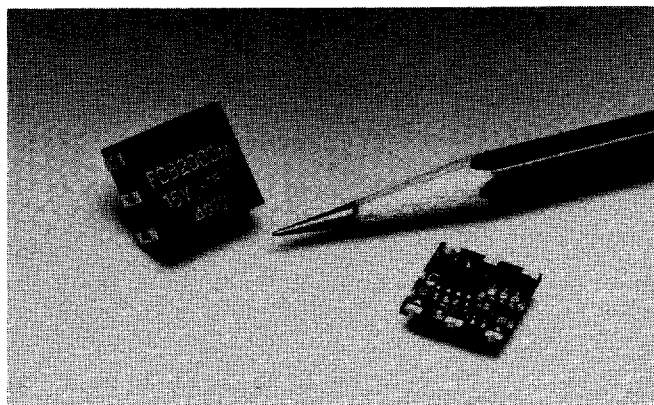


MINIATURE SIZE DC-DC CONVERTER

FEATURES

- Miniature Size
- Surface mount type
- High power density
- High efficiency design
- Small tolerance of output voltage
- Parallel operation is available
- ON/OFF control is available for output voltage
- High reliability



APPLICATIONS

- Compact electronic equipment
- Office automation
- Cold cathode display equipment
- Memo boards
- Liquid crystal panels

ENVIRONMENTAL CONDITIONS

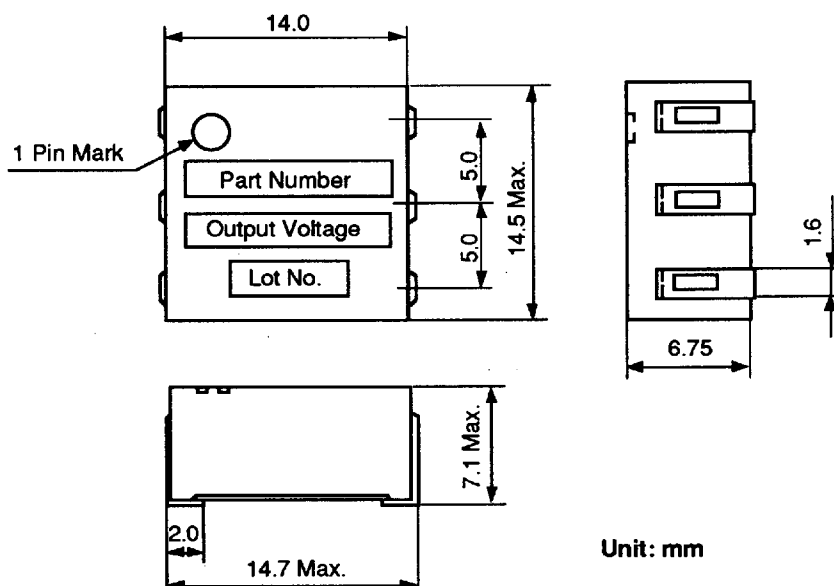
- Operating temperature range: -10 ~ +65°C
- Storage temperature range: -40 ~ +85°C
- Operating humidity range: 20 ~ 95% (Not dewed)

DESCRIPTION

Toko's CFD Series is an extremely compact, high power density DC-DC converter, available in both step-down and flyback designs. Its small size makes this product ideal for low profile applications, and especially popular for compact electronic equipment.

The CFD Series is also designed for power distributed and redundant type applications, with parallel operation available up to 5 units.

PHYSICAL DIMENSIONS



CFD Series

PART NUMBER TABLE

STEP-DOWN TYPE: CFDD

Toko Part Number	No. of ch.	Input voltage Vin (V)			Output voltage Vo (V)			Output current Io (mA)			Efficiency η (%) *3
		Min.	Typ.	Max.	Channel	Vo (V)	Tol. *2	Min.	Typ.	Max.	
CFDD1106M/S	1	5	8	12	ch. 1	3.3	±3%	120	360	600	84 Typ.
CFDD1206M/S	1	6	12	17	ch. 1	3.3	±3%	120	360	600	82 Typ.
CFDD1203M/S	1	6	12	17	ch. 1	5.0	±3%	120	360	600	87 Typ.

