

# CFRS SERIES

1.3W REGULATED

# DANUBE

## FEATURES

- DUAL IN LINE PACKAGE
- UP TO 1.3W REGULATED OUTPUT POWER
- 100% BURNED IN
- HIGH EFFICIENCY
- FIVE-SIDED SHIELD TO REDUCE EMI
- NO EXTERNAL COMPONENTS REQUIRED
- LOW NOISE
- UL 94V-0 PACKAGE MATERIAL
- CUSTOM SOLUTIONS AVAILABLE



## OUTPUT SPECIFICATIONS

Voltage Setpoint Accuracy	+/-3% max
Temperature Coefficient	+/-0.05%/°C
Ripple & Noise(20MHz BW) <sup>1</sup>	100mVp-p max
Line Regulation <sup>2</sup>	+/-1% max
Load Regulation <sup>3</sup>	+/-1% max
Minimum Load	10% of Full Load
Short Circuit Protection	Current Limit Protection
Short Circuit Restart	Automatic
Transient Response <sup>5</sup>	200uS max

## ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-25°C to +71°C
Storage Temperature	-55°C to +125°C
Humidity	95% max
Cooling	Free-Air Convection

## INPUT SPECIFICATIONS

Input Voltage Range	+/-10% max
Input Filter	Pi Network
Protection	Fuse Recommended

## GENERAL SPECIFICATIONS

Efficiency	60% min
Isolation Voltage <sup>4</sup>	1500 VDC min
Isolation Resistance	10 <sup>9</sup> ohms min
Isolation Capacitance	80pF max
Switching Frequency	50KHz min
MTBF <sup>6</sup>	>850,000 Hours
Weight	12.0g-14.4g
Case Material	Non-Conductive Plastic Or Five-Sided Shield Case
Case Size	31.8mm*20.3mm*10.2mm
Conducted Emissions	EN55022 Class A
Radiated Emissions	EN55022 Class A

ALL SPECIFICATIONS TYPICAL AT NOMINAL LINE, FULL LOAD, AND 25 °C UNLESS OTHERWISE NOTED.

<sup>1</sup> Measured with 1uF ceramic capacitor connect to the output pins.

<sup>2</sup> High Line to Low Line.

<sup>3</sup> Load Regulation is for output load current change from 10% to 100%.

<sup>4</sup> For 10 seconds.

<sup>5</sup> 25% Step Load Change.

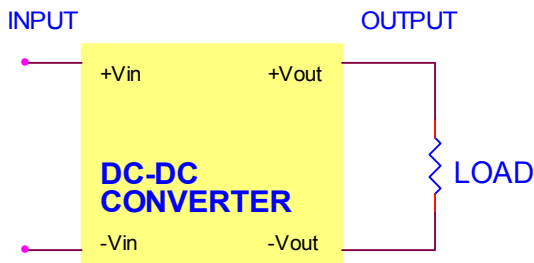
<sup>6</sup> MIL-HDBK-217F @25 °C, Ground Benign.

## ● SELECTION GUIDE

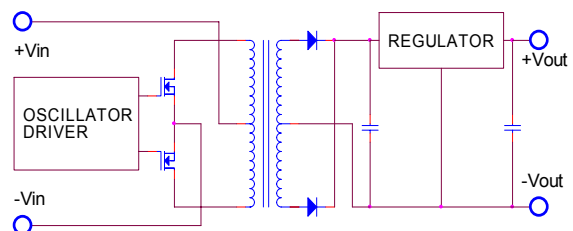
MODEL NUMBER <sup>7</sup>	INPUT VOLTAGE (VDC)	OUTPUT VOLTAGE (VDC)	OUTPUT CURRENT (mA)	INPUT <sup>8</sup> CURRENT(mA)		EFF (%) <sup>9</sup>	ISOLATION (VDC)
				FULL LOAD	NO LOAD		
				CFRS-0505D(M)	4.5-5.5		
CFRS-0509D(M)	4.5-5.5	9	145	400	42	65	1500
CFRS-0512D(M)	4.5-5.5	12	108	400	41	65	1500
CFRS-0515D(M)	4.5-5.5	15	87	394	41	66	1500
CFRS-0524D(M)	4.5-5.5	24	54	394	41	66	1500
CFRS-1205D(M)	10.8-13.2	5	260	170	14	63	1500
CFRS-1209D(M)	10.8-13.2	9	145	169	14	64	1500
CFRS-1212D(M)	10.8-13.2	12	108	167	14	65	1500
CFRS-1215D(M)	10.8-13.2	15	87	167	14	65	1500
CFRS-1224D(M)	10.8-13.2	24	54	164	14	66	1500
CFRS-2405D(M)	21.6-26.4	5	260	86	9	63	1500
CFRS-2409D(M)	21.6-26.4	9	145	86	9	63	1500
CFRS-2412D(M)	21.6-26.4	12	108	85	9	64	1500
CFRS-2415D(M)	21.6-26.4	15	87	83	9	65	1500
CFRS-2424D(M)	21.6-26.4	24	54	83	9	65	1500
CFRS-4805D(M)	43.2-52.8	5	260	41	2	66	1500
CFRS-4809D(M)	43.2-52.8	9	145	41	2	66	1500
CFRS-4812D(M)	43.2-52.8	12	108	41	2	66	1500
CFRS-4815D(M)	43.2-52.8	15	87	40	2	67	1500
CFRS-4824D(M)	43.2-52.8	24	54	40	2	67	1500

