DC-DC Converters 1 Watt

1 or 2 outputs

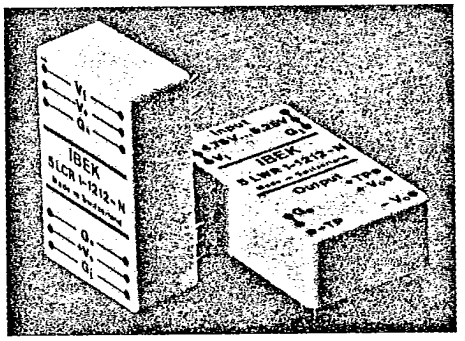
with input to output isolation

with input-capacitor

Input : 5, 12 V DC

Outputs : 5, 12, 15 V DC

Combinations of output voltages
see Block Diagrams page 8
and Type Survey below



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 small 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 an input capacitor.

Features

- Input capacitor
- High efficiency (typ 58 %)
- High reliability
- Optimal dynamic characteristics
- Height of 10.5 mm only
- No derating

Benefits

- low noise level
- low heat generation
- MTBF = 350 000 h (T_A = +40 °C, G_F)
- excellent dynamic load behavior
- 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 µPs, RAMs, PROMs, RS-232 databuses

Type Designation Key

Example:
12 LWR 1-12-12-N

- 12 — Operating ambient temperature range T_A
- LWR — Nominal output voltage $U_{o2\ nom}$
- 1 — Nominal output voltage $U_{o1\ nom}$
- 12 — Nominal output power
- 12 — Family
- N — Nominal input voltage $U_{i\ nom}$

Type Survey

$U_{i\ nom}$	Typ	$U_{o1\ nom}$	$I_{o1\ nom}$	$U_{o2\ nom}$	$I_{o2\ nom}$	Group [4]
5 V	.. LWR 1-05-N [3]	5 V	200 mA	–	–	01
	.. LWR 1-12-N	12 V	80 mA	–	–	
	.. LWR 1-15-N	15 V	66 mA	–	–	
	.. LWR 1-1212-N [1]	±12 V	±40 mA	–	–	02
	.. LWR 1-1515-N [1]	±15 V	±33 mA	–	–	
	.. LWR 1-12-12-N [1]	12 V	40 mA	12 V	40 mA	03
	.. LWR 1-15-15-N [1]	15 V	33 mA	15 V	33 mA	
12 V	.. LCR 1-05-N [3]	5 V	200 mA	–	–	06
	.. LCR 1-12-N	12 V	80 mA	–	–	
	.. LCR 1-15-N	15 V	66 mA	–	–	
	.. LCR 1-1212-N [1] [2]	±12 V	±40 mA	–	–	07
	.. LCR 1-1515-N [1] [2]	±15 V	±33 mA	–	–	
	.. LCR 1-12-12-N	12 V	40 mA	12 V	40 mA	08
	.. LCR 1-15-15-N	15 V	33 mA	15 V	33 mA	

.. see Type Designation Key above and table Maximum Ratings page 7
[1], [2], [3] see page 3 [4] see Block Diagrams page 8

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Maximum Ratings

Characteristic		5 L...	12 L...
Admissible input voltage $U_{i\,abs}$ without defect (max 60 s)	min	0 V	0 V
	max	6.25 V	15 V
Input voltage U_i	min	4.75 V	10.8 V
	max	5.25 V	13.2 V
Storage temperature T_S		-40 °C...+85 °C	
Operating ambient temperature T_A		0 °C...+71 °C	

