

DC-DC Converters 5 to 6 Watt

1 or 2 outputs

with input to output isolation

with input filter

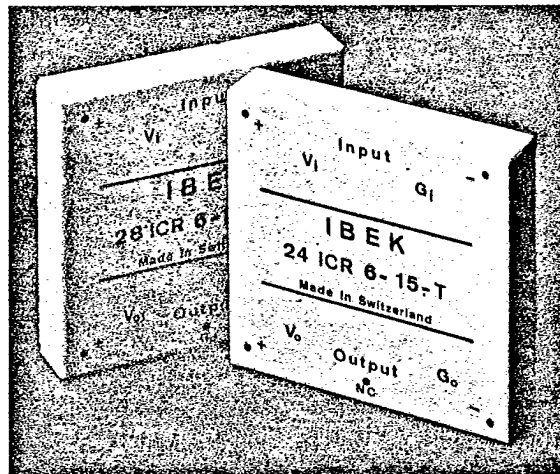
Input : 5, 12, 15, 24, 28, 48 V DC

Outputs : 5, 12, 15 V DC

Combinations of output voltages
 see Block Diagrams page 12
 and Type Survey page 10

Description

The DC-DC converters have been developed as a response to the increasing need for decentralised power supply systems. They are especially suitable to power medium loads on pcbs. At the same time they are an ideal element to realize redundant systems. The DC-DC converters feature low output ripple, low module height, high quality and reliability. To minimize feedback effects in the supply system, the modules are equipped with a low-pass input filter.



Features

- Input filter
- High efficiency (typ 75 %)
- High reliability
- Optimal dynamic characteristics
- Short-circuit proof
- Metal case
- Height of 10.5 mm only
- No derating

Benefits

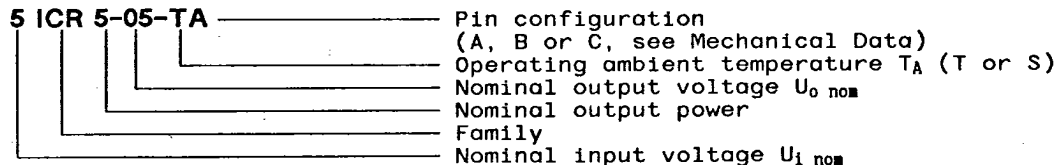
- low noise level
- low heat generation
- MTBF = 350 000 h ($T_A = +40\text{ }^\circ\text{C}$, G_F)
- excellent dynamic load behavior
- safe and simple handling
- self-cooling feature
- compact circuitry and system design
- full load capability over the specified ambient temperature range

Applications

Power supply for Op-Amps, A/D- and D/A converters
 Power supply for μ Ps, RAMs, PROMs

Type Designation Key

Example:



Type Survey

U_i nom	Typ	U_o nom	I_o nom	I_{i0} typ	η	Group 1)
5 V	5 ICR 5-05-..	5 V	1000 mA	32 mA	68	01
	5 ICR 6-12-..	12 V	500 mA	46 mA	72	
	5 ICR 6-15-..	15 V	400 mA	52 mA	72	
	5 ICR 6-1212-..	± 12 V	± 250 mA	125 mA	68	02
5 ICR 6-1515-..	± 15 V	± 200 mA	150 mA	70		
12 V	12 ICR 5-05-..	5 V	1000 mA	20 mA	70	01
	12 ICR 6-12-..	12 V	500 mA	25 mA	75	
	12 ICR 6-15-..	15 V	400 mA	30 mA	75	
	12 ICR 6-1212-..	± 12 V	± 250 mA	60 mA	72	02
12 ICR 6-1515-..	± 15 V	± 200 mA	63 mA	73		
15 V	15 ICR 5-05-..	5 V	1000 mA	18 mA	72	01
	15 ICR 6-12-..	12 V	500 mA	19 mA	75	
	15 ICR 6-15-..	15 V	400 mA	20 mA	75	
24 V	24 ICR 5-05-..	5 V	1000 mA	18 mA	72	01
	24 ICR 6-12-..	12 V	500 mA	19 mA	76	
	24 ICR 6-15-..	15 V	400 mA	20 mA	76	
	24 ICR 6-1212-..	± 12 V	± 250 mA	37 mA	74	02
24 ICR 6-1515-..	± 15 V	± 200 mA	39 mA	75		
28 V	28 ICR 5-05-..	5 V	1000 mA	18 mA	72	01
	28 ICR 6-12-..	12 V	500 mA	19 mA	76	
	28 ICR 6-15-..	15 V	400 mA	20 mA	76	
	28 ICR 6-1212-..	± 12 V	250 mA	34 mA	75	02
28 ICR 6-1515-..	± 15 V	200 mA	36 mA	75		
48 V	48 ICR 5-05-..	5 V	1000 mA	12 mA	70	01
	48 ICR 6-12-..	12 V	500 mA	13 mA	72	
	48 ICR 6-15-..	15 V	400 mA	14 mA	72	
	48 ICR 6-1212-..	± 12 V	± 250 mA	28 mA	73	02
48 ICR 6-1515-..	± 15 V	± 200 mA	30 mA	73		

