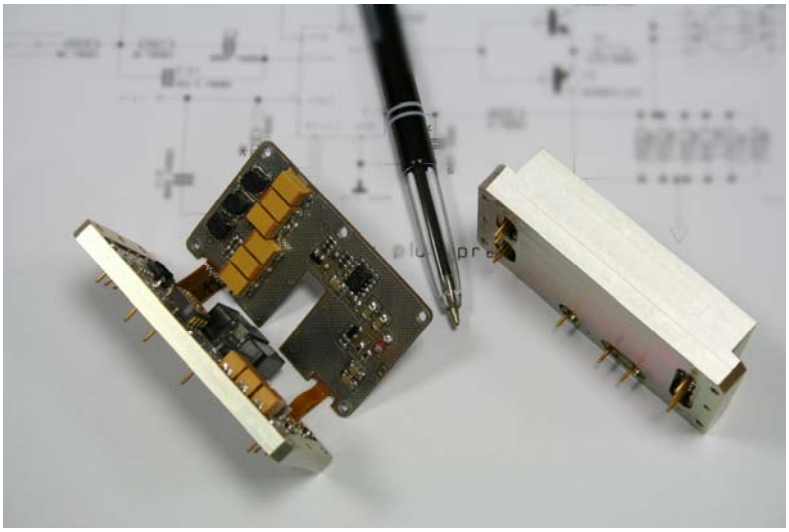


FEATURES

- Screening according to ESA standard ECSS-Q-60-05A
- Component derating according to ECSS-Q-30-11A
- Itar Free
- 22 to 38 VDC input
- Maximum output Power : 6.6W to 10W limited to 2A output
- Up to 78% efficiency @ full load
- Temperature drift : 0.5mV/°C between -40°C and +60°C
- Maximum total ionizing dose : up to 8kRad
- Galvanic isolation input-output case
- Fixed frequency, 460 kHz typical
- Inrush current limiter
- Temperature output
- Sync function*
- Inhibit function
- Output voltage adjustable (By Rsense Adjustement)
- -40°C to +60°C operation*
- -55°C to +125°C storage

* Please contact Us

Description

The SEDC28 CV-STEEL modules are high frequency and small dimensions DC-DC converters made for space applications. Available in several voltage ranges adjustable by an external resistor, they deliver a maximum output current of 2A or a maximal power of 10W.
The SEDC28 includes an in rush current limiter at power on, primary and secondary differential filters, an inhibit function by open collector, an output voltage image of the converter temperature, an input synchronisation clock and an output clock at sample frequency. This output is used to synchronise several modules integrated in the same equipment using external electronics for the definition of the signals.
Output voltages are adjustable by an external resistor. All models of CV-STEEL converters can be mechanically or electrically customized in factory according to the requirements and the specifications of the application only if the performances are not affected.
Multiple SEDC28 may be used in parallel to drive a common load by using a diode on each converter output. In this mode, an external LC filter must be integrated on the common line input to prevent modulated noise.

Design

The SEDC28 converters are « Flyback ». They operate in discontinued mode with a sample frequency of 460KHz. Galvanic isolation between the primary and the secondary is realized by the transformer for the power transfer channel and by an opto-coupler for the control channel. With this control, typical regulation rates of 0,3% can be reached from 0 to 100% of the load rate, and a line regulation of 0,3% can also be obtained for input voltage changes between 22V and 38V. An input voltage control system protects the converters power-on to avoid forced oscillations and a spoil of the converter if there is a continuous input under voltage. At power on, 1A maximum current peaks during 4ms max can be reached, thanks to an in rush current limiter.
Output voltage change with the temperature is 0.5mV/°C. The converter temperature can be measured by an output voltage, image of the internal temperature of the converter.

Inhibit Function

It is possible to inhibit or to activate the converters thanks to an ON/OFF input open collector, resulting in no output and very low quiescent input current.

