



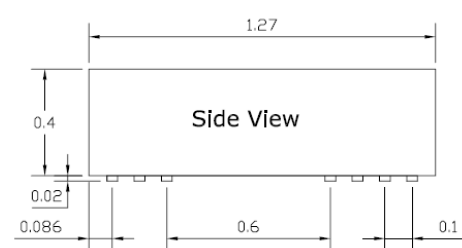
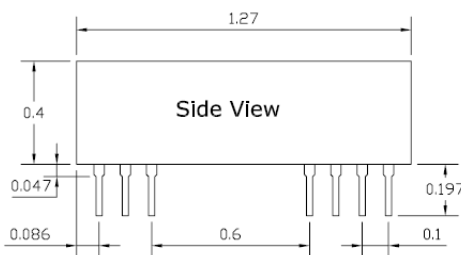
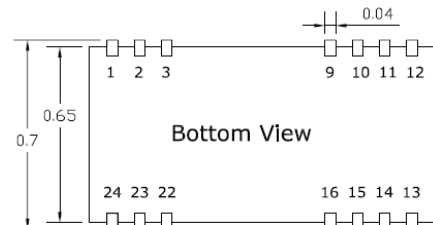
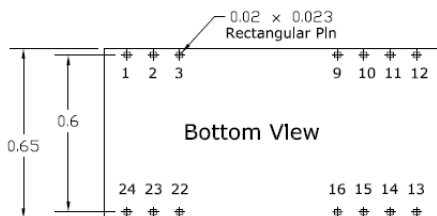
Features

- **Standard pin out; DIP24 packages compliant**
- High efficiency – **88% @ 5V /3A Full Load**
- Compact size – **1.27” x 0.65” x 0.4”**
- **4:1 Ultra-Wide** input range 4.5 – 18 & 9 – 36VDC
- 3.3V, 5V, 12V, 15V, ±12V or ±15V outputs
- -40°C to +60°C operation without derating
- MTBF≥2,000,000 hours @50°C GB (BellCoreTR-332)
- No life-span constrained Capacitor inside
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation upto 6K VDC
- Thermal shutdown
- RoHS compliant
- **SMT package available**
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

ESAN converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is supplied completely encased to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Single	Dual
1	EN	EN
2	-Vin	-Vin
3	-Vin	-Vin
4-8	No Pin	No Pin
9	NC	Comm
10	NC	NC
11	NC	-Vout
12	NC	NC

Pin#	Single	Dual
13	NC	NC
14	+Vout	+Vout
15	NC	NC
16	-Vout	Comm
17-21	No Pin	No Pin
22	+Vin	+Vin
23	+Vin	+Vin
24	NC	NC

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
ESAN10050-1-E7	4.5-18 (10)	0.62	5	1.4	7	80%
ESAN10120-S-E7		0.61	12	0.58		82%
ESAN10150-S-E7		0.61	15	0.46		82%
ESAN10120-D-E7		0.61	±12	±0.29		82%
ESAN10150-D-E7		0.61	±15	±0.23		82%
ESAN10050-2-E10		1.19	5	2	10	84%
ESAN10120-S-E10		1.19	12	0.83		84%
ESAN10150-S-E10		1.19	15	0.66		84%
ESAN10120-D-E10		1.19	±12	±0.41		84%
ESAN10150-D-E10		1.19	±15	±0.33		84%
ESAN18033-2-E7	9-36 (18)	0.33	3.3	2.1	7	84%
ESAN18050-1-E7		0.32	5	1.4		85%
ESAN18120-S-E7		0.33	12	0.58		84%
ESAN18150-S-E7		0.33	15	0.46		84%
ESAN18120-D-E7		0.33	±12	±0.29		84%
ESAN18150-D-E7		0.33	±15	±0.23		84%
ESAN18033-3-E10		0.65	3.3	3	10	86%
ESAN18050-2-E10		0.65	5	2		86%
ESAN18120-S-E10		0.65	12	0.83		86%
ESAN18150-S-E10		0.65	15	0.66		86%
ESAN18120-D-E10		0.65	±12	±0.43		86%
ESAN18150-D-E10		0.65	±15	±0.33		86%
ESAN18033-5-E15		0.96	3.3	4.5	15	87%
ESAN18050-3-E15		0.95	5	3		88%
ESAN18120-S-E15		0.96	12	1.25		87%
ESAN18150-S-E15		0.96	15	1		87%
ESAN18120-D-E15		0.96	±12	±0.625		87%
ESAN18150-D-E15		0.96	±15	±0.5		87%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	ESAN10 models	4.5	10	18	VDC
	ESAN18 models	9	18	36	VDC
Under-Voltage Lockout Turn-ON Threshold	ESAN10 models	4.5			VDC
	ESAN18 models	8.8			VDC
Under-Voltage Lockout Turn-OFF Threshold	ESAN10 models			4.2	VDC
	ESAN18 models			8	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	10% Load			±1.0	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0	3.0	%Vo(pk-pk)
			0.4	1.0	%Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	50-75% load step change		100	200	µSec.
Transient Peck Deviation	50-75% load step change			±2	%Vo
Start-Up Time			100	200	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		105	°C
Isolation Voltage	All models, 1 Minute			3000	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	For 3KV version only			1000	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Efficiency	See model selection guide				
Dimensions	1.27" x 0.65" x 0.4" (32.3 x 16.5 x 10.2mm)				
Case Material	Plastic				

It is recommended to protect the input by fuses or other protection devices.

