

ARC-SGBC5005S 40V-60V Input 15W output DC/DC converters Space application

Design

ARC-SGBC5000S and **ARC-SGBC5000D** isolated 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 75°C.

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 baseplate is designed to dissipate the power reducing the temperature stress on junctions of silicon devices. The case can be fixed to the structure by means of 6 screws to achieve robustness against vibrations, and proper thermal conductivity.

The SGBC5000X series is equipped with a differential mode filter and doesn't need an additional differential mode filter cell outside the module.

The design documentation includes worst case, part stress analysis, FMEA and reliability prediction. Full manufacturing data package can be delivered together with the hardware.

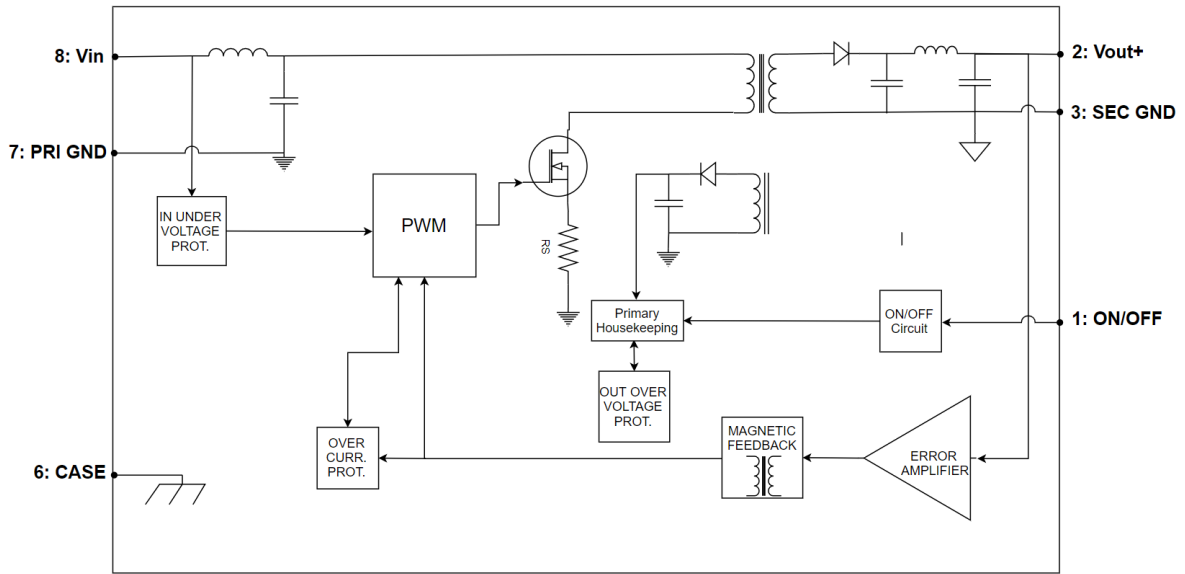


Features

- Input voltage 40V-60V
- Input fault tolerance 80V
- Operating temperature range: -40°C ÷ +75°C (15W @75°C, within ECSS-Q.ST-30-11C derating rules)
- ON/OFF capability
- Input under-voltage protection with activation hysteresis
- Output over-voltage latching protection
- Over-voltage protection status monitor
- Overpower/short circuit protection
- Radiation tolerance¹:
 - TID: 50Krad
 - SEE LET 62 MeV-cm²/mg
- Magnetic coupled feedback
- Integrated Differential Mode Filter
- External frequency synchronization
- Export restriction free

¹ Radiation tolerance based on components screening and unit level analysis.

Block diagram



Electrical characteristics and performances

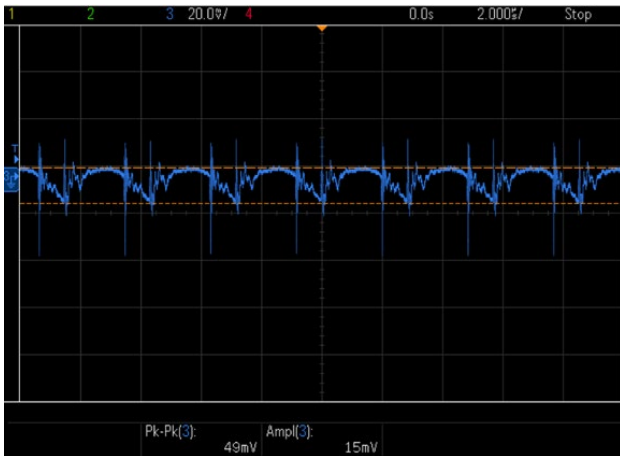
Performances in the range -40°C ÷ +75°C, input voltage 50V, full load; unless otherwise specified.

