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TDK·Lambda

i7A Series

400-750W, 9 to 18V, 18 to 32V, 18 to 60V or 28 to 60V Input Non-Isolated Step Down DC-DC Converter

https://product.tdk.com/en/power/i7a
www.emea.lambda.tdk.com/i7a



Industrial | Test | COMM | Broadcast | Robotics

The i7A series of up to 750W non-isolated DC-DC step-down converters are ideal for creating additional high current/high power 20A, 33A, 45A and 60A output voltage rails from a single output 12V, 24V, 36V or 48V AC-DC or DC-DC power supply. The highly efficient i7A series has low ripple, excellent dynamic response under sudden load changes, accepts a wide DC input with a wide output adjustment range and optional current limit (OCP) adjust. Three mechanical configurations are available; low profile open frame, baseplate construction for conduction cooling, or models with an integral heat sink for convection or forced air cooling. The i7A series expands upon TDK-Lambda's existing 100 to 250W rated i3A / i6A series and reduces the need to parallel modules.

Features	Benefits
• Up to 750W in a 1/16th Brick Footprint	• High Power Density, Less Board Area Needed
• High Efficiency - Up to 98.5%	• Longer Battery Life / Less Power Consumed
• Wide 0.8 to 8V or 3.3 up to 32V Output Adjustment	• One Part Supports Multiple System Voltages
• 9 to 18V, 18 to 32V, 18 to 60V or 28 to 60V Input	• Can Operate From Different DC Source Voltages Including Batteries
• Low Component Count With Minimal External Components	• Low Cost
• Minimal Derating Requirements in Low Airflow Environments	• Easy To Cool In End System

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max O/P Current (A)	Max O/P Power (W)	Remote On/Off Logic	Adjustable (OCP) Current Limit	Integrated Heatsink	Integrated Baseplate
i7A4W033A033V-000-R	18 - 60	3.3 - 24	33	500	Positive	-	-	-
i7A4W033A033V-001-R	18 - 60	3.3 - 24	33	500	Negative	-	-	-
i7A4W033A033V-003-R	18 - 60	3.3 - 24	33	500	Negative	Yes	-	-
i7A4W033A033V-0C1-R	18 - 60	3.3 - 24	33	500	Negative	-	-	Yes
i7A4W033A033V-0C3-R	18 - 60	3.3 - 24	33	500	Negative	Yes	-	Yes
i7A4W033A033V-0F1-R	18 - 60	3.3 - 24	33	500	Negative	-	Yes	-
i7A4W033A033V-0F3-R	18 - 60	3.3 - 24	33	500	Negative	Yes	Yes	-
i7A24045A033V-000-R	18 - 32	3.3 - 18	45	750	Positive	-	-	-
i7A24045A033V-001-R	18 - 32	3.3 - 18	45	750	Negative	-	-	-
i7A24045A033V-003-R	18 - 32	3.3 - 18	45	750	Negative	Yes	-	-
i7A24045A033V-0C1-R	18 - 32	3.3 - 18	45	750	Negative	-	-	Yes
i7A24045A033V-0C3-R	18 - 32	3.3 - 18	45	750	Negative	Yes	-	Yes
i7A24045A033V-0F1-R	18 - 32	3.3 - 18	45	750	Negative	-	Yes	-
i7A24045A033V-0F3-R	18 - 32	3.3 - 18	45	750	Negative	Yes	Yes	-
i7A12060A008V-000-R	9 - 18	0.8 - 8	60	400	Positive	-	-	-
i7A12060A008V-001-R	9 - 18	0.8 - 8	60	400	Negative	-	-	-
i7A12060A008V-003-R	9 - 18	0.8 - 8	60	400	Negative	Yes	-	-
i7A12060A008V-0C1-R	9 - 18	0.8 - 8	60	400	Negative	-	-	Yes
i7A12060A008V-0C3-R	9 - 18	0.8 - 8	60	400	Negative	Yes	-	Yes
i7A12060A008V-0F1-R	9 - 18	0.8 - 8	60	400	Negative	-	Yes	-
i7A12060A008V-0F3-R	9 - 18	0.8 - 8	60	400	Negative	Yes	Yes	-
i7A48020A033V-000-R	28 - 60	3.3 - 32	20	500	Positive	-	-	-
i7A48020A033V-001-R	28 - 60	3.3 - 32	20	500	Negative	-	-	-
i7A48020A033V-003-R	28 - 60	3.3 - 32	20	500	Negative	Yes	-	-
i7A48020A033V-0C1-R	28 - 60	3.3 - 32	20	500	Negative	-	-	Yes
i7A48020A033V-0C3-R	28 - 60	3.3 - 32	20	500	Negative	Yes	-	Yes
i7A48020A033V-0F1-R	28 - 60	3.3 - 32	20	500	Negative	-	Yes	-
i7A48020A033V-0F3-R	28 - 60	3.3 - 32	20	500	Negative	Yes	Yes	-