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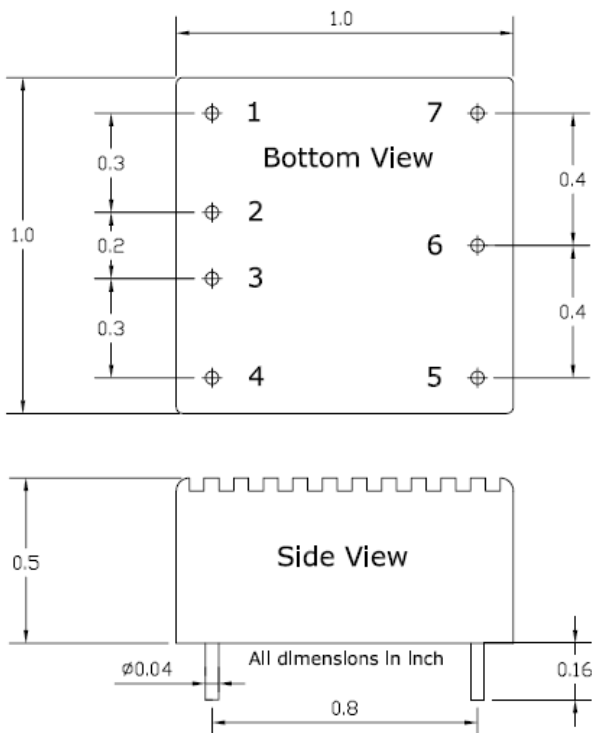
Features

- Industrial Standard pin out
- High efficiency – 89% @ 5V /4A Full Load
- Compact size – 1.0” x 1.0” x 0.4”
- 4:1 Ultra-Wide input range 9–36, 18–75, 40–160VDC
- 3.3V, 5V, 12V, 15V, ±12V or ±15V outputs
- -40°C to +60°C operation without derating
- MTBF ≥ 2,000,000 hours @ 50°C GB (BellCoreTR-332)
- No life-span constrained Capacitor inside
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Light weight with 6 sided metal case shielding
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

ESBN converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is supplied completely encased to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Single	Dual
1	Case (Optional)	Case (Optional)
2	+Vin	+Vin
3	-Vin	-Vin
4	Enable	Enable
5	-Vout	-Vout
6	Trim	Comm
7	+Vout	+Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
ESBN18033-6-E PV	9-36 (18)	1.27	3.3	6.1	20	88%
ESBN18050-4-E PV		1.26	5	4		89%
ESBN18120-S-E PV		1.27	12	1.66		88%
ESBN18150-S-E PV		1.27	15	1.33		88%
ESBN18120-D-E PV		1.27	±12	±0.83		88%
ESBN18150-D-E PV		1.27	±15	±0.66		88%
ESBN36033-6-E PV	18-75 (36)	0.63	3.3	6.1		88%
ESBN36050-4-E PV		0.62	5	4		89%
ESBN36120-S-E PV		0.63	12	1.66		88%
ESBN36150-S-E PV		0.63	15	1.33		88%
ESBN36120-D-E PV		0.63	±12	±0.83		88%
ESBN36150-D-E PV		0.63	±15	±0.66		88%
ESBN110033-6-E PV	40-160 (110)	0.20	3.3	6.1		88%
ESBN110050-4-E PV		0.20	5	4		89%
ESBN110120-S-E PV		0.20	12	1.66		88%
ESBN110150-S-E PV		0.20	15	1.33		88%
ESBN110120-D-E PV		0.20	±12	±0.83		88%
ESBN110150-D-E PV		0.20	±15	±0.66		88%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	ESBN18 models	9	18	36	VDC
	ESBN36 models	18	36	75	VDC
	ESBN110 models	40			VDC
Under-Voltage Lockout Turn-ON Threshold	ESBN18 models	8.8			VDC
	ESBN36 models	17.8			VDC
	ESBN110 models	39			VDC
Under-Voltage Lockout Turn-OFF Threshold	ESBN18 models			8	VDC
	ESBN36 models			16	VDC
	ESBN110 models			38	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	10% Load			±1.0	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0	3.0	%Vo(pk-pk)
			0.4	1.0	%Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	50-75% load step change		100	200	µSec.
Transient Peck Deviation	50-75% load step change			±2	%Vo
Start-Up Time			100	200	mSec.
Output Power Protection		100	120	140	%

