EREBUS® TECHNOLOGY Product Brief

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High-temperature DC-DC Converter Platform

General Description

EREBUS® 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 package 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.
Compared to CISSOID' VESUVIO® technology, EREBUS® brings a wider voltage input range (40V or 50V max.), a scalable output current (from 2A to 8A) as well as protection against short circuit on the output.

EREBUS® is built around CISSOID's chipset CHT-MAGMA & CHT-HYPERION (PWM controller and half-bridge driver) plus some high-temperature MOSFETs from the CISSOID' PLANET family. The bill of materials also includes a CHT-555 timer and two additional small-signal transistors which implement the short-circuit protection stage. This stage can be removed by the user if not needed.

The EREBUS ® technology is available under license from CISSOID. The evaluation board is available in 2 versions: with a 40V or 50V maximum input voltage. The output is set to a 5V voltage with 2A current capability. The design is scalable by replacing MOSFET transistors, increasing the current capability to 4A (and up to 8A for EVK-EREBUS-40). The output voltage can easily be modified by the user to fit different needs.

EREBUS® Technology Kit Content:

- One EVK-EREBUS-x0 Eval-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 schematics
- Bill-of-Material
- Application Note
- User's License
- 5 hours of engineering support

Evaluation Board - Key Features

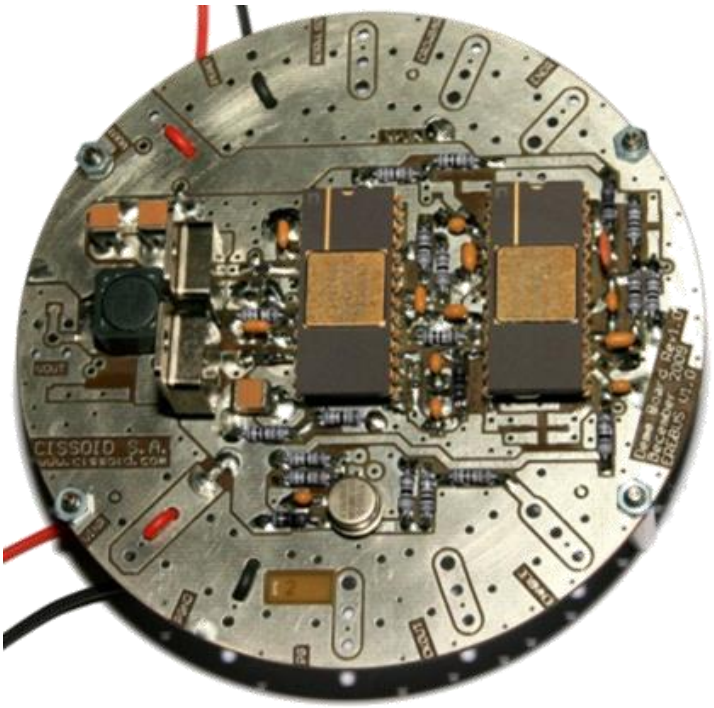
- **Input voltage range:**
  - EVK-EREBUS-40: **12V to 40V**
  - EVK-EREBUS-50: **12V to 50V**
- **Output voltage: +5V** (other voltages possible thru customization)
- **Max. output current: 2A** (scalable to 4A and 8A)
- Switching frequency: 230kHz
- Soft start for inrush current limitation
- Clock synchronization input & output
- Short-circuit protection
- Efficiency: up to 85% at maximum power at room temperature
- Bill of Material:
  - Resistors (1/8W): 36 pcs
  - Capacitors (up to 22µF): 32 pcs
  - 33µH inductor: 1 pc
  - CISSOID: 3 ICs and 4 MOSFET
- PCB Dimension: Φ 100mm [4.2"]

