



# CRT100W12 SERIES 100 WATT 12:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency up to 92%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Ambient Temperature -40 to +90°C
- UL 62368-1 3rd (Reinforced Insulation) Approval
- Baseplate Cooled
- Low Inrush Current
- Input Reverse Polarity Protection
- Semi-Potting for High Moisture Environment
- Option Oring FET Model for Redundant Use
- Compliant to EN 55032/35, EN 50155, EN50121-3-2, EN 45545-2
- Output LED Indicator
- 5000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	(2)	
CRT100W12-72S12	14.4-160 VDC	12 VDC	0 mA	8.34 A	10 mA	1600 mA	91	91	8330 uF
CRT100W12-72S24	14.4-160 VDC	24 VDC	0 mA	4.17 A	10 mA	1600 mA	90.5	90.5	4200 uF
CRT100W12-72S48	14.4-160 VDC	48 VDC	0 mA	2.09 A	10 mA	1600 mA	92	92	2100 μF

**NOTE:**

1. Nominal input voltage 72VDC.
2. Measured at 110V<sub>in</sub>.
3. To meet EN50155 and RIA12 refer to application note.
4. The converter operates in positive logic, turning on when the remote pin is high and off when it is low or open. In negative logic, it turns on when the remote pin is low or open and off when it is high. Refer to the **feature characteristics** section for details.

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Mounting Type	Remote On/Off Logic	Oring	Protective Coating
CRT100W12-	II	O	XX	YY	L	Q	P
CRT100W12	72 : 72VDC	S : Single	12 : 12VDC 24 : 24VDC 48 : 48VDC	EC : Enclosed Chassis Mount	None : Positive N : Negative	None : No Oring Function Q : With Oring Function	None : No Protective Coating With Protective Coating P : Protective Coating

**Part Number Example:**

**CRT100W12-72S12ECN:** 100W, 12:1 14.4-160Vdc Input, Single 12Vdc Output, Enclosed Chassis Mount, Negative Logic



# CRT100W12 Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All	-160		160	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			200	V <sub>dc</sub>
Operating Ambient Temperature	See derating curve	All	-40		90	°C
Operating Case Temperature	At the center part of case plate	All	-40		95	°C
Storage Temperature		All	-55		105	°C

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	14.4	72	160	V <sub>dc</sub>
Input Under Voltage Lockout						
Turn-On Voltage Threshold	50% Load	All		13.5	14	V <sub>dc</sub>
Turn-Off Voltage Threshold	50% Load	All	11.8	12.3		V <sub>dc</sub>
Lockout Hysteresis Voltage	50% Load	All		1.2		V <sub>dc</sub>
Maximum Input Current	V <sub>in</sub> =14.4V <sub>dc</sub> , 75% Load, V <sub>in</sub> =36.6V <sub>dc</sub> , Full load	All			6.4	A
No-Load Input Current	V <sub>in</sub> =72V, I <sub>o</sub> =0A	See Model Number Table				mA
Inrush Current	V <sub>in</sub> =110V <sub>dc</sub> , Full load	All			10	A
Hold up Time	V <sub>in</sub> =24V <sub>dc</sub> , Full Load (S2 level) V <sub>in</sub> =37.8V <sub>dc</sub> , Full load (S3 level) V <sub>in</sub> =110V <sub>dc</sub> , Full load (S3 level)	All	10 20 40	15 25 45		ms
Fuse	Build-In	All		10		A

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V <sub>in</sub> =72V <sub>dc</sub> , Full Load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	All			±0.5	%
Line Regulation	V <sub>in</sub> =High line to low line, full load	All			±0.5	%
Temperature Coefficient	T <sub>c</sub> =-40°C to 90°C	All			±0.02	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF aluminum and 1uF ceramic capacitors	All			100	mV
Output Current Range	V <sub>in</sub> = 14.4 to 160V <sub>dc</sub>	See Model Number Table & Power Derating Curve				A
Over Current Protection	Hiccup, Auto recovery	All	105	120	180	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Adjustment Range	P <sub>o</sub> ≤ max. rated power, I <sub>o</sub> ≤ I <sub>o,max</sub> .	12Vo others	-15 -15		+25 +20	%
Over Voltage Protection	Limited voltage, % of nominal V <sub>o</sub>	48Vo others	120 130	125 135	130 140	%

### EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V <sub>in</sub> =72V <sub>dc</sub> , 110V <sub>dc</sub>	See Model Number Table				%



# CRT100W12 Series

## DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Current Transient						
Error Band	75% to 100% of $I_{o\_max}$ . step load change $d/d_t=0.1A/us$	All			±3	%
Recovery Time		All		250	500	us
Turn-On Delay and Rise Time						
Full load (Constant resistive load)						
Turn-On Delay Time, From On/Off Control	$V_{on/off}$ to 10% $V_{o\_set}$ , Remote on	All		25		ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10% $V_{o\_set}$ , Power up	All		25		ms
Output Voltage Rise Time	10% $V_{o\_set}$ to 90% $V_{o\_set}$	48Vo		30		ms
		others		22		

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100%factory Hi-Pot tested @2sec.)	1 Minute; input to output	All			3000 4242	$V_{ac}$ $V_{dc}$
	1 Minute; input to case	All			2000 2828	$V_{ac}$ $V_{dc}$
	1 Minute; output to case	All			1500 2121	$V_{ac}$ $V_{dc}$
Isolation Resistance	Input to output	All	100			MΩ
Isolation Capacitor	Input to output	All		4700		pF
	Input to case	48Vo others		8800 16600		pF
	Output to case	48Vo others		20000 9400		pF

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output ripple frequency	All	90	100	110	KHz
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}>0.3mA$	All	3.5		160	V
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=off	All	0		1.2	V
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}>0.3mA$	All	3.5		160	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=on	All	0		1.2	V
On/Off Current (for Both Remote On/Off Logic)	$I_{on/off}$ at $V_{on/off}=0V$	All	0.3		2.4	mA
Off Converter Input Current	Shutdown input idle current	All		3	10	mA
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All		100		°C
Over Temperature Recovery		All		90		°C

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100%$ of $I_{o\_max.}$ ; MIL-HDBK - 217F_Notice 1, GB, 25°C	12Vo		319		K hours
		24Vo		262		
		48Vo		267		
	$I_o=100%$ of $I_{o\_max.}$ ; Telcordia SR332, GB, 25°C	12Vo		2975		
		24Vo		2746		
		48Vo		3038		
Weight		All		325		grams
Case Material	Aluminum					
Potting Material	UL 94V-0					



# CRT100W12 Series

## GENERAL SPECIFICATIONS

Shock/Vibration	EN 50155 (EN 61373) Compliant
Humidity	95% RH max. Non Condensing
Altitude	5000m Operating altitude, 12000m Transport altitude
Thermal Shock	MIL-STD-810F
Fire & Smoke	EN 45545-2 Compliant

## EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI	EN 55032 & EN 50155 Compliant	Class A
ESD	EN 61000-4-2 Level 3: Air $\pm 8$ kV, Contact $\pm 6$ kV	Perf. Criteria A
Radiated Immunity	EN 61000-4-3 Level 3: 80~1000MHz, 20V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4 Level 3: On power input port, $\pm 2$ kV (EN 50155) Level 3: On power input port, $\pm 2$ kV (EN 55035)	Perf. Criteria A
Surge	EN 61000-4-5 Level 4: Line to earth, $\pm 4$ kV, line to line, $\pm 2$ kV (EN 50155) Level 3: Line to earth, $\pm 2$ kV, line to line, $\pm 1$ kV (EN 55035)	Perf. Criteria A
Conducted Immunity	EN 61000-4-6 Level 3: 0.15~80MHz, 10V	Perf. Criteria A
Power Frequency Immunity	EN 61000-4-8 Level 3: 50 Hz, 10A/m	Perf. Criteria A
Interruptions of Voltage Supply	EN 50155 Class S2: 10ms Interruptions	Perf. Criteria A
Supply Change Over	EN 50155 Class C1: At 0.6VI during 100ms	Perf. Criteria A
Application Note Link	<a href="#">CRT100W12 Series App Notes</a>	
Packaging Information Link	<a href="#">Packaging Information</a>	

