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TDK·Lambda

i1C Series

https://product.tdk.com/en/power/i1c
www.emea.lambda.tdk.com/i1c

200W, 9 to 36V or 18 to 75 V Input Non-Isolated 1 x 1” DC-DC Buck-Boost Converters



Industrial | COTS | Test | COMM | Broadcast | Robotics

The i1C series are non-isolated buck-boost DC-DC converters that delivers up to 200W in a compact and familiar industry standard 1 x 1 inch footprint. Operating from either a 9-36V or 18-75V input, it comes with a wide adjustable output of 9.6 to 28V that can support multiple system load voltages, minimizing part number variations. Encased in a 5-sided metal case that supports -40 to 120°C case temperature operation along with its remarkable 98% efficiency, the i1C series provides a higher power migration path in applications where space is at a premium.

Features	Benefits
• Up to 200W in a 1 x 1 inch Industry Footprint	• High Power Density, Less Board Area Needed
• Encapsulated in a 5-sided metal case	• Improves EMI
• 120°C maximum case temperature	• Rugged deployment in harsh environment with high shock & vibration exposure
• Efficiency - Up to 98%	• Longer Battery Life / Low Power Consumed
• Wide Output Adjustment from 9.6 up to 28V	• One Part Supports Multiple System Voltages
• Wide Input Range	• Can Operate from Different DC Input Source Voltages

Model Selector

Model	Input Voltage (V)	Nominal Output Voltage (V)	Output Voltage Adjustment Range (V)	Max Current (A)	Max Power (W)	Remote On/Off Logic	Pin Length
i1C2W010A120V-000-R	9 - 36	12	9.6 - 28	10	200	Positive	0.145”
i1C2W010A120V-001-R	9 - 36	12	9.6 - 28	10	200	Negative	0.145”
i1C2W010A120V-004-R	9 - 36	12	9.6 - 28	10	200	Positive	0.220”
i1C2W010A120V-005-R	9 - 36	12	9.6 - 28	10	200	Negative	0.220”
i1C4W010A120V-000-R	18 - 75	12	9.6 - 28	10	200	Positive	0.145”
i1C4W010A120V-001-R	18 - 75	12	9.6 - 28	10	200	Negative	0.145”
i1C4W010A120V-004-R	18 - 75	12	9.6 - 28	10	200	Positive	0.220”
i1C4W010A120V-005-R	18 - 75	12	9.6 - 28	10	200	Negative	0.220”

Related Products

Type	Part Number	Description
Isolated DC-DC Converter	CCG	15-30W 1 x 1 inch Footprint, Input 9-36V or 18-76V, 3.3 to 30V single or dual outputs
Ruggedized DC-DC Buck Converter	RGA	250W, Input 9-40V and Output 3.3-24V or, 9-53V Input and 3.3V up to 40V Output
Ruggedized DC-DC Buck Converter	RGB	400-750W, Input 9-18V, 18-32V, 18-60V; Output 0.8-8V 60A, 3.3-18V 45A, 3.3-24V 33A
Ruggedized DC-DC Buck-Boost Converter	RGC	300W, Input 9-53V, Output 9.6-48V 8A or 5-28V 12.5A
DC-DC Buck-Boost Converter	i7C	300W, Input 9-53V or 9-36V, Output 9.6-48V 8A, 5-28V 12.5A or 8-24V 20A
DC-DC Buck Converter	i7A	400-750W, Input 9-18V, 18-32V, 18-60V, 28-60V; Output 0.8-8V 60A, 3.3-18V 45A, 3.3-24V 33A, 3.3-32V 20A
DC-DC Buck Converter	i6A4W	250W, Input 9 -53V, Output 3.3-40V 10A or 3.3-15V 20A
Isolated DC-DC Converter	GQA	120W Industrial, Input 9-36V, Isolated Quarter Brick
Evaluation Board	i1C2W10A-C01-EVK-S1	Evaluation board with i1C2W010A120V-001-R
Evaluation Board	i1C4W10A-C01-EVK-S1	Evaluation board with i1C4W010A120V-001-R