SGBC5005S					
Parameter	Description	Min	Typ	Max	Unit
Input Section					
Operating input voltage	ECSS-Q-ST-30-11C compliant	40	50	60	V
Fault input voltage tolerance	Continuous	-	-	80	V
Under voltage lockout	ON threshold	33.8	-	35.0	V
	OFF threshold	31.1	-	32.2	V
Ripple current	20Hz to 10Mhz	-	3	5	mApp
No load current	On condition no load connected @25°C	-	40	-	mA
OFF condition current		-	2	3	mA
Output Section					
Voltage positive output	-40°C ÷ +75°C	4.92	5.00	5.08	V
Power	-40°C ÷ +75°C (ECSS-Q-ST-30-11C compliant)	0	-	15	W
Current positive output	-40°C ÷ +75°C (ECSS-Q-ST-30-11C compliant)	0	-	3	A
Current negative output	-40°C ÷ +75°C (ECSS-Q-ST-30-11C compliant)		N/A		A
Ripple voltage	Switching frequency	-	15	30	mVpp
Spikes	High frequency	-	-	100	mVpp
Line regulation	40V to 60V input	-	1	5	mV
Load regulation	0A to 3A load	-	10	20	mV
Load step positive output	Half to full load	-	75	100	mV
	Recovery time	-	300	400	µsec
Start up overshoot pos. out.	0V to 28V	-	5	50	mV
Start up rise time	0V to nominal output voltage	-	20	25	msec
Functions					
Inhibit	OFF (J1 PIN 4 grounded to PRI_GND)	0	-	1.5	V
	ON (J1 PIN4 high impedance)		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 to 11V			
Other data					

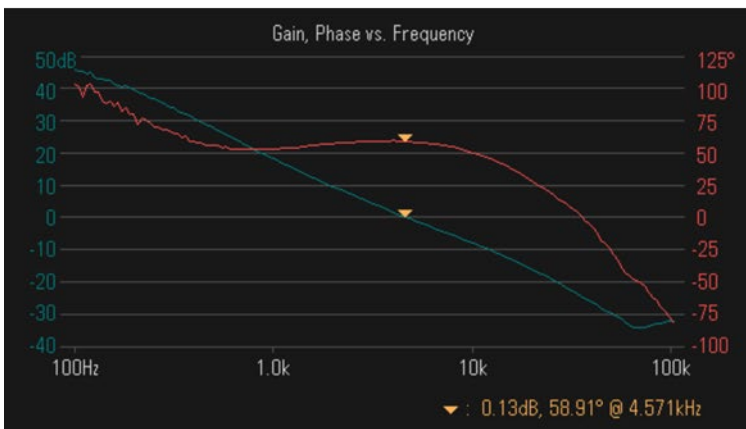
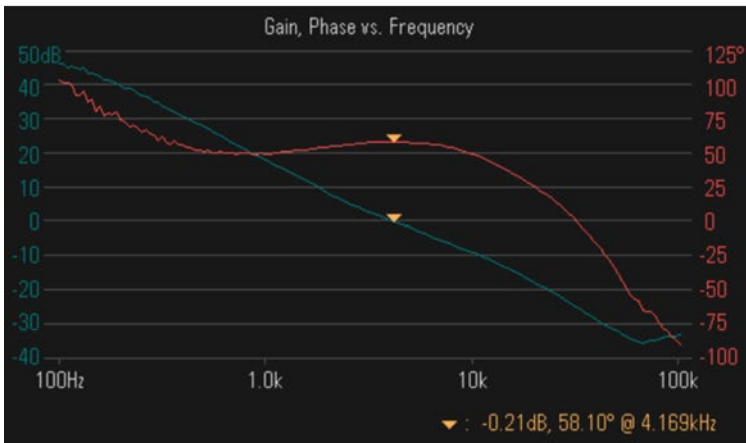
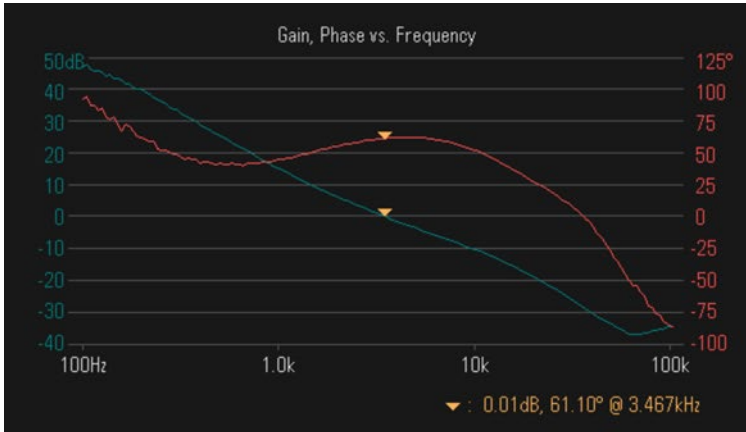
SGBC5005S					
Parameter	Description	Min	Typ	Max	Unit
Efficiency	@ 25°C		76		%
Capacitive load (per output)		-	-	300	μF
Switching frequency	Fix frequency	350	-	400	kHz
Storage temperature		-55	-	125	°C
Soldering temperature		-	-	300	°C
Weight		-	-	180	g

