VESUVIO® TECHNOLOGY Product Brief

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High-temperature DC-DC Converter Platform

General Description

VESUVIO® technology is a turnkey non-isolated DC-DC converter platform offering ultimate reliability and extreme operating temperature range **from -55°C to +225°C.** It implements a voltage mode, constant frequency and continuous current mode (CCM) synchronous buck converter topology. The technology from CISSOID provides a flexible and scalable reference design and an evaluation board for non-isolated DC-DC converters applications such as switched-mode power supplies and point-of-loads, with high-efficiency on the whole temperature range from -55°C to +225°C.

VESUVIO® is built around CISSOID's chipset CHT-MAGMA & CHT-HYPERION (PWM controller and half-bridge driver) plus some high-temperature MOSFETs from the CISSOID's PLANET family.

The VESUVIO® technology is available under license from CISSOID. The evaluation board is available in a 10W output power configuration, suitable to deliver a 5V voltage output from a wide voltage input range. The output voltage and power range can easily be modified by the user to fit different needs.

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 LWD equipment

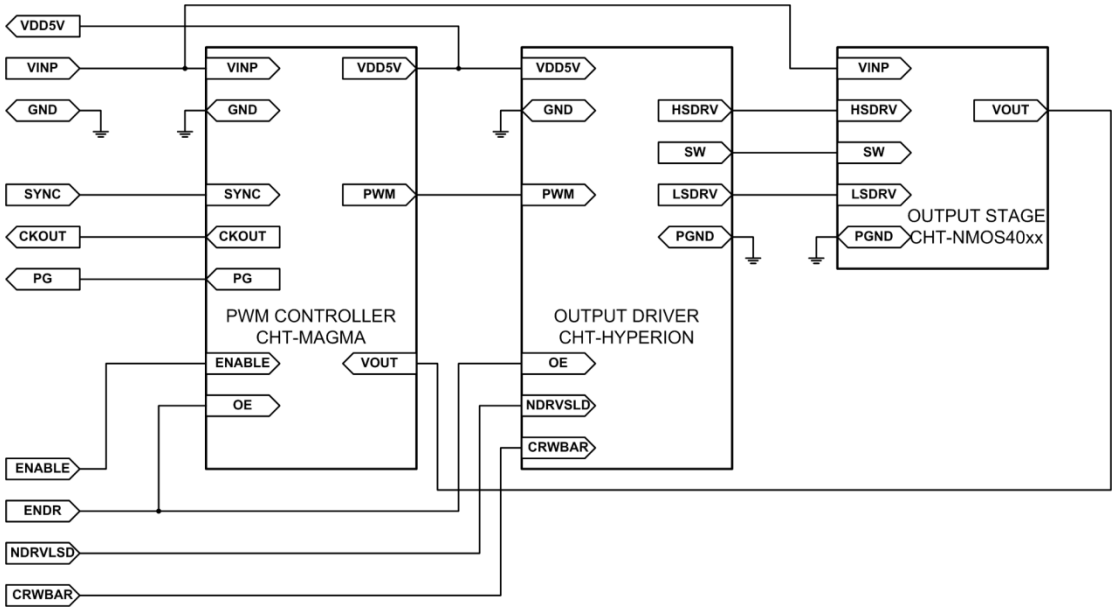
VESUVIO® Technology Kit Content:

- EVK-VESUVIO-30 Evaluation-Board:
  - Qualified from -55 to +175°C (Ta)
  - 200°C Polyimide 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

