

---

# STROMBOLI® TECHNOLOGY

## Product Brief

Version: 2.1

8-Mar-11

---

### High-temperature Isolated DC-DC Converter Platform

---

#### General Description

STROMBOLI® technology is the world's first platform implementing a turnkey, high voltage, isolated DC-DC converter with ultimate reliability and with an operating temperature range **from -55°C to +225°C**. It provides a flexible and scalable reference design and evaluation boards for high temperature, high voltage isolated DC-DC converters with high efficiency **on the whole temperature range from -55°C to +225°C**. Thanks to the fly-back architecture, user can easily modify the design to meet particular needs such as input voltage up to 400V, symmetrical output voltages, and output voltages up to +/-25V or higher power ranges.

STROMBOLI® is built from CISSOID's chip-set CHT-MAGMA & CHT-HYPERION and high-temperature transistors from the PLANET family:

- For high output power, a synchronous rectification is implemented for an improved efficiency while for low power levels, standard rectification can simplify the BOM.
- A feedback loop provides the output voltage temperature stability and the load regulation.

STROMBOLI® also features an Under-Voltage-Lockout (UVLO) function and the pulse-by-pulse current sensing provides intrinsic output current limitation in case of overload or short-circuits.

The STROMBOLI® technology is available under license from CISSOID. The evaluation board is available in two versions, optimized for input voltage ranges of 15V-40V or 150-350V. They both can deliver 25W with efficiencies up to 70% at 225°C. The output voltage can easily be modified by the user to fit different needs.

#### STROMBOLI® Technology Kit Content:

- One EVK-STROMBOLI-xx-xx Evaluation-Board:
  - Qualified from -55 to +175°C (Ta)
  - 200°C Polyamide PCB
  - Active components all qualified from -55 to +225°C (Tj)
- Data-sheet
- Detailed electrical schematic
- Bill-of-Material
- Application Note
- User's License
- 5 hours of engineering support

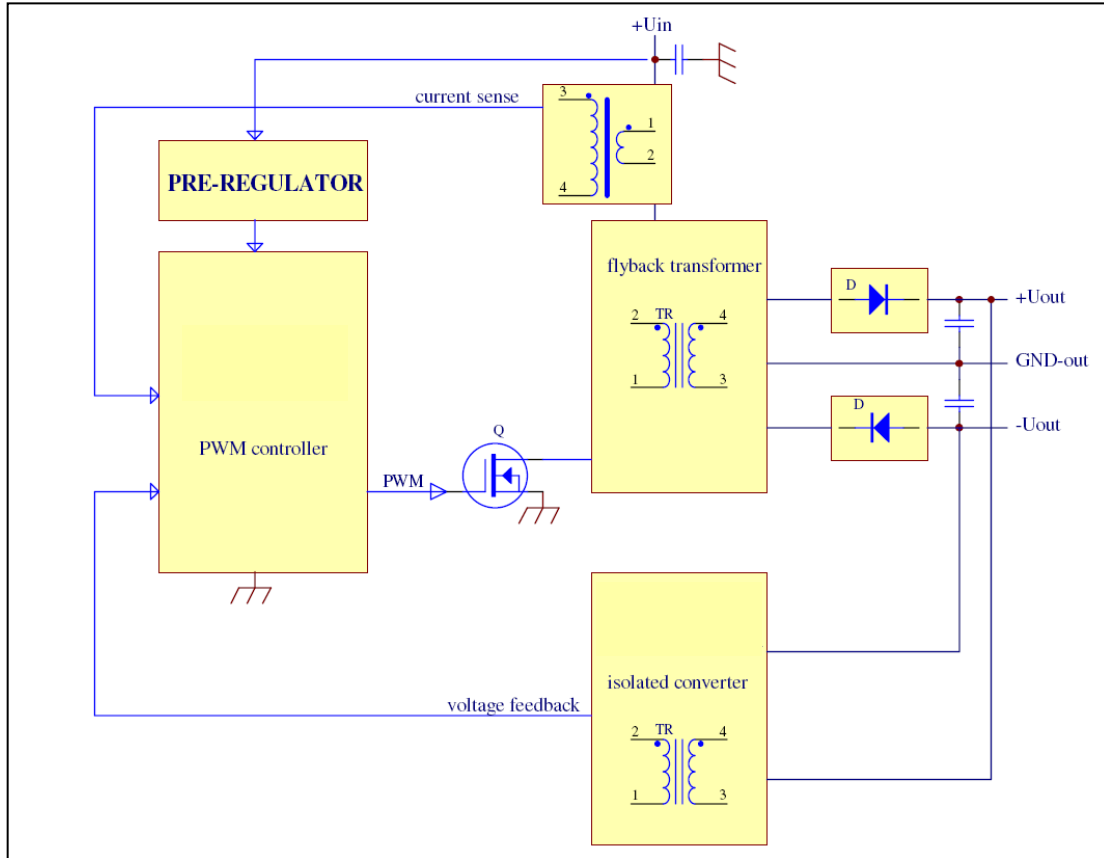
#### Evaluation Board - Key Features

- **Input voltage range:**
  - EVK-STROMBOLI-15-40: **15V to 40V**
  - EVK-STROMBOLI-150-350: **150V to 350V**
- **Output voltage: Dual/symmetrical ±12V** (other voltages possible through customization)
- **Output Power: 25W max**
- Efficiency: > 70% at maximum power at room temperature
- Isolation: 10MΩ @ 500VDC
- Short-circuit protection
- Line Under-Voltage Lockout
- Bill of Material:
  - Resistors: 47 pcs
  - Capacitors: 62 pcs
  - Transformers: 5 pcs
  - CISSOID: 3 ICs and 16 MOSFETs
- PCB Dimension: 102x152mm (4 x6 ")