Synchronisation

A synchronisation feature is included with the SEDC28 series that allows the user to match the switching frequency of the converter to the frequency of the system clock. This allows the user to adjust the nominally 460 kHz operating frequency within the range of 460kHz to 520kHz. This is initiated by applying a compatible input of the desired frequency to pin 8.

Quality Level

These converters are built with surface mount components carried on a rigid circuit. The specification for components is defined in the list of EEE parts "as design" which is available (ref: SE-STEEL-CVDCDC-T-LIEEE). All components are supplied from “approved suppliers” and delivered with a manufacturer or provider Certificate of Conformity. PCB is manufactured according to ESA standard ECSS-Q-70-11.
Most active components are COTS. For each of them a justified document is available. Qualified test lots are listed (for COTS which total dose and heavy ion tests have been made).
STEEL is certified by ESA/CNES for manufacturing according to ESA PSS 01-738.

Screening

The quality level of our DC/DC converters is guaranteed in the version / QS by a full environmental screening. This screening is done according to ESA standard ECSS Q 60-05A.

Tableau 1 : Quality level available

	Part List, DML/DPL	Coating	Clean room Manufacture	Screening	Min/Max temp test
/..	No compliant	No	No	No	No
Q	Compliant	Yes	Yes	No	Yes
Qs	compliant	Yes	Yes	Yes	Yes

Tableau 2 : Screening tests

Step	Sequence	Test condition	Sample size
#1	External visual inspection		100%
#2	Physical dimensions		100%
#3	Thermal cycling	-10 cycles : -55°C/+125°C - Step duration : 10mn - Transfer time : 12°C/mn	100%
#4	Pre Burn-In Electrical @ Ambient temp	- Precision - Load regulation - Line regulation - Efficiency - Step Load Response - Internal Temp	100%
#5	Burn In	168h	100%
#6	Final electrical test : @ Ambient temp @ Min and Max temps	- Precision - Load regulation - Line regulation - Efficiency - Step Load Response - Internal Temp	100%
#7	External visual inspection		100%

28 VOLT INPUT

Electrical Characteristics: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

		SLDC283R3SP10F			SLDC285R2SP10F			SLDC28015SP10F			UNIT
PARAMETER	CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE	50% LOAD	3.28	3.3	3.32	5.174	5.2	5.226	15.12	15.2	15.27	VDC
OUTPUT CURRENT	VIN = 22 TO 40 VDC	-	-	2	-	-	1.8	-	-	0.53	A
OUTPUT POWER	VIN = 22 TO 40 VDC	-	-	6.6	-	-	10	-	-	8	W
OUTPUT RIPPLE	BW = 200 MHz	-	-	270	-	-	270	-	-	270	mV
LINE REGULATION	VIN = 22 TO 40 VDC	-	-	± 0.15	-	-	± 0.15	-	-	± 0.15	%
LOAD REGULATION	10% TO 100% LOAD	-	-	± 0.15	-	-	± 0.15	-	-	± 0.15	%
INPUT CURRENT	NO LOAD	-	-	25	-	-	25	-	-	25	mA
	INHIBITED			4			4			4	
EFFICIENCY		74	-	-	73.5	-	-	78	-	-	%
START UP TIME		-	-	25	-	-	25	-	-	25	ms
STEP LOAD RESPONSE	100% - 50% - 100% TRANSIENT	-	-	200	-	-	200	-	-	100	mV pk
	RECOVERY	-	-	1	-	-	1	-	-	1	ms
STEP LINE RESPONSE	40 – 22 – 40 VDC	-	-	200			200	-	-	200	mV pk
	RECOVERY	-	-	1			1	-	-	1	ms
Weight		40									g