Preferred Model

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Specification

Model		i7A4W033A033V	i7A24045A033V	i7A12060A008V	i7A48020A033V
Input					
Input Voltage Range	Vdc	18 - 60 (Turn on at 16.5 typ)	18 - 32 (Turn on at 16.5 typ)	9 - 18 (Turn on at 8.1 typ)	28 - 60 (Turn on at 8.1V typ)
Input Transient (t < 100 ms)	Vdc	65 max	36 max	22 max	22 max
Input Current (max)	A	50		65	35
Efficiency	%	91 - 98	93 - 98.5	86 - 97	92-96
Safety Certifications and Markings	-	IEC/EN/UL/CSA/EN62368-1, CE Mark and UKCA Mark			
Output					
Output Voltage Tolerance	%	±3.5			
Switching Frequency	kHz	330			
Line Regulation	%	0.2			
Load Regulation	%	0.4			0.3
External Load Capacitance	uF	220 - 10000	330 - 10000		
Output Current	A	0 - 33	0 - 45	0 - 60	0 - 20
Ripple & Noise	mVpp	25		40	25
Overcurrent Protection Threshold (typ)	A	45	63	70	30
Overtemperature Protection	-	Yes			
Remote Sense	-	(+) Sense, compensating up to 5% of output voltage			
Remote On/Off	-	See Model Selector table			
Output Voltage Adjust	-	See detailed specifications for trim equation.			
Output Current Limit Adjust	-	See Model Selector and detailed specifications.			
Dynamic Response	-	420 mV / 70 µs typ. Vo=12V, 1 A/µs, 25% to 75% max Io	425 mV / 80 µs typ. Vo=12V, 1 A/µs, 25% to 50% max Io	400 mV / 100 µs typ. Vo=3.3V, 1 A/µs, 25% to 50% max Io	500 mV / 180 µs typ. Vo=12V, 1 A/µs, 25% to 75% max Io
Environmental					
Operating Temperature (Tref)	°C	-40 to 125 (See i7A Specifications for Derating)			
Storage Temperature	°C	-55° to +125			
Humidity (non condensing)	%RH	5 - 95 (Operating & Storage)			
Cooling	-	Convection, conduction (baseplate) or forced air			
Altitude (2)	m	2000			
Random Vibration (Operating)		IEC 60068-2-64 / IPC9592B: 2.40 Grms, 10-500 Hz, 30 min per x, y, z axis			
Shock (Operating)		IEC 60068-2-27 / IPC9592B: 30G, 11ms per x, y, z axis			
Other					
Weight (Typ)	g	Open Frame: 25g With Baseplate: 50g With Heatsink: 70g			
Size (LxWxH)	mm	Open Frame: 34 x 36.8 x 11.5 With Baseplate: 34 x 36.8 x 12.7 With Heatsink: 34 x 36.8 x 24.9			
Size (LxWxH)	Inches	Open Frame: 1.34 x 1.45 x 0.45 With Baseplate: 1.34 x 1.45 x 0.50 With Heatsink: 1.34 x 1.45 x 0.98			
MTBF - Telcordia SR-332	-	> 5 MHrs; 100% Load; Ta = 40 °C			
Warranty	yrs	3			

