



Industrial DC/DC CONVERTER MGDBI-25 Wide Input : Bi-25W POWER

Industrial
Grade ■

4:1 Wide Input
Bi Output for mixed logic 5V & 3,3V
Metallic Case - 1.500 VDC Isolation

- Nominal power up to 23 W
- Wide temperature range : -40°C/+ 95° case
- High efficiency (typ. 84%)
- Soft start
- Galvanic isolation 1.500 VDC according to EN 60950
- Integrated LC EMI filter
- Permanent short circuit protection
- UL qualified



1- General

The MGDBI-25 is a line of DC/DC power modules providing dual output for mixed logic 5V & 3,3V designed for use in distributed power architecture and is particularly suitable for mobile or ground fixed applications in transportation, industrial and telecommunication areas. These modules use a high frequency fixed switching technic at 250kHz providing excellent reliability, low noise characteristics and high power density. Standard models are available with wide input voltage range of 18-75 volts. The modules include dual output voltage choices of 3,3 and 5 volts. No external heatsink is required for the MGDBI-25 series to supply 23W output power over the full temperature range.

The MGDBI-25 series is designed in conformity with safety standards EN60950 and UL1950.

The module is designed with LC network filters to minimize reflected input current ripple and output voltage ripple according to EN55022 and FCC Part 15J standard.

The module includes a soft-start, and a permanent short circuit protection to ensure efficient module protection. The soft-start allows current limitation and eliminates inrush current during start-up. The short circuit protection completely protects the module against short-circuits of any duration by a shut-down and restores to normal when the overload is removed.

The design has been carried out with surface mount components and is manufactured in a fully automated process to guarantee high quality. Every module is tested with a GAIA converter automated test equipment.

2- Product Selection

Bi output model : MGDBI-25- ☐ — ☐

Permanent Input Voltage Range

O : 18-75 VDC

Output

CB : 5 VDC / 3,5A max. *
& 3,3 VDC / 3A max. *

* The MGDBI-25-0-CB can support any combination of 5V and 3,3V loading up to a total of 23W.

3- Electrical Specifications

Data are valid at +25°C, unless otherwise specified.

Models				Bi output MGDBI-25
Parameter	Conditions	Limit or typical	Units	MGDBI-25
Input				
Nominal input voltage	Full temperature range	Nominal	VDC	48
Permanent input voltage range (Ui)	Full temperature range	Min.-Max.	VDC	18-75
Start up time	Ui nominal Nominal output Full load : resistive	Maximum	ms	20
Reflected ripple current	Ui nominal, full load BW=20MHz	Maximum	mApp	50
Input current in short circuit mode (Average value)	Ui nominal Short-circuit	Maximum	mA	40
No load input current	Ui nominal No load	Maximum	mA	60
Output				
Output voltage	Ui min. to max. 75 % load	Nominal Nominal	VDC VDC	3,3 5
Set point accuracy for primary and secondary output	Ambient temperature : +25°C Ui nominal 75 % load	Maximum	%	+/-2
Output power primary output and secondary output	Full temperature range Ui min. to max.	Maximum Maximum	W W	combination of both output must not exceed 23 W 17,5 10
Output current primary output 5V secondary output 3,3V	Full temperature range Ui min. to max.	Maximum Maximum	A A	combination of both output must not exceed 23 W 3,5 3
Ripple output voltage * primary output 5V secondary output 3,3V	Ui nominal Full load BM = 20 MHz	Maximum Maximum	mVpp mVpp	50 50
Line regulation	Ui min. to max. Full load	Maximum	%	+/-1
Load regulation on primary and secondary output	Ui nominal 25 % to full load	Maximum	%	+/-2
Cross load output regulation	Ui nominal Primary output : nominal Secondary output : 25 % to full load	Maximum	%	+/-0,5
Efficiency	Ui nominal Full load	Typical	%	84
Maximum admissible capacitive load	Ui nominal Full load Per output	Maximum	μF	NA

Note * : The ripple output voltage is the periodic AC component imposed on the output voltage, an aperiodic and random component (noise) has also to be considered. This noise can be reduced by adding an external capacitance (typically 10nF/rated voltage depending on isolation requirement) connected between the pin Gin and the pin Gout of the converter. This capacitance should be layed-out as close as possible from the converter.

