MagI³C Power Modules

Frequently Asked Questions (FAQ)

powermodules@we-online.com

MagI³C Frequently Asked Questions

Overview and Structure

Frequently Asked Questions

The FAQ section is structured in three main sections:

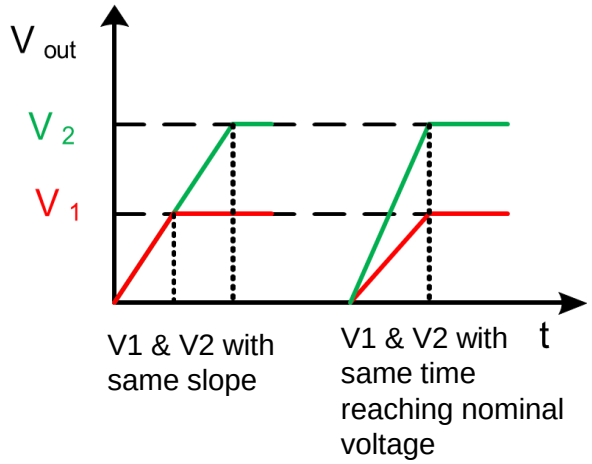
- Features & Benefits MagI³C Power Modules questions
  → Explaining the abilities of the MagI³C power modules over all families
- Product series / Package specific questions
  → Detailed look on the characteristics on family level
- General questions
  → Clarifying content about topics that are overall related to power modules

MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is sequential voltage tracking?

Answer:
Simultaneous V_{OUT} rise of two power modules during start-up (same slope or same time reaching nominal voltage).
→e.g. two power supplies in FPGAs with critical V_{CC} rise requirements

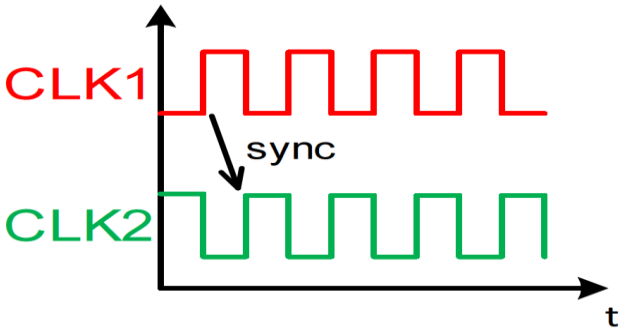


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is synchronization?

Answer:
A power module switching frequency can be synchronized by an external clock.
→Avoids interference caused for example by synchronous switching of two different modules
→Reduces input peak currents

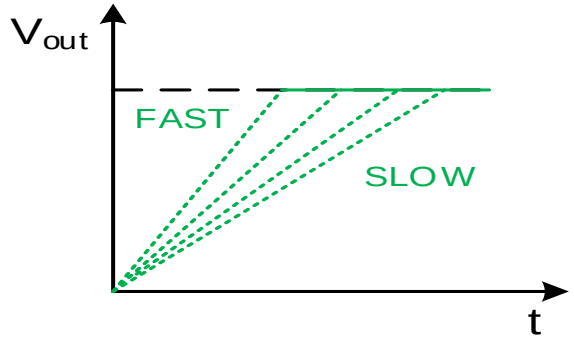


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is adjustable soft start?

Answer:
During start-up the slope of the rise of V_{OUT} can be adjusted.
→No overshoot at V_{OUT}
→Smooth start-up current
→Avoids current spikes

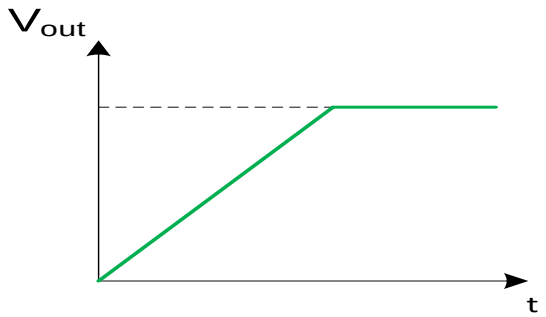


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is meant by a fixed soft start?

