
EREBUS® TECHNOLOGY

Product Brief

Version: 1.1

8-Mar-11

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 chip-set 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

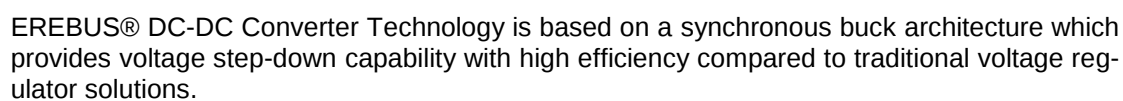
Evaluation Board - Key Features

- **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

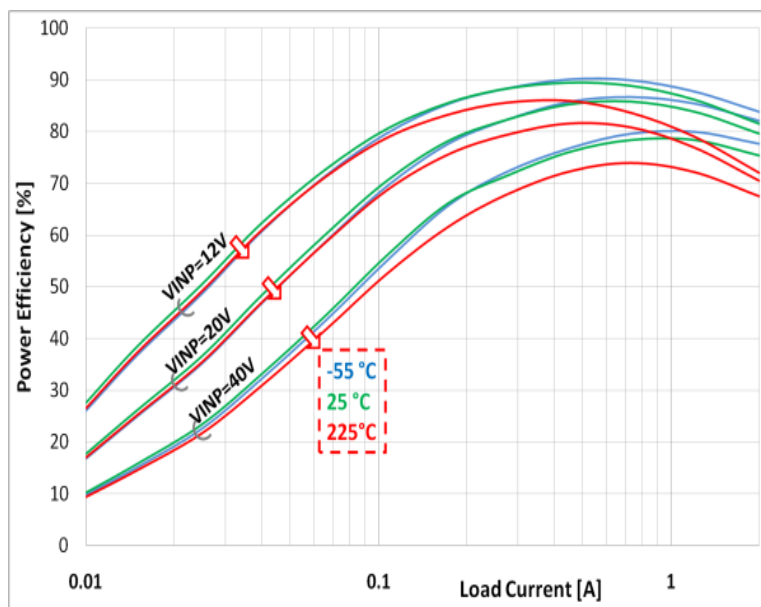
- Distributed power architectures in aeronautics, aerospace, industrial and military electronic systems:
 - PoL (Point of Loads)
 - PDU (Power Distribution Units)
- SMPS power supplies in down-hole tools such as MWD and equipment

EVK-EREBUS-40 / 50 Evaluation Board

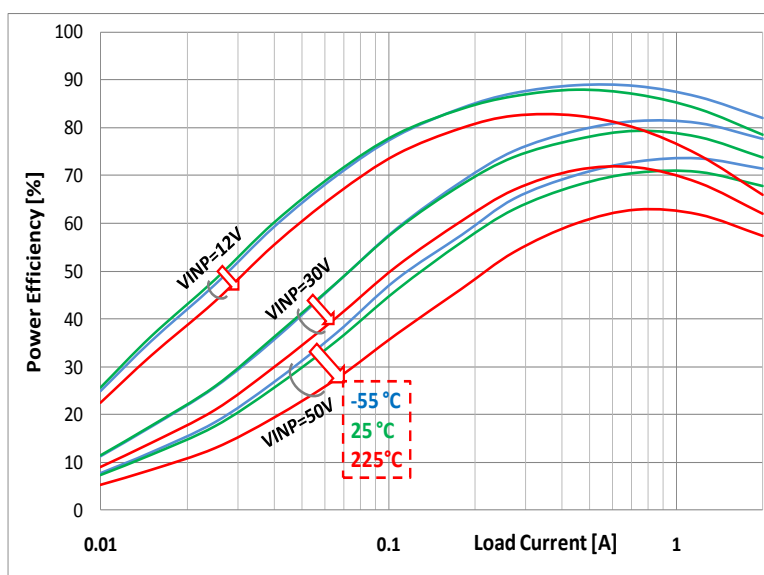


Efficiency

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



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: $T_j=25^\circ\text{C}$. **Bold underlined** values indicate values over the whole temperature range ($-55^\circ\text{C} < T_j < +225^\circ\text{C}$).

Parameter	Condition	Min	Typ	Max	Units
Supply voltage V_{IN}	$I_{out}=0$ to 2A	<u>12</u>		<u>50</u> <u>[40]</u>	V
Output current I_{out}		<u>0</u>		<u>2</u>	A
Output voltage V_{out}	$V_{IN}=50\text{V}$; $I_{out}=0$ to 2A	4.85	5	5.15	V
Output voltage temperature drift dV_{out}/dT	$V_{IN}=12\dots 50\text{V}$		<u>500</u>		$\mu\text{V}/^\circ\text{C}$
Output voltage DC line regulation dV_{out}/dV_{IN}	$I_{out}=2\text{A}$	<u>-4</u>		<u>4</u>	mV/V
Output voltage DC load regulation dV_{out}/dI_{out}	$V_{IN}=50\text{V}$, $I_{out}=0.2\dots 2\text{A}$	<u>-10</u>		<u>+10</u>	mV/A
Output ripple	$I_{out}=0$ to 2A; $V_{IN}=12\text{V}$ $V_{IN}=20\text{V}$ $V_{IN}=30\text{V}$ $V_{IN}=40\text{V}$ $V_{IN}=50\text{V}$		<u>75</u> <u>[130]</u> <u>90</u> <u>[122]</u> <u>95</u> <u>[130]</u> <u>100</u> <u>[146]</u> <u>110</u> <u>[144]</u>		mV _{pk-pk}
Switching frequency	Internal default oscillator		230		kHz
Switching frequency drift over temperature			<u>0.18</u>		kHz/ $^\circ\text{C}$
Duty-cycle		0		93	%
Efficiency (see Erreur ! Source du renvoi introuvable.) $(V_{out} \times I_{out}) / (V_{IN} \times I_{IN})$	$I_{out}=100\text{mA}$; $T_a=225^\circ\text{C}$ $V_{IN}=12\text{V}$ $V_{IN}=30\text{V}$ $V_{IN}=50\text{V}$ $I_{out}=1\text{A}$; $T_a=225^\circ\text{C}$ $V_{IN}=12\text{V}$ $V_{IN}=30\text{V}$ $V_{IN}=50\text{V}$		73 [78] 50 [67] 36 [51] 76 [82] 70 [78] 62 [73]		%
Current consumption at zero load current I_Q	$V_{IN}=12\dots 50\text{V}$		<u>12</u>		mA
Load capacitance			2*22		μF
Output inductor			33		μH
Current through digital inputs I_{DIN} ENDR & NDRVLS	Internal pull up	<u>25</u>		<u>85</u>	μA
Digital input high voltage V_{IH}		<u>VDD5V-1.2</u>		<u>VDD5V+0.3</u>	V
Digital input low voltage V_{IL}		<u>-0.3</u>		<u>1.5</u>	V
Short circuit protection current threshold	$T_a=25^\circ\text{C}$		2.6		A

Contact & Ordering

Ordering Information

DESCRIPTION	ORDER NUMBER
IP EREBUS®: High-temperature non-Isolated DC-DC Converter Technology - Voltage input range 12V to 40V – The package includes one evaluation Board, documentation and user's license.	LIC-EREBUS-40
IP EREBUS®: High-temperature non-Isolated DC-DC Converter Technology - Voltage input range 12V to 50V – The package includes one evaluation Board, documentation and user's license.	LIC- EREBUS -50

CISOID S.A.

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

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