3- Electrical Characteristics (continued)

Figure 1 : Typical load regulation characteristics at nominal input 48 VDC on primary output 5V with secondary output 3.3V set at 1.3A

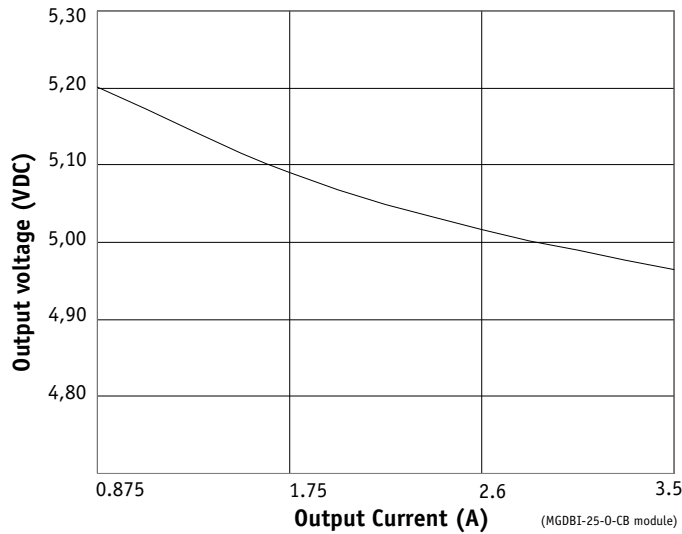


Figure 2 : Typical load regulation characteristics at nominal input 48 VDC on secondary output 3.3V with primary output set at 2A

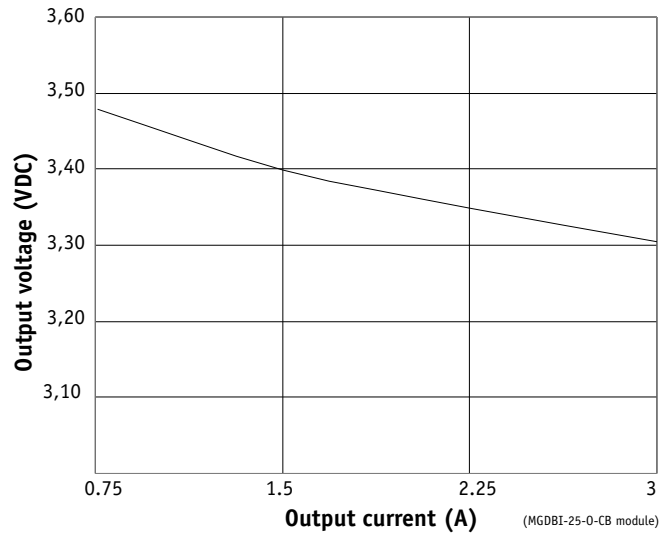


Figure 3 : Typical line regulation characteristics at various load for primary output 5 VDC

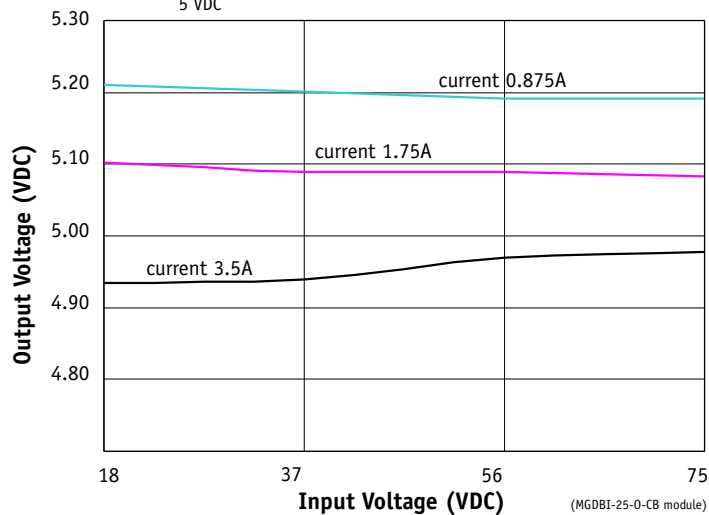


Figure 4 : Typical line regulation characteristics at various load for secondary output 3.3 VDC