Answer:
The slope of the rise of the output voltage during start up is fixed.
→No overshoot at V_{OUT}

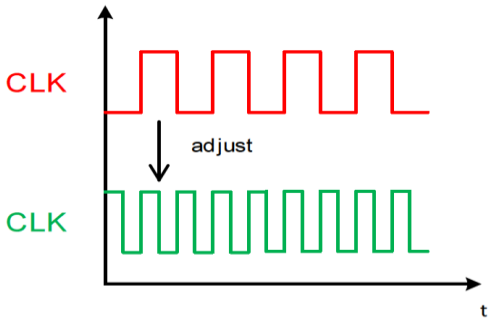


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is meant by adjustable frequency?

Answer:
The switching frequency of the power module can be adjusted.
→User selectable balance between efficiency and ripple. Avoiding not preferred frequencies

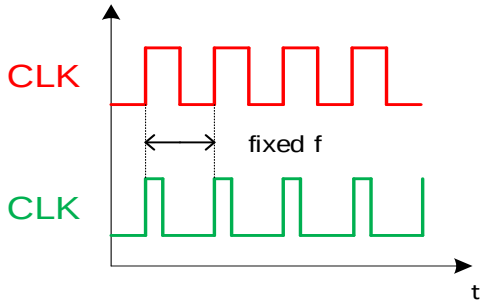


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is meant by fixed frequency?

Answer:
The switching frequency of the power module is fixed.
→Simple Design for faster design-in time
→Design for optimum balance between speed versus efficiency



MagI³C Frequently Asked Questions

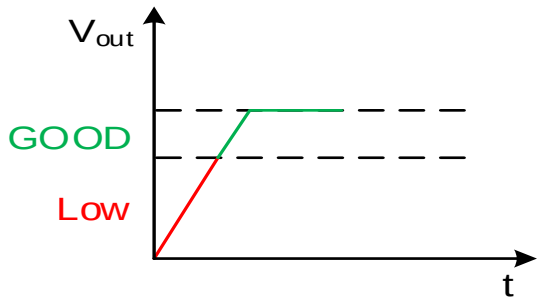
Features & Benefits MagI³C Power Modules

Question:
How does the 'Power Good' feature work?

Answer:
Detects the value of V_{OUT} and indicates if it is within the nominal range.

→Monitoring for diagnostics/signaling

→Allows sequencing



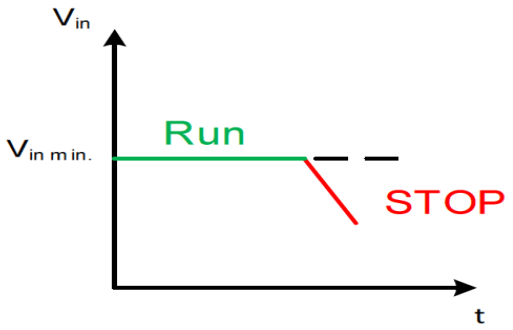
MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is the adjustable UVLO (under voltage lockout)?

Answer:
Turns off the power module output in the event of a input voltage dropping below a defined limit value.

→Avoids undefined behavior of components during input voltage failures

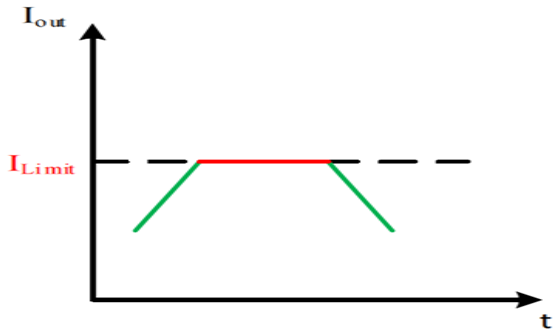


MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is the overcurrent protection (OCP)?

Answer:
During an overcurrent condition the output current is limited.
→Protect overheating of PCB components
→Protecting components from electrical overstress



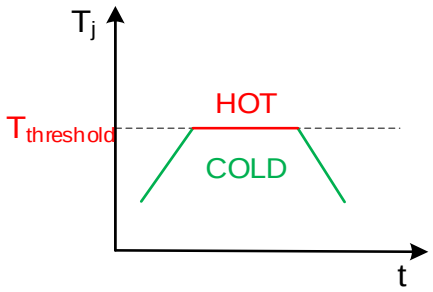
MagI³C Frequently Asked Questions

Features & Benefits MagI³C Power Modules

Question:
What is the overtemperature protection (OTP)?

Answer:
Turns off the power module when the junction temperature exceeds a certain temperature threshold.