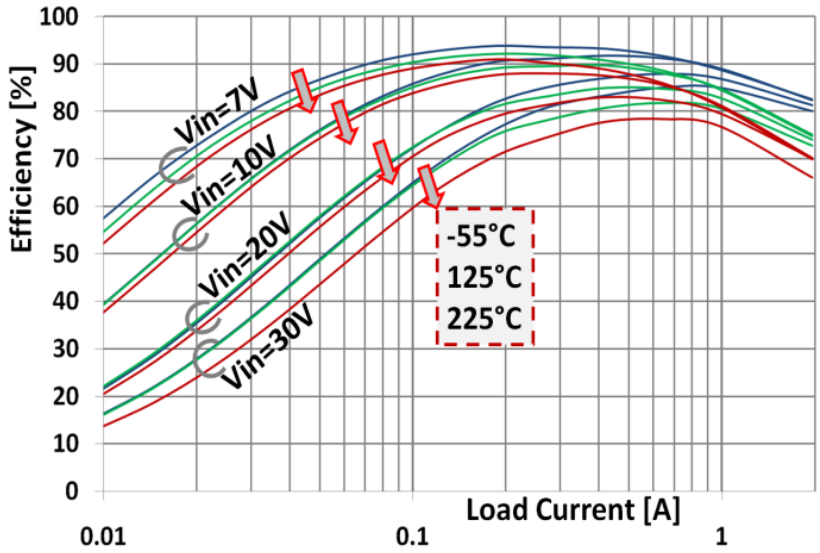
- **Input voltage range: 6V to 30V**
- **Output voltage: +5V** (other voltages possible through customization)
- **Output Power: 10W max**
- Switching frequency: 230kHz
- Soft start for inrush current limitation
- Clock synchronization input & output
- Efficiency: up to 93%
- Bill of Material:
  - Resistors (1/8W): 20 pcs
  - Capacitors (up to 22µF): 18 pcs
  - 33µH inductor: 1 pc
  - CISSOID parts: 2 ICs and 2 MOSFET transistors
- PCB Dimension: Φ 100mm [4.2"]

Functional Block Diagram



VESUVIO® DC-DC Converter Technology is based on a synchronous buck architecture which provides voltage step-down capability with high efficiency compared to traditional voltage regulator solutions.

Efficiency



Efficiency vs. Load current at -55°C, 125°C and 225°C (junction)
for various input voltages and V_{out}=5V

Absolute Maximum Ratings

Supply Voltage V_{IN} to GND	-0.3 to 35V
Load current (no short-circuit protection)	2.5A

Operating Conditions

Supply Voltage V_{IN} to GND	6V to 30V
Junction temperature	-55°C to +225°C
Load current	0 to 2A

Electrical Characteristics (EVK-VESUVIO-30)

Unless otherwise stated: T_j=25°C. **Bold underlined** values indicate values over the whole temperature range (-55°C < T_j < +225°C).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage **V_{IN}**	I_{out}<100mA I_{out}<1A I_{out}=0 to 2A	**6** **7** **8**		**30**	V
Ouput current **I_{out}**		**0**		**2**	A
Output voltage **V_{out}**	T_a=125°C; V_{IN}=8V; I_{out}=0 to 2A	4.85	5	5.15	V
Output voltage temperature drift **dV_{out}/dT**	V_{IN}=7V, I_{out}<1A V_{IN}=8V, I_{out}=0 to 2A		**500**		µV/°C
Output voltage DC line regulation **dV_{out}/dV_{IN}**			**±4**		mV/V
Output voltage DC load regulation **dV_{out}/dI_{out}**	V_{IN}=8V, I_{out}=0 to 2A T_a=-55°C T_a=225°C		 +10 +13		mV/A
Output ripple	I_{out}=0 to 2A; V_{IN}=8V V_{IN} =10V V_{IN} =20V V_{IN} =30V		 **30** **50** **75** **80**		mV_{pk-pk}
Switching frequency	Internal default oscillator		230		kHz
Switching frequency drift over temperature			**0.18**		kHz/°C
Duty-cycle		0		93	%
Efficiency **$(V_{out}xI_{out})/(V_{IN}xI_{IN})$**	I_{out}=500mA ; T_a=225°C V_{IN} =7V V_{IN} =30V		 87 78		%
Current consumption at zero load current **I_Q**	V_{IN} =7V ENDR high (-55°C) ENDR high (225°C) ENDR low (-55°C) (output is off) ENDR low (225°C) (output is off)		 5.3 7.2 1.8 3.17		mA
Load capacitance			2*22		µF
Output inductor			33		µH
Current through digital inputs **I_{DIN}** ENDR & NDRVLSD • CROWBAR	 Internal pull up T_a=-55°C T_a=225°C Internal pull down T_a=-55°C T_a=225°C		 75 36 50 25	 **150** **100**	µA
Digital input high voltage **V_{IH}**		**VDD-1.2**		**VDD+0.3**	V
Digital input low voltage **V_{IL}**		**-0.3**		**1.5**	V

Contact

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