#### Applications

- Distributed power architectures in aeronautics, aerospace, industrial and military electronic systems:
  - PoL (Point of Loads)
  - PDU (Power Distribution Units)
- SMPS power supplies in down-hole tools such as MWD and equipment

## Functional Block Diagram



STROMBOLI® DC-DC Converter Technology is based on a flyback architecture which provides isolation capability, easy way to generate multiple outputs while keeping good regulation on all outputs. The same architecture is used to cover both input voltage ranges.

Output rectification is implemented using synchronous rectification in order to optimize the system efficiency; this is an optional feature which can be easily removed if density and costs are more important than efficiency.

Output voltage regulation is achieved by means of a voltage feedback towards primary controller. This feedback loop is implemented through a dedicated low power flyback DC-DC converter.

In steady-state operation, primary side controller power supply is provided by a dedicated winding on the flyback transformer in order to minimize primary side power dissipation.

Short-circuit protection is implemented by a pulse-by-pulse current sensing mechanism on the primary side; above a settable threshold, the sensing function will disable the gate of the power transistor.

## Evaluation Board Characteristics EVK-STROMBOLI-15-40 [150-350]

### Absolute Maximum Ratings

Supply Voltage  $V_{IN}$  to GND -0.3 to 40V [355V]  
 Load current 2.5A

### Operating Conditions

Supply Voltage  $V_{IN}$  to GND 15V to 40V [150V to 350V]  
 Junction temperature -55°C to +225°C  
 Load current 0 to 2A

## Electrical Characteristics EVK-STROMBOLI-15-40 [150-350]

Unless otherwise stated:  $T_a=25^\circ\text{C}$ . **Bold underlined** values indicate values over the whole temperature range ( $-55^\circ\text{C} < T_a < +175^\circ\text{C}$ ).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage $V_{IN}$		<b><u>15 [150]</u></b>		<b><u>40 [350]</u></b>	V
Output Power $P_{out}$				<b><u>25</u></b>	W
Output voltage $V_{out}$	$V_{in}=25V$ ; $P_{out}=12.5W$ ; $T_a=25^\circ\text{C}$	$\pm 11.9$	$\pm 12$	$\pm 12.1$	V
Output voltage temperature drift $dV_{out}/dT$	$V_{in}=25V$ ; $P_{out}=12.5W$		100	<b><u>150</u></b>	ppm/°C
Output voltage DC line regulation $dV_{out}/dV_{IN}$	From 15V up to 40V $T_a=25^\circ\text{C}$ ; $P_{out}=12.5W$		$\pm 10$		ppm/V
Output voltage DC load regulation $dV_{out}/dI_{out}$	$P_{out}$ from 0 to 25W $V_{in}=25V$		$\pm 0.15$	<b><u><math>\pm 0.5</math></u></b>	%
Output ripple	$V_{in}=25V$ ; $P_{out}=12.5W$ ; BW=20Mhz			<b><u>100</u></b>	mV <sub>pk-pk</sub>
Switching frequency			150		kHz
Switching frequency drift over temperature			0.2		kHz/°C
Power Efficiency	$V_{in}=25V$ ; $P_{out}=25W$	<b><u>70</u></b>			%
Line Under Voltage Lockout (UVLO) start threshold				13 [145]	V
Line Under Voltage Lockout (UVLO) stop threshold		12 [130]			V
Transient load response overshoot			600		mV pk
Transient load response recovery time			6		ms
Start-up time			16		ms
Isolation	At 500V			<b><u>10</u></b>	M $\Omega$

## Contact & Ordering

### Ordering Information

DESCRIPTION	ORDER NUMBER
IP Stromboli®: High-temperature Isolated DC-DC Converter Technology - Voltage input range 15V to 40V – The package includes one evaluation Board, documentation and user's license	LIC-STROMBOLI-15-40
IP Stromboli®: High-temperature Isolated DC-DC Converter Technology - Voltage input range 150V to 350V – The package includes one evaluation Board, documentation and user's license	LIC -STROMBOLI-150-350

### CISSOID S.A.

Headquarters and contact EMEA:	CISSOID S.A. – Rue Francqui, 3 – 1435 Mont Saint Guibert - Belgium T : +32 10 48 92 10 - F: +32 10 88 98 75 Email: <a href="mailto:sales@cissoid.com">sales@cissoid.com</a>
Sales Representatives:	Visit our website: <a href="http://www.cissoid.com">http://www.cissoid.com</a>

### Disclaimer

*Neither CISSOID, nor any of its directors, employees or affiliates make any representations or extend any warranties of any kind, either express or implied, including but not limited to warranties of merchantability, fitness for a particular purpose, and the absence of latent or other defects, whether or not discoverable. In no event shall CISSOID, its directors, employees and affiliates be liable for direct, indirect, special, incidental or consequential damages of any kind arising out of the use of its circuits and their documentation, even if they have been advised of the possibility of such a damage. The circuits are provided "as is". CISSOID has no obligation to provide maintenance, support, updates, or modifications.*