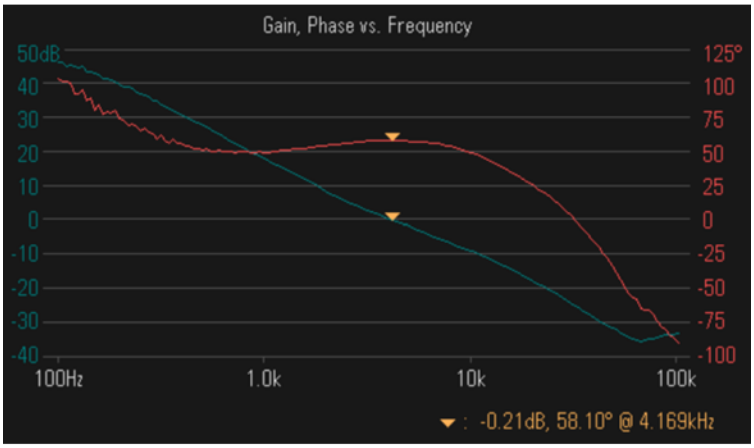
Output voltage ripple 5V single output 3A

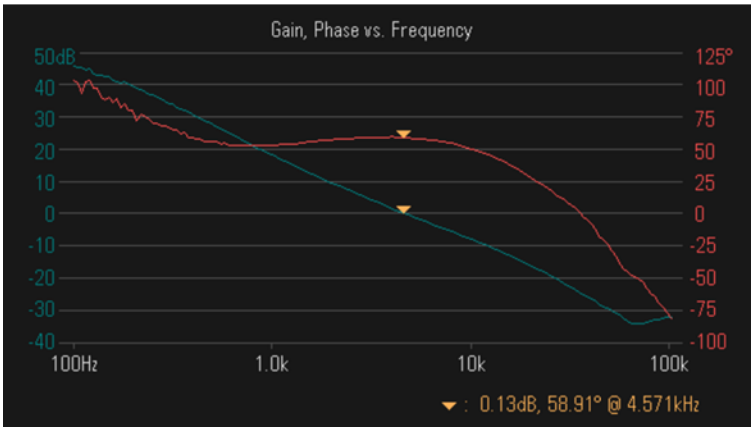


Stability

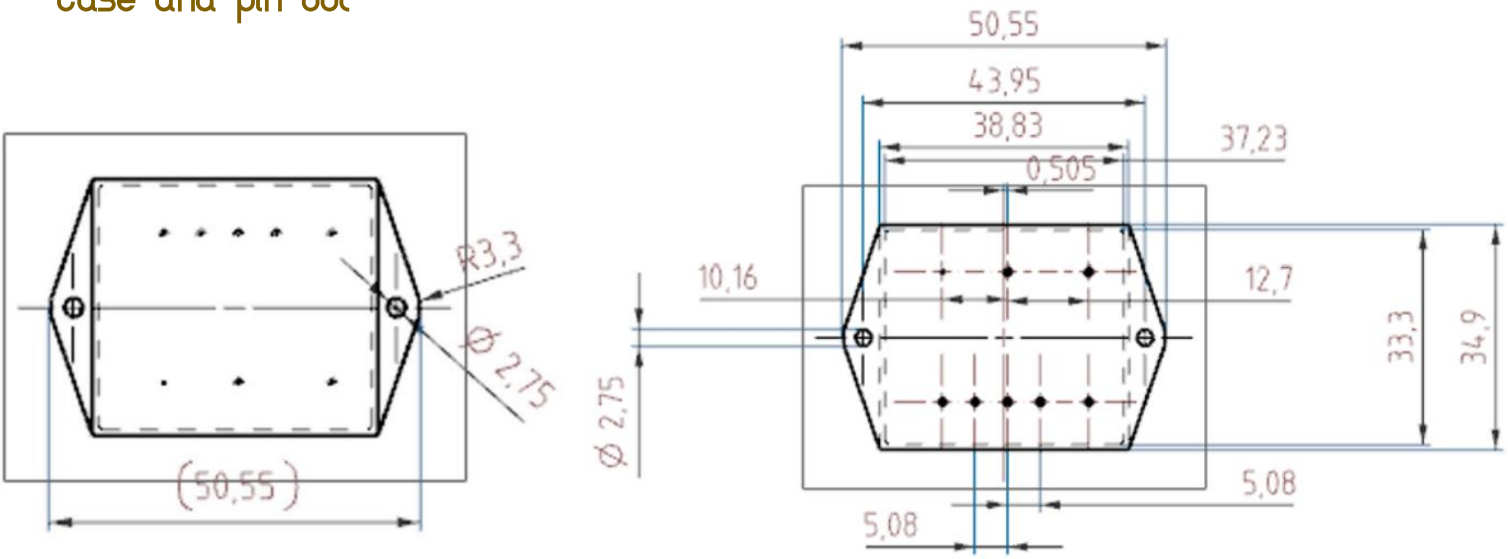
Stability 28V input @ 5W, 10W and 15W output

