

CTW-30W Series

30W 4:1 Regulated Single & Dual & Triple output



Features

- Ultra Wide 4:1 Input Range
- Full SMD Technology
- 1600VDC Isolation
- Efficiency up to 90%
- Operating Temperature Range -40 ~ 86°C max
- Adjustable Output Voltage
- Remote ON/OFF Control (CTRL)
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Over Temperature Protection
- Soft Start
- Optional Heat-sink



PART NUMBER STRUCTURE

CTW - **24** **0512** **S** **30** **SK**

(1) (2) (3) (4) (5) (6)

(1) Series

(2) Input Voltage Range

24 - 9-36 V

48 - 18-75 V

(4) Output Type

S - Single Output

D - Dual Output

T - Triple Output

(3) Output Voltage

Single & Dual Output

3R3 - 3.3V

05 - 5.0V or $\pm 5V$

5R1 - 5.1V

12 - 12V or $\pm 12V$

15 - 15V or $\pm 15V$

(5) Watt

(6) Heat-sink (Optional)

Blank - Without Heat-sink

SK - With Heat-sink

Triple Output Voltage

3R312 - 3.3V / $\pm 12V$

3R315 - 3.3V / $\pm 15V$

0512 - 5.0V / $\pm 12V$

0515 - 5.0V / $\pm 15V$

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Auxiliary (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)			Min. load (mA)	Full load (mA)		
CTW-243R3S30	9-36	100	1159	3.3		0	7500	89	20000
CTW-2405S30	9-36	160	1389	5		0	6000	90	14000
CTW-245R1S30	9-36	120	1417	5.1		0	6000	90	14000
CTW-2412S30	9-36	30	1404	12		0	2500	89	2000
CTW-2415S30	9-36	30	1404	15		0	2000	89	2000
CTW-483R3S30	18-75	50	579	3.3		0	7500	89	20000
CTW-4805S30	18-75	60	694	5		0	6000	90	14000
CTW-485R1S30	18-75	100	708	5.1		0	6000	90	14000
CTW-4812S30	18-75	30	702	12		0	2500	89	2000
CTW-4815S30	18-75	30	694	15		0	2000	90	2000
CTW-2405D30	9-36	120	1404	±5		0	±3000	89	±3000
CTW-2412D30	9-36	30	1420	±12		0	±1250	88	±1300
CTW-2415D30	9-36	40	1420	±15		0	±1000	88	±1300
CTW-4805D30	18-75	80	694	±5		0	±3000	90	±3000
CTW-4812D30	18-75	30	710	±12		0	±1250	88	±1300
CTW-4815D30	18-75	40	702	±15		0	±1000	89	±1300
CTW-243R312T30	9-36	100	1273	3.3	±12	500 / ±42	5000 / ±420	87	15000 / ±220
CTW-243R315T30	9-36	100	1264	3.3	±15	500 / ±33	5000 / ±330	87	15000 / ±220
CTW-240512T30	9-36	100	1408	5	±12	400 / ±42	4000 / ±420	89	8000 / ±220
CTW-240515T30	9-36	125	1400	5	±15	400 / ±33	4000 / ±330	89	8000 / ±220
CTW-483R312T30	18-75	50	622	3.3	±12	500 / ±42	5000 / ±420	89	15000 / ±220
CTW-483R315T30	18-75	50	625	3.3	±15	500 / ±33	5000 / ±330	88	15000 / ±220
CTW-480512T30	18-75	60	696	5	±12	400 / ±42	4000 / ±420	90	8000 / ±220
CTW-480515T30	18-75	60	692	5	±15	400 / ±33	4000 / ±330	90	8000 / ±220

