

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



The i7A series of up to 750W non-isolated DC-DC step-down converters are ideal for creating additional high current/high power 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 24V Output Adjustment	• One Part Supports Multiple System Voltages
• 9 to 18V, 18 to 32V or 18 to 60V Input Ranges	• 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
<a href="#">i7A4W033A033V-000-R</a>	18 - 60	3.3 - 24	33	500	Positive	-	-	-
<a href="#">i7A4W033A033V-001-R</a>	18 - 60	3.3 - 24	33	500	Negative	-	-	-
<a href="#">i7A4W033A033V-003-R</a>	18 - 60	3.3 - 24	33	500	Negative	Yes	-	-
<a href="#">i7A4W033A033V-0C1-R</a>	18 - 60	3.3 - 24	33	500	Negative	-	-	Yes
<a href="#">i7A4W033A033V-0C3-R</a>	18 - 60	3.3 - 24	33	500	Negative	Yes	-	Yes
<a href="#">i7A4W033A033V-0F1-R</a>	18 - 60	3.3 - 24	33	500	Negative	-	Yes	-
<a href="#">i7A4W033A033V-0F3-R</a>	18 - 60	3.3 - 24	33	500	Negative	Yes	Yes	-
<a href="#">i7A24045A033V-000-R</a>	18 - 32	3.3 - 18	45	750	Positive	-	-	-
<a href="#">i7A24045A033V-001-R</a>	18 - 32	3.3 - 18	45	750	Negative	-	-	-
<a href="#">i7A24045A033V-003-R</a>	18 - 32	3.3 - 18	45	750	Negative	Yes	-	-
<a href="#">i7A24045A033V-0C1-R</a>	18 - 32	3.3 - 18	45	750	Negative	-	-	Yes
<a href="#">i7A24045A033V-0C3-R</a>	18 - 32	3.3 - 18	45	750	Negative	Yes	-	Yes
<a href="#">i7A24045A033V-0F1-R</a>	18 - 32	3.3 - 18	45	750	Negative	-	Yes	-
<a href="#">i7A24045A033V-0F3-R</a>	18 - 32	3.3 - 18	45	750	Negative	Yes	Yes	-
<a href="#">i7A12060A008V-000-R</a>	9 - 18	0.8 - 8	60	400	Positive	-	-	-
<a href="#">i7A12060A008V-001-R</a>	9 - 18	0.8 - 8	60	400	Negative	-	-	-
<a href="#">i7A12060A008V-003-R</a>	9 - 18	0.8 - 8	60	400	Negative	Yes	-	-
<a href="#">i7A12060A008V-0C1-R</a>	9 - 18	0.8 - 8	60	400	Negative	-	-	Yes
<a href="#">i7A12060A008V-0C3-R</a>	9 - 18	0.8 - 8	60	400	Negative	Yes	-	Yes
<a href="#">i7A12060A008V-0F1-R</a>	9 - 18	0.8 - 8	60	400	Negative	-	Yes	-
<a href="#">i7A12060A008V-0F3-R</a>	9 - 18	0.8 - 8	60	400	Negative	Yes	Yes	-

Preferred Model

Specification				
Model		i7A4W033A033V	i7A24045A033V	i7A12060A008V
<b>Input</b>				
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)
Input Transient (t < 100 ms)	Vdc	65 max	36 max	22 max
Input Current (max)	A	50		65
Efficiency	%	91 - 98	93 - 98.5	86 - 97
Safety Certifications and Markings	-	IEC/EN/UL/CSA/EN62368-1, CE Mark and UKCA Mark		
<b>Output</b>				
Output Voltage Tolerance	%	±3.5		
Switching Frequency	kHz	330		
Line Regulation	%	0.2		
Load Regulation	%	0.4		
External Load Capacitance	µF	220 - 10000	330 - 10000	330 - 10000 <sup>(1)</sup>
Output Current	A	0 - 33	0 - 45	0 - 60
Ripple & Noise	mVpp	25		40
Overcurrent Protection Threshold (typ)	A	45	63	70
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 lo	425 mV / 80 µs typ. Vo=12V, 1 A/µs, 25% to 50% max lo	400 mV / 100 µs typ. Vo=3.3V, 1 A/µs, 25% to 50% max lo
<b>Environmental</b>				
Operating Temperature (Tref)	°C	-40 to 125 (See <a href="#">i7A Specifications</a> for Derating)		
Storage Temperature	°C	-55° to +125		
Humidity (non condensing)	%RH	5 - 95 (Operating & Storage)		
Cooling	-	Convection, conduction (baseplate) or forced air		
Altitude <sup>(2)</sup>	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		
<b>Other</b>				
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