SEDC285R2SP10F

Typical Performance Curves: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

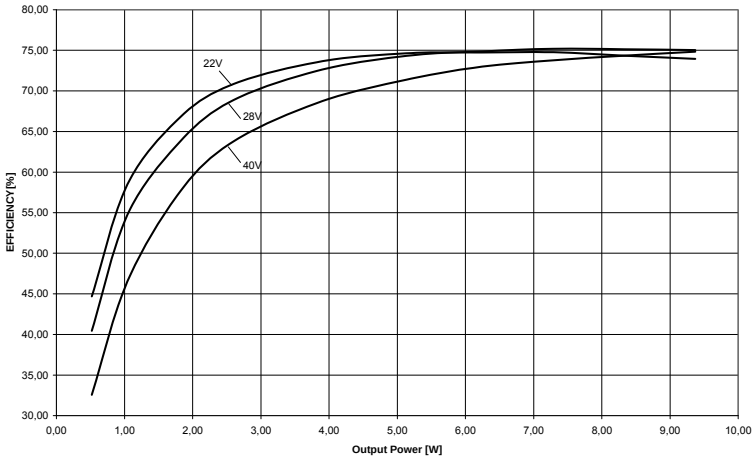


FIGURE 1 : EFFICIENCY

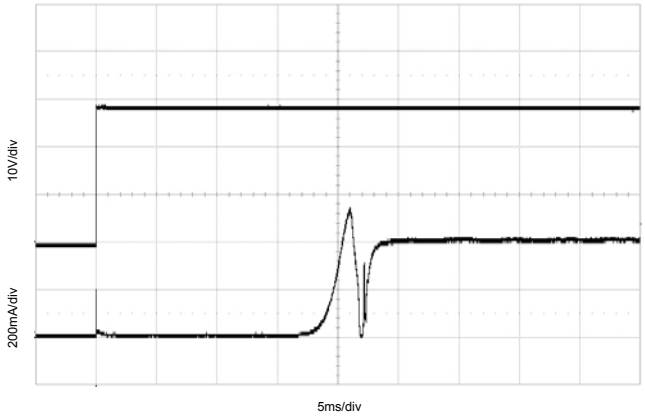


FIGURE 2 : INRUSH CURRENT

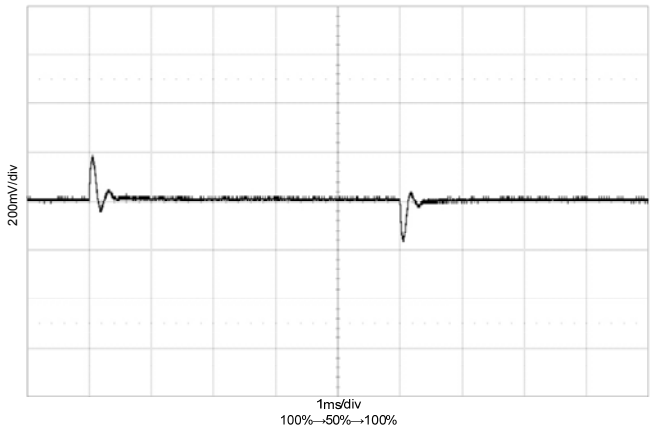


FIGURE 3 : STEP LOAD RESPONSE

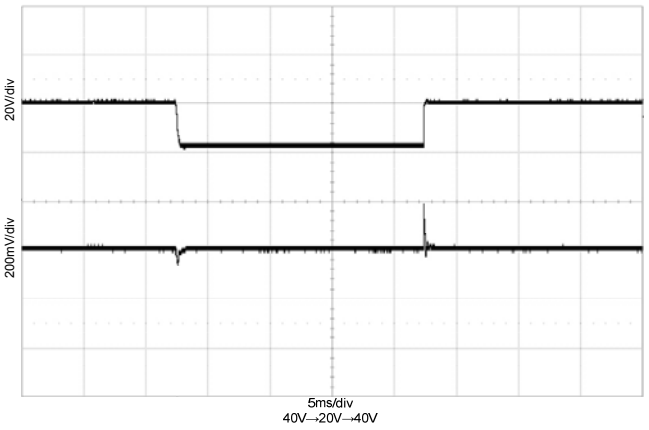