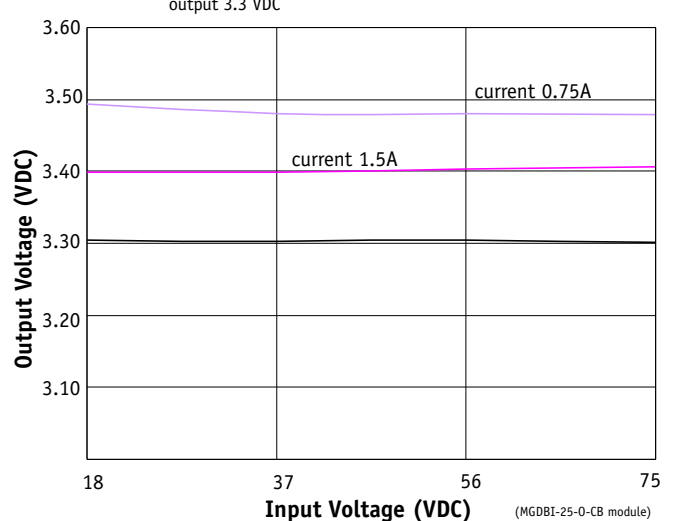


Figure 5 : Typical efficiency versus line at various load

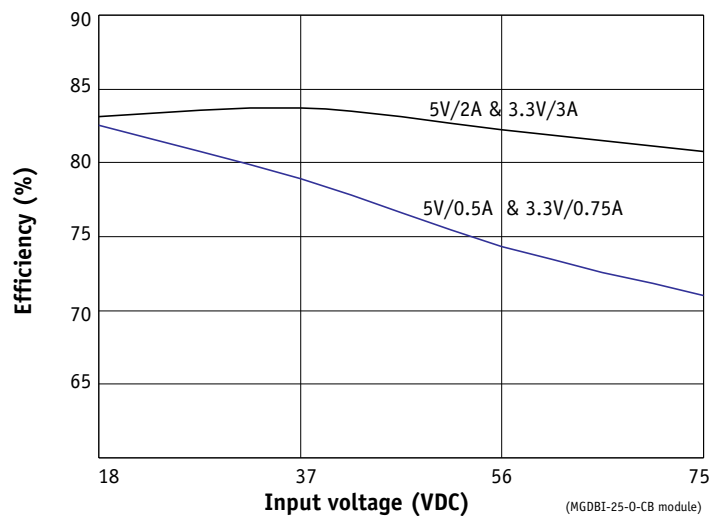
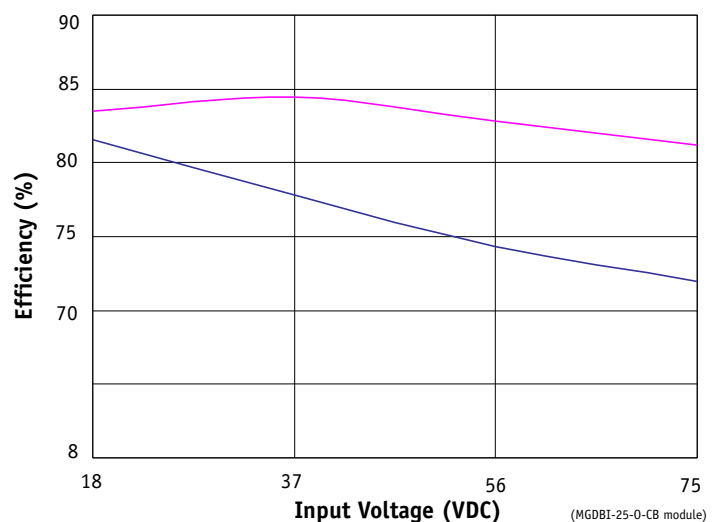


Figure 6 : Typical efficiency versus line at various load



4- Functional Characteristics

Characteristics	Conditions	Limit or typical	Performances
Electric strength test voltage	Nominal	Minimum	1.500 VDC / 1 min
Isolation resistance	500 VDC	Minimum	100 Mohm
Short circuit protection	Short circuit	Auto restart	Permanent
Switching frequency	No load to full load	Nominal	250 KHz

