

## FEATURES :

## DC-DC Converter

- 40W DIL Package
- 8:1 Wide Input Voltage Range
- High Efficiency Up To 91%
- Regulated Output Types
- No Minimum Load Required
- Over Power and Short Circuit Protection
- Over Temperature Protection
- Operating Temperature: -40°C To +60°C
- UL94V-0 Package Material
- 100% Burned In
- 3 Years Warranty

## SYNC40 SERIES

40Watt Single/Dual Output

8:1 Input Voltage Range

1600Vdc Isolated

2" X 1" Size

Specifications typical at TA=25°C, nominal input voltage and rated output current unless otherwise specified

### Selection Guide

Part Number	Input Voltage Range	Input Current		Output Voltage	Output Current	Efficiency ( @36Vin )	Maximum capacitor Load
		No-Load	Full-Load				
	Vdc	mA (typ)	mA (typ)	Vdc	mA (typ)	% (typ)	µF
SYNC40-36S05	9-75	10	1235	5	8000	90	13600
SYNC40-36S12	9-75	10	1221	12	3333	91	2400
SYNC40-36S15	9-75	10	1221	15	2667	91	1500
SYNC40-36S24	9-75	10	1221	24	1667	91	600
SYNC40-36D12	9-75	10	1221	±12	±1667	91	±1200
SYNC40-36D15	9-75	10	1221	±15	±1333	91	±800

### Part Number

$\frac{\text{SYNC}}{\text{A}} \frac{\text{40}}{\text{B}} - \frac{\text{36}}{\text{C}} \frac{\text{S}}{\text{D}} \frac{\text{05}}{\text{E}}$

- A : Series
- B : Output Power
- C : Input Voltage
- D : Single/Dual Output
- E : Output Voltage



## Input Specifications

Parameters	Conditions	Min	Typ	Max	Units	
Input Voltage		9	36	75	Vdc	
Input Surge Voltage (100 ms max.)		-0.7		100	Vdc	
Start-up Voltage				9	Vdc	
Under Voltage Shutdown			7.5		Vdc	
Start-up Time	Constant Resistive Load, Nominal Vin	Power-up		35	ms	
		Remote ON/OFF		35		
Input Filter	All Models	Internal Pi type				
Remote ON/OFF (Ctrl PIN Refer To -Vin PIN)	Positive Logic (Standard)	DC/DC ON		Open or 3.5 Vdc – 12 Vdc		
		DC/DC OFF		Short or 0 Vdc – 1.2 Vdc		
	Input Current of Ctrl PIN		-0.5		0.5	mA
	Remote Off Input Current			3		

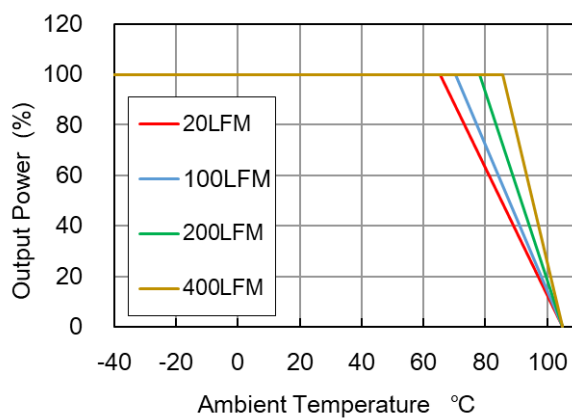
## Output Specifications

Parameters	Conditions	Min	Typ	Max	Units
Voltage Tolerance	100% Load	-2		+2	%
Line Regulation	Vin(min) to Vin(max) @100% Load	-0.2		+0.2	%
Load Regulation	0% Load to 100% Load	-0.5		+0.5	%
Ripple & Noise (BW=20MHz)	With an 1uF MLCC	5Vout		100	mVp-p
		12Vout		150	
		15Vout		150	
		24Vout		150	
Transient Response Setting Time	25% Load Step Change		350	650	us
Transient Response Deviation	25% Load Step Change	-5	±3	+5	%
Temperature Coefficient		-0.02		+0.02	%/°C
Voltage Adjustability	% of Vout	-10		+10	%
Output Power Protection	% of Io, Hiccup mode, Auto-recovery	115	150	185	%
Short Circuit Protection	Continuous [Hiccup Mode], Auto-Recovery				
Over Voltage Protection	5Vout		6.2		Vdc
	12Vout, ±12Vout		15		
	15Vout, ±15Vout		18		
	24Vout		30		