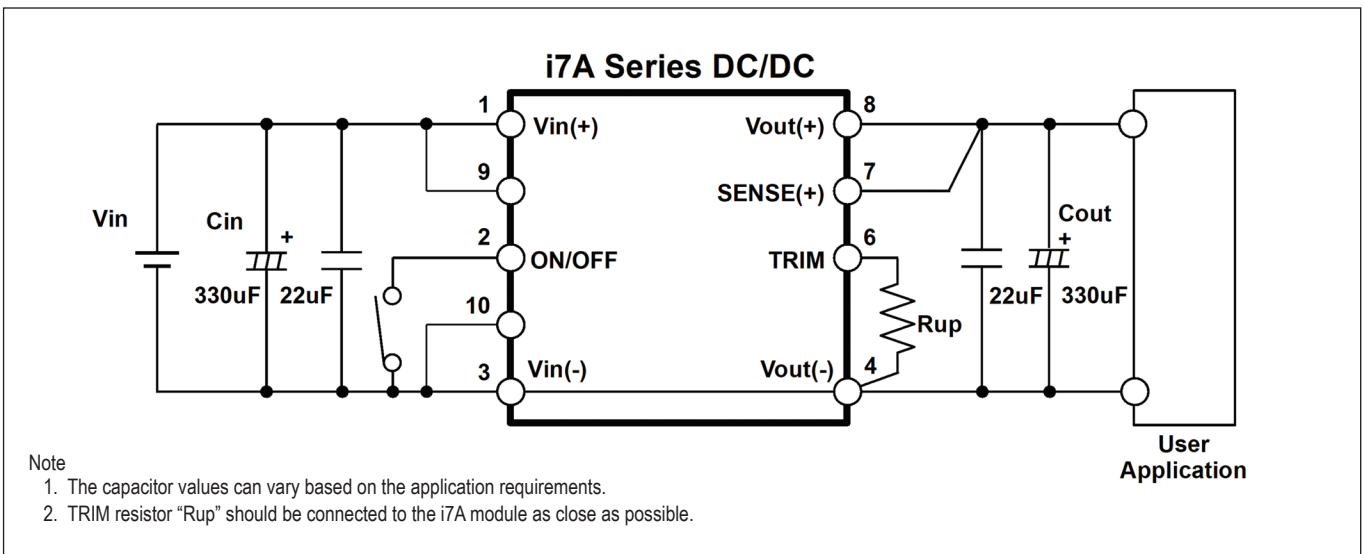
See website for detailed [specifications](#) and test methods.

(1) For Vo ≤ 1.2V, 470µF min capacitance is recommended.