→Prevents catastrophic failures during accidental device overheating



MagI³C Frequently Asked Questions

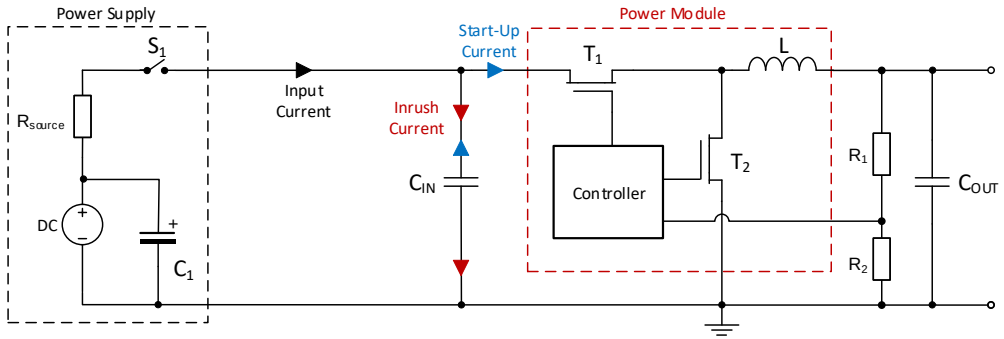
Features & Benefits MagI³C Power Modules

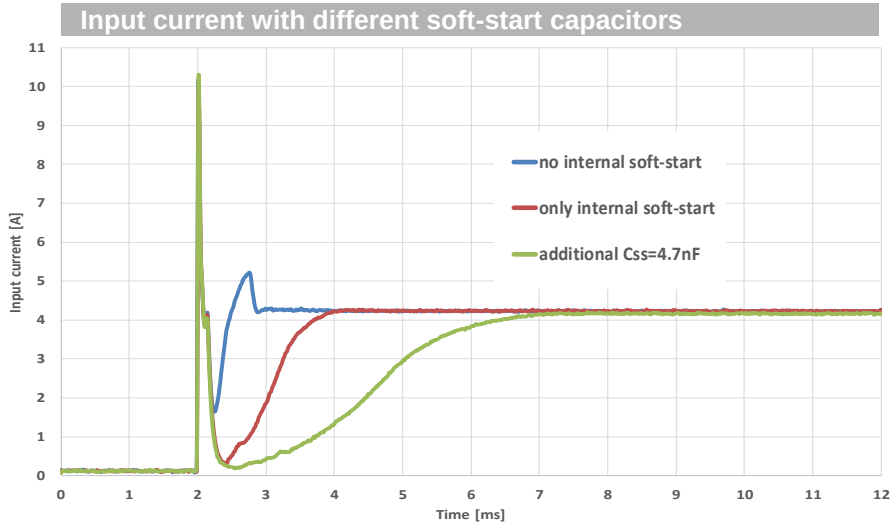
Question:

What is the difference between inrush and start up current?

Answer:

- The first input current peak (inrush current) is due to the initial charge of C_{IN}
- The inrush current *(red)* flows into the uncharged capacitor C_{IN} as the switch S_1 is closing
- C_{IN} acts as a short circuit allowing the current to rapidly increase to a high peak and decreases when C_{IN} is fully charged
- This current peak is not affected by the soft-start capacitor
- CIN starts supplying the power module with the start-up current (blue)
- During soft-start the input current smoothly rises
- The different slope of the rising input currents is defined by the different soft-start capacitor values
- At about 7ms the steady state of the input current is reached





MagI³C Frequently Asked Questions

General

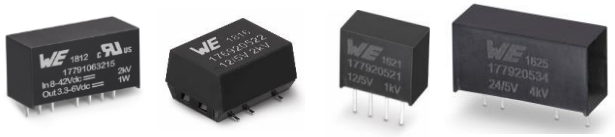
Question:
Are the power modules UL certified?

Answer:
Below is a grouped summary of the actual UL certificates of our power modules.

