

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



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

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 μ s typ. Vo=12V, 1 A/ μ s, 25% to 75% max lo	425 mV / 80 μ s typ. Vo=12V, 1 A/ μ s, 25% to 50% max lo	400 mV / 100 μ s typ. Vo=3.3V, 1 A/ μ s, 25% to 50% max lo	500 mV / 180 μ s typ. Vo=12V, 1 A/ μ s, 25% to 75% max lo
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

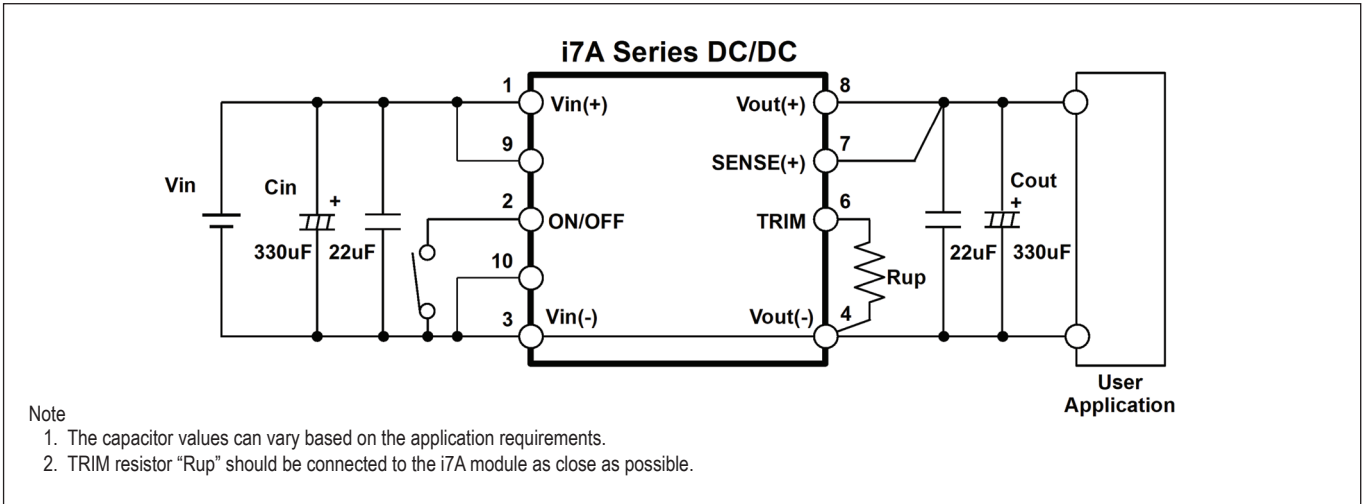
See website for detailed [specifications](#) and test methods.(1) For Vo \leq 1.2V, 470uF min capacitance is recommended.