5- Thermal and Reliability Characteristics

Characteristics	Conditions	Limit or typical	Performances
Operating ambient temperature range	Ambient temperature*	Minimum Maximum	-40°C +71°C
Operating case temperature range	Case temperature	Minimum Maximum	-40°C +95°C
Storage temperature range	Non fonctionning	Minimum Maximum	-40°C +125°C
Mean time between failure According to MIL-HDBK-217F	Ground fixed (Gf)	Case at 40°C Case at 85°C	850.000 Hrs 340.000 Hrs

* The upper temperature range depends on configuration, the user must assure a max. case of +95°C

6- Environmental and Electromagnetic Interference Testing

Characteristics	Conditions	Severity	Test procedure
Humidity	Damp heat Temperature	93 % H.R 56 Days 40°C	IEC 68-2-3
Vibration (Sinusoidal)	Number of cycle Frequency Amplitude /acceleration	10 cycles in each axis 10 to 60 Hz/ 60 to 2000 Hz 0.7 mm/10 g	IEC 68-2-6
Shock (Half sinus)	Number of shocks Peak acceleration Duration	3 shocks in each axis 100 g 6 ms	IEC 68-2-27
Bump (Half sinus)	Number of bumps Peak acceleration Duration	2000 Bumps in each axis 25 g 6 ms	IEC 68-2-29
Temperature cycling	Number of cycle Temperature change Transfert time Steady state time	200 -40°C/+71°C 40 min 20 min	IEC 68-2-14
Conducted noise emission	Frequency range 150 KHz to 30 MHz	Class A with external filter Class B with external filter	EN55022 and FCC part 15J
Radiated noise emission	Frequency range 30 MHz to 1.000 MHz	Class A compliance stand alone	EN55022 and FCC part 15J
Electrical discharge susceptibility	Air discharge level +/-4 KV Contact discharge level +/- 2KV Air discharge level 8 KV Contact discharge level 4 KV	sanction A sanction A sanction B sanction B	EN55082-2 with : EN61000-4-2 IEC 801-2
Electrical field susceptibility	Antenna at 1 m Wave form : AM modulated 80 %, 1KHz Test : 26 KHz to 1 GHz	Value 10V/m	EN55082-2 with : EN61000-4-3 IEC801-3
Electrical fast transient susceptibility	Level 1 : 0.5 KV Level 3 : 2 KV	sanction A sanction B	EN55082-2 with : EN61000-4-4 IEC801-4

8- Application Notes

7-1 Short Circuit Protection

The short circuit protection device protects each output individually against short circuits of any duration and restores the module to normal operation when the short circuit is removed.

7-2 Safety

The MGDBI-25 series is recognized according to UL1950, EN60950 and EN41003.

The isolation voltage is an operational insulation in accordance with EN60950 and the DC/DC module shall be installed in an end-use equipment.

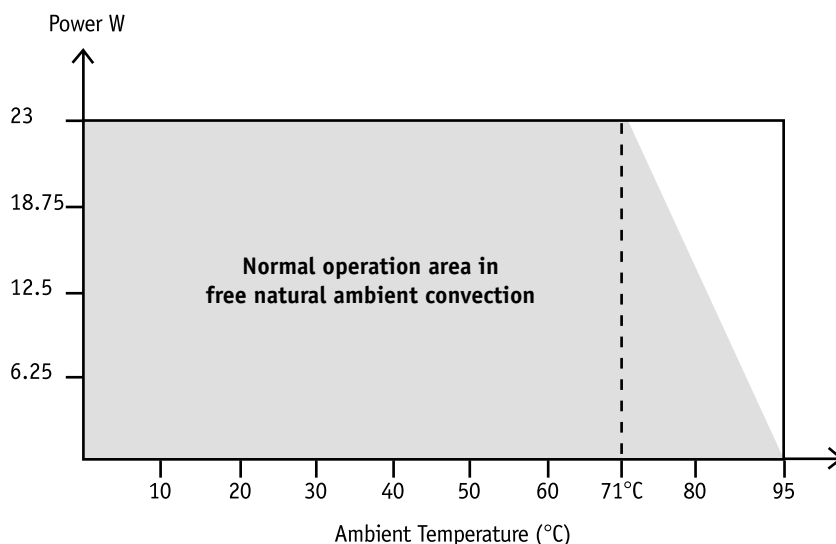
7-3 UL Qualification

The MGDBI-25 is UL qualified according to UL file number E200451.