Type	Package	Material	UL-class	Cert. Nr. material	Cert. Nr. power module
Variable Step Down Regulator Module (VDRM, VDMM 1,2A)	BQFN-39	EME-G770H	UL94 Class V0	E41429	*not applicable*
	BQFN-41				
	TO-263-7EP	EME-G760	UL94 Class V0	E41429	*not applicable*
	LGA-6/-16	EME-G760L	UL94 Class V0	E41429	*not applicable*
Variable Step Down MicroModule (VDMM 0,6A/1A)	LGA-6	*not applicable*	*not applicable*	*not applicable*	*not applicable*
Fixed Step Down Regulator Module (FDSM)	SIP-3	Case: WH-9100 Potting: KET132-A/B	UL94 Class V0	Case: E150608 Potting: E174951	*not applicable*
Fixed Isolated SIP Module (FISM)	SIP-4	Case: WH-9100 Potting: IR-401	UL94 Class V0	Case: E150608 Potting: E129811	E487909
Fixed Isolated SIP Module (FISM)	SIP-7				
Fixed Isolated SMT Module (FISM)	SMT-8	Case: WH-9100	UL94 Class V0	Casel: E150608	
Variabel Isolated SIP Module (VISM)	SIP-8	*not applicable*	UL94 Class V0	Case: E497615 Potting: E497615	E497615
LED Step Down High Current Module (LDHM)	TO263-7EP	EME-G760	UL94 Class V0	E41429	*not applicable*

MagI³C Frequently Asked Questions

VISM SIP-8 / FISM SIP-4 / SIP-7 / SMD-8



Question:
For what do I need the “power boost” feature?

Answer:
The power boost feature provides additional current, allowing the module to fulfill the following demands:

- Unexpected increases in load demands
- Monotonic charging of capacitive loads – no voltage dips
- Backup power for momentary higher energy demands of the application
- Tripping of input fuses of downstream applications in case of overload (ensures higher current for safe tripping)

All isolated power modules have the power boost feature.

MagI³C Frequently Asked Questions

VISM SIP-8

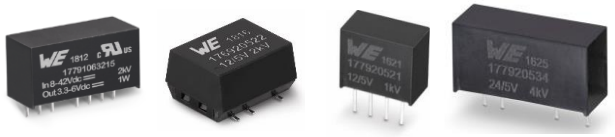
Question:
Which approvals can I get with the VISM SIP-8?

Answer:
The SIP-8 has multiple approvals. An overview is listed below:

SYMBOL	STANDARD	DESCRIPTION
c UL us	UL60950-1, 2nd Edition 2014-10-14	Recognized for use as Information Technology Equipment, U.S.A. (UL60950-1) and Canada (C22.2 No. 60950-1) E-File: E497615 Applicable for altitudes up to 2000m
IECEE CB SCHEME	IEC 60950-1:2005 (2nd Edition); Am1:2009 + Am2:2013 EN 60950-1:2006 + A1:2010 + A2:2013	CB Scheme, Information Technology Equipment
c UL us	UL62368-1 2nd Edition	Recognized for use as Audio/Video, Information and Communication Technology Equipment, U.S.A. (UL62368-1) and Canada (C22.2 No. 62368-1) E-File: E497615 Applicable for altitudes up to 2000m
IECEE CB SCHEME	IEC/EN 62368-1 2nd Edition	CB Scheme, Audio/Video, Information and Communication Technology Equipment

MagI³C Frequently Asked Questions

VISM SIP-8 / FISM SIP-4 / SIP-7 / SMD-8



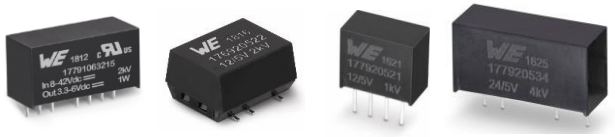
Question:
When do I need a functional insulated MagI³C Power Module?

Answer:
An insulated, galvanic isolated DC/DC converter avoids:

- Humm loops,
- Overvoltages,
- Excessive EMI
- generally for avoiding Disturbances / interference due to different ground potentials

MagI³C Frequently Asked Questions

VISM SIP-8 / FISM SIP-4 / SIP-7 / SMD-8



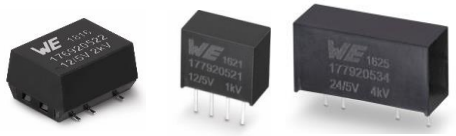
Question:
What is the isolation voltage level of WE isolated power modules?

Answer:.