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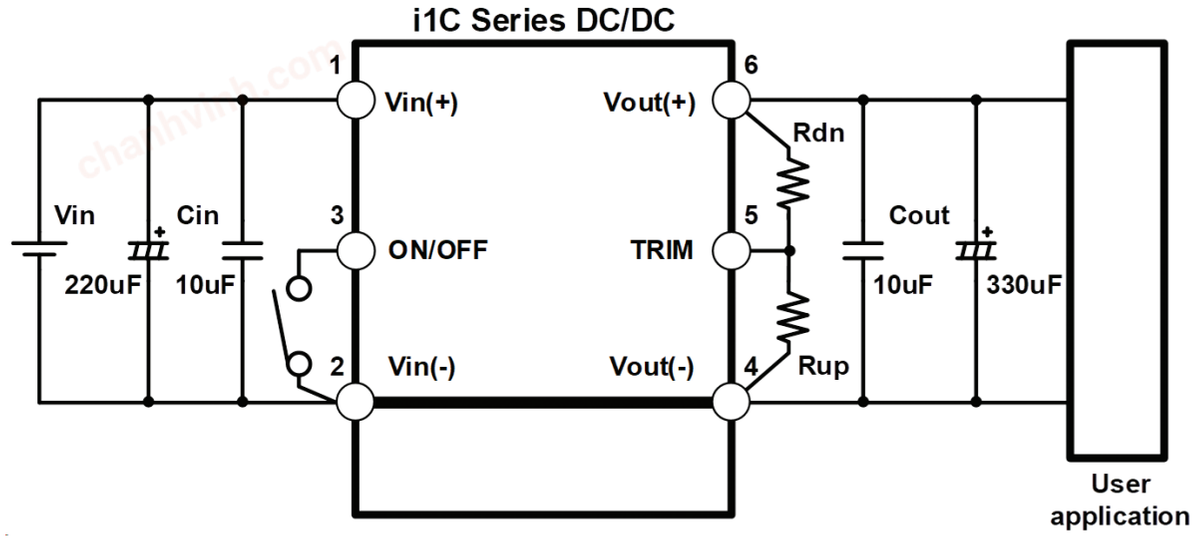
Specification

Model		i1C2W010A120V	i1C4W010A120V
Input			
Operating Voltage Range	Vdc	9 - 36	18 - 75
Continuous Input Voltage	Vdc	-0.25 to 40	-0.25 to 80
Input Current (max)	A	20 (Vin,min to Vin,max, Po,max)	15 (Vin,min to Vin,max, Po,max)
Standby Input Current	mA	2 (Vin,nom, Remote ON/OFF = OFF)	
No Load Input Current	mA	40 typical (Vin = 24V; Vo = 12V; Io = No Load)	27 typical
Turn-ON Input Voltage	Vdc	8.2	15.5
Turn-OFF Input Voltage	Vdc	7.7	14.7
Efficiency	%	95 - 98	92 - 97
Safety Certifications and Markings	-	CE Mark and UKCA Mark	
Output			
Output Voltage Initial Setpoint	-	12V ±2%	12V ±2%
Output Voltage Tolerance	%	±4 (Over all Line, Load, and Temperature conditions to end of life)	
Output Voltage Adjustment Range (2)	Vdc	9.6 - 28 (Refer to Product Specifications for Output Trim Equation)	
Line Regulation	%	0.2	
Load Regulation	%	0.5	
Ripple & Noise Step Down/Buck (typ) (3)	mVpp	150 (24Vin, 12Vo, 10A)	50 (24Vin, 12Vo, 10A
Step Up / Boost	mVpp	240 (12Vin, 24Vo, 4.6A)	160 (18Vin, 24Vo, 4.6A)
Output Current (2)	A	0 - 10	
Over Current Protection Threshold (typ)	A	14	14
Short Circuit Current (Vo = 0.25V)	A	12	14
External Load Capacitance	uF	100 - 3000 (4)	100 - 3000 (4)
Switching Frequency	kHz	250	
Overtemperature Protection	°C	Yes	
Remote On/Off	-	Positive (-000-R, -004-R suffix) or Negative (-001-R, -005-R suffix) Logic	
Remote Sense	-	NA	
Environmental			
Operating Temperature (Tcase)	°C	-40 to 120	
Storage Temperature	°C	-55 to 125	
Humidity (non condensing)	%RH	10 - 95	
Cooling	-	Conduction Cooling (Convection or Forced Air Cooling possible)	
Shock	-	MIL-STD-810G, Method 516.6 Procedure I	
Vibration	-	MIL-STD-810G, Method 514.6 Procedure I, Category 4	
Thermal Cycling Test (TCT)	-	700 cycles / -40 to 125°C, 60°C/minute ramp, 30minute dwell time	
Other			
Weight (typ / max)	g	20 / 30	
Size (LxWxH)	mm	26.42 x 26.42 x 10.2	
Size (LxWxH)	Inches	1.04 x 1.04 x 0.40	
Through Hole Pin Legnth Options		Refer to Model Selector Table	
MTBF - Telcordia SR-332 (100% Load, 40°C)	MHrs	> 23	
Warranty	yrs	3	