*Note: Other input to output voltages may be available. Please contact factory.*

## ● TYPICAL APPLICATIONS



## ● SIMPLIFIED SCHEMATIC



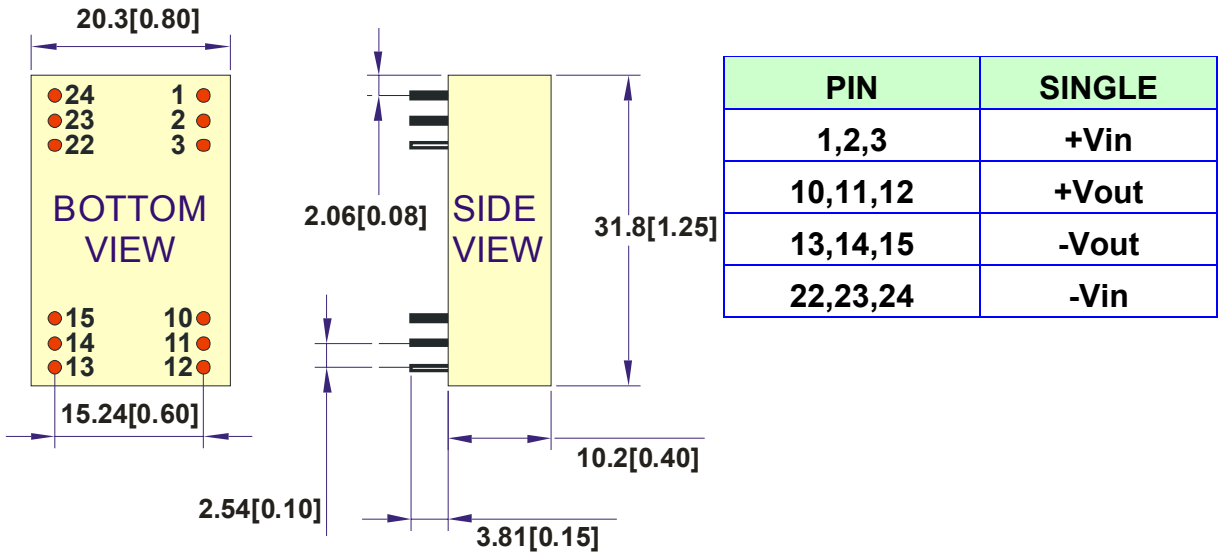
<sup>7</sup> CFRS-\*\*\*\*D ----- Non-Conductive Plastic

CFRS-\*\*\*\*DM ----- Five-sided shield case

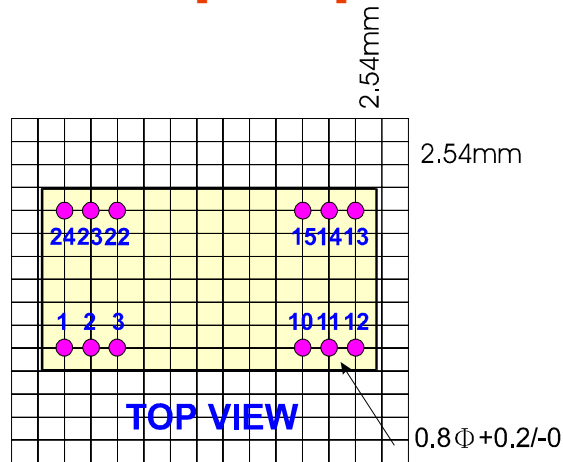
<sup>8</sup> NOMINAL INPUT VOLTAGE.