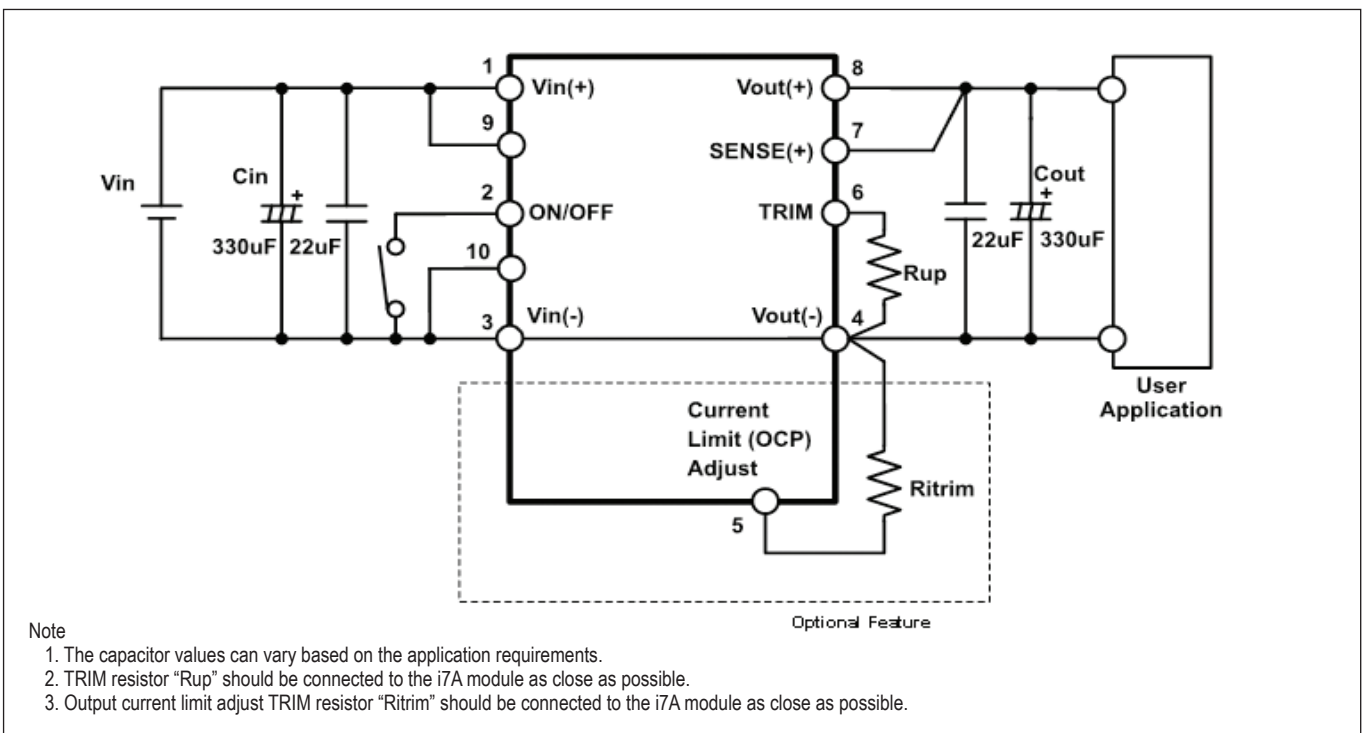
(2) Contact Technical Support for operation at higher altitudes.

Related Products		
Type	Part Number	Description
DC-DC Buck Converter	<a href="#">i3A</a>	100W, Input 9-53V, Output 5-30V 4.5A or 3.3-16.5V 8A
DC-DC Buck Converter	<a href="#">i6AN</a>	75W, Input 9-40V, Negative Output -3.3 to -30V, 8A
DC-DC Buck Converter	<a href="#">i6A24</a>	250W, Input 9-40V, Output 3.3-24V 14A
DC-DC Buck Converter	<a href="#">i6A4W</a>	250W, Input 9-53V, Output 3.3-40V 10A or 3.3-15V 20A
DC-DC Buck-Boost Converter	<a href="#">i7C</a>	300W, Input 9-53V or 9-36V, Output 9.6-48V 8A, 5-28V 12.5A or 8-24V 20A
DC-DC Buck Converter	<a href="#">RGA</a>	250W, Input 9 up to 53V, Output 3.3 up to 40V, Rugged Modules
Evaluation Kit	<a href="#">i7A33A-C01-EVK-S1</a>	Evaluation kit with i7A4W033A033V-001-R Full Module
	<a href="#">i7A45A-C01-EVK-S1</a>	Evaluation kit with i7A24045A033V-001-R Module
	<a href="#">i7A60A-C01-EVK-S1</a>	Evaluation kit with i7A12060A008V-001-R Module