Output short-circuit protection included

FLYBACK TYPE (up or down): CFDB and CFDF

Toko Part Number *1	No. of ch.	Input voltage Vin (V)			Output voltage Vo (V)			Output current Io (mA)			Efficiency η (%) *3
		Min.	Typ.	Max.	Channel	Vo (V)	Tol. *2	Min.	Typ.	Max.	
CFDB1001M/S	1	4.5	5	5.5	ch. 1	12	±3%	45	80	115	70 Typ.
CFDB1002M/S	1	4.5	5	5.5	ch. 1	15	±3%	40	65	90	70 Typ.
CFDF1103M/S	1	5	8	12	ch. 1	5	±3%	100	175	250	77 Typ.
CFDF1105M/S	1	5	8	12	ch. 1	30	±3%	10	20	30	79 Typ.
CFDF1205M/S	1	6	12	17	ch. 1	30	±3%	10	20	30	80 Typ.
CFDF1301M/S	1	9	12	17	ch. 1	12	±3%	70	100	125	71 Typ.
CFDF1302M/S	1	9	12	17	ch. 1	15	±3%	70	85	100	71 Typ.
CFDB2001M/S	2	4.5	5	5.5	ch. 1	12	±3%	22.5	40	57.5	72 Typ.
					ch. 2	-12	±6%	22.5	40	57.5	
CFDB2002M/S	2	4.5	5	5.5	ch. 1	15	±3%	20	32.5	45	72 Typ.
					ch. 2	-15	±6%	20	32.5	45	
CFDF2301M/S	2	9	12	17	ch. 1	12	±3%	35	50	62.5	73 Typ.
					ch. 2	-12	±6%	35	50	62.5	
CFDF2302M/S	2	9	12	17	ch. 1	15	±3%	35	42.5	50	73 Typ.
					ch. 2	-15	±6%	35	42.5	50	

*1 Tail character M indicates Master; S indicates Slave.

*2 The tolerance of output voltage includes the line regulation, load regulation and temperature drift.

*3 At Vin type. and Io max.

PIN CONNECTIONS

(Master)

Pin No.	Step-down, Flyback 1 channel type	Flyback 2 channel type
1	Input voltage (Vin)	Input voltage (Vin)
2	ON/OFF control signal (CTL) *1	ON/OFF control signal (CTL) *1
3	Output of parallel drive sig. (PDR)	Output of parallel drive sig. (PDR)
4	Output voltage (Vo)	ch.1 Output voltage (Vo)
5	GND	GND
6	NC	ch.2 Output voltage (-Vo)

*1 ON at low, OFF at Vin or floating.

(Slave)

Pin No.	Step-down, Flyback 1 channel type	Flyback 2 channel type
1	Input voltage (Vin)	Input voltage (Vin)
2	NC	NC
3	Input of parallel drive sig. (PDR)	Input of parallel drive sig. (PDR)
4	Output voltage (Vo)	ch.1 Output voltage (Vo)
5	GND	GND
6	NC	ch.2 Output voltage (-Vo)

RECOMMENDABLE EXTERNAL CAPACITOR FOR CFD SERIES

1. RIPPLE CURRENT AND RECOMMENDABLE EXTERNAL CAPACITORS

Part Number	Ripple current		Recommendable external capacitor	
	Input	Output	Input	Output
CFDD1106M/S	535	100	OS-CON (20SM10M) Al. Chip (ECEV1EV330S)	SP Cap (ECGCOKB220)
CFDD1206M/S	490	105	.	.
CFDD1203M/S	575	135	.	.
CFDF1301M/S	245	205	OS-CON (20SM3R3M) Al. Chip (ECEV1EV330S)	OS-CON (20SM3R3M) Al. Chip (ECEV1EV330S)
CFDF1302M/S	240	180	.	.
CFDF2301M/S	260	135	.	.
CFDF2302M/S	250	130	.	.
CFDF1103M/S	475	395	OS-CON (20SM10M) Al. Chip (ECEV1EV330S)	SP Cap (ECGCOKB220) Al. Chip (ECEV1EV330S)
CFDF1105M/S	295	55	.	Al. Chip (ECEV1HV100S) Al. Chip (ECEV1HV100S)
CFDF1205M/S	270	60	.	.
CFDB1001M/S	450	245	OS-CON (20SM10M) Al. Chip (ECEV1EV330S)	OS-CON (20SM10M) Al. Chip (ECEV1EV330S)
CFDB1002M/S	450	215	.	.
CFDB2001M/S	425	125	.	OS-CON (20SM3R3M) Al. Chip (ECEV1EV330S)
CFDB2002M/S	415	105	.	.