Notes
(1) Typical specification unless otherwise indicated. See website for detailed product specifications.
(2) Observe maximum power limit. Allowable output current varies with input voltage.
(3) Measured with one 330 µF electrolytic and 22 µF ceramic capacitors, BW = 20MHz.
(4) Contact technical support for very low ESR capacitor banks or if higher capacitance is required.

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Typical Application Circuit



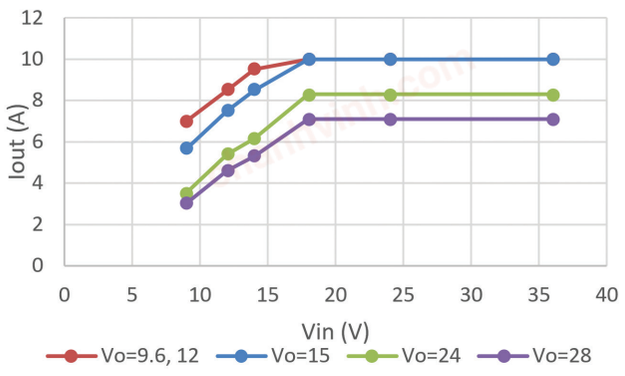
Recommendation

1. Cin and Cout MLCC should be connected to the i1C module as close as possible to reject high frequency noise.
2. Connect Vin(-) and Vout(-) to copper ground plane underneath the i1C module.
3. TRIM resistors Rup or Rdn should be connected to the i1C module as close as possible.

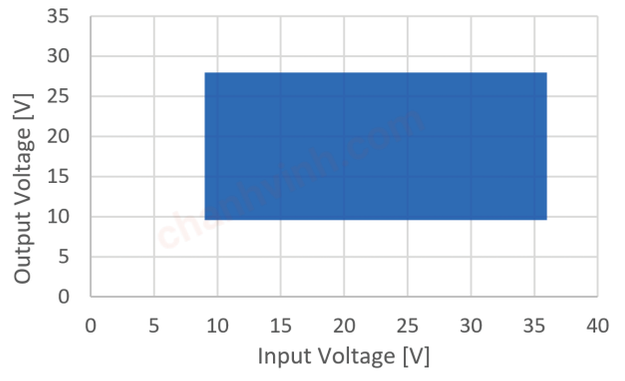
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Input vs. Output Operating Range

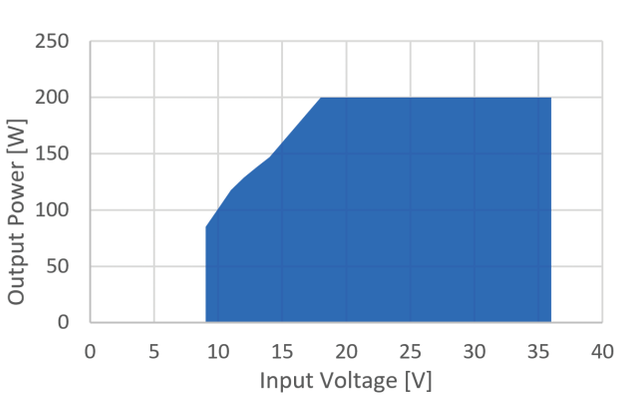
i1C2W010A120V-xxx-R



Input Voltage vs. Output Current operating range.