Stability

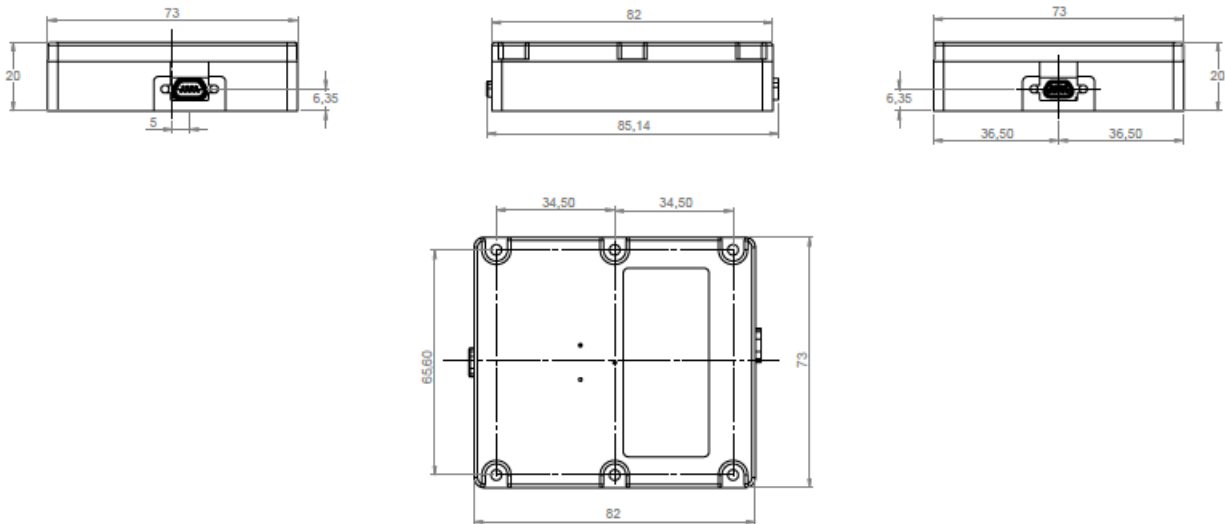
Output voltage ripple 5V single output 3A



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



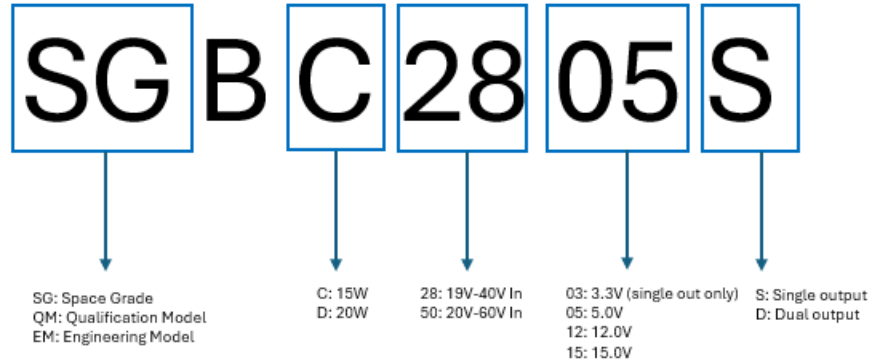
Case and pin out



J01	340102902B 9SFR136A	Description
1	Vin	Input bus voltage
2	NC	
3	OV_Status	0V= OV not tripped; 10V-to 11V= OV tripped
4	ON_OFF CMD	OFF= grounded to PRI_GND; ON=not connected or high impedance
5	PRI_GND	Primary Power Return
6	Vin	Input bus voltage
7	NC	
8	SYNC	Frequency synchronization input (referred to PRI_GND)
9	PRI_GND	Primary Power Return

J02	340102902B 9PFR136A	Description
1	SEC_GND	Secondary Ground
2	SEC_GND	Secondary Ground
3	-Pout (or NC is case of single output)	Cross-regulated negative output
4	Pout	Regulated positive output
5	Pout	Regulated positive output
6	SEC_GND	Secondary Ground
7	SEC_GND	Secondary Ground
8	-Pout (or NC is case of single output)	Cross-regulated negative output
9	Pout	Regulated positive output

Ordering information:



For customization of the product (input voltage range, output voltages, etc.), or additional information please contact info@arc-power.com.