Electrical Data

T_A = +25 °C

Characteristic		Conditions	5 L..	12 L..
No load input current $I_{i\,0}$	typ	$U_{i\,nom}$, I_o = 0	85 mA	35 mA
	max		110 mA	45 mA
Switching freq. f_s	typ	$U_{i\,nom}$, $I_{o\,nom}$	25 kHz	
Impulse voltage withstand test		IEC 255.4	LWR Class III: 5 kV (1.2/50; 500Ω)	
		Appendix E	LCR Class II : 1 kV (1.2/50; 500Ω)	
Isolation test voltage U_{is} input to outputs 50 Hz, 1 min		input short-circuited as well as outputs short-circuited	all LWR 3 kV_{pp}	
			all LCR 500 V_{pp}	
Coupling cap. C_{io}	typ		all LWR 10 pF, all LCR 20 pF	
Isolation resistance R_{is}	typ	100 V DC after 1 min	2000 MΩ	
Output voltage U_o	min	$U_{i\,nom}$, $I_{o\,nom}$	$U_{o\,nom}$ -5 %	
	nom		$U_{o\,nom}$	
	max		$U_{o\,nom}$ +5 %	
Temp. coefficient α_{Uo}		$U_{i\,nom}$, $I_{o\,nom}$	± 0.02 %/K	
Static control deviation versus input voltage $\Delta U_{o\,U}$	typ	$U_{i\,min}...U_{i\,max}$ $I_{o\,nom}$	± 0.2 % [1]	
Static control deviation versus output current $\Delta U_{o\,I}$	typ	$U_{i\,nom}$ I_o=0...$I_{o\,nom}$	± 0.1 % [2]	
Output ripple (BW = 20 MHz) u_o	typ	$U_{i\,nom}$ $I_{o\,nom}$	25 mV_{pp}	35 mV_{pp}
Efficiency η	min		50 %	
	typ		58 %	

[1]) for 5 V output: typ ±0.3 %

[2]) for 5 V output: typ ±0.8 %

Pin Configuration see page 8 and table below

Group	1	2	3	8	10	11	12	13	14	15	16	17	22	23	24
01	Vi	Vi	Vi	-	-	-	Go	Vo	-	-	-	+TP	Gi	Gi	Gi
02	Vi	Vi	Vi	-	Go	Go	-TP	-Vo	-	+Vo	+TP	-	Gi	Gi	Gi
03	Vi	Vi	Vi	Go1	-	-	Vo1	Vo2	-	-	Go2	-	Gi	Gi	Gi
06	Vi	-	-	-	Go	Vo	Gi	Gi	Vo	Go	-	-	-	-	Vi
07	Vi	-Vo	Go	-	Go	+Vo	Gi	Gi	+Vo	Go	-	-	Go	-Vo	Vi
08	Vi	Go2	Vo2	-	Go1	Vo1	Gi	Gi	Vo1	Go1	-	-	Vo2	Go2	Vi