FIGURE 4 : STEP LINE RESPONSE

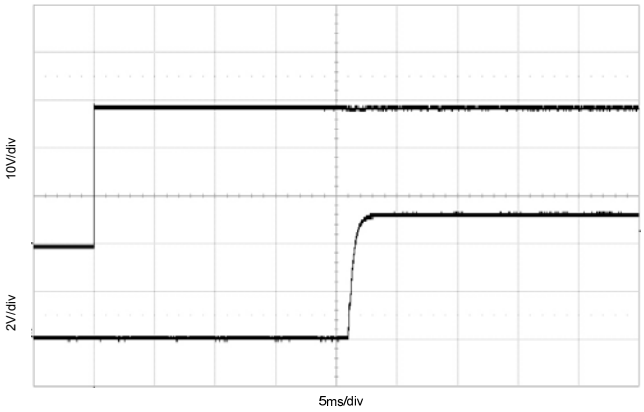


FIGURE 5 : TURN ON

SEDC283R3SP10F

Typical Performance Curves: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

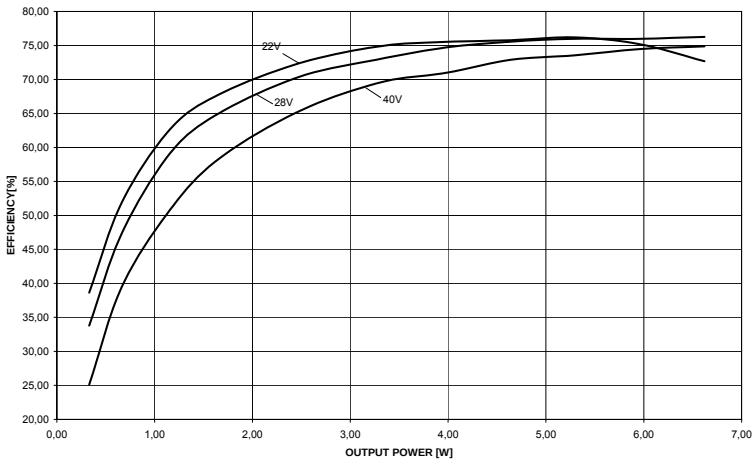


FIGURE 6 : EFFICIENCY

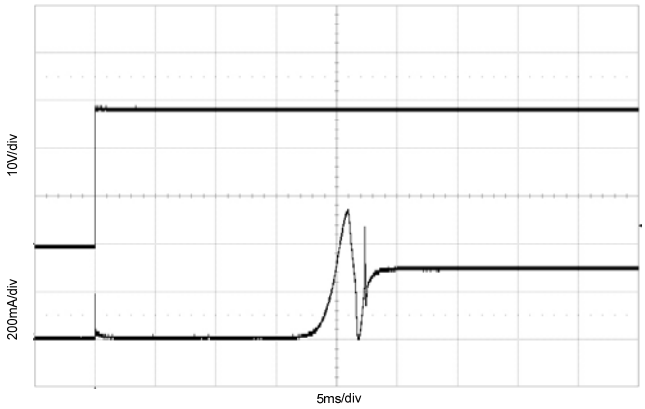