7-4 Ambient versus Case Temperature

The MGDI-25 series operating case temperature at full load must not exceed 95°C. The maximum ambient temperature admissible for the DC/DC converter corresponding to the maximum operating case temperature of 95°C depends on the ambient airflow, the unit mounting/orientation, the cooling features and the power dissipated. Thermal calculation shows two areas of operation :

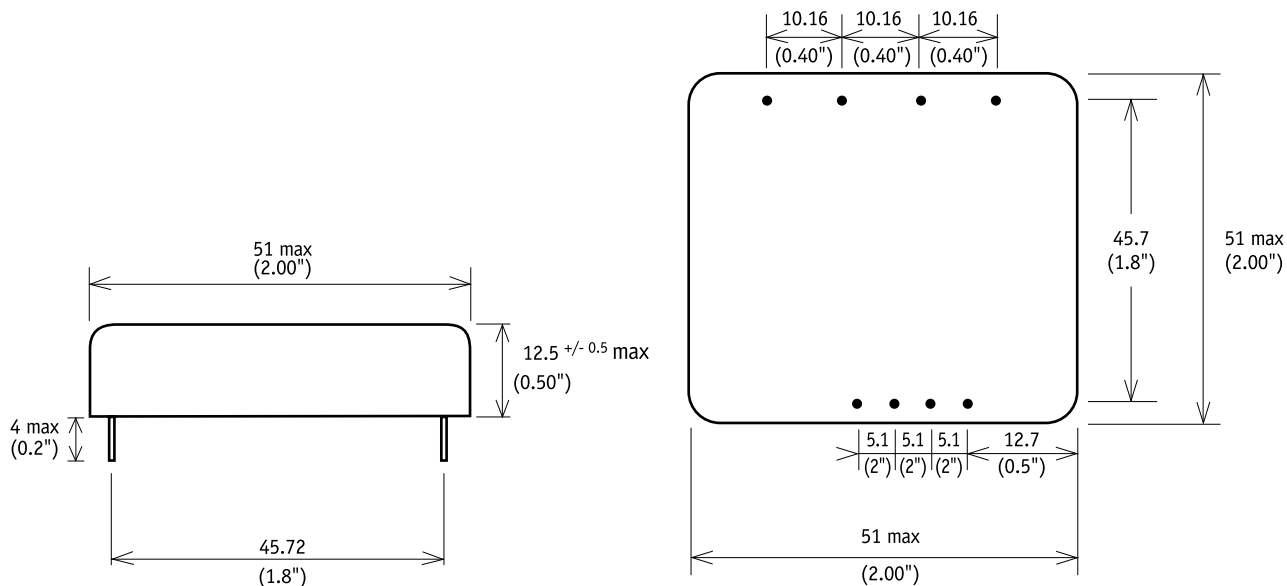
- a normal operation area in a free natural ambient convection (grey area in the following graph)
- an area with cooling features (air flow or heatsink) ensuring a maximum case temperature below 95°C at full load (white area in the following graph).



8- Dimensions

Dimensions are given in mm (inches). Tolerance : +/- 0.2 mm (+/- 0.01 ") unless otherwise indicated.

Weight : 80 grams (2.8 Ozs) max.



Pin dimensions : Ø 1 mm (0.04 ")

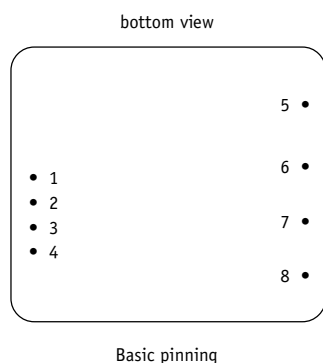
Metallic case black anodized coating solder plated pin

9- Product Marking

Upper face : Company logo, module reference, location of manufacturing

Side face : Date code : year and week of manufacturing and option.

10- Connections



Pin	Dual Output
1	+ input (Vi)
2	- input (Gi)
3	Non connected
4	Non connected
5	Non connected
6	5V Output (Vo1)
7	Common (Go)
8	3.3V Output (Vo2)



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