

FEATURES

- Component derating according to ECSS-Q-30-11C
- Class 2 or 3 components quality levels according to ECSS-Q-ST-60C
- Itar Free
- 22 to 40 VDC input
- Maximum output Power : 6.6W to 10W limited to 2A output
- Up to 82% efficiency @ full load
- Temperature drift : (TBD) mV/°C between -40°C and +60°C
- Maximum total ionizing dose : up to 20kRad (TBC)
- Galvanic isolation input-output case
- Fixed frequency, 500 kHz typical
- Sync function*
- Soft Start function
- -40°C to +60°C operation*
- -55°C to +125°C storage

* Please contact Us

Description

The SLxDC28 CV-STEEL modules are high frequency and small dimensions DC-DC converters made for space applications. Available in several voltage ranges, they deliver a maximum output current of 2A or a maximal power of 10W.

The SLxDC28 includes primary and secondary differential filters, a soft start function and an input synchronisation clock. All models of SLxDC28 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 SLxDC28 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 SLxDC28 converters are « Flyback ». They operate in discontinued mode with a sample frequency of 500KHz. 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 $\pm 1.5\%$ can be reached from 10% to 100% of the load rate, and a line regulation of 0,1% can also be obtained for input voltage changes between 22V and 40V.

Soft Start Function

Some applications require a controlled turn-on of their voltages. Indeed, some voltages must appear before all others. To allow this, a Soft Start feature has been implemented in the converter to delay the turn-on of a voltage (up to 200 μ s) by simply adding a capacitor at its terminals. (pin 3 and pin 8).

Moreover, the soft start function limits the inrush current at initial start-up converter.

Synchronisation

A synchronisation feature is included with the SLxDC28 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 470 kHz operating frequency within the range of 470kHz to 500kHz. This is initiated by applying a compatible input of the desired frequency to pin 5.

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". All components are supplied from "approved suppliers" and delivered with a manufacturer or provider Certificate of Conformity.

For flight models, two qualities of components (Class 2 or Class 3) are available according to ECSS-Q-ST-60C Rev1. PCB is manufactured according to ESA standard ECSS-Q-70-11.

STEEL-ELECTRONIQUE is certified by ESA/CNES for manufacturing according to ESA PSS 01-738.

Miscellaneous

- Temperature drift : (mV/°C between -40°C and +60°C) must be confirmed
- Max TID not tested yet

RESULTATS PRELIMINAIRES

28 VOLT INPUT

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

PARAMETER	CONDITIONS	SLDC283R3SP10F			SLDC285R2SP10F			SLDC28015SP10F			UNIT
		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	-	-	500	-	-	700	-	-	400	mV
LINE REGULATION	VIN = 22 TO 40 VDC	-	-	± 0.1	-	-	± 0.1	-	-	± 0.1	%
LOAD REGULATION	10% TO 100% LOAD	-	-	± 1.5	-	-	± 1	-	-	± 0.1	%
INPUT CURRENT	NO LOAD	-	-	15	-	-	15	-	-	15	mA
EFFICIENCY		74	-	-	76	-	-	82	-	-	%
START UP TIME		-	-	40	-	-	40	-	-	40	ms
STEP LOAD RESPONSE	100% - 50% - 100% TRANSIENT	-	-	300	-	-	200	-	-	100	mV pk
	RECOVERY	-	-	< 1	-	-	< 1	-	-	< 1	ms
STEP LINE RESPONSE	40 - 22 - 40 VDC	-	-	50			50	-	-	50	mV pk
	RECOVERY	-	-	< 1			< 1	-	-	< 1	ms
Weight		< 45									g