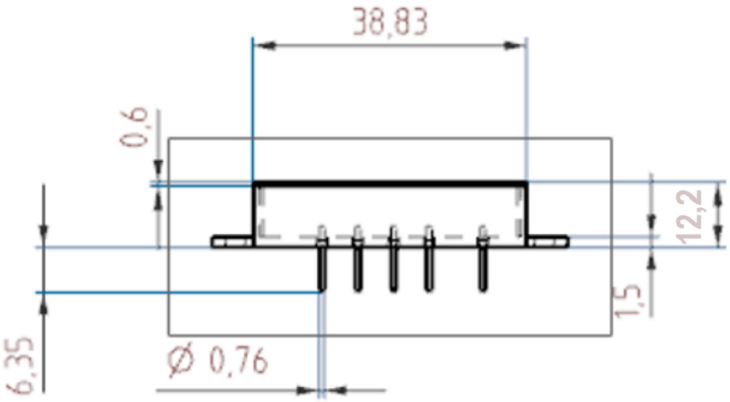






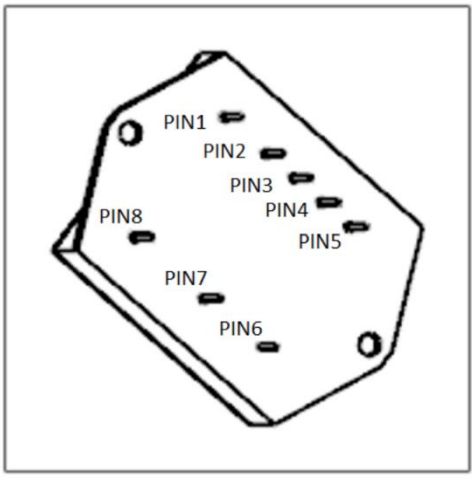
Case and pin out



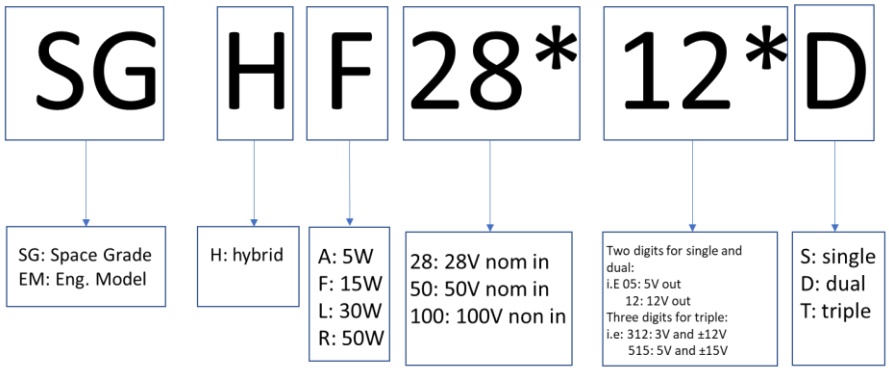


Case Dimension in mm
Tolerance: +/-0.13 for three decimal places; +/-0.3 for two decimal places
Soldering
Heat from may damage the device. Solder pins individually with heat application not exceeding 300°C for10 seconds.
Materials:
Header: Steel/Nickel/Gold
Cover: Steel/Nickel/Gold
Pins: Iron-Nickel Alloy 52/Gold compression glass seal; Gold Plating of 1.27-3.81 µm included in pin diameter
Seal Hole: 2 ±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_STATUS
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.

For reliability figures please contact info@aerospacepg.com.