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

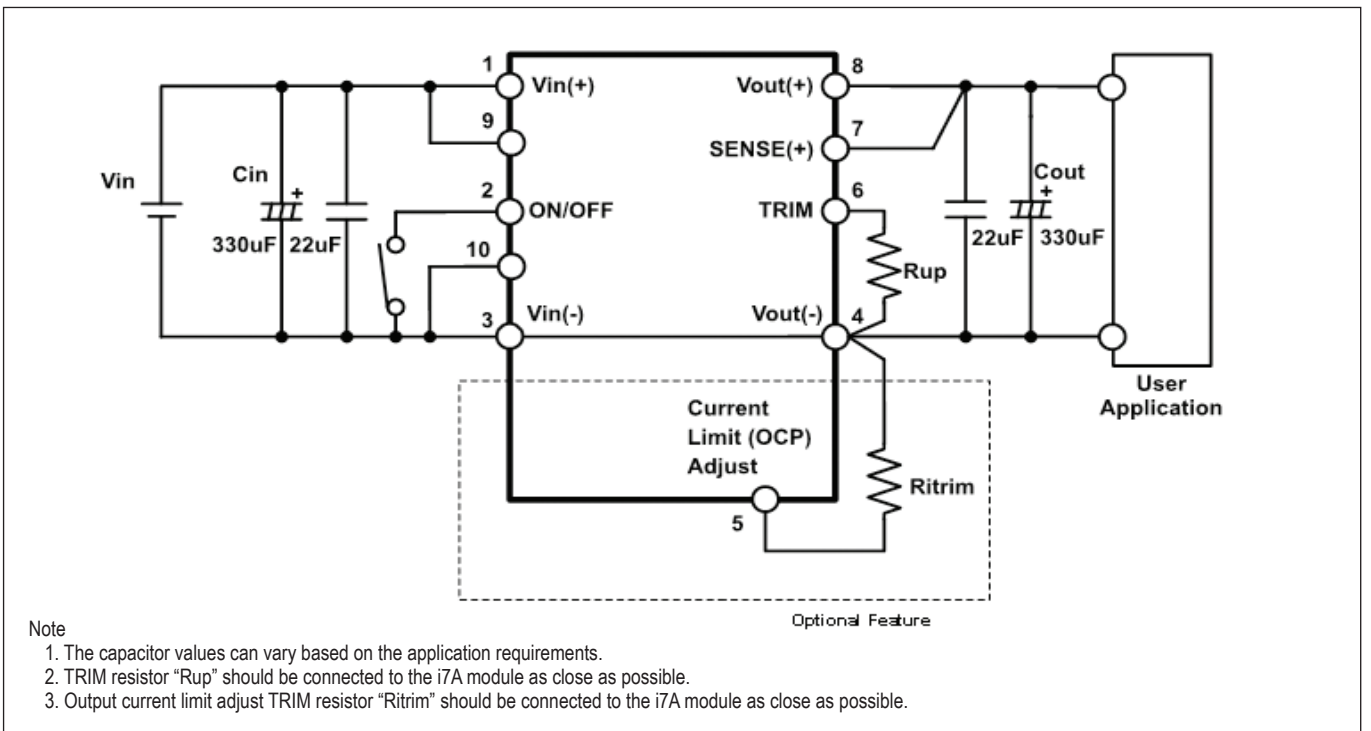
Related Products

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)

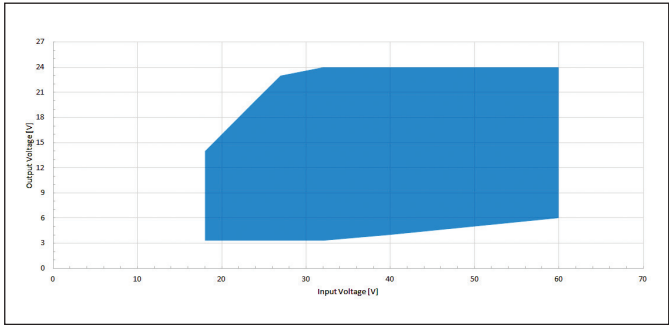


Typical Application Circuit (Suffix -xx3-R with output current limit (OCP) adjust feature)