FIGURE 7 : INRUSH CURRENT

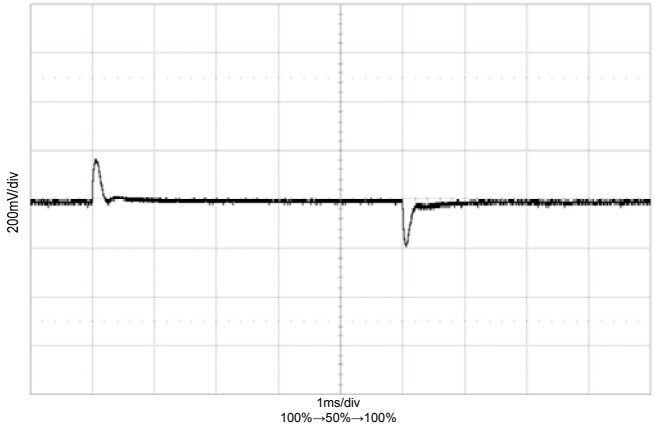


FIGURE 8 : STEP LOAD RESPONSE

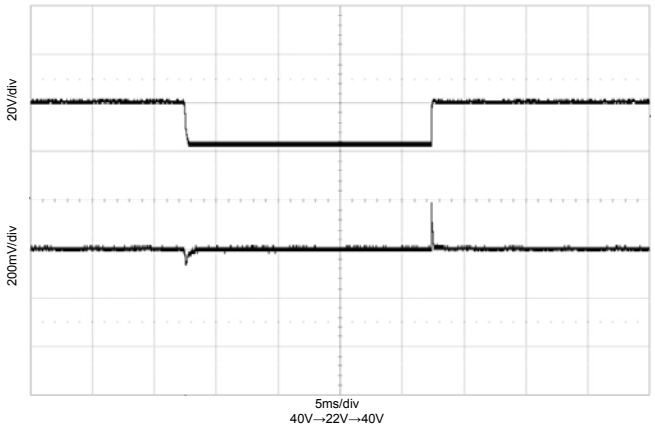


FIGURE 9 : STEP LINE RESPONSE

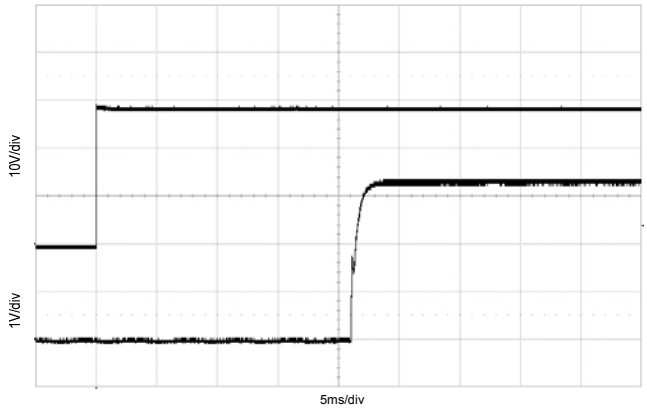


FIGURE 10 : TURN ON

SEDC28015SP10F

Typical Performance Curves: 25°C Tc, 28 VDC Vin, 100% load, unless otherwise specified.