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

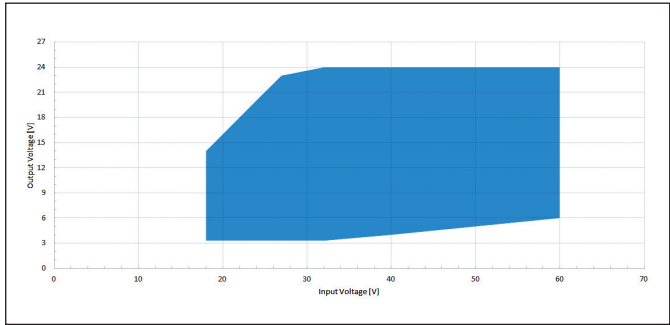


**Typical Application Circuit (Suffix -xx3-R with output current limit (OCP) adjust feature)**

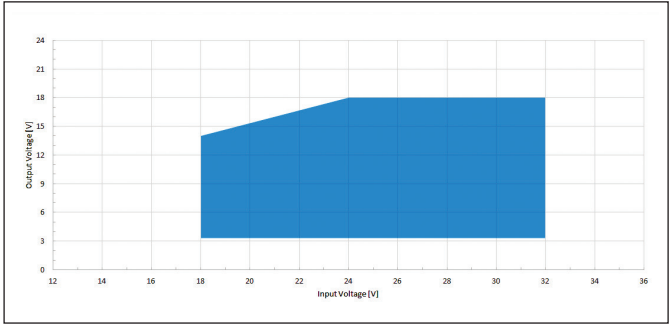


Output vs. Input Voltage Operating Range

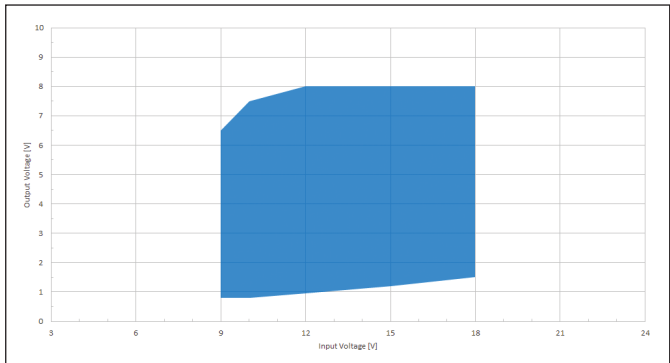
**i7A4W033A033V**



**i7A24045A033V**

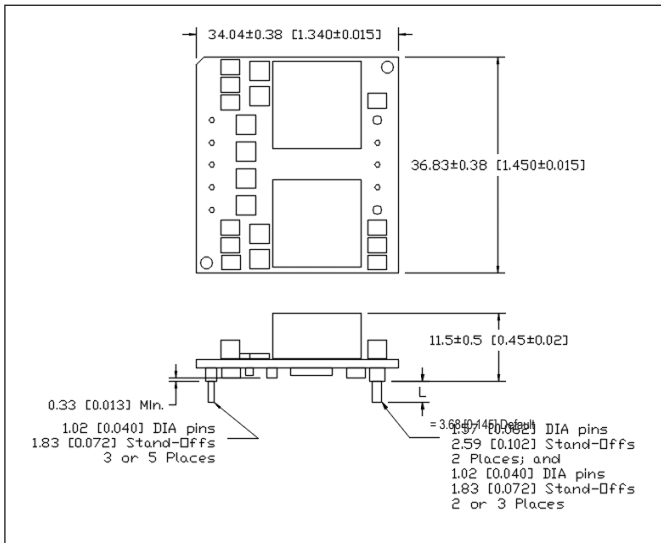


**i7A12060A008V**

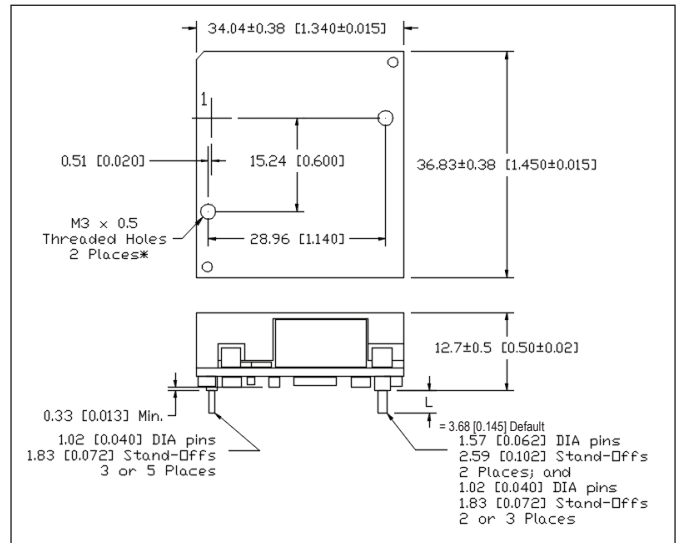


## Mechanical Specification

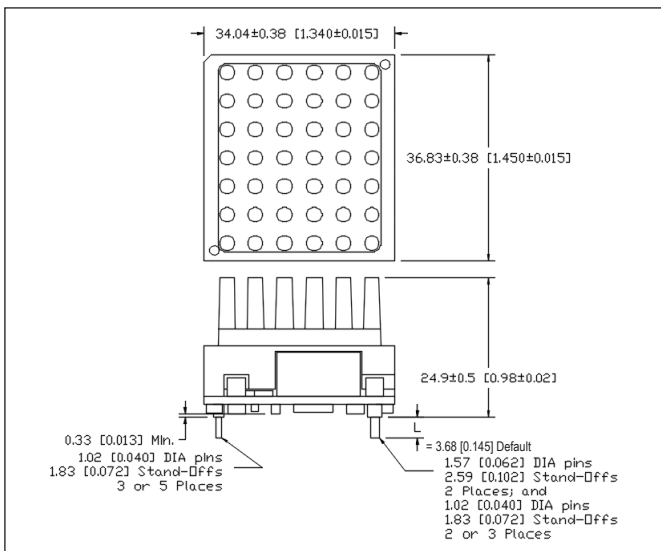
Outline Drawing Open frame –00x-R product options



Outline Drawing With Baseplate –xCx-R product options)