SLDC285R2

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

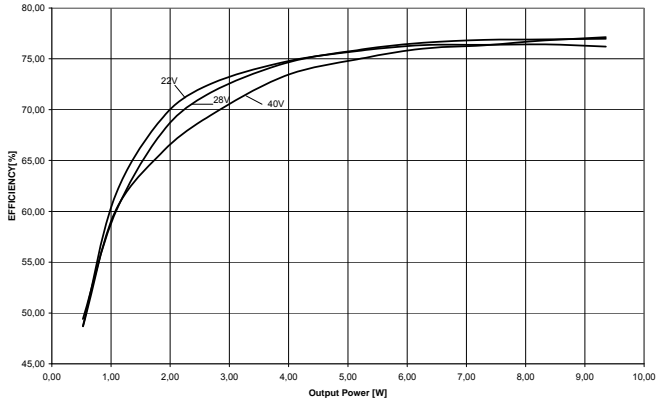


FIGURE 1 : EFFICIENCY

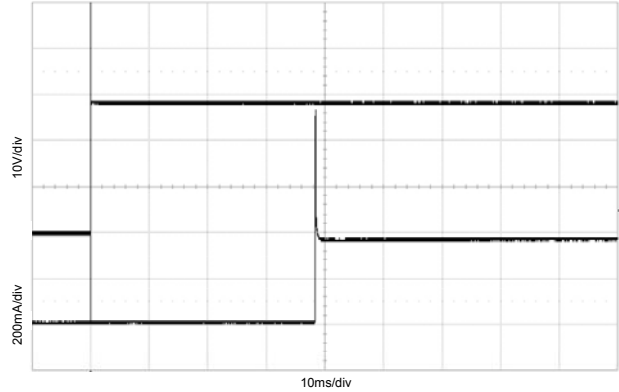


FIGURE 2 : INRUSH CURRENT

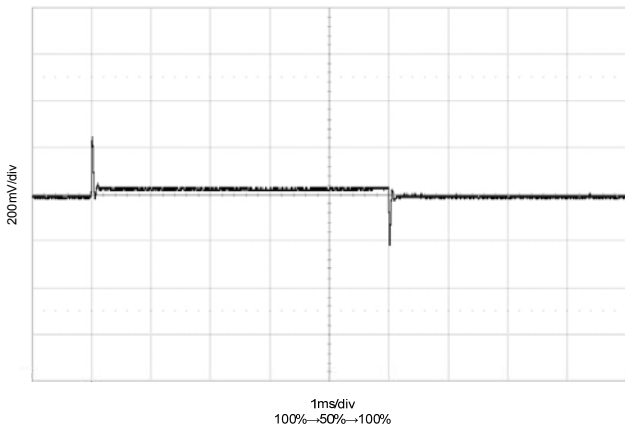


FIGURE 3 : STEP LOAD RESPONSE

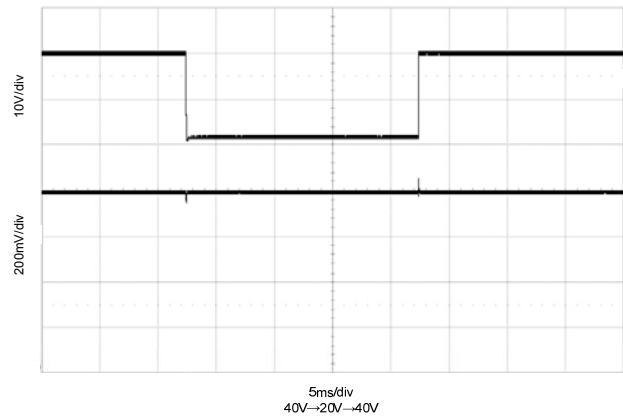


FIGURE 4 : STEP LINE RESPONSE

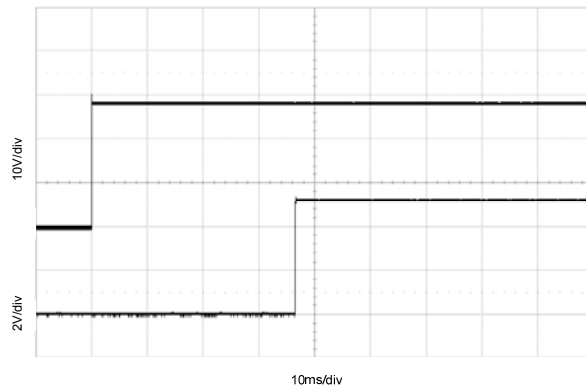