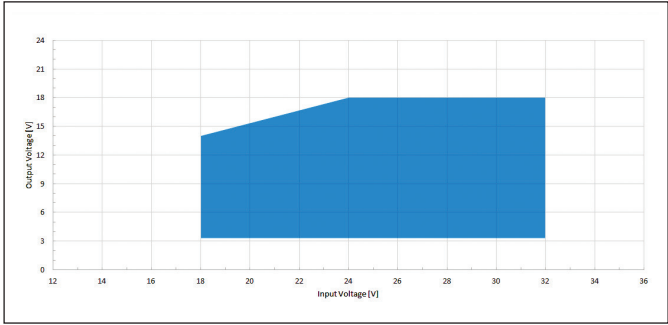


Output vs. Input Voltage Operating Range

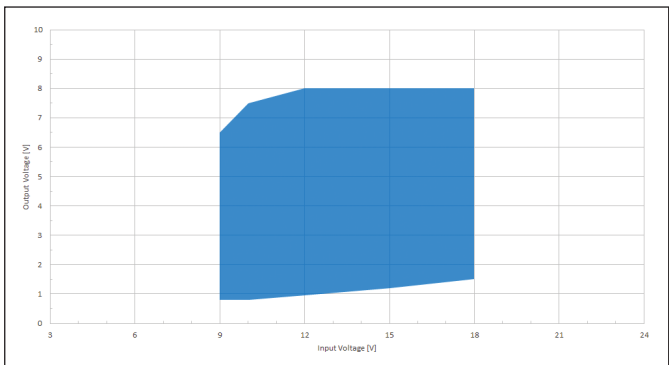
i7A4W033A033V



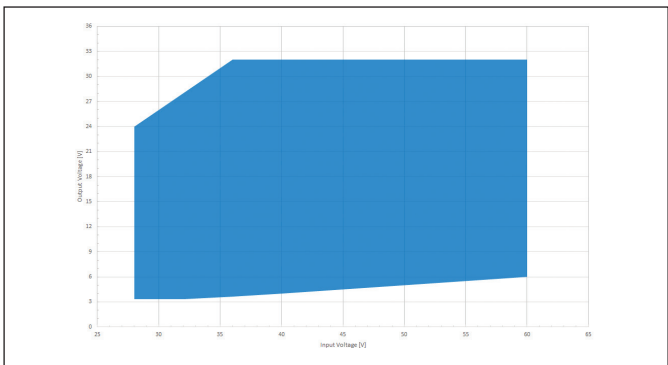
i7A24045A033V



i7A12060A008V

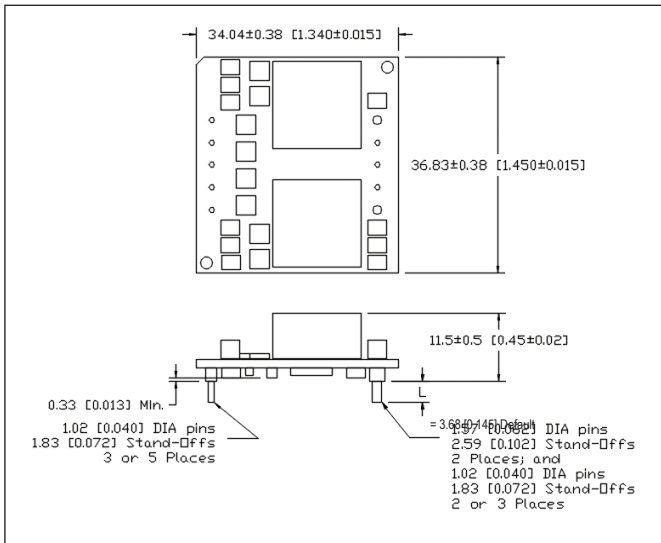


i7A48020A033V

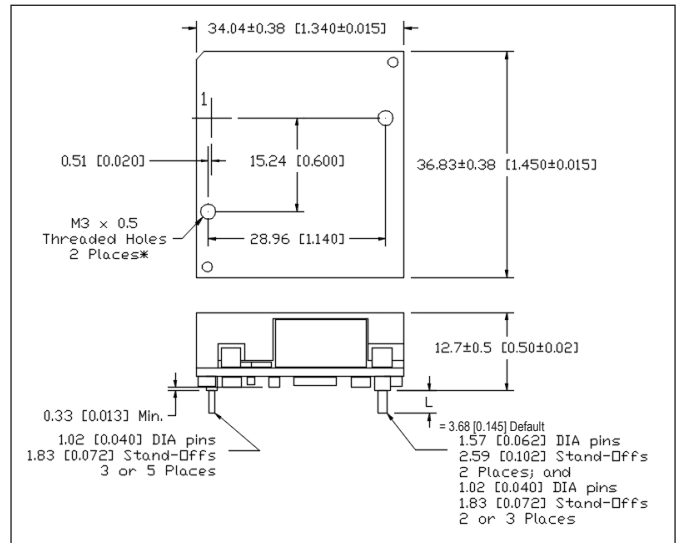


Mechanical Specification

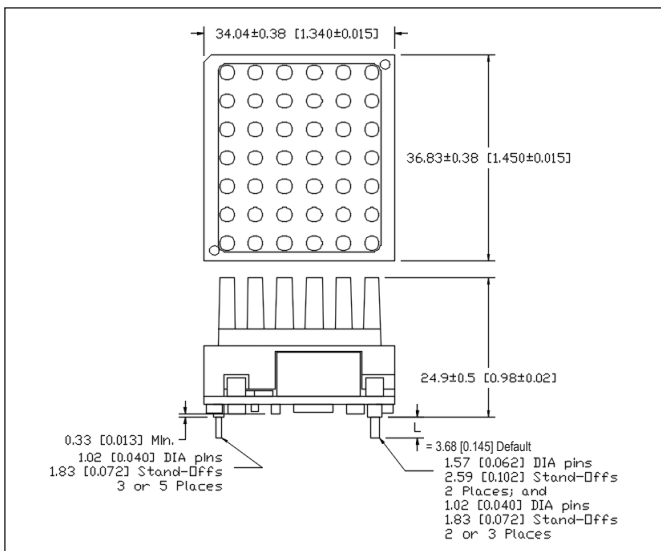