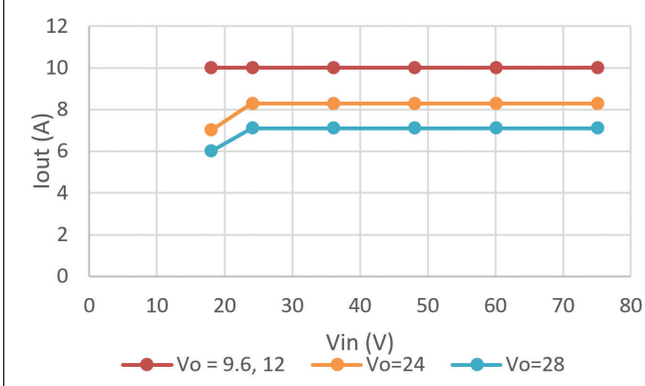


Input Voltage vs. Output Voltage operating range.

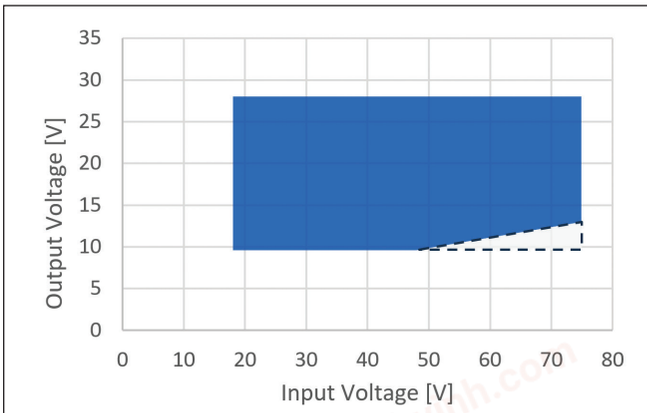


Input Voltage vs. Output Power operating range.

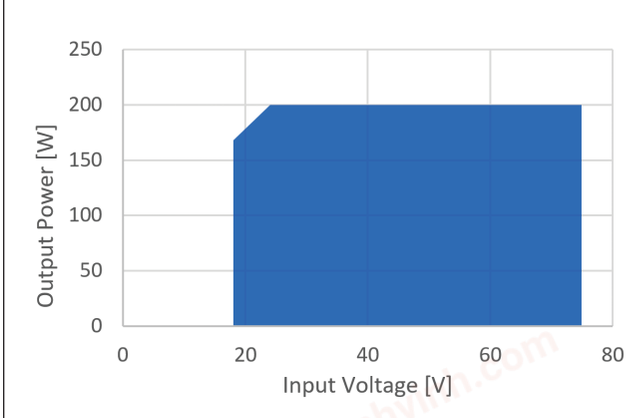
i1C4W010A120V-xxx-R



Input Voltage vs. Output Current operating range.



Input Voltage vs. Output Voltage operating range.
Operating the unit in the unspecified region indicated by the dashed lines will not damage the unit, though at light loads can lead to increased output ripple and/or poor regulation.

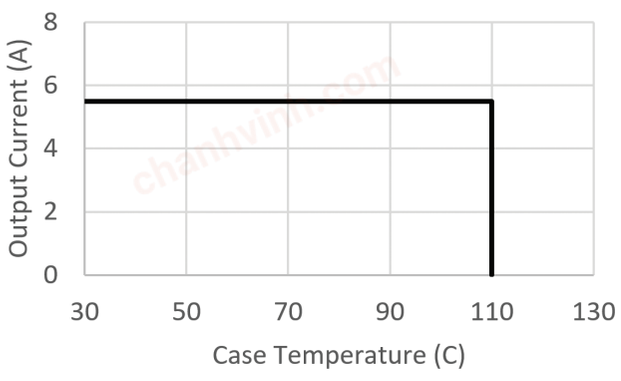


Input Voltage vs. Output Power operating range.