<sup>9</sup> NOMINAL INPUT VOLTAGE, FULL LOAD.

## MECHANICAL DIMENSIONS & RECOMMENDED FOOTPRINT DETAILS



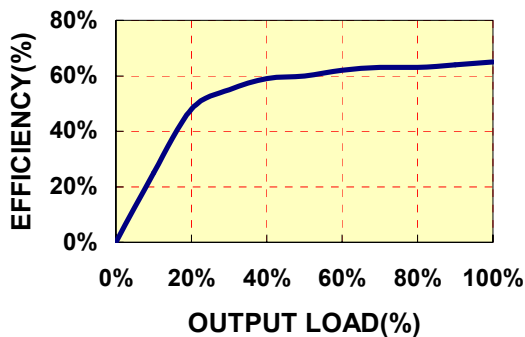
All dimensions are in mm[inches]



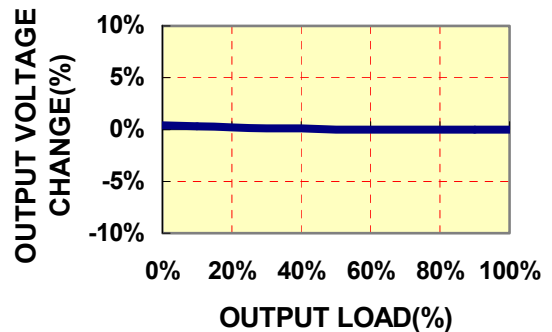
## TYPICAL PERFORMANCE CURVES

Specifications typical at TA=25°C, nominal input voltage, rated output current unless otherwise specified.

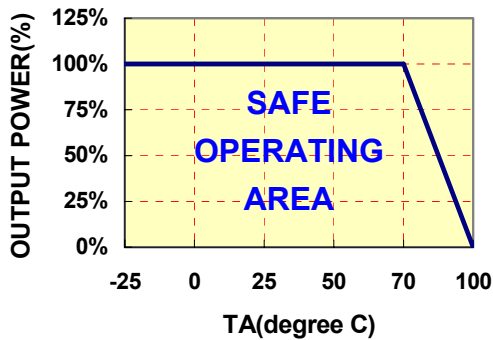
OUTPUT LOAD VS EFFICIENCY



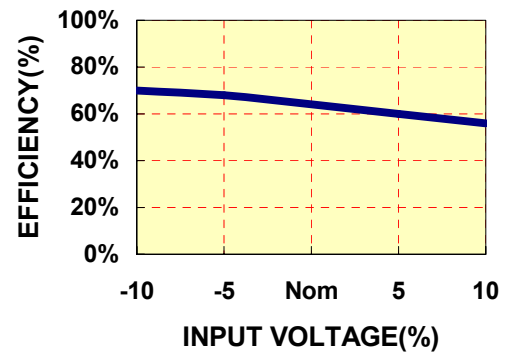
OUTPUT LOAD VS OUTPUT VOLTAGE



## TEMPERATURE DERATING



## INPUT VOLTAGE VS EFFICIENCY



## ● INPUT FUSE SELECTION GUIDE

4.5-5.5V INPUT VOLTAGE(VDC)	10.8-13.2V INPUT VOLTAGE(VDC)	21.6-26.4V INPUT VOLTAGE(VDC)	43.2-52.8V INPUT VOLTAGE(VDC)
600mA Slow-Blow Type	250mA Slow-Blow Type	150mA Slow-Blow Type	65mA Slow-Blow Type

**Note:** Certain applications may require the installation of external fuse in front of the input.

## CFRS SERIES APPLICATION NOTES:

### EXTERNAL CAPACITANCE REQUIREMENTS:

No external capacitance is required for operation of the CFRS.

To meet the reflected ripple requirements of the converter, an input impedance of less than 0.5 ohm from DC to 100KHz is required.

External output capacitance is not required for operation, however it is recommended that 10uF tantalum and 0.1uF ceramic capacitance be selected for reduced system noise.

Additional output capacitance may be added for increased filtering, but should not exceed 220uF.

We Can Offer EMC-Filter According To EN55011/22 Class B.

### Negative Outputs:

A negative output voltage may be obtained by connecting the +OUT to circuit ground and connecting -OUT as the negative output.

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## FOR MORE INFORMATION CALL:

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Home Page

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