FIGURE 5 : TURN ON

SLDC283R3

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

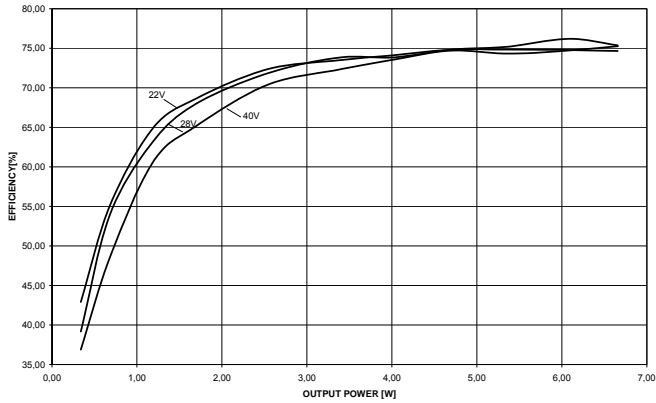


FIGURE 6 : EFFICIENCY

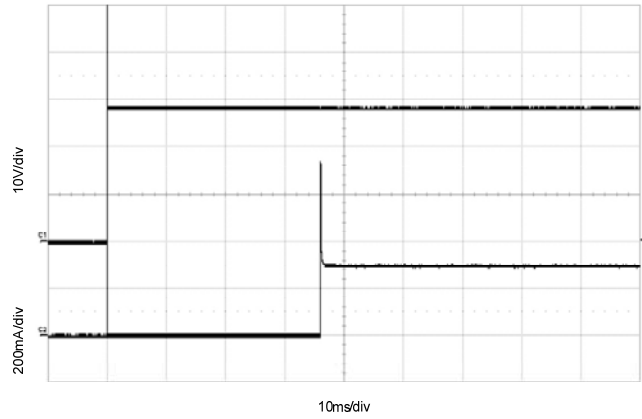


FIGURE 7 : INRUSH CURRENT

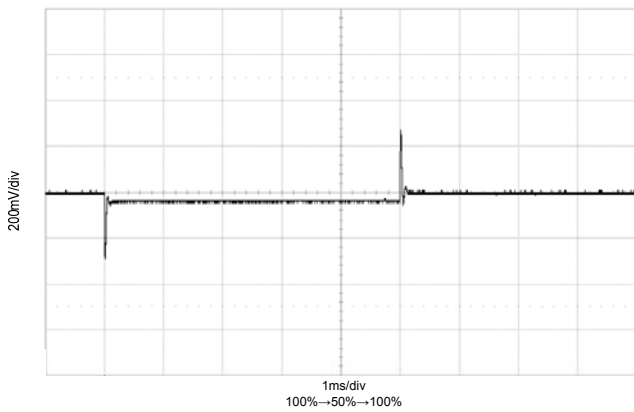


FIGURE 8 : STEP LOAD RESPONSE

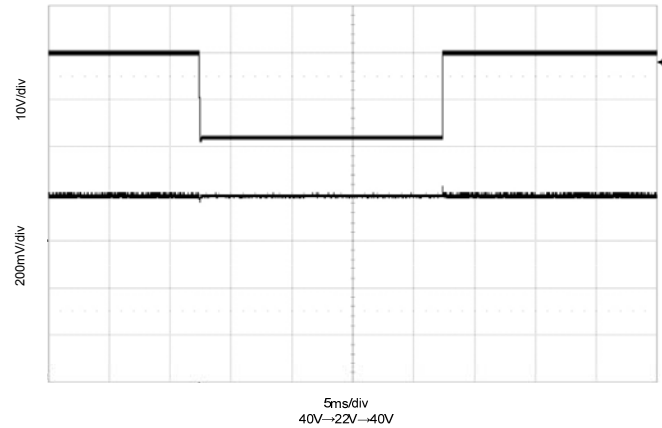


FIGURE 9 : STEP LINE RESPONSE

