
STROMBOLI® TECHNOLOGY

Product Brief

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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

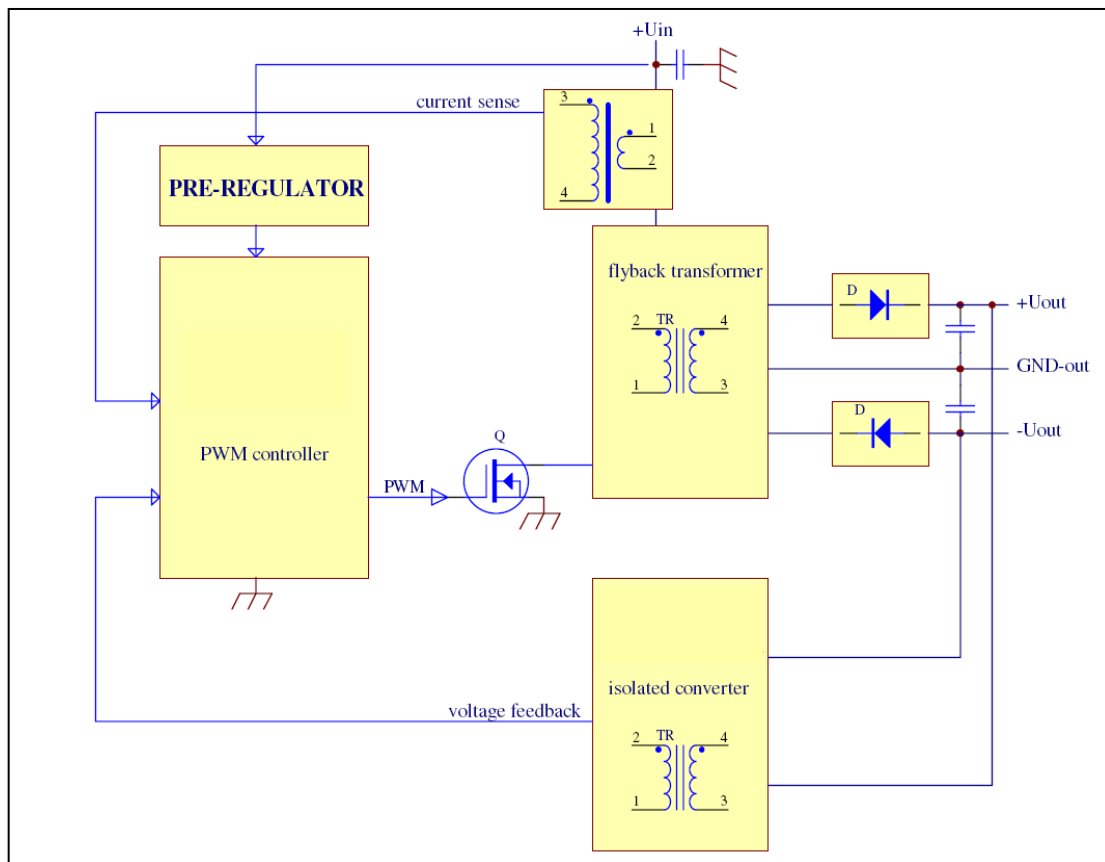
Evaluation Board - Key Features

- **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}		<u>15</u> [150]		<u>40</u> [350]	V
Output Power P_{out}				<u>25</u>	W
Output voltage V_{out}	$V_{in}=25\text{V}$; $P_{out}=12.5\text{W}$; $T_a=25^\circ\text{C}$	± 11.9	± 12	± 12.1	V
Output voltage temperature drift dV_{out}/dT	$V_{in}=25\text{V}$; $P_{out}=12.5\text{W}$		100	<u>150</u>	ppm/ $^\circ\text{C}$
Output voltage DC line regulation dV_{out}/dV_{IN}	From 15V up to 40V $T_a=25^\circ\text{C}$; $P_{out}=12.5\text{W}$		± 10		ppm/V
Output voltage DC load regulation dV_{out}/dI_{out}	P_{out} from 0 to 25W $V_{in}=25\text{V}$		± 0.15	<u>± 0.5</u>	%
Output ripple	$V_{in}=25\text{V}$; $P_{out}=12.5\text{W}$; $BW=20\text{Mhz}$			<u>100</u>	mV _{pk-pk}
Switching frequency			150		kHz
Switching frequency drift over temperature			0.2		kHz/ $^\circ\text{C}$
Power Efficiency	$V_{in}=25\text{V}$; $P_{out}=25\text{W}$	<u>70</u>			%
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			<u>10</u>	M Ω

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