## General Specifications

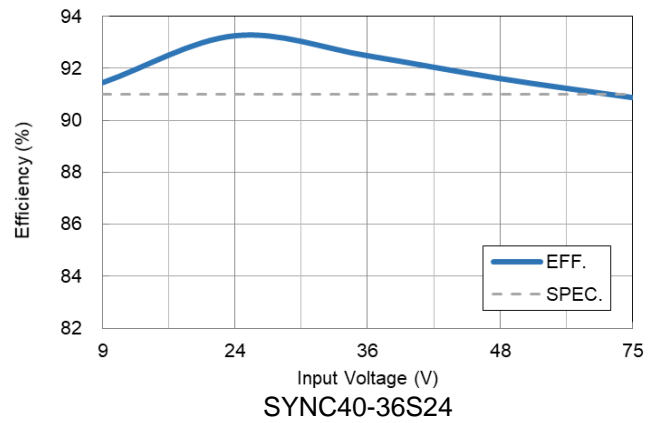
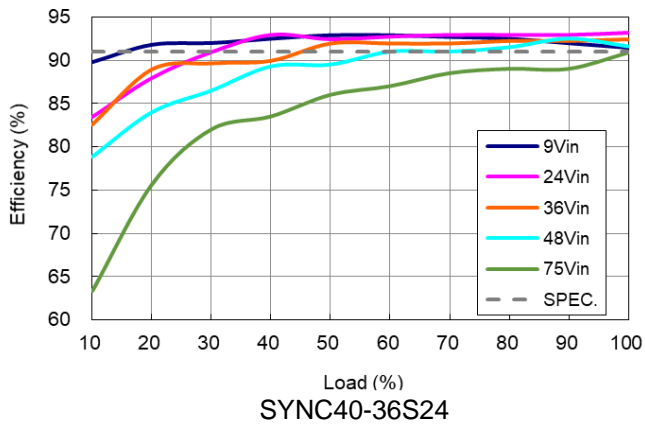
Parameters	Conditions	Min	Typ	Max	Units
Isolation Voltage	Input to Output (60sec.)	1600			Vdc
	Input (Output) To Case (60sec.)	1000			Vdc
Isolation Resistance	500Vdc	1000			MΩ
Isolation Capacitance	100kHz, 1V			2200	pF
Switching Frequency	Full Load, Nominal Input	5Vout		185	KHz
		Others		230	
Operating Ambient Temperature (Power Derating See Derating Graph)	Nominal Vin, 100% Load	SYNC40-36S05		60	°C
		SYNC40-36S12, SYNC40-36S15, SYNC40-36S24, SYNC40-36D12, SYNC40-36D15	-40	65	
Thermal Impedance	20LFM		10		°C/W
	100LFM		8.8		
	200LFM		6.8		
	400LFM		4.9		
Maximum Case Temperature				105	°C
Over Temperature Protection	Case temperature		115		°C
Storage Temperature		-55		125	°C
Humidity	Non Condensing	5		95	%
Cooling	Natural Convection				
Case Material	Copper				
Potting Material	Silicone (UL94-V0)				
MTBF	MIL-HDBK-217F@25°C (calculated)		4.15x10 <sup>5</sup>		Hours
Weight			50		g
Dimensions	50.8 x 25.4 x 11.6				mm