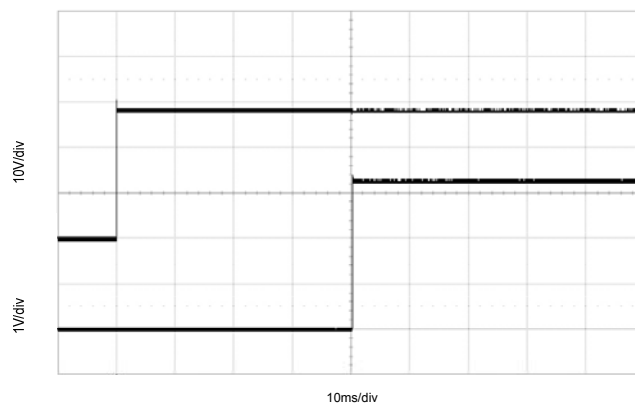


FIGURE 10 : TURN ON

SLDC28015

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

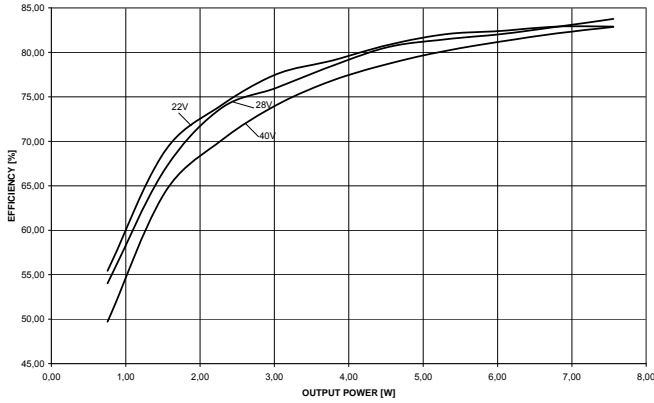


FIGURE 11 : EFFICIENCY

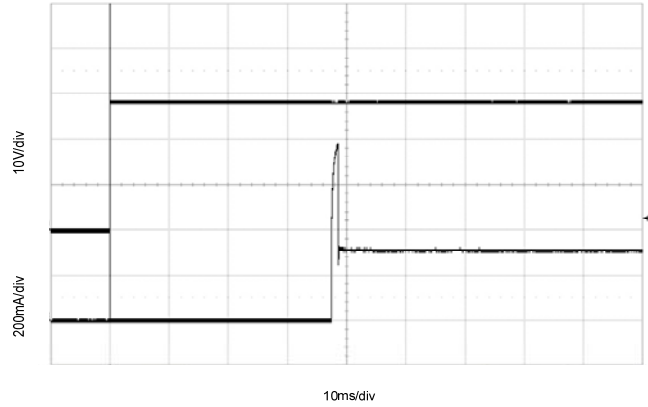


FIGURE 12 : INRUSH CURRENT

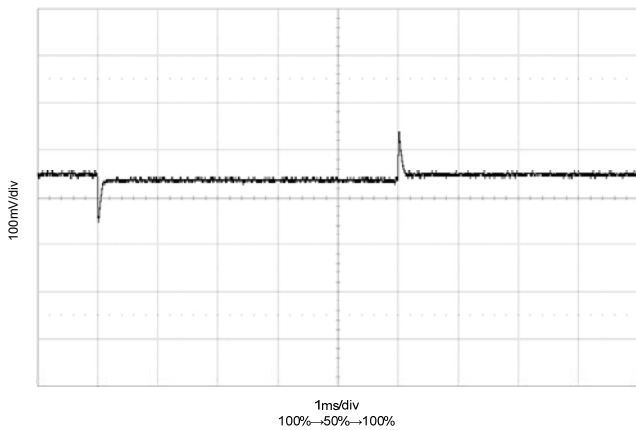


FIGURE 13 : STEP LOAD RESPONSE