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INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	24V Input		9	24	36	VDC
	48V Input		18	48	75	
Under Voltage Protection	24V Input	Module ON		8.6		VDC
		Module OFF		7.9		
	48V Input	Module ON		17.8		
		Module OFF		16		
Input Filter			Pi Type			
Input Reflected Ripple Current (1)				20		mApk-pk
Start up Time	Nominal Vin and constant resistive load			30		ms
Remote ON/OFF Control (2)	Module ON (Open Circuit)		3.0		12	VDC
	Module OFF (Short circuit pin 2 and pin 3)		0		1.2	
	OFF idle current			5.0		mA
Recommended input fuse (slow blow)	24V Input		6			A
	48V Input		3			

Note :

1. Measured with a simulated source inductance of 4.7 μ H and a source capacitor Cin (33 μ F, ESR<1.0 Ω at 100kHz).
2. The remote ON/OFF control pin is referenced to -Vin (pin2).

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OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Single Models & Dual Models		-1.0		+1.0	%
	Triple Models (main)		-1.0		+1.0	
	Triple Models (auxiliary)		-5.0		+5.0	
Output Voltage Adjustability (Trim)	Single Output Only		-10		+10	%
Line Regulation	Single Models & Dual Models		-0.5		+0.5	%
	Triple Models (main)		-1.0		+1.0	
	Triple Models (auxiliary)		-5.0		+5.0	
Load Regulation	From 0% to 100% Load	Single Output	-0.5		+0.5	%
		Dual Output (balanced load)	-1.0		+1.0	
	From 10% to 100% Load	Triple Output (main)	-1.0		+1.0	
		Triple Output (auxiliary)	-5.0		+5.0	
Cross Regulation (1)	Asymmetrical Load 25% / 100%	Dual Output	-5		+5	%
		Triple Output	-5		+5	
Ripple & Noise (2)	20MHz bandwidth	Single & Dual Output			100	mVpk-pk
		Triple Output (main)			50	
		Triple Output (auxiliary)			75	
Over Voltage Protection (Zener diode clamp)	3.3V output			3.9		VDC
	5.0V output			6.2		
	5.1V output			6.2		
	12V output			15		
	15V output			18		
Over Current Protection				150		% of FL
Short Circuit Protection			Indefinite (hiccup) (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			
Transient Recovery Time	Nominal Vin and 25% load step change (75%-50%-25% of Io)			250		µs
Transient Response Deviation			-3		+3	%
Note :						
1. Dual: One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%. Triple: Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%. Auxiliary outputs (+ Aux and - Aux) : main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to100%.						
2. Measured with a 1.0uF MLCC.						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	24V Input			50	VDC
	48V Input			100	
Soldering Temperature	1.5mm from case 10sec max.			260	°C
Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

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GENERAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec		1600			VDC
	Case-I/O, and rated for 60sec		1600			
Isolation Resistance	Input-output		1000			MΩ
Isolation Capacitance	Input-output			1000		pF
Switching Frequency				330		kHz
MTBF	MIL-HDBK-217 F @ 25°C	Single&Dual Output	435			k hours
		Triple Output	320			
Safety Standard	IEC / EN / UL 62368-1		Design to meet			
Safety Approval	EN 62368-1		WL20A1001-L0			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		86	°C
Maximum Case Temperature				105	°C
Thermal Impedance	Without Heat-sink	14.4			°C/W
	With Heat-sink	10.9			
Over Temperature Protection	Case Temperature		115		°C
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Air: ±8kV / Contact: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	1A/m	A

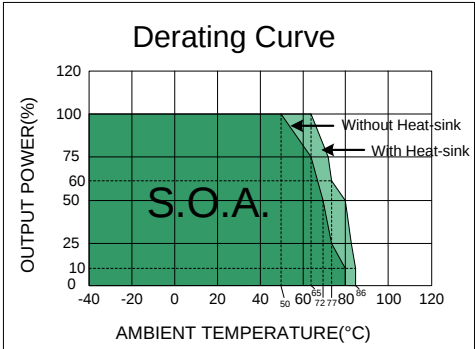
PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Copper
Base Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Ø1.0mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	35.0 g, typ. (Without Heat-sink)
	46.3 g, typ. (With Heat-sink)
Dimensions	2.00" x 1.00" x 0.40" (Without Heat-sink)
	2.00" x 1.00" x 0.64" (With Heat-sink)