Applications

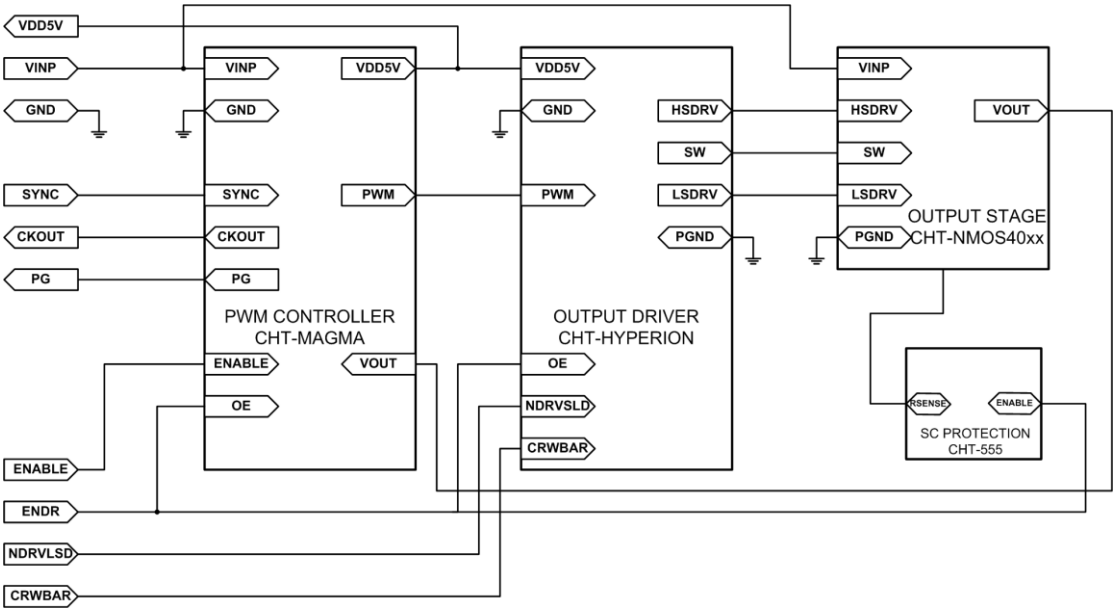
- Distributed power architectures in aeronautics, aerospace, industrial and military electronic systems:
  - PoL (Point of Loads)
  - PDU (Power Distribution Units)
- SMPS power supplies in down-hole tools such as MWD and equipment