Block Diagrams

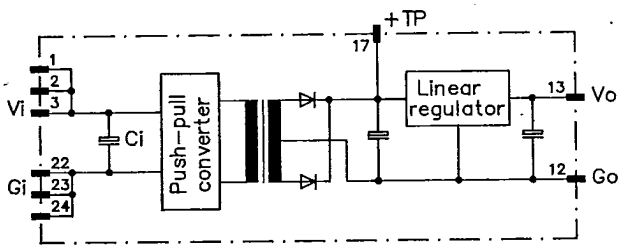


Fig. 9
LWR Group 01

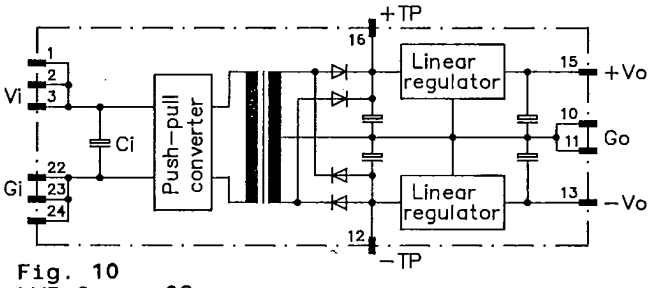


Fig. 10
LWR Group 02

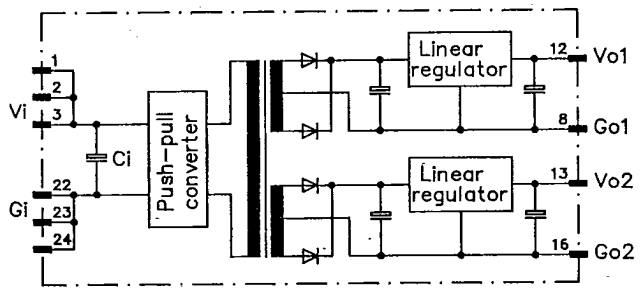


Fig. 11
LWR Group 03

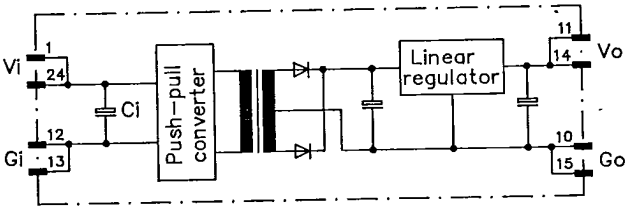


Fig. 12
LCR Group 06

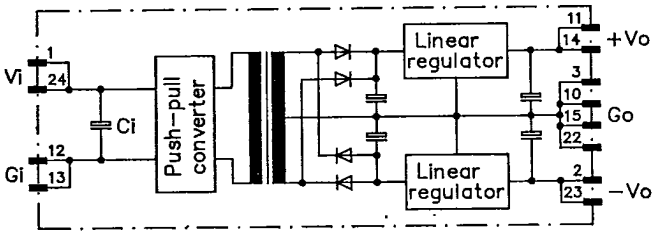


Fig. 13
LCR Group 07

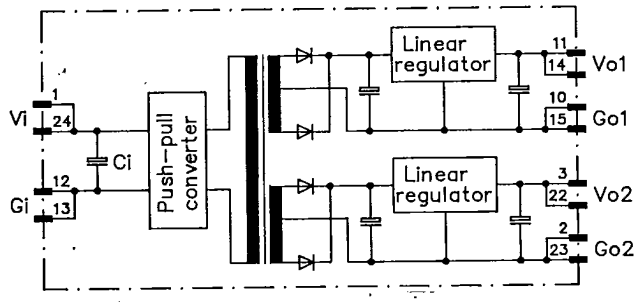
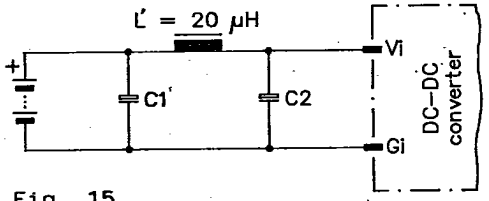


Fig. 14
LCR Group 08

Application Note

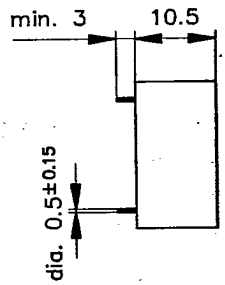


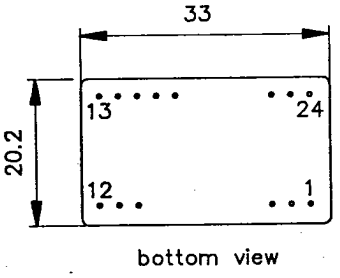
U_i nom	C1 = C2
5 V	68 µF, 10 V
12 V	47 µF, 16 V

Fig. 15
Input filter to reduce the input ripple

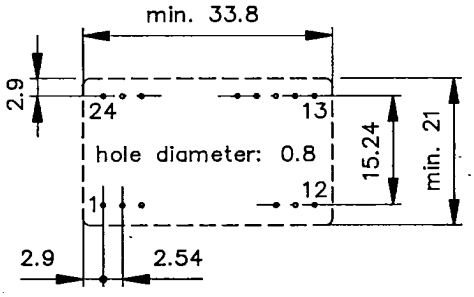
Mechanical Data

Dimensions in mm, tolerances ±0.3 mm, unless otherwise specified.





bottom view



view from component side

Fig. 16
Case DIL 24
Weight 15 g

Fig. 17
Hole location for circuit board mounting
---- Space reserved for the DC-DC converter

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