DC-DC Converter Application Manual MYGTM01210BZN

1. Features

∧ Note:

- · Single output/SIL/non-isolated type DC-DC converter with high power (120W).
- •High efficiency and small size have been achieved. •Wide input range (17.0V to 40.0V) .
- ·Wide adjustable output voltage range by connecting external resistance (5.0V to 12.0V).
- Shield case type.
- ·ON/OFF function and Short-circuit protection function are built in.

2. Appearance, Dimensions



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Pi	n Number and Function	on	
	Pin No.	Symbol	Function
	1,2,3	Vin	Input
	4	ON/OFF	Remote ON/OFF
	5,6,7,8,9	GND	GND
	10,11,12	Vout	Output
	13	VAR	Output Voltage Adjust

3. Block Diagram



4. Absolute Maximum Rating

Input Voltage +45V

No voltage, no matter how instantaneous, shall be applied beyond the absolute maximum voltage rating to this product. If you apply any voltage over this limit the product characteristics will deteriorate or the product itself will be destroyed. Even though it may continue operating for a while after the over-voltage event, it's life will likely be shortened significantly. Reliability and life of the module may degrade similarly if the maximum operating voltage rating is continuously exceeded.

This product is designed to operate within the maximum operating voltage rating specification.

5. Environmental Conditions

- 5.1 Operating Temperature Range
- 5.2 Storage Temperature Range
- 5.3 Operating Humidity Range
- 5.4 Storage Humidity Range

-10°C ~ +80°C -20°C ~ +85°C 20% ~ 85% (Net

- (No water condenses in any cases.)
- 10% ~ 90% (No water condenses in any cases.)

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6. Characteristics

Item		Condition		Value			Linit
	Symbol			Min.	Тур.	Max.	Unit
Input Voltage Range	Vin			17.0	24.0	40.0	V
Output Voltage	Vout	Vin=17.0~40.0V, lout=0~10A	VAR=GND	11.64	12.00	12.36	v
Output voltage			VAR=Open	4.85	5.00	5.15	
Output Current	lout	Vin=17.0~40.0V, thermal derated		0	-	10.0	А
Ripple Voltage	Vrpl	Vin=24V, lout=10A, BW = 20MHz,		-	100	-	mV(pp)
Efficiency	EFF	Vin =24V, lout=10A, Vout=12V			97.3	-	%
	VIH	- Vin=17.0~40.0V	OFF	2.5		-	V
ON/OFF Voltage	VIL		ON	-	-	0.5	
				Open			
Protection Output Current	Іоср	Vin=17.0~40.0V		10.5	-	-	А
Short Circuit Protection	SCP	If output is shorted to GND, DC-DC Converter shall be operated in a hiccup mode. After the short circuit event has cleared, the output is automatically brought back into regulation.					

Causion

The above electrical characteristics are guaranteed with the condition that the impedance of the input voltage source is sufficiently low as shown in section 6. Connecting an input inductance or using an input power supply with output inductance may cause an unstable operation of this device. Please check the proper operation of this device with the peripheral circuits on your system.

6. 2 Thermal Dereting



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7. Pin Description

7.1. Adjusting the Output Voltage

The output voltage can be adjusted ranging from 5.0V to 12.0V by connecting resistors between VAR-pin(13pin) to GND-pin. The following equation gives the required external-resistor values to adjust the output voltage to Vo-adj. It is highly recommended that evaluation of the characteristics of this DC-DC converter's operation under your board conditions be thoroughly conducted.



<RVAR Calculation Example>

Vo-adj [V]	Calculated RVAR[kΩ]	RVAR Example			
12.0	0	0Ω			
9.0	0.751	750Ω			
7.0	2.504	2.4kΩ + 100Ω			
5.0	-2921	Open			

7.2. ON/OFF Control

ON/OFF function

Using the ON/OFF feature, the operation of this product can be disabled without removal of the input voltage. Sequencing of a power supply system and power-saving control can be easily achieved using this function.

ON/OFF Control Operation

When ON/OFF-pin(4pin) is connected to Vin When ON/OFF-pin(4pin) is connected to GND or open Output Voltage =OFF Output Voltage =ON



< Caution> ON/OFF pin is pulled down inside of the DC-DC converter, so voltage appears up to GND at ON/OFF pin.