Note: Unit of ripple current is mA rms.
In case of 2ch. output type, please connect external capacitors for each output channels.

2. OUTLINE OF CAPACITORS

Aluminium Electrolytic Chip Capacitors

Part Number	Maker	Cap (μF)	W.V. (V)	Ripple current (mA rms) (120Hz/105°C)
ECEV1EV330S ECEV1HV100S	Matsushita Electric Industrial Co., Ltd.	33.0 10.0	25 50	65 35

(OS-CON) ... Aluminium solid capacitors with Organic semiconductive electrolyte

Part Number	Maker	Cap (μF)	W.V. (V)	Ripple current (mA rms) (100kHz/85°C)
20SM3R3M 20SM10M	SANYO electric Co., Ltd.	3.3 10.0	20 20	490 623

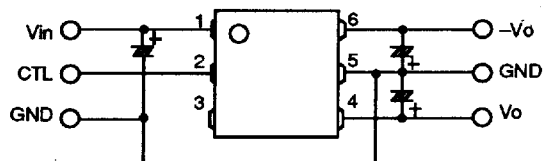
(SP Cap) ... Speciality Polymer Aluminium Electrolytic Chip Capacitors

Part Number	Maker	Cap (μF)	W.V. (V)	Ripple current (mA rms) (100kHz/105°C)
ECGCOKB220	Matsushita Electric Industrial Co., Ltd.	22.0	8	1600

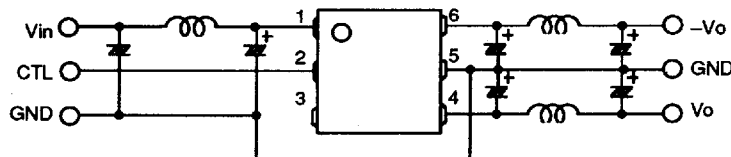
CFD Series

EXTERNAL CONNECTION EXAMPLES

FOR DIGITAL CIRCUIT

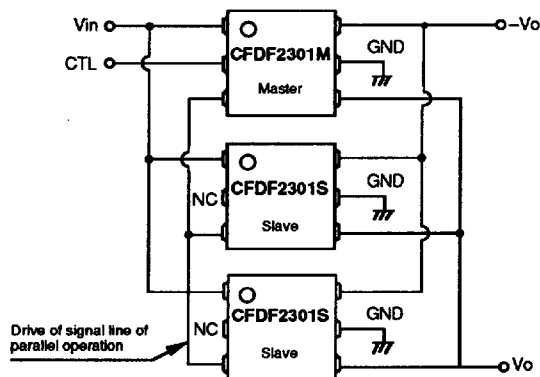


FOR ANALOG CIRCUIT



- For selection of input and output choke coils please refer to Toko's Coil & Filter catalog. For SMD choke coils review specifications on: 43CS, 43FS, 5CA, 10RF, 12RF, D73F/C, and D75F/C. For leaded choke coils review specifications on: 8RBS, 8RHB, 8RHT, 8RB, 8RD, 10RBM, 10RBH and 10RHB. Choke coils with high inductance will greatly reduce the ripple voltage, however it should be noted that there is a limitation in the current capacity.
- It is recommended to use low impedance smoothing capacitor of high frequency application. Please see table of recommendable external capacitors.
- The smoothing capacitor should be connected within 15mm from the converter pin.

PARALLEL CONNECTIONS



- In parallel operation, connect with master's output pin of parallel drive signal and slave's input pin of parallel drive signal like as above connections.
- "M" is put at the tail of part number as the master and "S" as the slave.
- 5pcs. are available for the parallel operation.
- Please put each converter as close as possible.

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