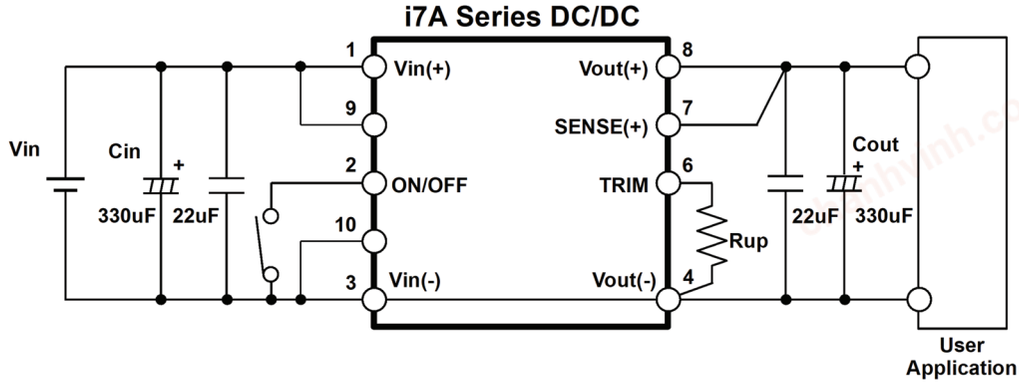
Notes
See website for detailed specifications and test methods.
(1) For Vo ≤ 1.2V, 470uF min capacitance is recommended.
(2) Contact Technical Support for operation at higher alttiudes.

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Related Products

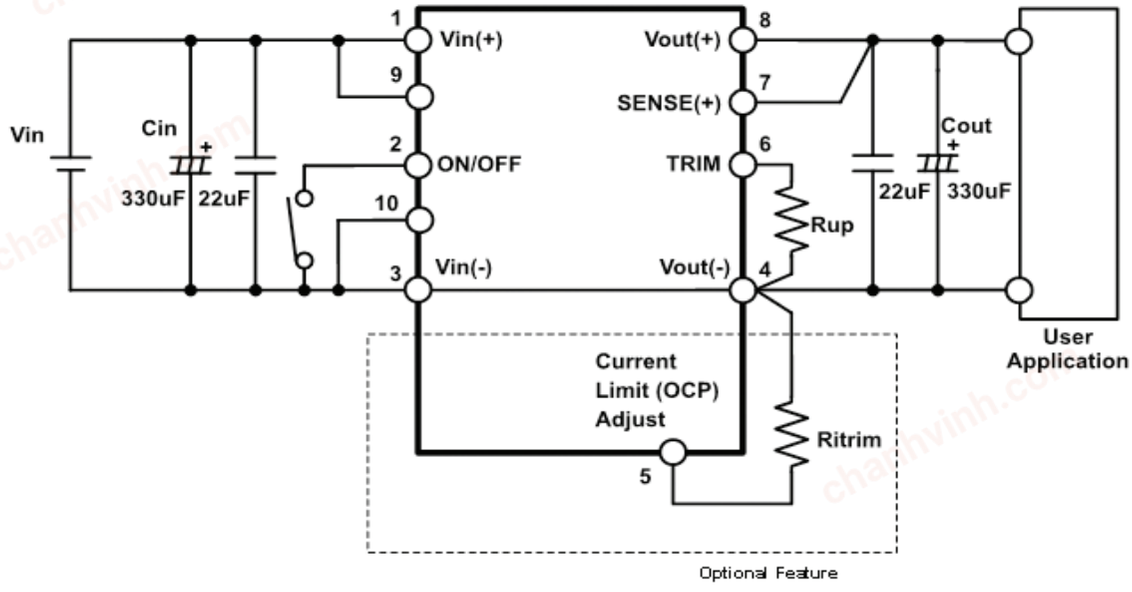
Type	Part Number	Description
DC-DC Buck Converter	i3A	100W, Input 9-53V, Output 5-30V 4.5A or 3.3-16.5V 8A
DC-DC Buck Converter	i6A24	250W, Input 9-40V, Output 3.3-24V 14A
DC-DC Buck Converter	i6A4W	250W, Input 9-53V, Output 3.3-40V 10A or 3.3-15V 20A
DC-DC Buck-Boost Converter	i7C	300W, Input 9-53V or 9-36V, Output 9.6-48V 8A, 5-28V 12.5A or 8-24V 20A
DC-DC Buck Converter	RGA	250W, Input 9 up to 53V, Output 3.3 up to 40V, Rugged Modules
DC-DC Buck Converter	RGB	400-750W, Input 9 to 18V or 18 up to 60V, Output 0.8 tp 8V or 3.3 up to 24V, Rugged Modules
DC-DC Buck-Boost Converter	RGC	300W, Input 9-53V, Output 9.6-48V 8A or 5-28V 12.5A, Rugged Modules
Evaluation Kit	i7A20A-C01-EVK-S1	Evaluation kit with i7A48020A033V-001-R Module
Evaluation Kit	i7A33A-C01-EVK-S1	Evaluation kit with i7A4W033A033V-001-R Module
Evaluation Kit	i7A45A-C01-EVK-S1	Evaluation kit with i7A24045A033V-001-R Module
Evaluation Kit	i7A60A-C01-EVK-S1	Evaluation kit with i7A12060A008V-001-R Module