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ELECTRICAL CHARACTERISTIC CURVES



CTW-30W Series

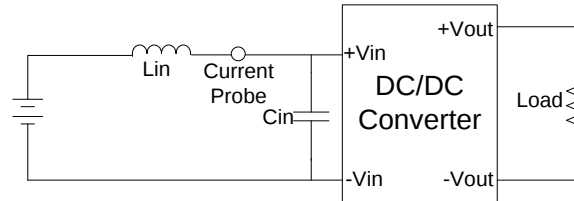
30W 4:1 Regulated Single & Dual & Triple output



TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor L_{in} (4.7 μ H) and a source capacitor C_{in} (33 μ F, ESR<1.0 Ω at 100kHz) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Over Current Protection

The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup). The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

Over Temperature Protection Test

The over temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the over temperature threshold the module will shut down. The module will try to restart after shut down, if the over temperature condition still exists during restart, the module will shut down again. This restart trial will continue until the temperature is within specification.

Remote Module ON / OFF

Positive logic turns on the module during high logic and off during low logic. Remote module ON/OFF can be controlled by an external switch between the CTRL terminal and $-Vin$ terminal. For positive logic if the remote feature is not used, please leave the CTRL pin floating.

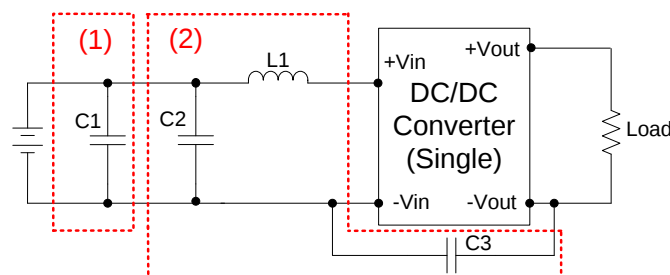
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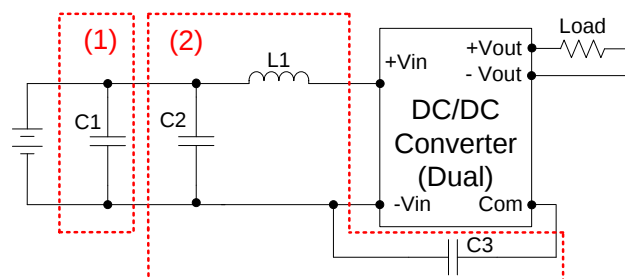
DESIGN & FEATURE CONFIGURATIONS

EMC Filter

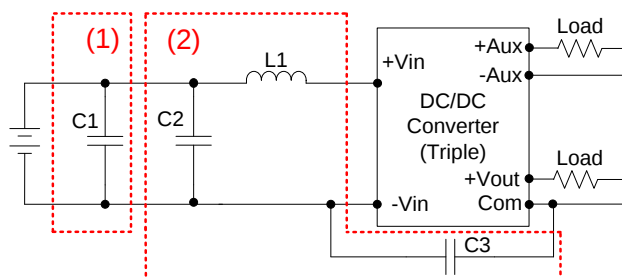
The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



Single	C1	C2	L1	C3
CTW-24XXS30	NIPPON Chemi-con KY Series 220μF, 100V	NIPPON Chemi-con KY Series 100μF, 100V	12μH	MLCC 470pF, 2kV
CTW-48XXS30				



Dual	C1	C2	L1	C3
CTW-24XXD30	NIPPON Chemi-con KY Series 220μF, 100V	NIPPON Chemi-con KY Series 100μF, 100V	12μH	MLCC 470pF, 2kV
CTW-48XXD30				