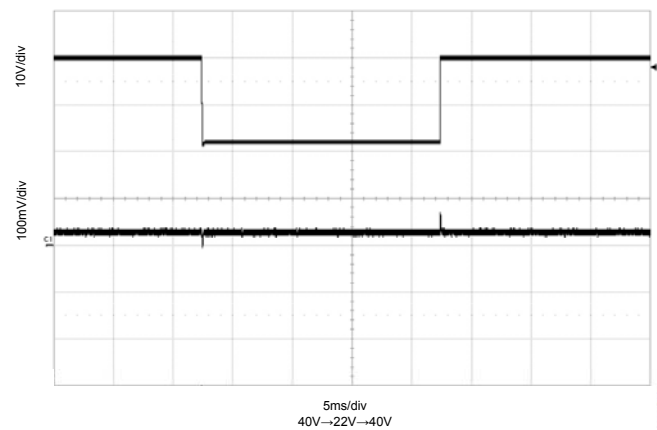


FIGURE 14 : STEP LINE RESPONSE

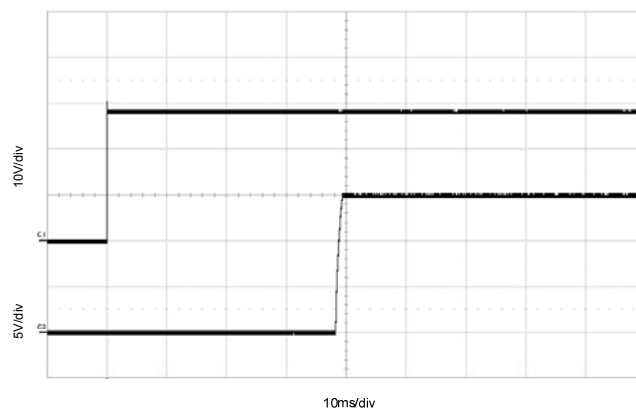
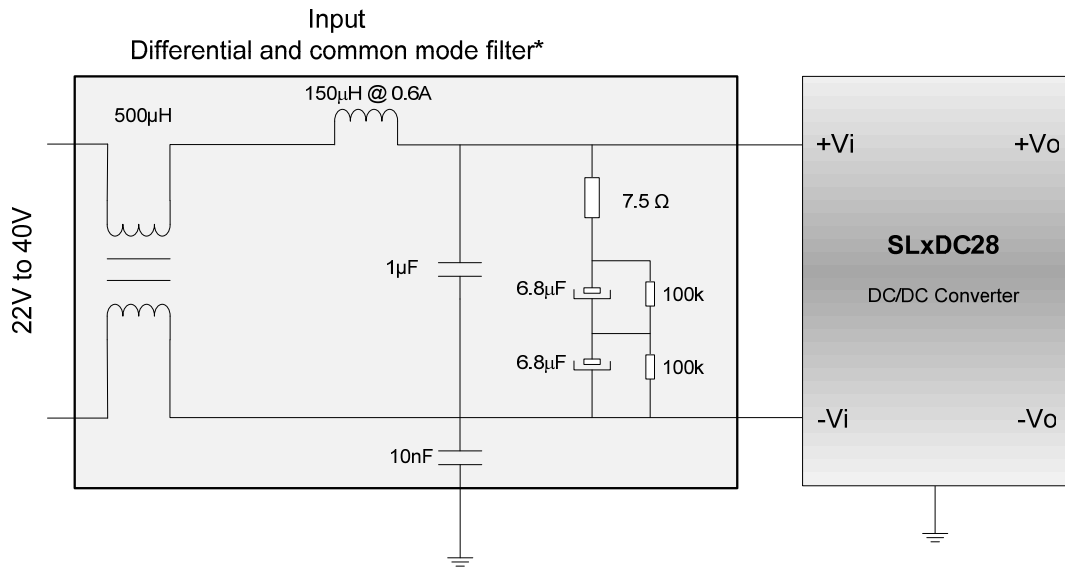


FIGURE 15 : TURN ON

APPLICATION NOTE

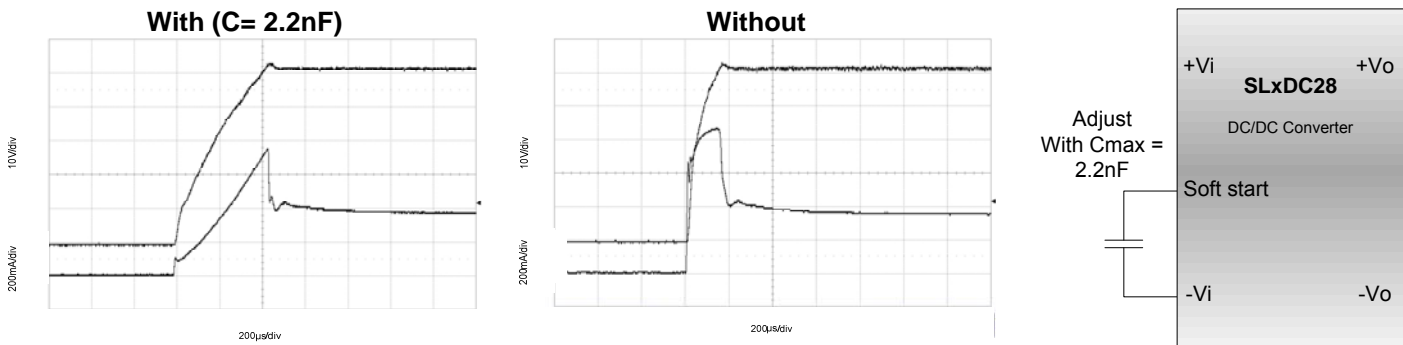
EMI conducted Interference

Following filters will reduce the converter's power line and Output spectral noise current to within the limit of MIL-STD-461C