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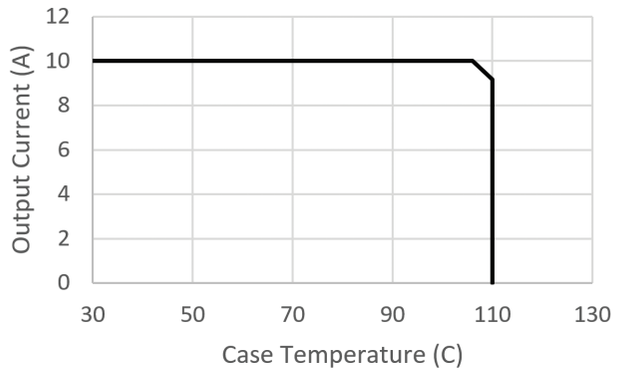
Typical Thermal Derating

i1C2W010A120V-xxx-R

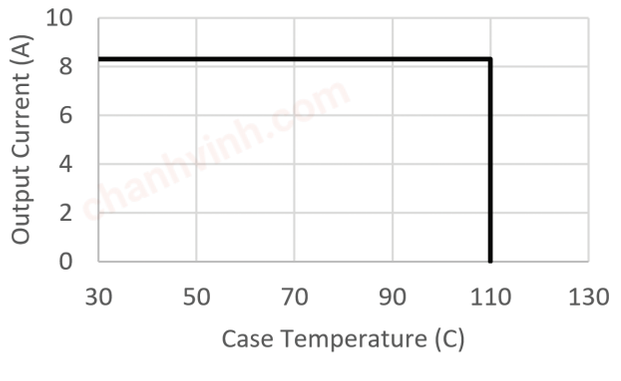


Vin=12V, Vo=24V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.

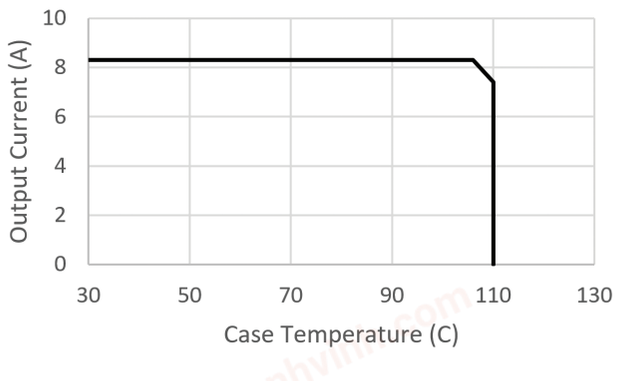
i1C4W010A120V-xxx-R



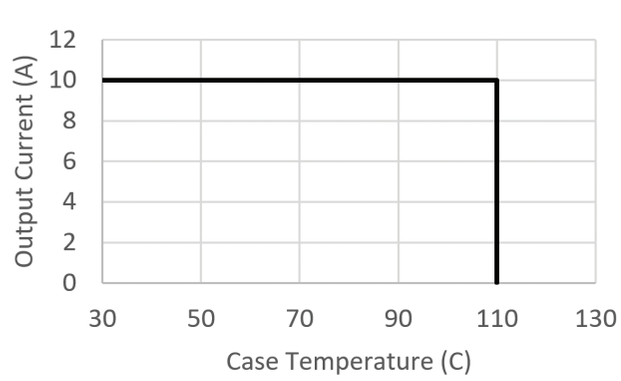
Vin=24V, Vo=12V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.