.. see Type Designation Key page 9, table below and Mechanical Data page 12

1) see Block Diagrams page 12

Maximum Ratings

Characteristic	5 V	12 V	15 V	24 V	28 V	48 V	
Admissible input voltage min $U_{i abs}$ without defect (max 60 s) max	0 V	0 V	0 V	0 V	0 V	0 V	
Operating input voltage U_i 60% load	min max	4.40 V 6.50 V	10.56 V 15.60 V	13.20 V 19.50 V	21.12 V 31.20 V	24.64 V 36.40 V	42.24 V 62.40 V
Operating input voltage U_i 80% load	min max	4.50 V 6.00 V	10.80 V 14.40 V	13.50 V 18.00 V	21.60 V 28.80 V	25.20 V 33.60 V	43.20 V 57.60 V
Operating input voltage U_i 100% load	min max	4.65 V 5.50 V	11.16 V 13.20 V	13.95 V 16.50 V	22.32 V 26.40 V	26.04 V 30.80 V	44.64 V 52.80 V
Storage temperature T_s	-40 °C...+105 °C						
Operating ambient temperature T_A	suffix T		-25 °C...+71 °C				
	suffix S 2)		-40 °C...+85 °C				

2) ICR 6: Linear derating of the maximum output power from 6 W to 5 W between $T_A = +71$ °C and $T_A = +85$ °C

Electrical Data

T_A = +25 °C

Characteristic	Conditions	Nominal Input voltage U _{i nom}					
		5 V	12 V	15 V	24 V	28 V	48 V
No load input current I _{i0}	U _{i nom} , I _o = 0	25mA 155mA	12mA 75mA	11mA 25mA	7mA 40mA	7mA 37mA	6mA 30mA
Input ripple current I _{i rfi}	U _{i nom} , I _{o nom} L _{source} ≈ 1 μH	1 % _{pp} from I _i 3 % _{pp} from I _i					
Switching freq. f _s	U _{i nom} , I _{o nom}	20 kHz					
Impulse voltage withstand test	IEC 255.4 Appendix E	Class II: 1 kV (1.2/50; 500 Ω)					
Isolation test voltage input to output U _{is io}	input short-circuited	500 V _{pp}					
Coupling cap. C _{io}	outputs short-circuited	70 pF					
Isolation resistance R _{is}	100 V DC after 1 min	2000 MΩ					
Output voltage U _o	U _{i nom} , I _{o nom}	U _{o nom} -0.5 % U _{o nom} U _{o nom} +0.5 %					
Temperature coefficient α _{Uo}	U _{i nom} , I _{o nom}	± 0.01 %/K ± 0.03 %/K					
Static control deviation versus input voltage ΔU _{o U}	U _{i min} ...U _{i max} I _{o nom}	± 0.05 %					
Static control deviation versus output current ΔU _{o I}	U _{i nom} I _o = 0...I _{o nom}	± 0.1 %					
Output current limitation response I _{o L}	U _{i nom}	1.25 I _{o nom}					
Short circuit output current I _{o s'}	U _{i nom} , U _o = 0	1.4 I _{o nom}					
Output ripple (BW = 20 MHz) u _o	U _{i nom} I _{o nom}	35 mV _{pp} 1 mV _{rms}					
Efficiency η	U _{i nom} I _{o nom}	68 % 75 %					
Dynamic control deviation u _{o d}	U _{i nom} I _o = 0..	50 mV					
Load transient recovery time t _{rr}	..1 I _{o nom}	20 μs					