## Immunity to Environmental Conditions.

Phenomenon	EN 50155; 2021 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT6 Temperature: -40°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6 & Cycle A Temperature: 85°C Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40°C Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25°C - 55°C Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25°C $\pm$ 10°C Humidity: 50% $\pm$ 25% RH Frequency range: 5 ~ 150 Hz Vertical: 0.988 $m/s^2$ Transverse: 0.441 $m/s^2$ Longitudinal: 0.683 $m/s^2$ Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: 25°C $\pm$ 10°C Humidity: 50% $\pm$ 25% RH Frequency range: 5 ~ 150 Hz Vertical: 5.59 $m/s^2$ Transverse: 2.49 $m/s^2$ Longitudinal: 3.87 $m/s^2$ Duration: 5 hrs / axis	Pass
Shock Test	13.4.11	EN 61373	Temperature: 25°C $\pm$ 10°C Humidity: 50% $\pm$ 25% RH Frequency range: 5 ~ 150 Hz $\pm$ Vertical: 30 $m/s^2$ $\pm$ Transverse: 30 $m/s^2$ $\pm$ Longitudinal: 50 $m/s^2$ Duration: 30ms x18 (Each axis 3 shocks)	Pass



# CRT100W12 Series

## EN 45545-2 Fire & Smoke Test Conditions

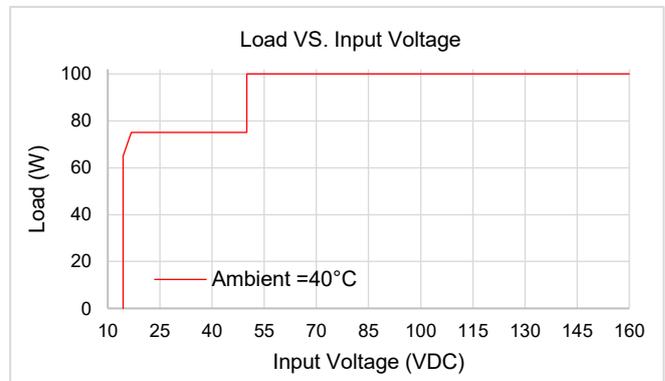
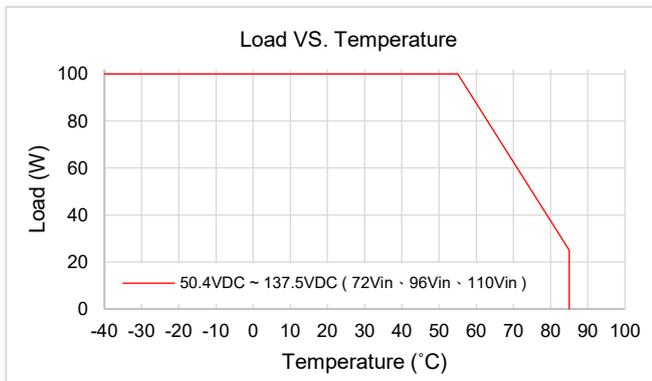
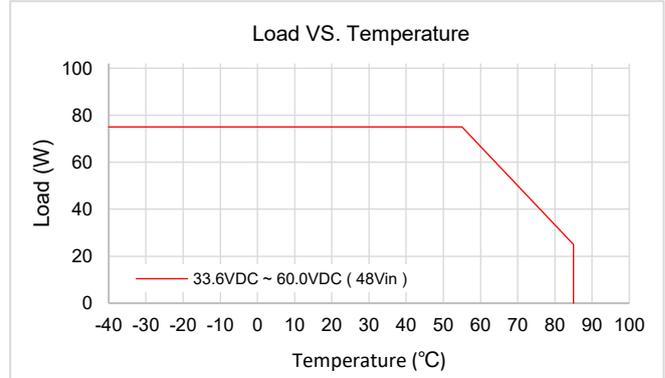
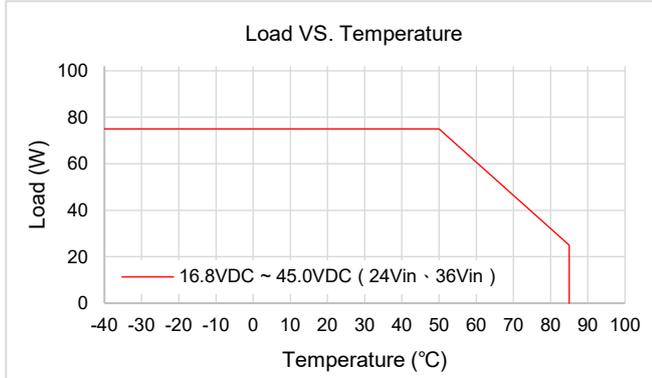
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013 EN 60695-2-11:2001	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013 EN 60695-11-10: 2013	HL1, HL2, HL3



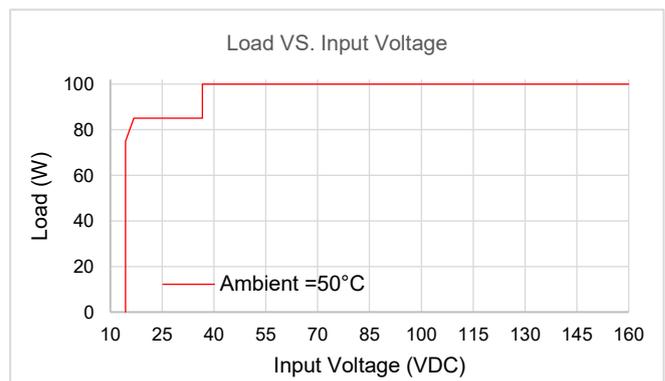
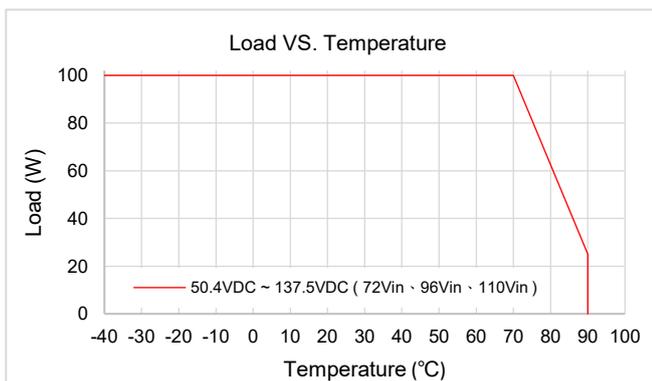
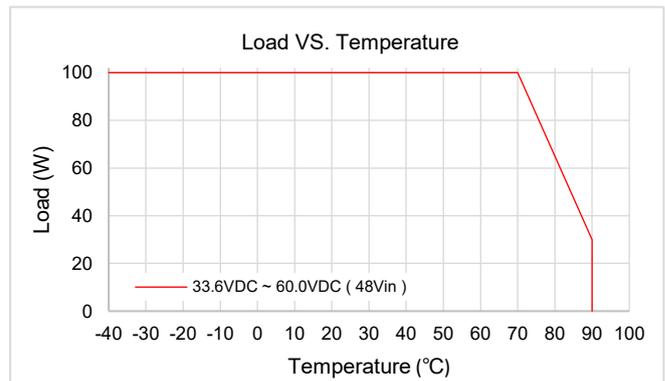
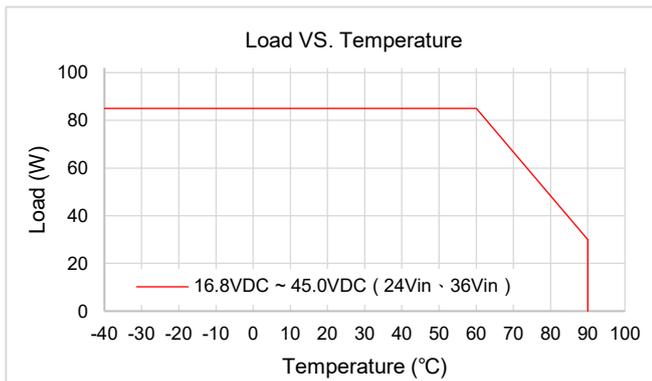
## CHARACTERISTIC CURVE