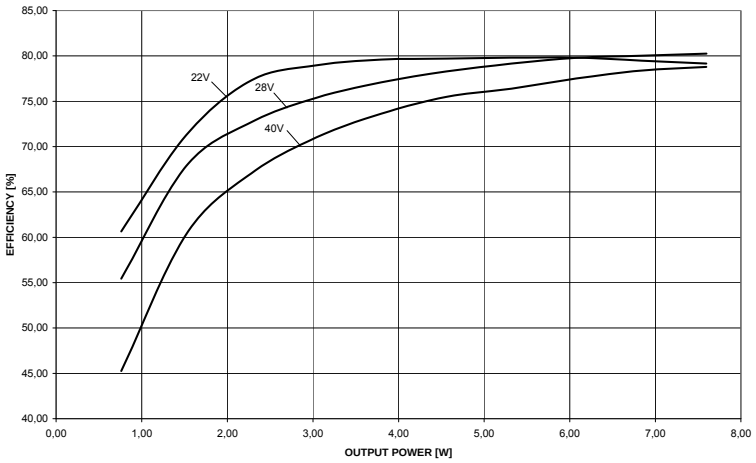


FIGURE 11 : EFFICIENCY

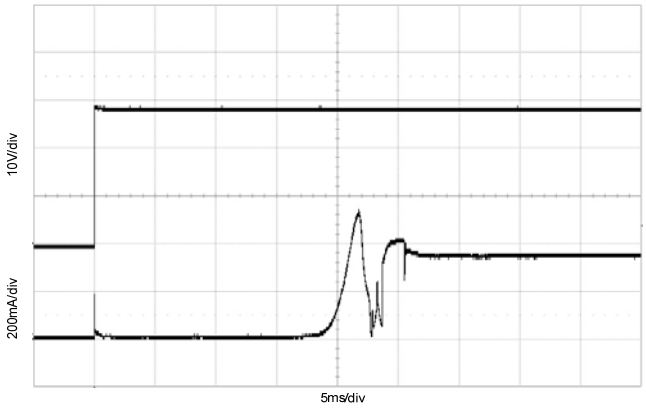


FIGURE 12 : INRUSH CURRENT

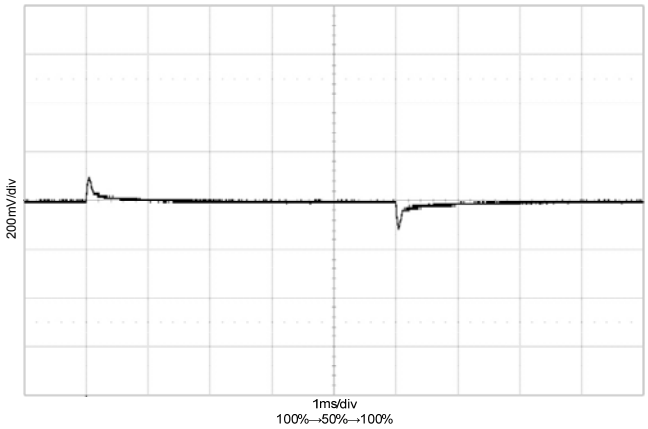


FIGURE 13 : STEP LOAD RESPONSE

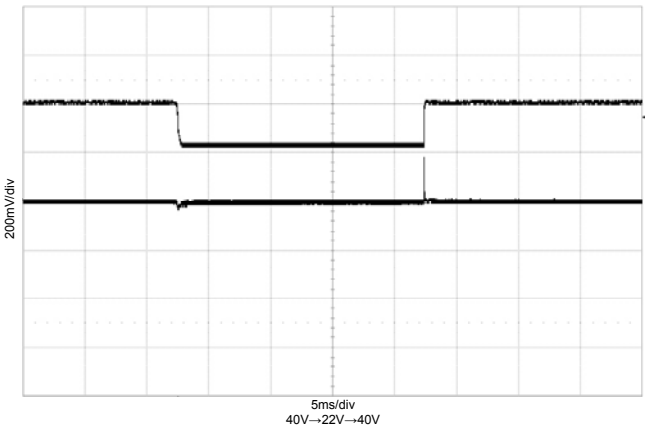


FIGURE 14 : STEP LINE RESPONSE

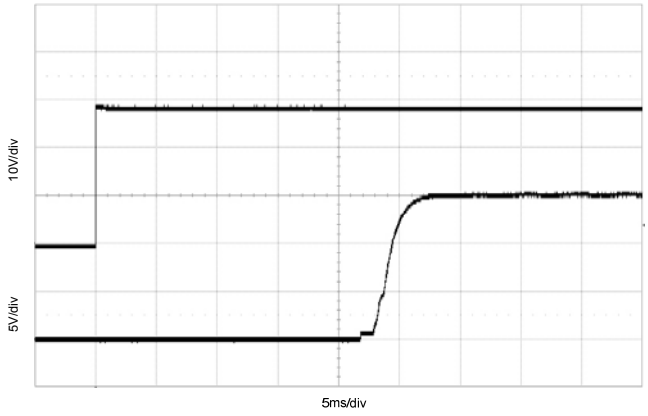
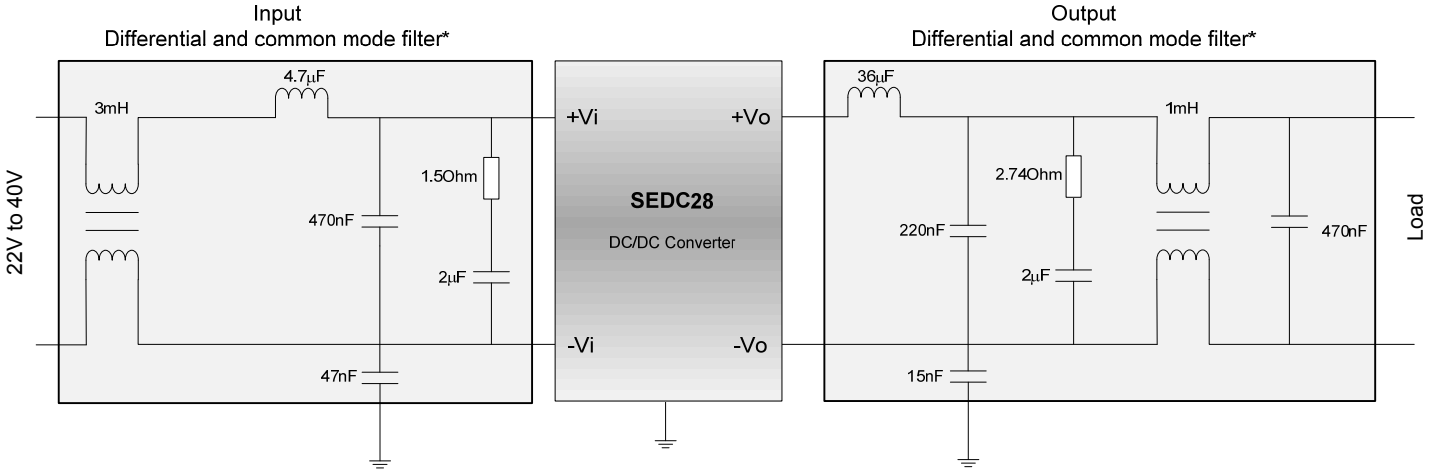


FIGURE 15 : TURN ON

APPLICATION NOTE

EMI conducted Interference

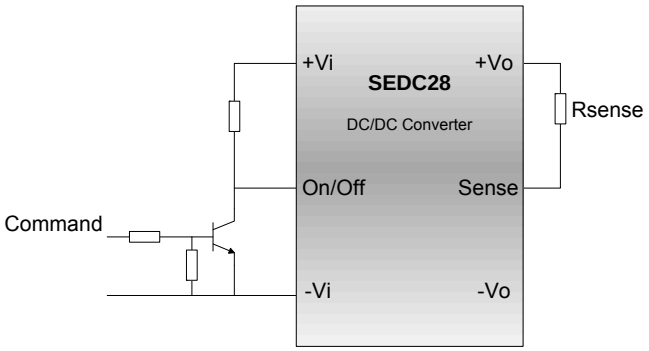
Following filters will reduce the converter's power line and Output spectral noise current to within the limit of MIL STD-461C
Output Ripple can be reduced less than 15mVpp.



*To be designed by customer

On/Off function

The converter can be inhibited when a logic low (<0.2V, referenced to –Vi) is applied to the ON/OFF pin (Pin 9). No connections or high impedance on pin 9 enables the converter.