Pin Configuration see page 12 and table below

Pin	Single Output
V _i	+ Input
G _i	- Input
+V _o	+ Output
G _o	No Pin
-V _o /G _o	- Output (G _o)

Pin	Dual Output
V _i	+ Input
G _i	- Input
+V _o	+ Output
G _o	Common
-V _o /G _o	- Output (-V _o)

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Block Diagrams

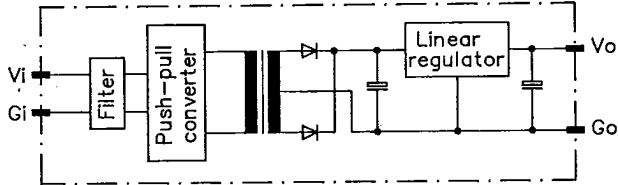


Fig. 18
Group 01
Single output

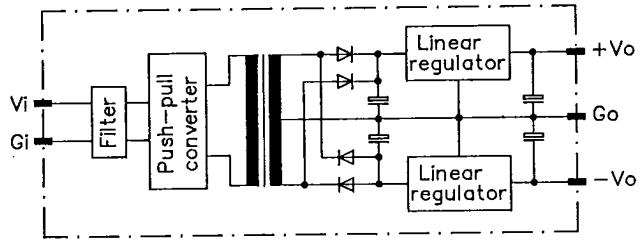


Fig. 19
Group 02
Dual output

Mechanical Data

Dimensions in mm, tolerances ± 0.3 mm, unless otherwise specified
Weight 75 g

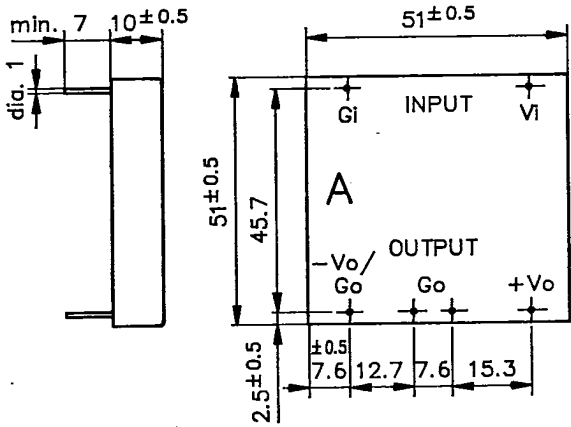


Fig. 20
Pin configuration A

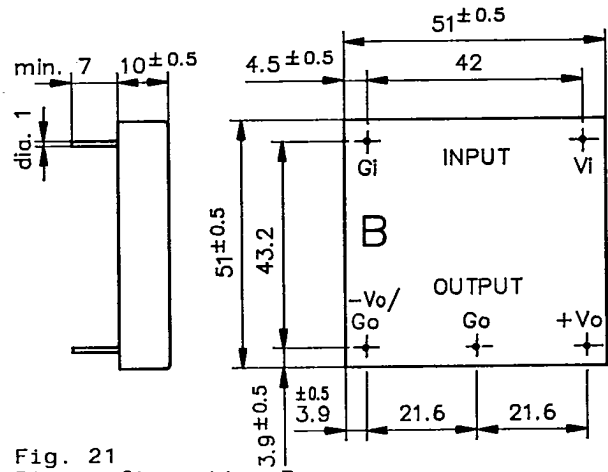


Fig. 21
Pin configuration B

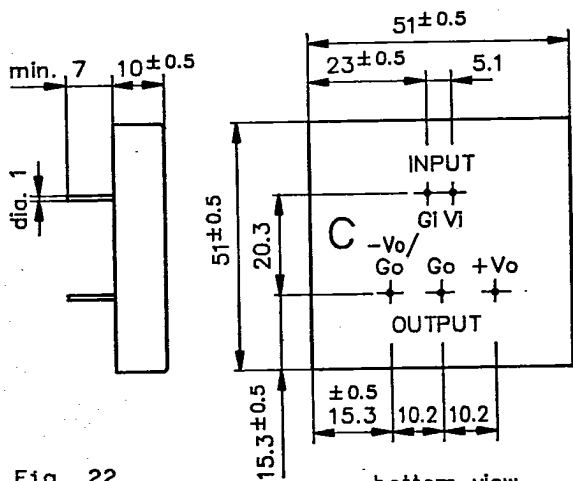


Fig. 22
Pin configuration C

Represented by: