

300W, 9 to 53V or 9 to 36V Input Non-Isolated Buck-Boost DC-DC Converter

<https://product.tdk.com/en/power/i7c>
www.emea.lambda.tdk.com/i7c



Industrial



Test



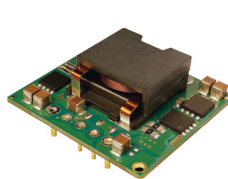
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Broadcast



Robotics



The i7C series of non-isolated step-up / step-down converters are ideal for generating additional DC output voltage rails up to 300 W from a single output 12V, 24V or 48V AC-DC power supply. The highly efficient i7C series accepts a very wide DC input and has a wide output adjustment range. Three mechanical configurations are available; low profile open frame, baseplate construction for conduction cooling, or integral heat sink for convection or forced air cooling. A full feature* Power Good signal, switching frequency synchronization and output current monitoring option is available.

Features	Benefits
• Up to 300W in a 1/16th Brick Pin-Out	• High Power Density, Less Board Area Needed
• High Efficiency - Up to 97%	• Longer Battery Life / Low Power Consumed
• Wide 5 to 28V, 8 to 24V or 9.6 to 48V Output Adjustment	• One Part Supports Multiple System Voltages
• Wide 9 to 36V or 9 to 53V Input Range	• Can Operate From Different DC Source Voltages
• Low Component Count With Minimal External Components	• Low Cost
• Low Airflow With Minimal Derating Requirements	• Easy To Cool In End System

Model Selector									
Model	Input Voltage (V)	Output Voltage (V)	Max Current (A)	Max Power (W)	Positive Logic On/Off	Negative Logic On/Off	Full Feature*	Integrated Heatsink	Integrated Baseplate
i7C4W008A120V-001-R	9 - 53	9.6 - 48	8	300	-	Yes	-	-	-
i7C4W008A120V-002-R	9 - 53	9.6 - 48	8	300	Yes	-	Yes	-	-
i7C4W008A120V-003-R	9 - 53	9.6 - 48	8	300	-	Yes	Yes	-	-
i7C4W008A120V-0C1-R	9 - 53	9.6 - 48	8	300	-	Yes	-	-	Yes
i7C4W008A120V-0C3-R	9 - 53	9.6 - 48	8	300	-	Yes	Yes	-	Yes
i7C4W008A120V-0F1-R	9 - 53	9.6 - 48	8	300	-	Yes	-	Yes	-
i7C4W012A050V-001-R	9 - 53	5 - 28	12.5	300	-	Yes	-	-	-
i7C4W012A050V-002-R	9 - 53	5 - 28	12.5	300	Yes	-	Yes	-	-
i7C4W012A050V-003-R	9 - 53	5 - 28	12.5	300	-	Yes	Yes	-	-
i7C4W012A050V-0C1-R	9 - 53	5 - 28	12.5	300	-	Yes	-	-	Yes
i7C4W012A050V-0C3-R	9 - 53	5 - 28	12.5	300	-	Yes	Yes	-	Yes
i7C4W012A050V-0F1-R	9 - 53	5 - 28	12.5	300	-	Yes	-	Yes	-
i7C2W020A120V-001-R	9 - 36	8 - 24	20	300	-	Yes	-	-	-
i7C2W020A120V-002-R	9 - 36	8 - 24	20	300	Yes	-	Yes	-	-
i7C2W020A120V-003-R	9 - 36	8 - 24	20	300	-	Yes	Yes	-	-

Preferred model

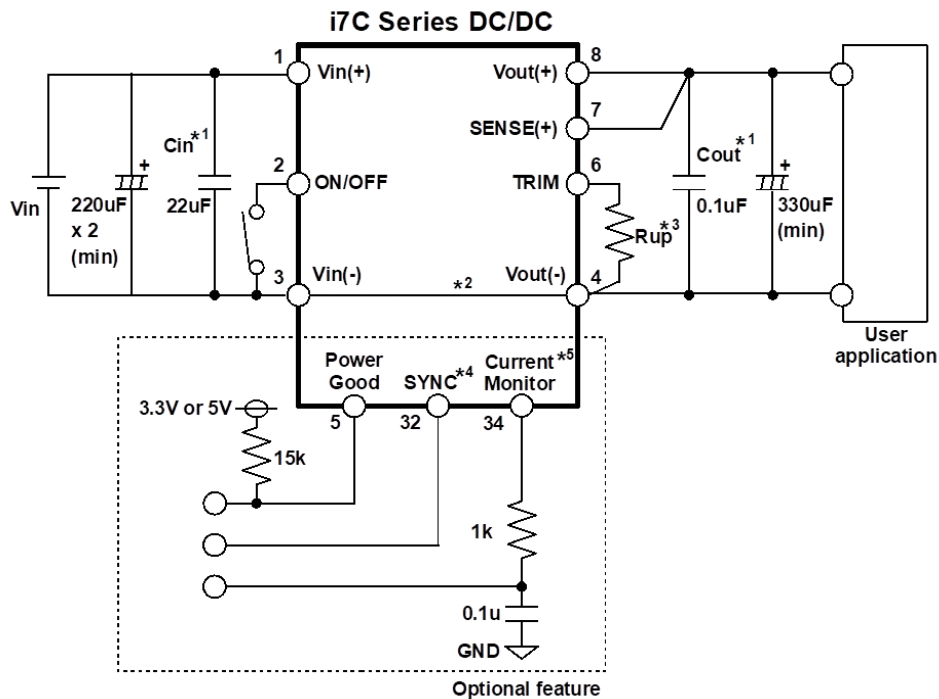
* Consult factory for a part number suffix of other feature combinations.

Related Products		
Type	Part Number	Description
DC-DC Buck Converter	i3A	100W, Input 9-53V, Output 5-30V 4.5A or 3.3-16.5V 8A
DC-DC Buck Converter	i6AN	75W, Input 9-40V, Negative Output -3.3 to -30V, 8A
DC-DC Buck Converter	i6A24	250W, Input 9-40V, Output 3.3-24V 14A
DC-DC Buck Converter	i6A4W	250W, Input 9-53V, Output 3.3-40V 10A or 3.3-15V 20A
DC-DC Buck Converter	i7A	500-750W, Input 18-60V or 18-32V, Output 3.3-24V 33A or 3.3-18V 45A
Evaluation Kit	i7C08A-C03-EVK-S1	Evaluation kit with i7C4W008A120V-003-R Full Featured Module
	i7C12A-C03-EVK-S1	Evaluation kit with i7C4W012A050V-003-R Full Featured Module
	i7C20A-C03-EVK-S1	Evaluation kit with i7C2W020A120V-003-R Full Featured Module

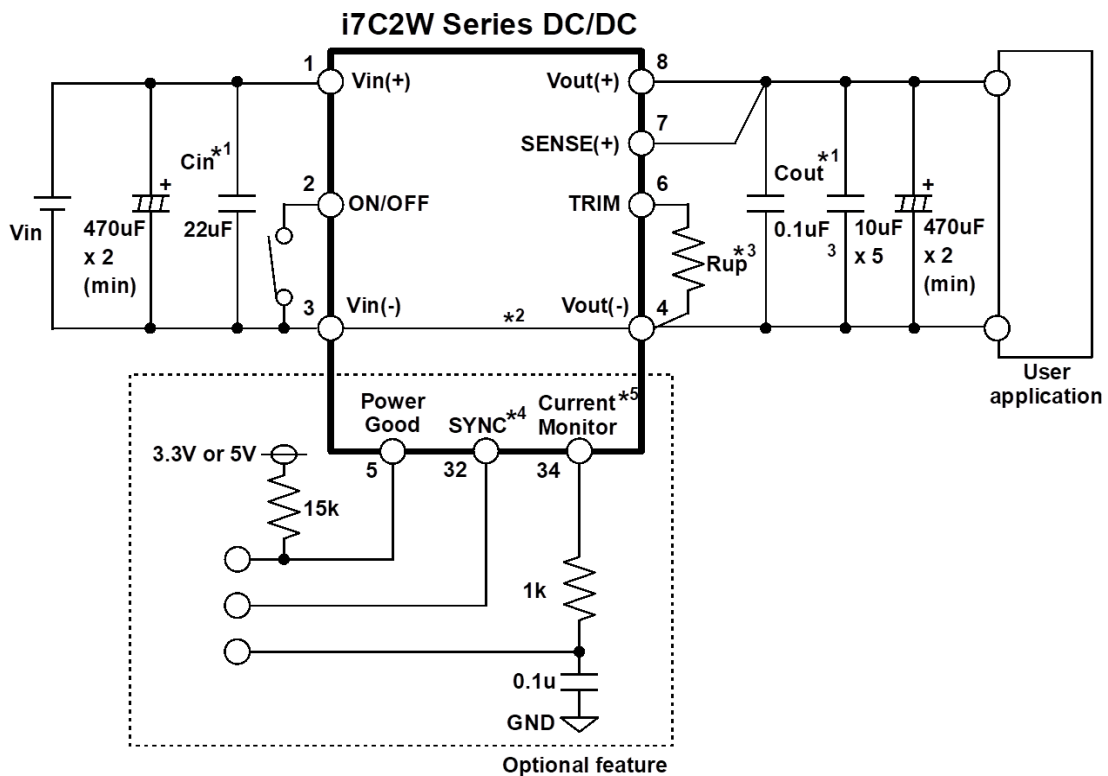
Specification					
Model		i7C4W012A050V		i7C4W008A120V	i7C2W020A120V
Input					
Input Voltage range	Vdc	9 - 53 (Turn on at 9.5V typ)		9 - 36 (Turn on at 9.5V typ)	
Input Current (max)	A	25		30	
Standby Input Current (typ)	mA	0.25 (Nominal input, ON/OFF = OFF)			
No Load Input Current, Vin = 24 V (typ)	mA	5.0 (Vo = 12 V)		5.0 (Vo = 24 V)	
Efficiency	%	91 - 96	93 - 97	94 - 97	
Safety Agency Certifications	-	IEC/UL/CSA/EN62368-1, 60950-1, CE Mark			
Output					
Output Voltage Tolerance	%	± 4			
Switching Frequency	kHz	250			
Line Regulation	%	0.8	0.8	0.8	
Load Regulation	%	0.8	0.5	0.8	
External Load Capacitance	uF	330 - 3000		1000 - 5000	
Ripple & Noise	mV	200	180	200	
Overcurrent Protection Threshold (typ)	A	17	15	26	
Overtemperature Protection	-	Yes			
Remote Sense	-	(+) Sense, compensating up to 5% of output voltage			
Remote On/Off	-	See Model Selector			
Power Good	-	Optional (Full Feature Version)			
Frequency Synchronization (Sync)	-	Optional (Full Feature Version)			
Current Monitor	-	Optional (Full Feature Version)			
Parallel Operation	-	Not possible			
Series Operation	-	Not possible			
Environmental					
Operating Temperature	°C	-40 to 125 (See i7C4W Specification ; i7C2W Specification for Derating)			
Storage Temperature	°C	-55 to 125			
Humidity (non condensing)	%RH	5 - 95 (Operating & Storage)			
Cooling	-	Convection, conduction (baseplate) or forced air		Convection or forced air	
Other					
Weight (Typ)	g	Open Frame: 25g, with Baseplate: 50g, with Heatsink: 70g		Open Frame: 28g	
Size (LxWxH)	mm	Open Frame: 34 x 36.8 x 12.2		34 x 36.8 x 14.7	
		With Baseplate: 34 x 36.8 x 13.0		-	
		With Heatsink: 34 x 36.8 x 24.9		-	
Size (LxWxH)	Inches	Open Frame: 1.34 x 1.45 x 0.5		1.34 x 1.45 x 0.58	
		With Baseplate: 1.34 x 1.45 x 0.51		-	
		With Heatsink: 1.34 x 1.45 x 0.98		-	
MTBF - Telcordia SR-332	-	> 10 Mhrs; 100% Load; Ta = 40 °C			
Warranty	yrs	3			

Notes
See website for detailed specifications and test methods.

Typical Application Circuit (i7C4W)



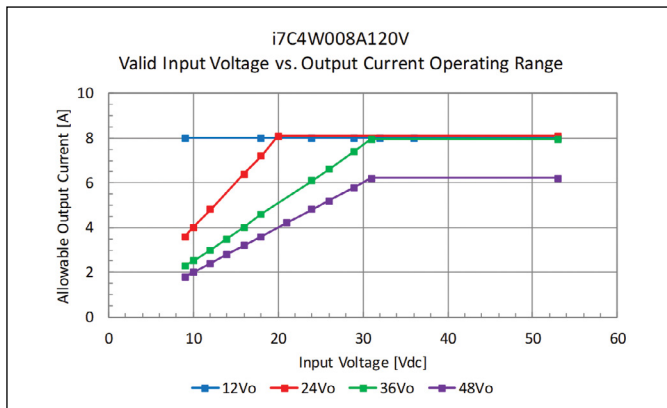
Typical Application Circuit (i7C2W)



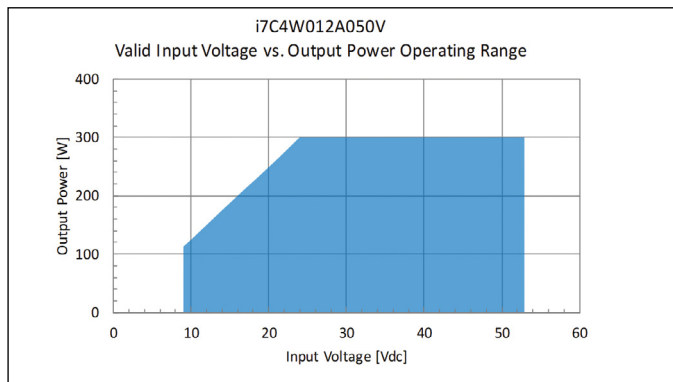
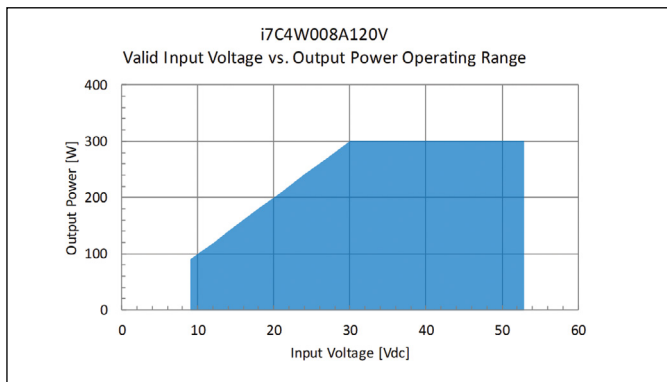
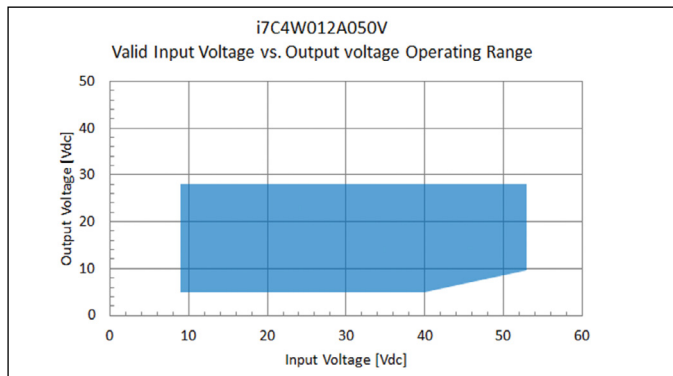
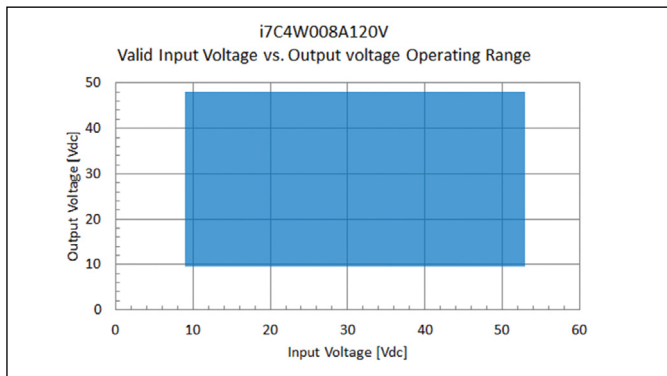
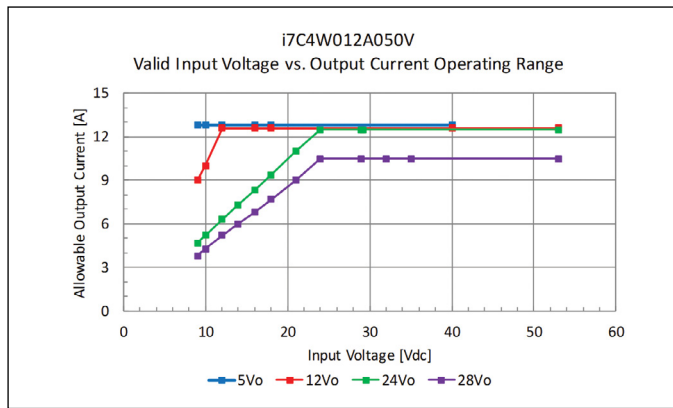
Recommendations:

1. Cin/Cout MLCC should be connected to the i7C module as close as possible in order to reject high frequency noise.
2. Connect Vin(-) and Vout(-) to copper ground plane underneath the i7C module.
3. TRIM resistor "Rup" should be connected to the i7C module as close as possible.
4. SYNC must be connected to GND when not in use.
5. External R-C filter is needed for Current Monitor, as shown, for Current Monitor.

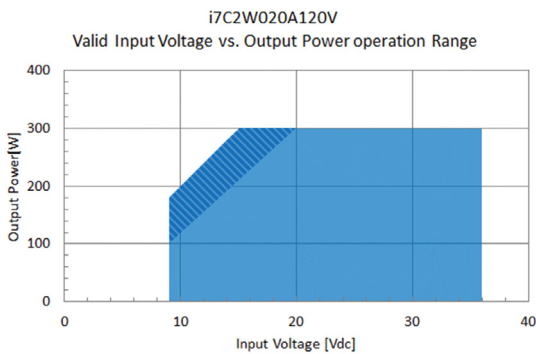
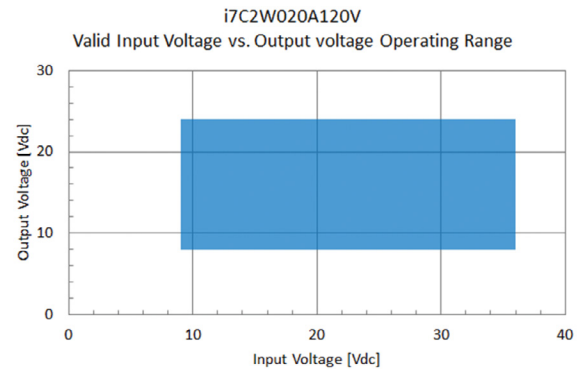
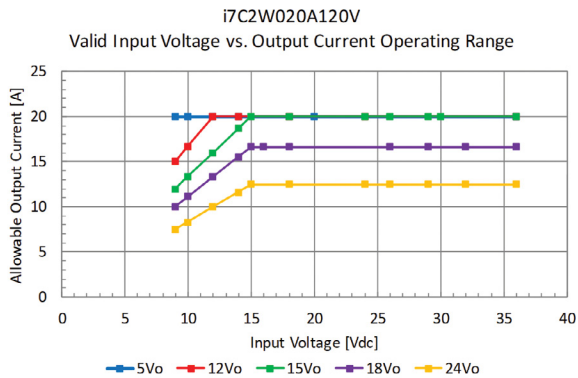
Operating Range i7C4W008A120V



Operating Range i7C4W012A050V



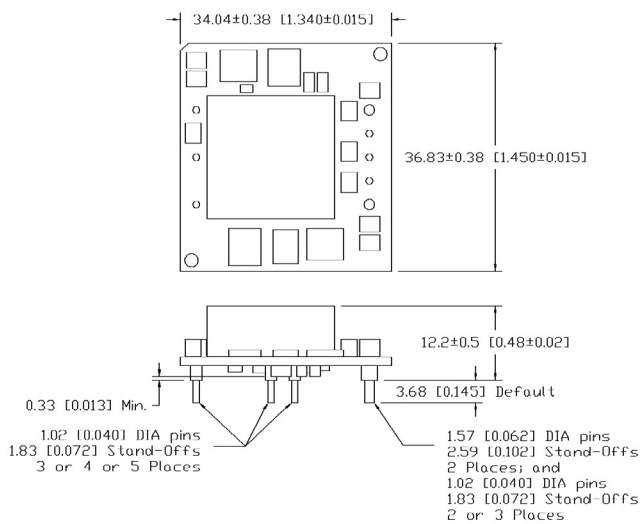
Operating Range i7C2W020A120V



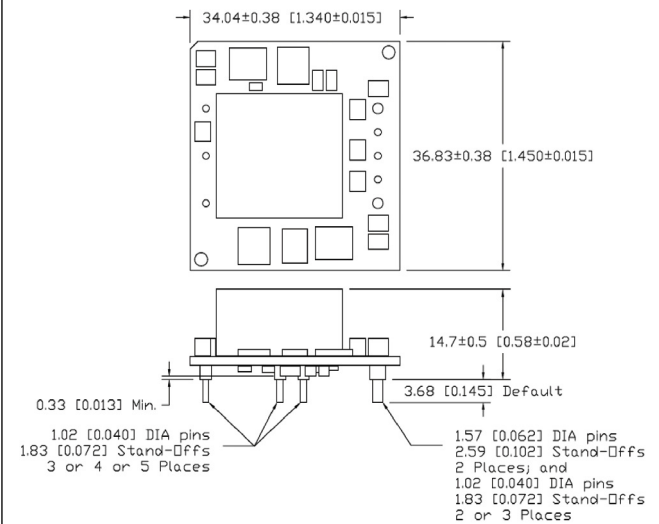
Wider output regulation tolerance (dark blue shaded region) expected during step-up/boost Operation when $V_{in} < 20V$, $P_{out} > 100W$.
See i7C2W Specifications for related load regulation charts.

Mechanical Specification

Openframe - 00x-R Series (i7C4W)

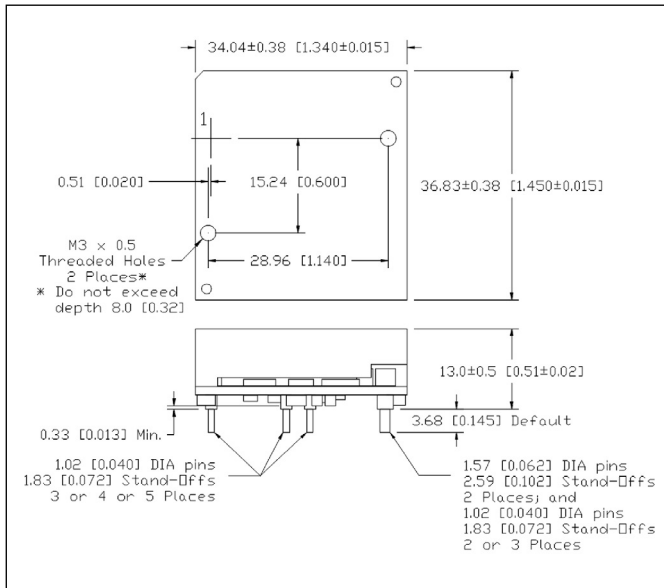


Openframe - 00x-R Series (i7C2W)

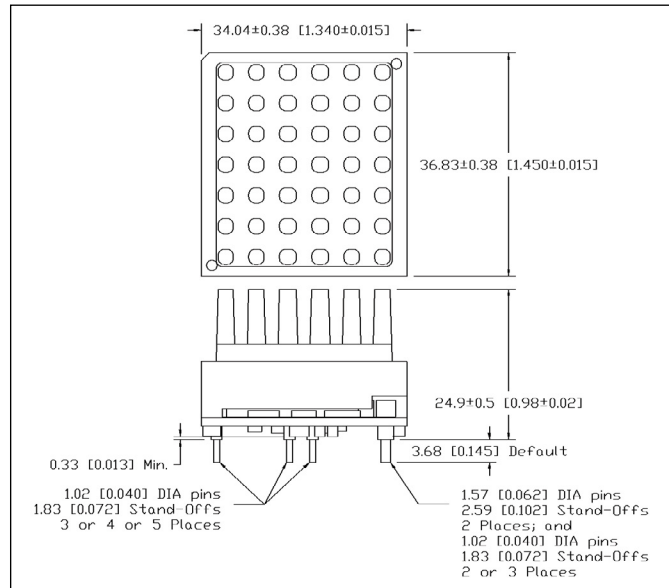


Mechanical Specification

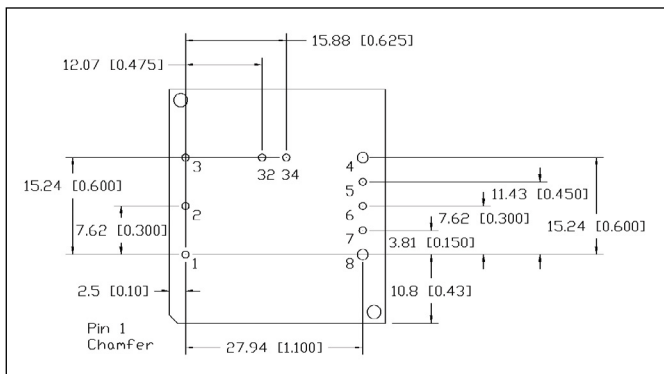
Baseplate - xCx-R Series (i7C4W)



Heatsink - xFx-R Series (i7C4W)



Mechanical Pin-Out / Spacing

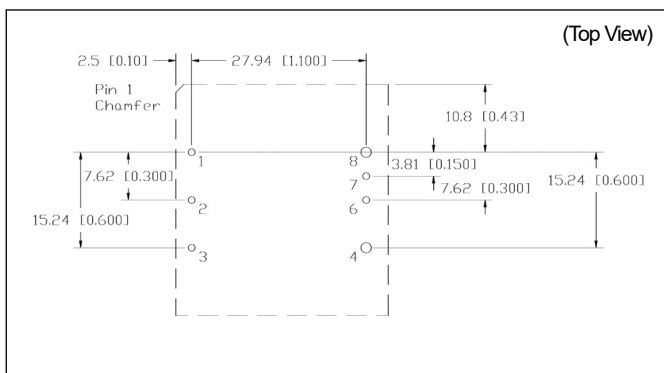


Pinout

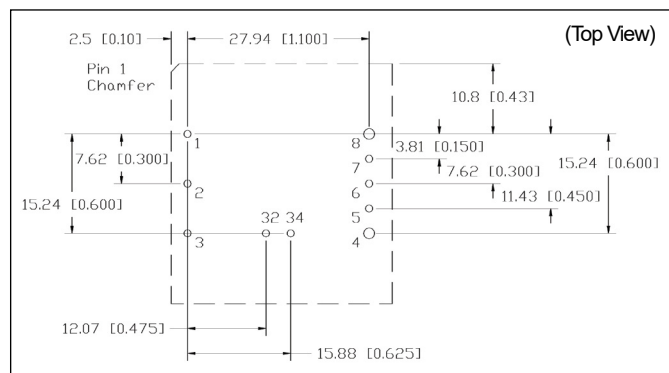
PIN	Function	PIN	Function
1	VIN (+)	6	TRIM
2	ON / OFF	7	SENSE (+)
3	VIN (-) / GND	8	VOOUT (+)
4	VOOUT (-) / GND	32	Sync (Option)
5	PWR GOOD (Option)	34	Current Monitor (Option)

Pin base material is brass or copper with gold over nickel plating.

Recommended Hole Pattern – STANDARD – xx1-R



Recommended Hole Pattern – FULL FEATURE – xx2-R / -xx3-R





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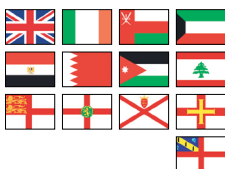
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