Outline Drawing Open frame –00x-R product options



Outline Drawing With Baseplate –xCx-R product options)

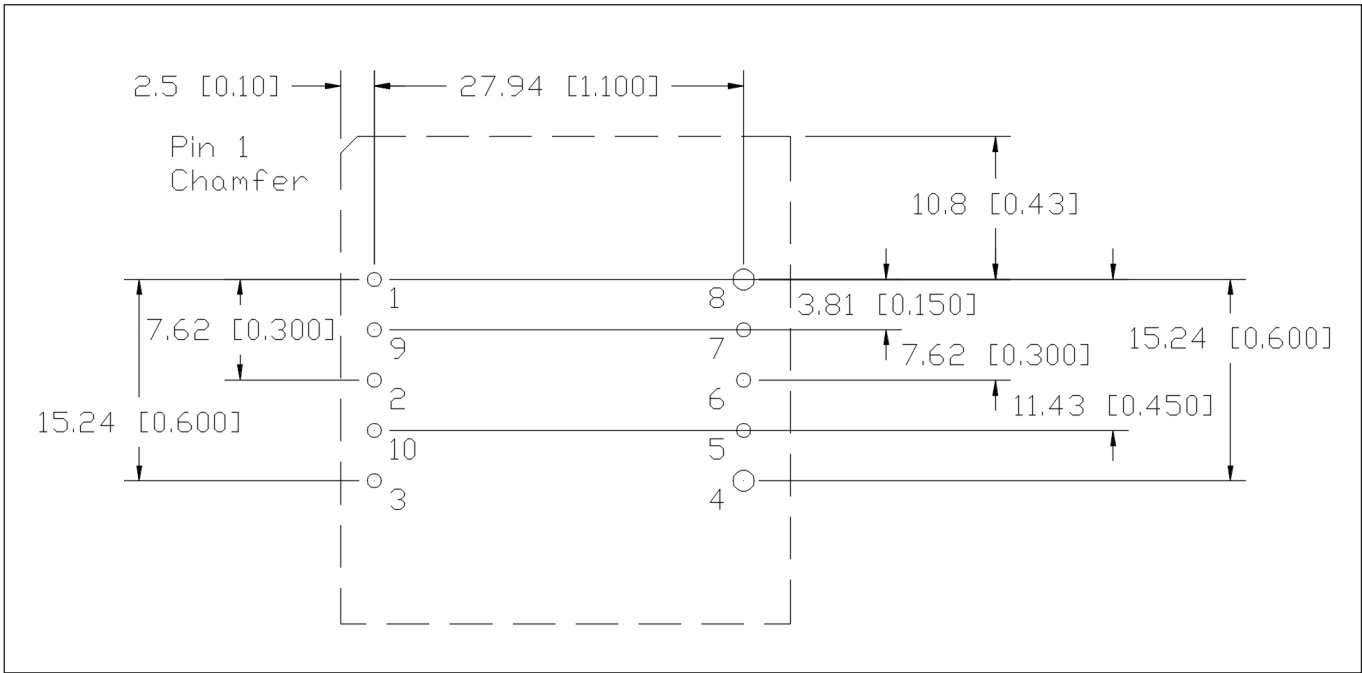


Outline Drawing With Heatsink –xFx-R product options



Mechanical Specification

Recommended Hole Pattern (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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