Typical Application Circuit (Standard model without output current limit adjust feature)



Note
1. The capacitor values can vary based on the application requirements.
2. TRIM resistor "Rup" should be connected to the i7A module as close as possible.

Typical Application Circuit (Suffix -xx3-R with output current limit (OCP) adjust feature)

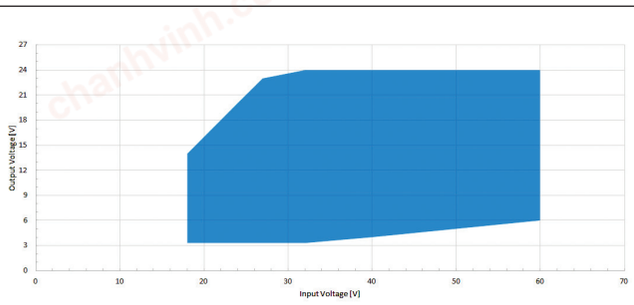


Note
1. The capacitor values can vary based on the application requirements.
2. TRIM resistor "Rup" should be connected to the i7A module as close as possible.
3. Output current limit adjust TRIM resistor "Ritrim" should be connected to the i7A module as close as possible.

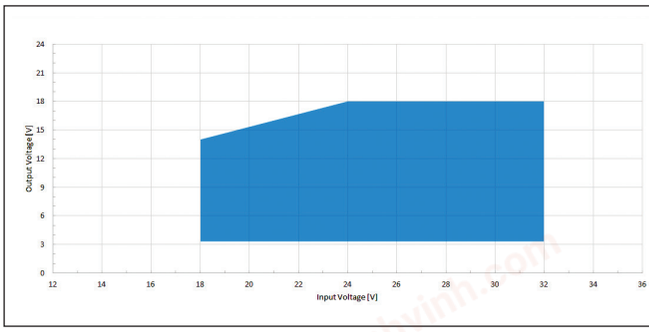
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Output vs. Input Voltage Operating Range