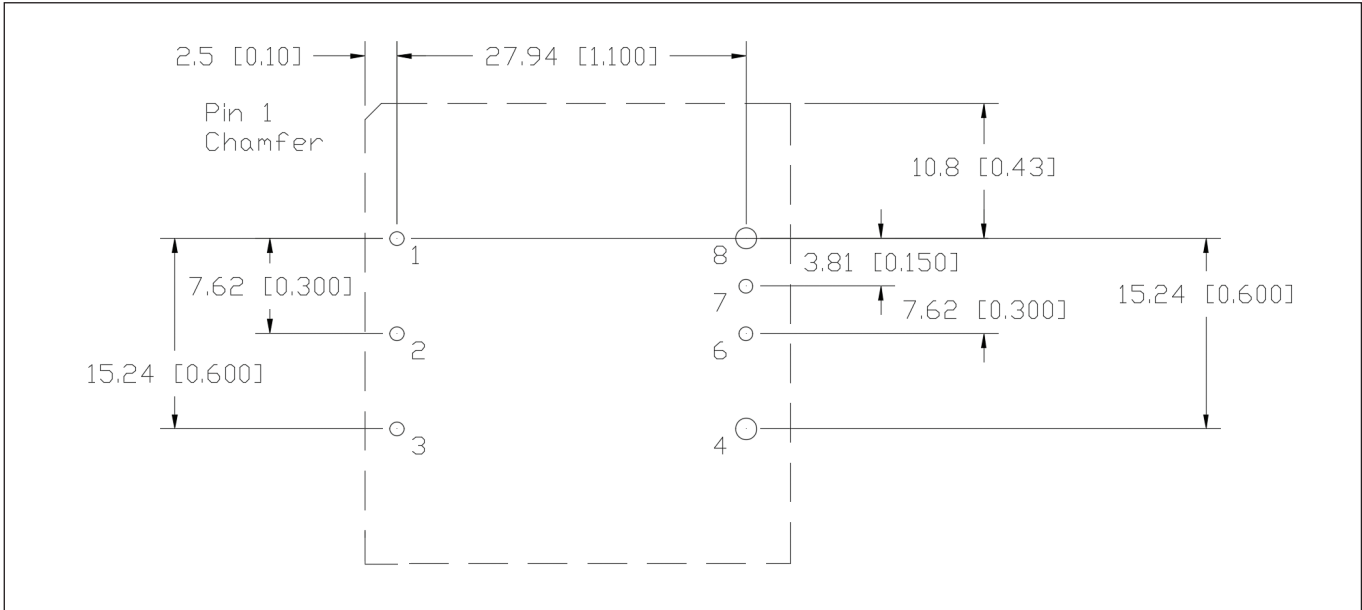


Outline Drawing With Heatsink –xFx-R product options

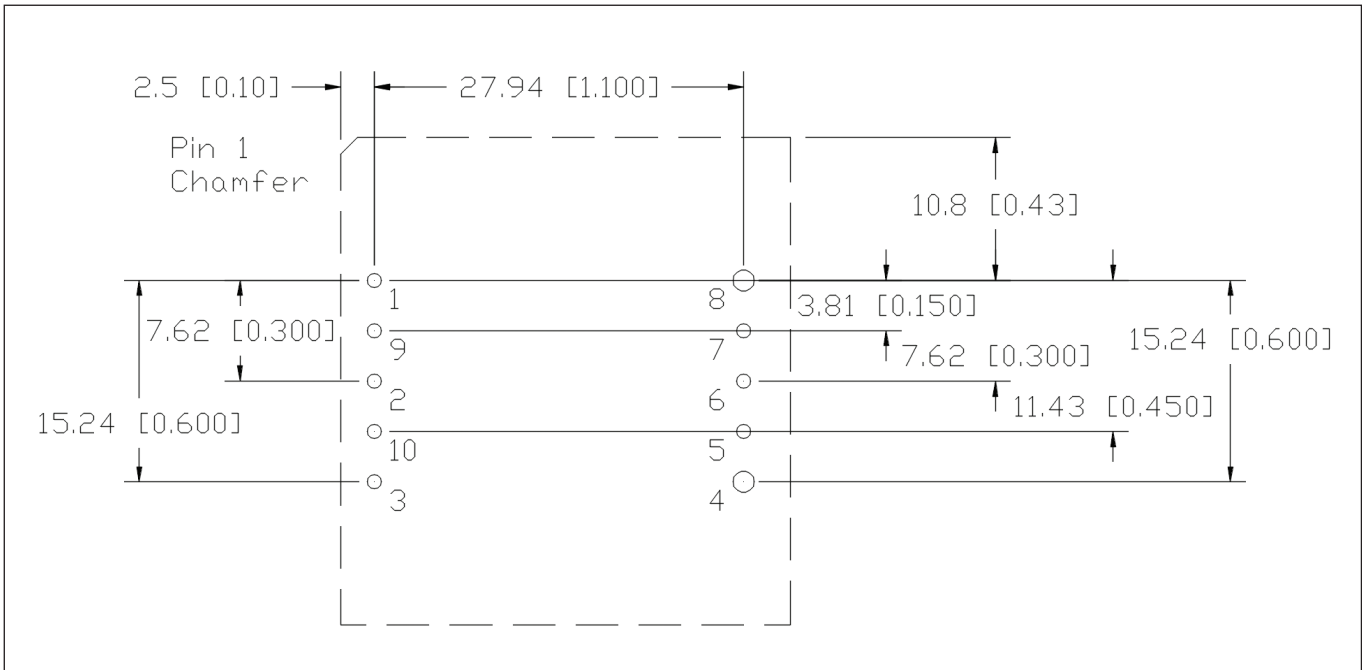


**Mechanical Specification**

**Recommended Hole Pattern – i7A4W033A033V-xxx-R (Top View)**



**Recommended Hole Pattern – i7A24045A033V-xxx-R and i7A12060A008V-xxx-R (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. i7A45A and 60A)

\*\* Pin 5 is only populated when this feature is present.

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



## TDK-Lambda France SAS

Tel: +33 1 60 12 71 65  
 tif.fr.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/fr



## Italy Sales Office

Tel: +39 02 61 29 38 63  
 tif.it.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/it



## Netherlands

tif.nl.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/nl



## TDK-Lambda Germany GmbH

Tel: +49 7841 666 0  
 tlg.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/de



## Austria Sales Office

Tel: +43 2256 655 84  
 tlg.at.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/at



## Switzerland Sales Office

Tel: +41 44 850 53 53  