### Power Derating Curve

#### Nature Convection



#### Conduction Convection with External Baseplate (36x36x0.2cm)

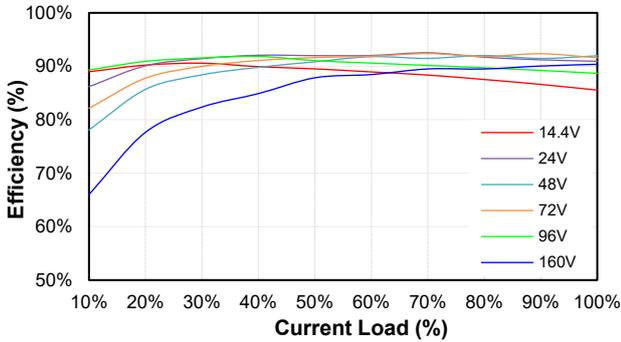




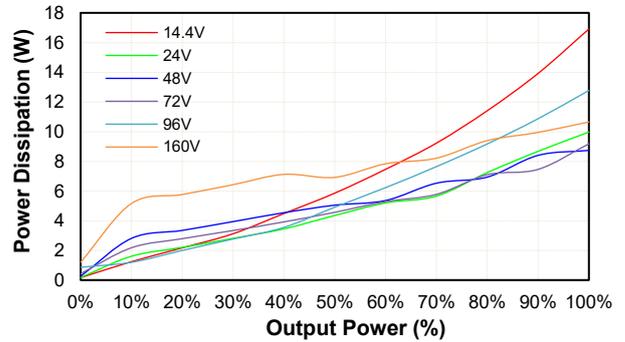
Performance Data

# CRT100W12 Series

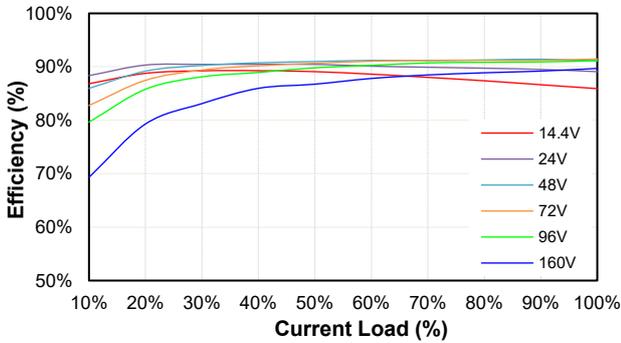
**CRT100W12-72S12**  
Eff Vs Io @25 Deg. C



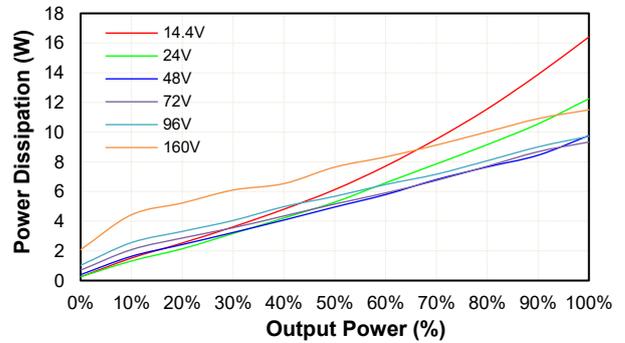
**CRT100W12-72S12**  
Pd Vs Po @25 Deg. C