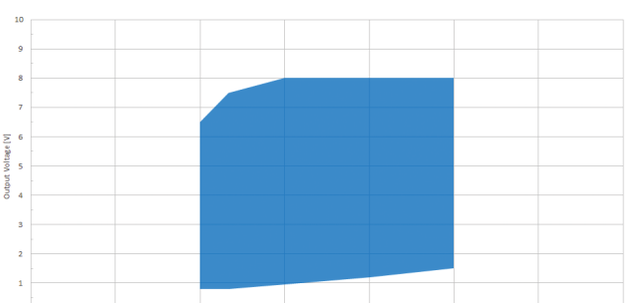
i7A4W033A033V



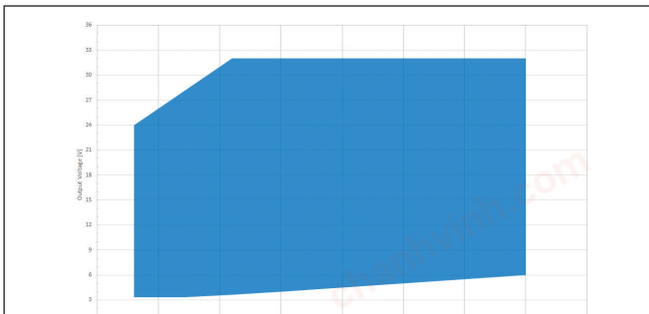
i7A24045A033V



i7A12060A008V



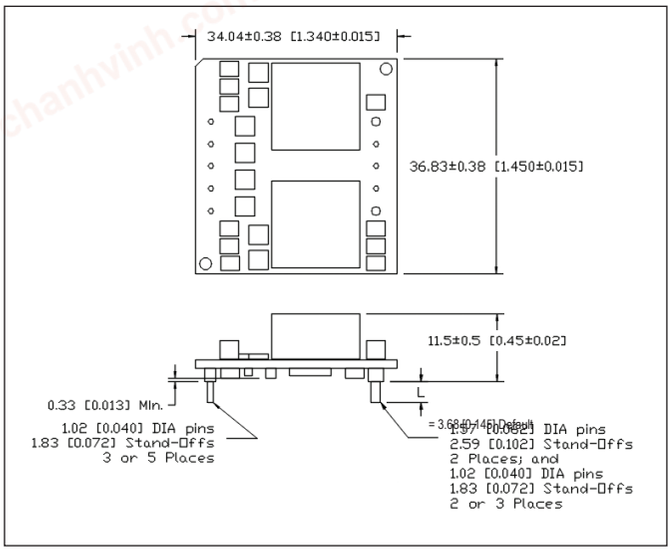
i7A48020A033V



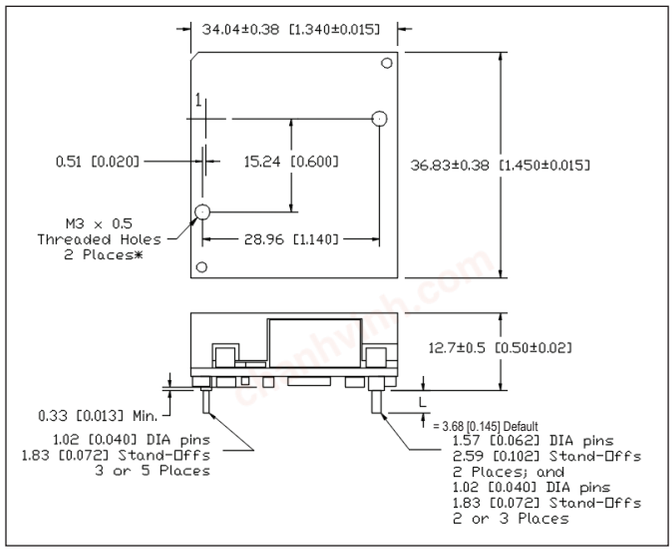
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Mechanical Specification