Evaluation Board

EVK-EREBUS-40 / 50 Evaluation Board



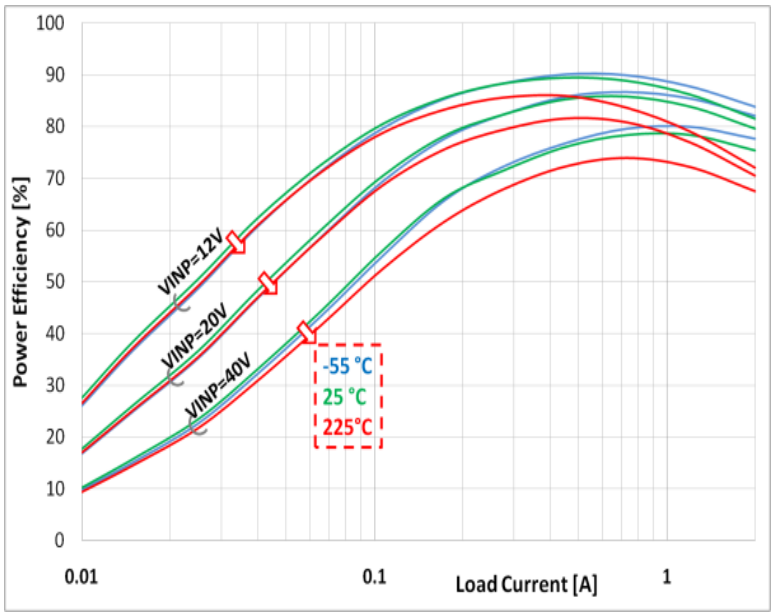
Functional Block Diagram



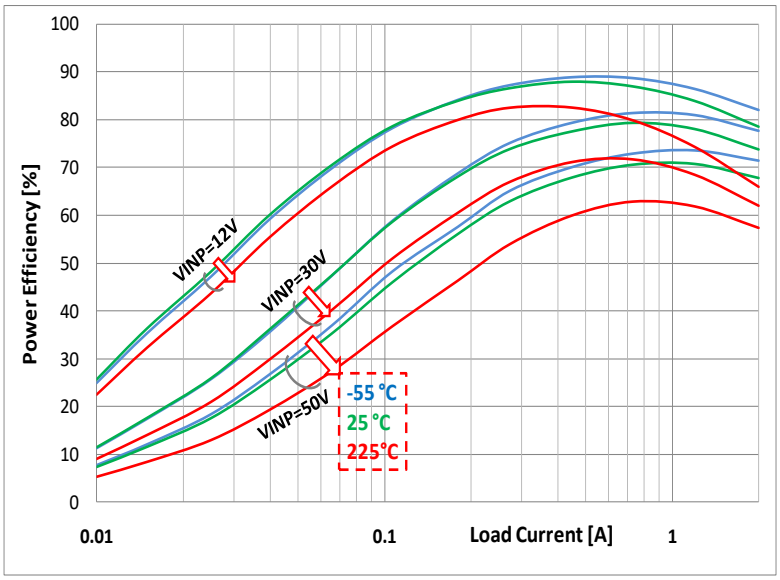
EREBUS® DC-DC Converter Technology is based on a synchronous buck architecture which provides voltage step-down capability with high efficiency compared to traditional voltage regulator solutions.

Efficiency

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



EVK-EREBUS-40



EVK-EREBUS-50

Evaluation Board Characteristics EVK-EREBUS-50 [-40]

Absolute Maximum Ratings

Supply Voltage V_{IN} to GND	-0.3 to 55V [45V]
Load current	2.5A

Operating Conditions

Supply Voltage V_{IN} to GND	12V to 50V [40V]
Junction temperature	-55°C to +225°C
Load current	0 to 2A

Electrical Characteristics

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}=0 to 2A	**12**		**50 [40]**	V
Ouput current **I_{out}**		**0**		**2**	A
Output voltage **V_{out}**	V_{IN}=50V; I_{out}=0 to 2A	4.85	5	5.15	V
Output voltage temperature drift **dV_{out}/dT**	V_{IN}=12…50V		**500**		µV/°C
Output voltage DC line regulation **dV_{out}/dV_{IN}**	I_{out}=2A	**-4**		**4**	mV/V
Output voltage DC load regulation **dV_{out}/dI_{out}**	V_{IN}=50V, I_{out}=0.2...2A	**-10**		**+10**	mV/A
Output ripple	I_{out}=0 to 2A; V_{IN} =12V V_{IN} =20V V_{IN} =30V V_{IN} =40V V_{IN} =50V		**75 [130]** **90 [122]** **95 [130]** **100 [146]** **110 [144]**		mV_{pk-pk}
Switching frequency	Internal default oscillator		230		kHz
Switching frequency drift over temperature			**0.18**		kHz/°C
Duty-cycle		0		93	%
Efficiency (see **Error! Reference source not found.**) **$(V_{out}xI_{out})/(V_{IN}xI_{IN})$**	I_{out}=100mA; T_a=225°C V_{IN} =12V V_{IN} =30V V_{IN} =50V I_{out}=1A; T_a=225°C V_{IN} =12V V_{IN} =30V V_{IN} =50V		 73 [78] 50 [67] 36 [51] 76 [82] 70 [78] 62 [73]		%
Current consumption at zero load current **I_Q**	V_{IN}=12…50V		**12**		mA
Load capacitance			2*22		µF
Output inductor			33		µH
Current through digital inputs **I_{DIN}** ENDR & NDRVLSD	Internal pull up	**25**		**85**	µA
Digital input high voltage **V_{IH}**		**VDD5V-1.2**		**VDD5V+0.3**	V
Digital input low voltage **V_{IL}**		**-0.3**		**1.5**	V
Short circuit protection current threshold	T_a=25°C		2.6		A

Contact

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