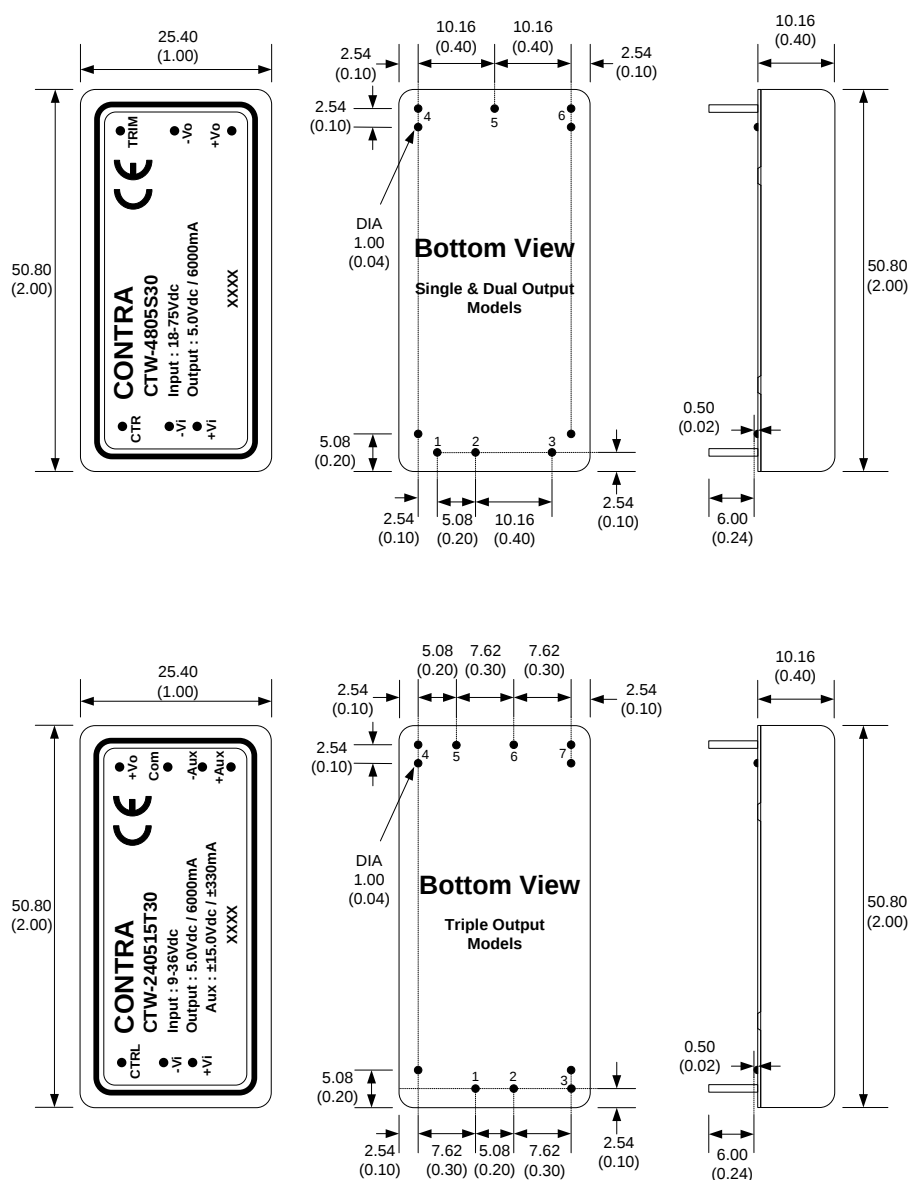


Triple	C1	C2	L1	C3
CTW-24XXXXT30	NIPPON Chemi-con KY Series 220μF, 100V	NIPPON Chemi-con KY Series 100μF, 100V	12μH	MLCC 470pF, 2kV
CTW-48XXXXT30				

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MECHANICAL SPECIFICATIONS



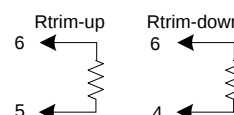
PIN CONNECTIONS			
PIN NUMBER	SINGLE	DUAL	Triple
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
3	CTRL	CTRL	CTRL
4	+Vout	+Vout	+Aux
5	-Vout	COM	-Aux
6	Trim	-Vout	COM
7	N.P.	N.P.	+Vout

*N.P. : No PIN

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method as below.