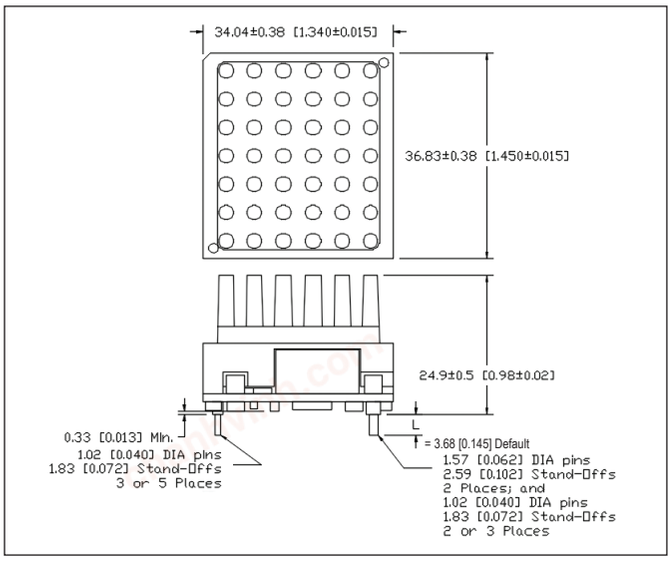
Outline Drawing Open frame –00x-R product options



Outline Drawing With Baseplate –xCx-R product options)



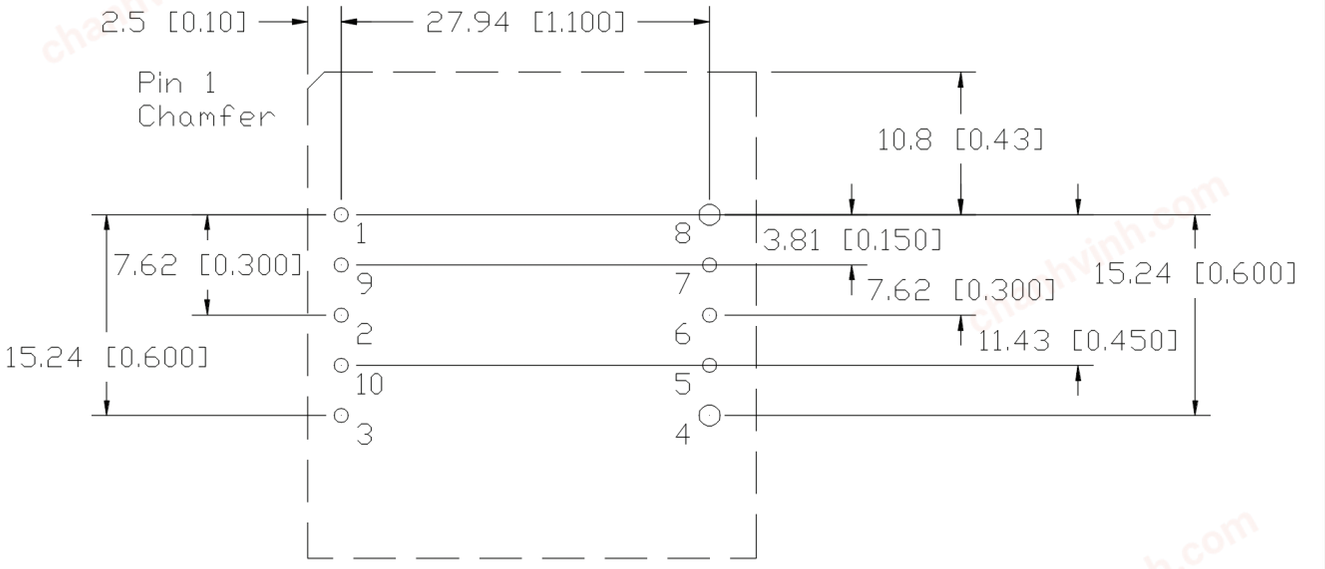
Outline Drawing With Heatsink –xFx-R product options



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Mechanical Specification

Recommended Hole Pattern (Top View)



Pinout

PIN	FUNCTION	PIN	FUNCTION
1	Vin (+)	6	TRIM
2	On / Off	7	SENSE +
3	Vin (-) / GND	8	Vout (+)
4	Vout (-) / GND	9*	Vin (+)
5**	Current Limit (OCP) Adjustment	10*	Vin (-) / GND

* Pins 9 & 10 are added for products drawing higher input currents (e.g. i7A24045A033V and i7A12060A008V)
** Pin 5 is only populated when this feature is present.
Pin base material is brass or copper with gold over nickel plating.

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