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9. Typical Characteristics Data9. 1 Static Electrical Characteristics



Fig.9-1-1. Output Voltage v.s. Output Current



Fig.9-1-3. Ripple Voltage v.s. Output Current



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Fig.9-1-2. Efficiency v.s. Output Current

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Vin=17V,24V,40V, Vout=12V (Ta=25°C, Cin=50ZL1000M*16×25 ×2, Cout= EKZE160ETD102MJ20S×3)



Fig.9-1-4. Output Voltage v.s. Output Current



Fig.9-1-6. Ripple Voltage v.s. Output Current



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Fig.9-1-5. Efficiency v.s. Output Current

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11. Notice

11.1 Soldering

11.1.1 Flux

Please solder the products with no-cleaning type Rosin Flux which leaves little residue and low activity . Do not use cleaning type flax, in case that you wash the products after using cleaning type flux, they may damage mounting parts on the products and may cause defective or low quality products.

11. 1.2 Solder

Please recommend use of the solder Sn-3Ag-0.5Cu. When use other solders, use it after examining at customer.

- 11. 1.3 Condition of soldering
 - Please solder under the following condition.
 - Flow soldering Preheating Solution and the table and the table and the table and the table and table an

11. 2 Cleaning

Please do not wash the products.

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- 12.1. Packing Form
 - These are packed in a tray(See Fig.12-1)
- 12.2. The number of products in pack specification form.
 - 35pcs./tray

If the products have fraction, may not follow this specification.

- 12.3.Packaging Form
 - 12.3.1. Case of reuseable box is used.
 - These trayies packed products are packaging for Fig.12-2.
 - 12.3.2. Case of reuseable box is not used
 - These trayies packed products are packaging for Fig.12-3.



products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering.

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Packaging form typical classification Box Dimensions of packaging form (typ.) Case of reuseable box is used. W = 538 (mm) D = 368 (mm) H = 284 (mm) H = 284 (mm) Case of reuseable box is not used W = 432 (mm) D = 296 (mm) H = 296 (mm) H = 264 (mm) The number of products in packaging form 175(p c s) Mass of one product 45(g) Typ. Remark If the products have fraction, may not follow this specification. *COn the Packing case, the following is indicated. Murata Parts No. Quantity Stamp No.	Item	Specification				
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On the Packing case, the following is indicated.Murata Parts No.Quantity						
Murata Parts No. Quantity	If the products have fraction, may not follow t	his specification.				
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	Murata Parts No.					
Stamp No.	Quantity					
	Stamp No.					

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+Vout

C2

Load



13.1. Input / Output capacitor When a inductance or a switch devise are connected to the input line, or when you use a power supply with output inductance as the input voltage source, the input voltage of the DC-DC converter will be fluctuated. By this input voltage fluctuation, the transient load response of the DC-DC converter may be deteriorated or abnormal oscillation may occur. So please confirm normal operation on each application. Please use external input capacitor in order to decrease inductance of input line. In case you use external output capacitor in order to improve transient load response, please use input capacitor to prevent abnormal oscillation. When you use external capacitors, following capacitors are recommendable. Output capacitor (C3+C4+C5+C6) : Please use capacitors lesss than 4500µF 13.2. Wiring of input / output capacitor In the case of input / output capacitor connection, in order to reduce electrical noise, please design PCBs with consideration of the following item. ①.Please be sure to check normal operation on your system. 2. Please use low impedance capacitors with good high frequency characteristic. ③ Please shorten those leads of each capacitor as much as possible, and make sure the lead Inductance low. ④.Both input-side and output side, please make the wiring loop between plus and minus as small as possible.The influence of leakage inductance can be reduced. ⑤.Please design the print pattern of the main circuit as wide and short as possible. Make wiring roop small Make wiring roop small +Vin +Vout +Vin DC-DC Converter +Vin GND C1 -Vin shorten the leads and pattern shorten the leads and pattern 13.3. This product should not be operated in parallel or in series. 13.4. Please do not use a connector or a socket to connect this product to your product. The electric characteristics may be deteriorated by the influence of contact resistance.

- 13.5. Be sure to provide an appropriate fail-safe function on your product to prevent secondary damage that may be caused due to abnormal functional or failure of this product.
- 13.6. Inrush current protection is not a feature of this product.
- 13.7. Please connect the input terminals with the correct polarity. If an error in polarity connection is made this product may be damaged. If this product is damaged internally, an elevated input current may flow, and so this product may exhibit an abnormal temperature rise, or your product may be damaged. Please add a diode and fuse per the following diagram to protect them.



*Please select diode and fuse after confirming the operation of your product.

∧ Note:

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