Match Code	V_{ISO} for 1s test time	V_{ISO} for 60s test time	Type of isolation
VISM SIP-8	-	2kVDC	functional isolation
FISM SIP-4	1kVDC	800VDC	functional isolation
FISM SIP-7	4kVDC	3kVDC	functional isolation
FISM SMD-8	2kVDC	1.6kVDC	functional isolation

MagI³C Frequently Asked Questions

FISM SIP-4 / SIP-7 / SMD-8



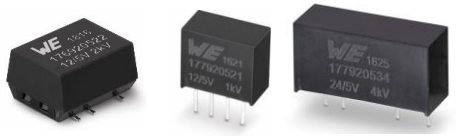
Question:
Do the isolated modules need external components to function?

Answer:
No these isolated power module families offer all inclusive solution where all the needed components are integrated.
Due to the switching behavior of the power module, however, it is advisable to include an additional input filter in the circuit design.
Würth Elektronik offers an application-specific filter bag for almost every power module.

Application specific emi filter

MagI³C Frequently Asked Questions

FISM SIP-4 / SIP-7 / SMD-8



Question:
How high can the output voltage of the unregulated SIP-4 / SIP-7/ FISM SMD-8 modules go?

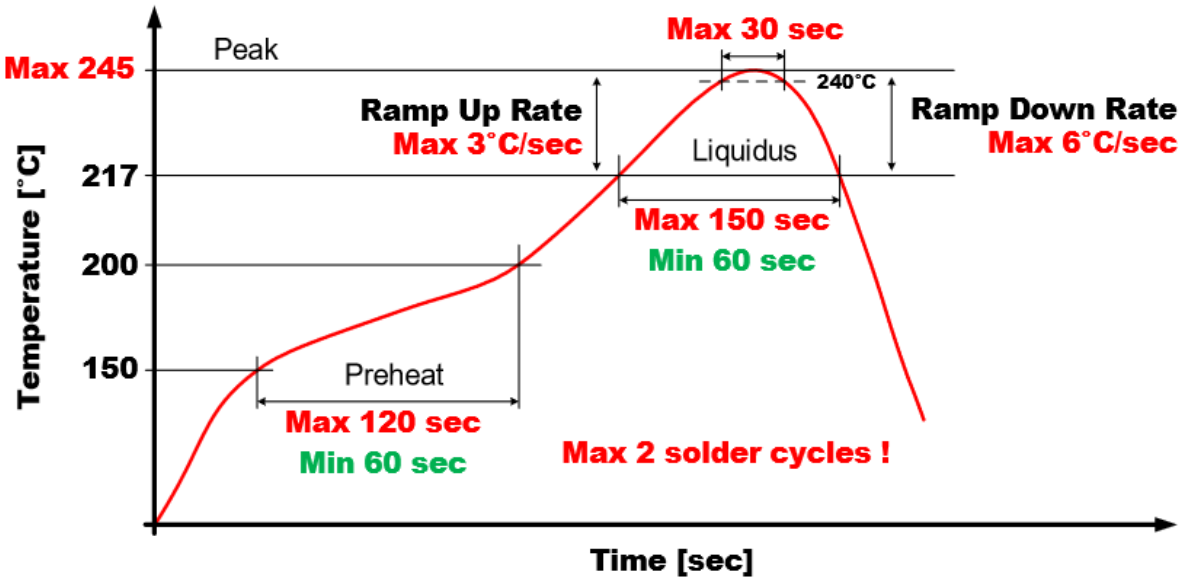
Answer:
Since these families are unregulated, under light load conditions <10% of the full load, the voltage can go higher than the specified output voltage value. If that is an issue for the application, it is recommended to use a zener diode or bleeding resistor to avoid that situation

MagI³C Frequently Asked Questions

FISM SMD-8

Question:
How can I solder the FISM SMD-8 power modules? And how many solder cycles can it withstand?

Answer:
The recommended soldering profile of SMD-8 module is shown below. The module can withstand two cycles where the 2nd cycle can be a reflow or solder cycle



MagI³C Frequently Asked Questions

General

Question:
Is the EMI emission filter integrated in the power module?

Answer:
No, because there are many different requirements for each power module.

Würth Elektronik provides an application specific filter bag for nearly each power module.

Application specific emi filter

MagI³C Frequently Asked Questions

General

Question:
What is meant by MTBF?

Answer:
Mean, average operating time between two failures, a specification for the reliability of a component or a component group. Various standards (e.g. MIL217, SN29500 or Telcordia) can be taken for calculation. The basis for calculations are the failure rates of the components taking various specific factors into consideration, such as ambient temperature, voltage, current, power, humidity, shock/vibration, etc.