*To be designed by customer

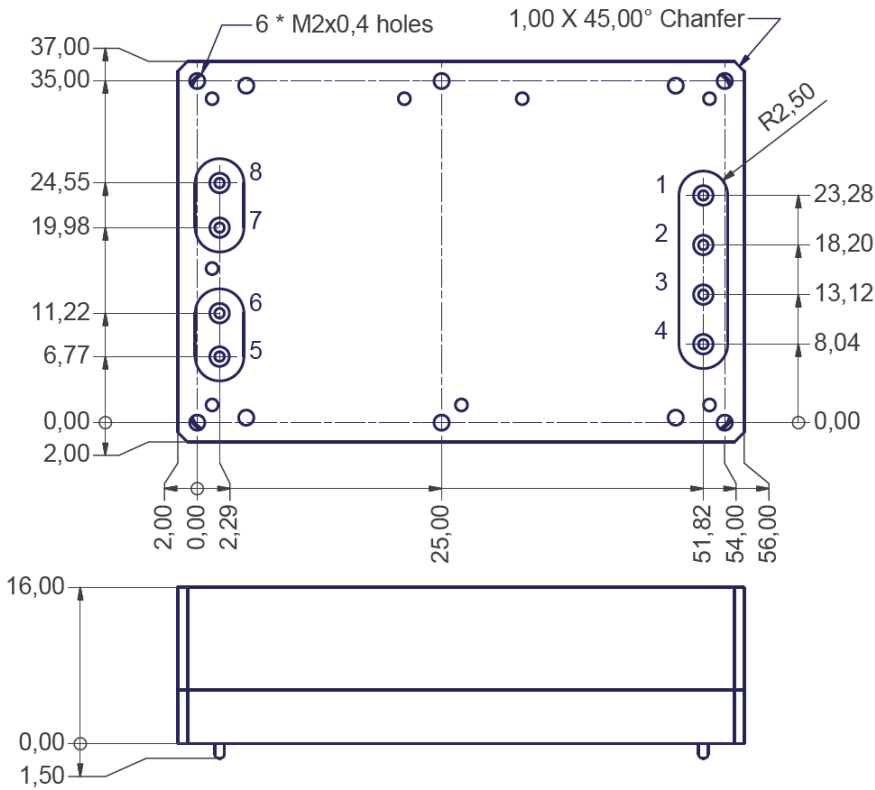
Soft Start Function



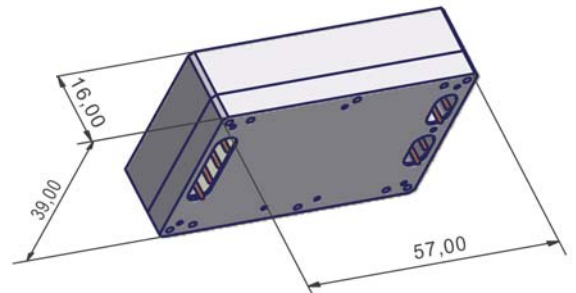
The following technical notes will be available (please contact us) :

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

MECHANICAL DRAWINGS AND PINOUT



Pin	Name	Description
1	+Vi	+ Input
2	-Vi	- Input
3	Soft Start	Soft start NC if not used.
4	In_Sync	Synchronization Clock Input NC if not used.
5	-Vo	-Output
6	+Vo	+Output
7	+Vo	+Output
8	CGND	Mechanical ground



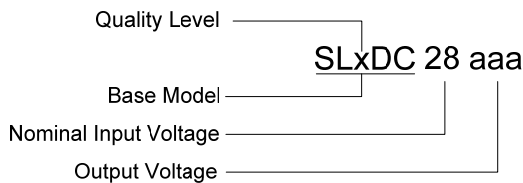
All dimensions are in millimetres

Mounting advised:

Welding sockets on PCB (p/n 41.6019 from Multi-contact- www.multi-contact.com).

Screened sockets are delivery by STEEL-ELECTRONIQUE for Qualification and Flight models.

ORDERING PART NUMBER



Output Voltage [V]	3.3	code	3R3
	5.2		5R2
	15		015
Quality Level :	Blank		Engineering model
	3		According to class 3 ESA standard ECSS-Q-ST-60
	2		According to class 2 ESA standard ECSS-Q-ST-60

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.