 tlg.ch.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/ch



## Nordic Sales Office

Tel: +45 8853 8086  
 tlg.dk.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/dk



## TDK-Lambda UK Ltd.

Tel: +44 (0) 12 71 85 66 66  
 tlu.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/uk



## TDK-Lambda Ltd.

Tel: +9 723 902 4333  
 tli.powersolutions@tdk.com  
 www.emea.lambda.tdk.com/il-en



## TDK-Lambda Americas

Tel: +1 800-LAMBDA-4 or 1-800-526-2324  
 tia.powersolutions@tdk.com  
 www.us.lambda.tdk.com



## TDK Electronics do Brasil Ltda

Tel: +55 11 3289-9599  
 sales.br@tdk-electronics.tdk.com  
 www.tdk-electronics.tdk.com/en



## TDK-Lambda Corporation

Tel: +81-3-6778-1113  
 www.jp.lambda.tdk.com



## TDK-Lambda (China) Electronics Co. Ltd.

Tel: +86 21 6485-0777  
 tlc.powersolutions@tdk.com  
 www.lambda.tdk.com.cn



## TDK-Lambda Singapore Pte Ltd.

Tel: +65 6251 7211  
 tfs.marketing@tdk.com  
 www.sg.lambda.tdk.com



## TDK India Private Limited, Power Supply Division

Tel: +91 80 4039-0660  
 mathew.philip@tdk.com  
 www.us.lambda.tdk.com



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