## Temperature Derating Graph

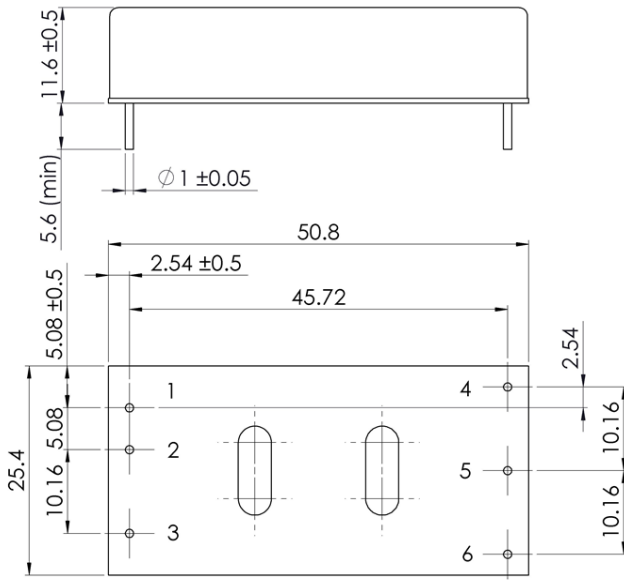


SYNC40-36S24

## Characteristic Curve



## Dimensions



**BOTTOM VIEW**

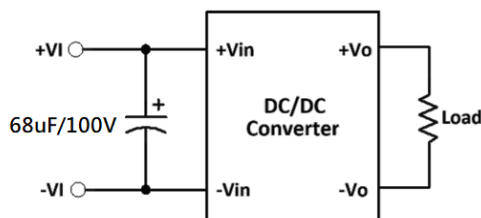
Unit : mm

Tolerance :  $XX.X \pm 0.5$  ,  $XX.XX \pm 0.25$

## PIN Assignment

Pin	Single	Dual	Diameter
1	+Vin	+Vin	1.0mm[0.04"]
2	-Vin	-Vin	1.0mm[0.04"]
3	Ctrl	Ctrl	1.0mm[0.04"]
4	+Vout	+Vout	1.0mm[0.04"]
5	-Vout	Com	1.0mm[0.04"]
6	Trim	-Vout	1.0mm[0.04"]

## Application Examples

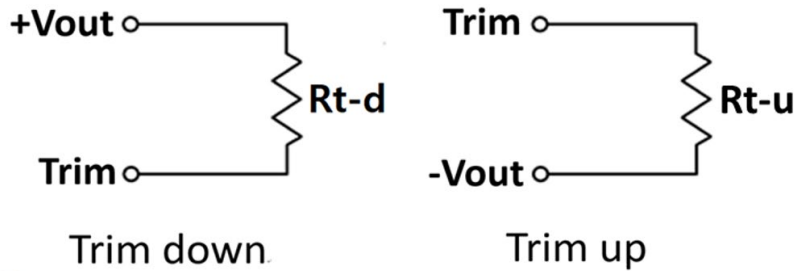


It is necessary to parallel a capacitor across the input pins under normal operation.

Minimum Capacitance: 68μF/100V.

## External Output Trimming

Output can be externally trimmed by using the method, shown as below.



Trim Table:

SYNC40-36S05											
Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	138.88KΩ	62.41KΩ	36.92KΩ	24.18KΩ	16.53KΩ	11.44KΩ	7.79KΩ	5.06KΩ	2.94KΩ	1.24KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	106.87KΩ	47.76KΩ	28.06KΩ	18.21KΩ	12.30KΩ	8.36KΩ	5.55KΩ	3.44KΩ	1.79KΩ	0.48KΩ

SYNC40-36S12											
Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	280.90KΩ	125.65KΩ	73.90KΩ	48.02KΩ	32.50KΩ	22.15KΩ	14.76KΩ	9.21KΩ	4.90KΩ	1.45KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	225.50KΩ	100.75KΩ	59.17KΩ	38.38KΩ	25.90KΩ	17.58KΩ	11.64KΩ	7.19KΩ	3.72KΩ	0.95KΩ

SYNC40-36S15											
Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	499.18KΩ	223.09KΩ	131.06KΩ	85.05KΩ	57.44KΩ	39.03KΩ	25.88KΩ	16.02KΩ	8.35KΩ	2.22KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	404.82KΩ	180.91KΩ	106.27KΩ	68.95KΩ	46.56KΩ	31.64KΩ	20.97KΩ	12.98KΩ	6.76KΩ	1.78KΩ

SYNC40-36S24											
Trim down	Vout	Vo*99%	Vo*98%	Vo*97%	Vo*96%	Vo*95%	Vo*94%	Vo*93%	Vo*92%	Vo*91%	Vo*90%
	Rt-d =	598.97KΩ	267.93KΩ	157.59KΩ	102.42KΩ	69.31KΩ	47.24KΩ	31.48KΩ	19.66KΩ	10.46KΩ	3.11KΩ
Trim up	Vout	Vo*101%	Vo*102%	Vo*103%	Vo*104%	Vo*105%	Vo*106%	Vo*107%	Vo*108%	Vo*109%	Vo*110%
	Rt-u =	486.83KΩ	217.87KΩ	128.21KΩ	83.38KΩ	56.49KΩ	38.56KΩ	25.75KΩ	16.14KΩ	8.67KΩ	2.69KΩ