(single output models only)



Notes : All dimensions are typical in millimeters (inches).

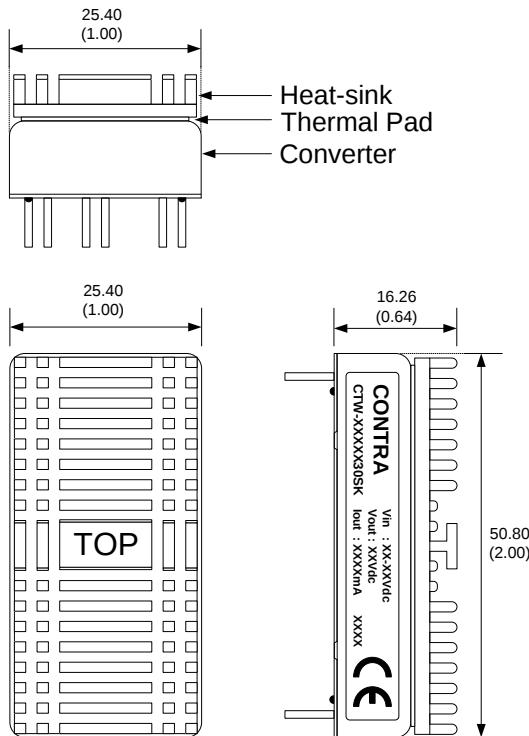
1. Pin diameter: 1.0 ± 0.05 (0.04 ± 0.002)
2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
3. Case tolerance: ± 0.5 (± 0.02)
4. Stand-off tolerance: ± 0.1 (± 0.004)

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MECHANICAL SPECIFICATIONS



With Heat-sink

Order code: CTW-XXXXX30SK (contain: heat-sink, thermal pad)

Material: Aluminum

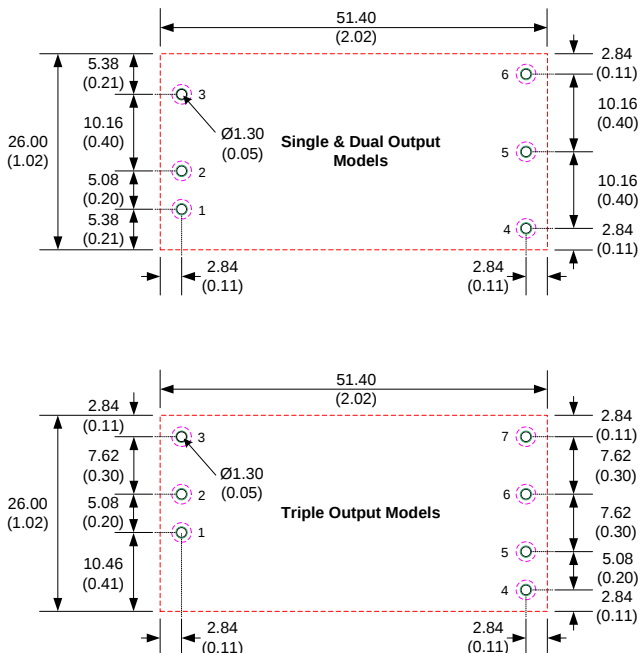
Finish: Anodic treatment (black)

Weight: 11.3 g (0.40 oz) (without converter)

Note:

1. Converters will be supplied with heat-sinks already mounted.
Please contact factory for quotation.

RECOMMENDED FOOTPRINT DETAILS



- Notes : 1. All dimensions are typical in millimeters (inches).
- Through hole (black) 1~7: $\varnothing 1.3$ (0.051)
 - Top view pad (green) 1~7: $\varnothing 1.5$ (0.059)
 - Bottom view pad (pink) 1~7: $\varnothing 2.6$ (0.102)