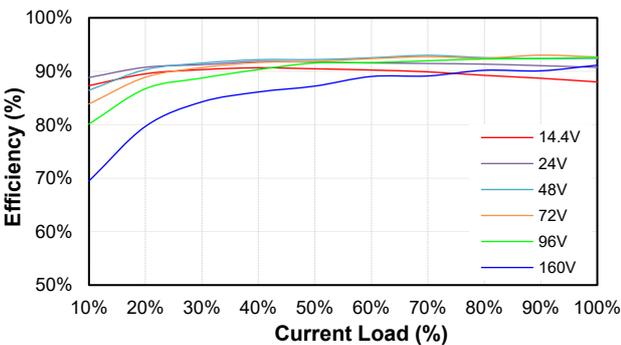
**CRT100W12-72S24**  
Eff Vs Io @25 Deg. C



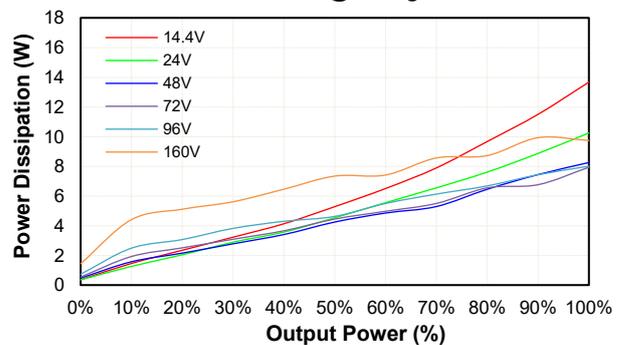
**CRT100W12-72S24**  
Pd Vs Po @25 Deg. C



**CRT100W12-72S48**  
Eff Vs Io @25 Deg. C



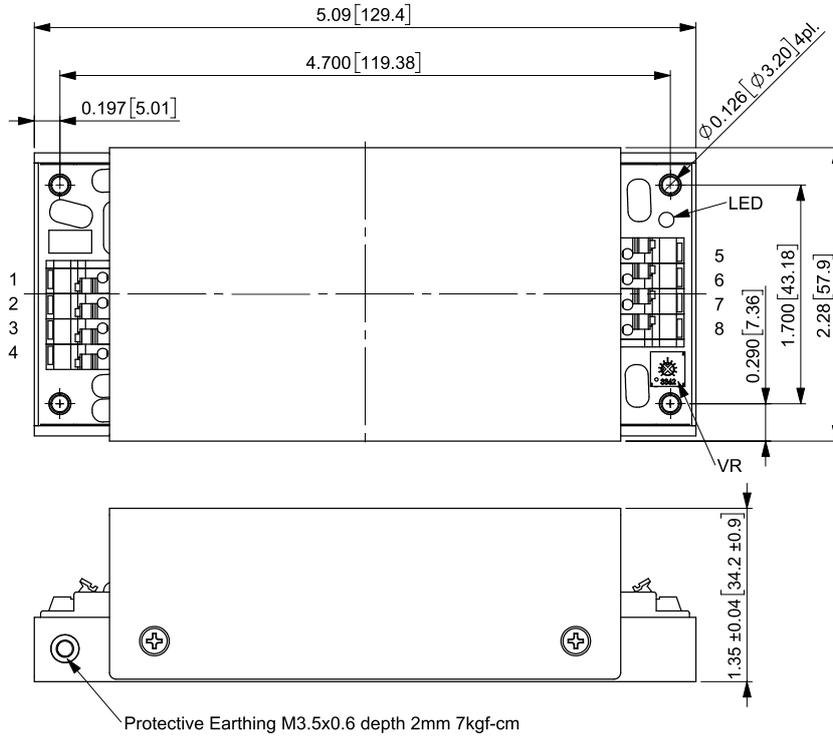
**CRT100W12-72S48**  
Pd Vs Po @25 Deg. C





# CRT100W12 Series

## MECHANICAL SPECIFICATION



All Dimensions in Inches[mm]  
 Tolerance Inches: x.xx=  $\pm 0.03$ , x.xxx=  $\pm 0.020$   
 Millimeters: x.x=  $\pm 0.7$ , x.xx=  $\pm 0.50$

Pin Connection

Pin	Function
1	+V Input
2	-V Input
3	Remote
4	Function Ground
5	+V Output
6	+V Output
7	-V Output
8	-V Output