Rsense Adjustement

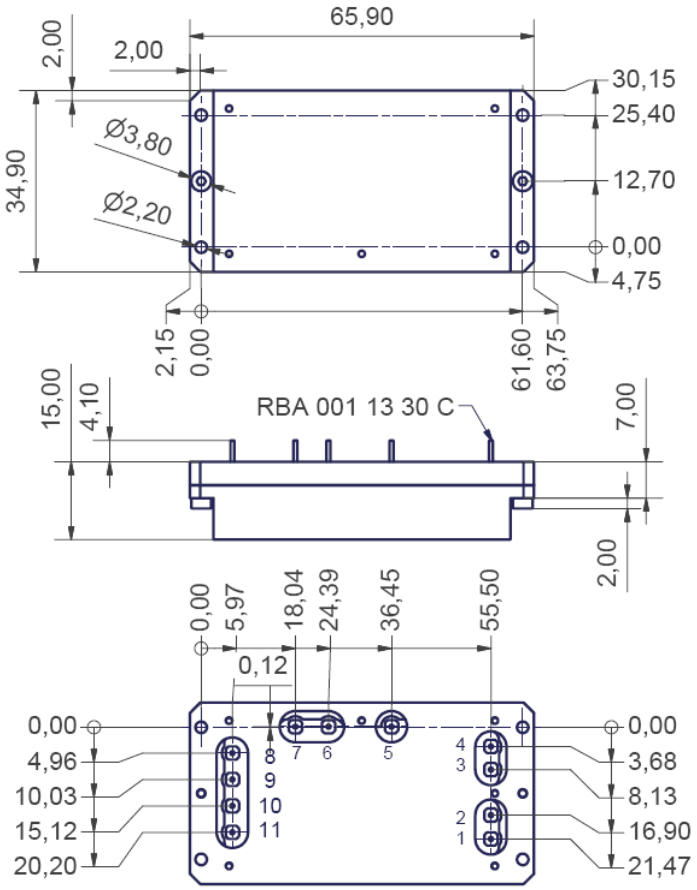
Type	Output*	Rsense
SEDC28 3R3 S10	3,3V	15 kΩ
SEDC28 5R2 S10	5,2V	75,1 kΩ
SEDC28 015 S10	15V	750 kΩ

* For others values please contact Us

The following technical notes will be available (please contact us) :

- EMC
- Heat used in accordance with mounting
- Series / parallels associations

MECHANICAL DRAWINGS AND PINOUT

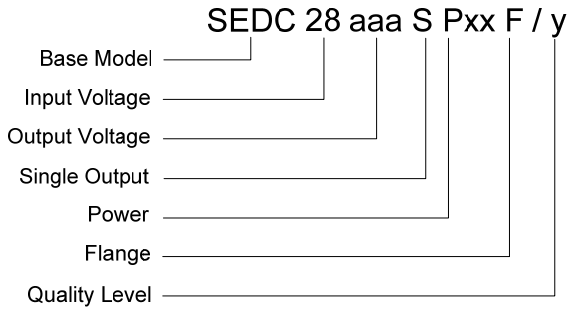


All dimensions are in millimetres

Pin	Name	Description
1	CGND	Mechanical ground
2	Sense	Sense Input
3	+Vo	+Output
4	-Vo	-Output
5	Out_Temp	Temperature voltage output (Ref on–Output) V=2,276V+0.008xT(°C) NC if not used
6	Out_BNR_F	Internal primary filter output NC if not used
7	Out_Sync	Switching Clock Output NC if not used.
8	In_Sync	Synchronization Clock Input NC if not used.
9	ON/OFF	ON/OFF NC if not used. To ground to turn off converter
10	-Vi	- Input
11	+Vi	+ Input

Mounting advised:
- Welding sockets on PCB (p/n 41.6021 from Multi-contact- www.multi-contact.com).
- For the DC/DC, the outputs could be done with sockets (p/n RBA0011330C from Hypertac-www.hypertac.com).

ORDERING PART NUMBER



Output Voltage	3.3V	**code**	3R3
	5.2V		5R2
	15V		015
Power	10W	**code**	10
Quality Level :	Blank	Standard or engineering model	
	Q	Suitable for space science applications whether screening are managed by the customer.	
	QS	Screening according to ESA standard ECSS-Q-60-05A	

All technical information in this data sheet has been carefully checked and is believed accurate, but no responsibility is assumed for errors or omissions. STEEL ELECTRONIQUE reserves the right to make changes without notice in products or specifications.

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