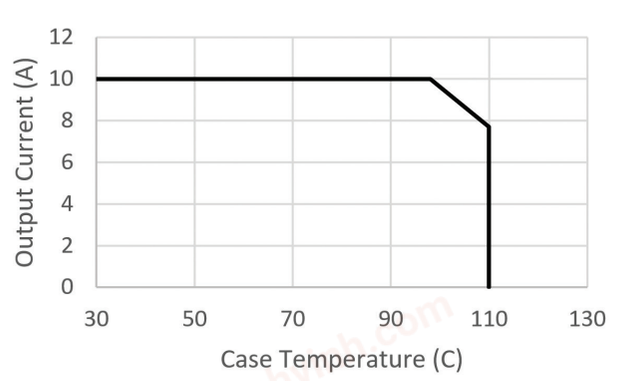
Vin=24V, Vo=24V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.



Vin=24V, Vo=24V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.



Vin=24V, Vo=12V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.



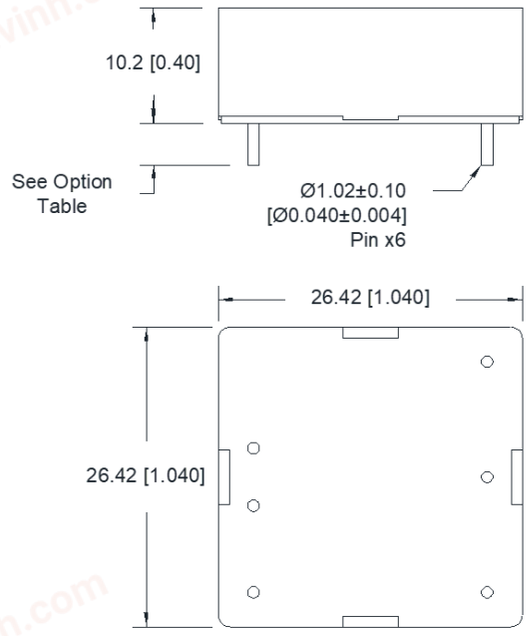
Vin=48V, Vo=12V maximum output current vs. baseplate temperature in enclosed environment with Ta = 85 °C.

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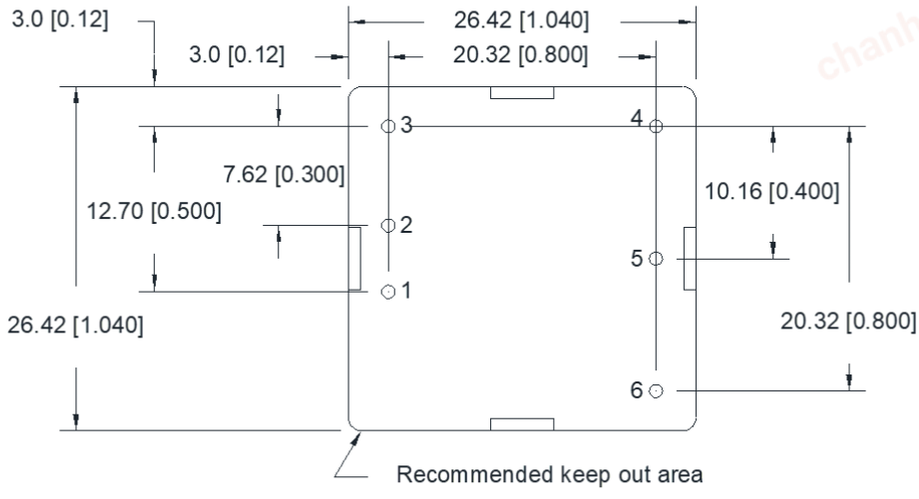
Mechanical Specification

Outline Drawing

Dimensions are in mm [in]. Unless otherwise specified.
Tolerances are: x.x ± 0.5 [0.02] / x.xx ± 0.25 [0.010]



Recommended PCB Hole Pattern (Top View)



Pinout

PIN	Function	PIN	Function	PIN	Function
1	Vin (+)	3	ON/OFF	5	TRIM
2	Vin (-) / GND	4	Vout (-) /GND	6	Vout (+)

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For Additional Information, please visit
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