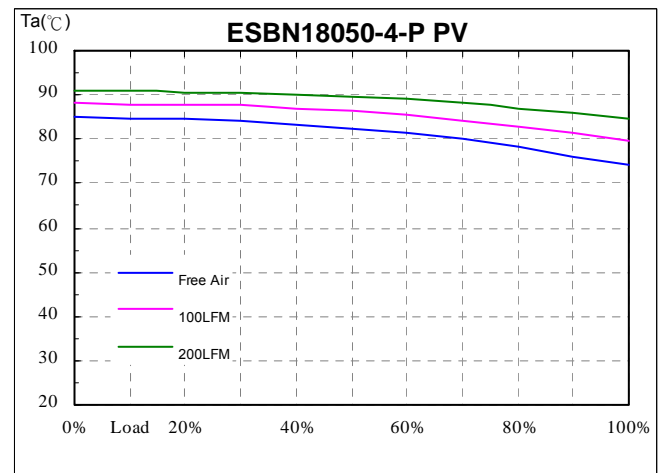
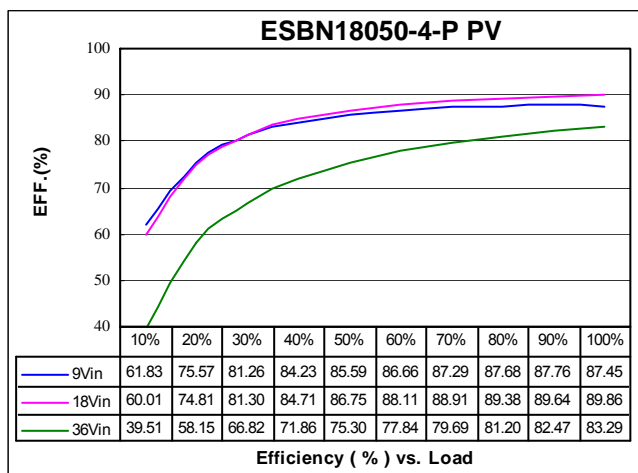
General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		100	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight				TBD	g (oz.)
Efficiency	See model selection guide				
Dimensions	1.0" x 1.0" x 0.5" (25.4 x 25.4 x 12.7mm)				

Characteristic Curves

Testing conditions are at typical input, Ta=+25°C, full load Unless otherwise indicated

The figures of ESBN18050-4-P PV



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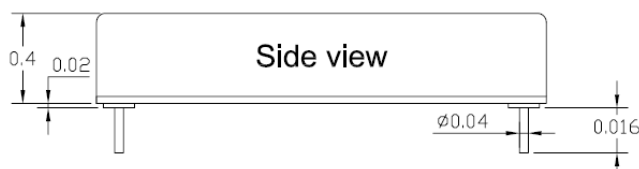
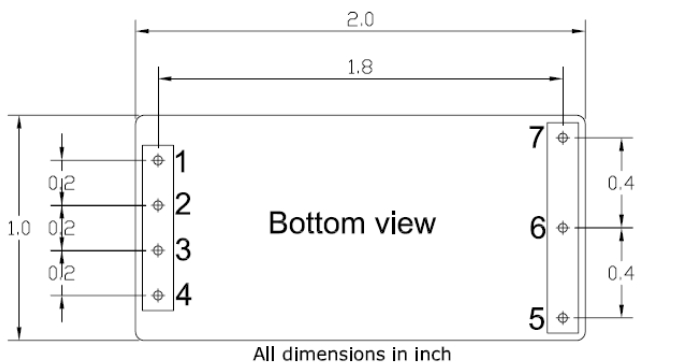
Features

- Industrial Standard pin out
- High efficiency – 90% @ 5V /8A Full Load
- Compact size – 2.0” x 1.0” x 0.4”
- 2:1 / 4:1 Ultra-Wide input range
- -40°C to +60°C operation without derating
- MTBF≥2,000,000 hours @50°C GB (BellCoreTR-332)
- No life-span constrained Capacitor inside
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Light weight with 6 sided metal case shielding
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

ESCN converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is supplied completely encased to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Case (Optional)	Case (Optional)
4	Enable	Enable
5	Trim	-Vout
6	-Vout	Comm
7	+Vout	+Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
ESCN24033-6-E	18-36 (24)	1.91	3.3	12.1	40	87%
ESCN24050-4-E		1.85	5	8		90%
ESCN24120-S-E		1.87	12	3.3		89%
ESCN24150-S-E		1.89	15	2.6		88%
ESCN24240-S-E		1.91	24	1.6		87%
ESCN24120-D-E		1.89	±12	±1.6		88%
ESCN24150-D-E		1.89	±15	±1.3		88%
ESCN24240-D-E		1.91	±24	±0.8		87%
ESCN48033-6-E	36-75 (48)	0.95	3.3	12.1		87%
ESCN48050-4-E		0.92	5	8		90%
ESCN48120-S-E		0.93	12	3.3		89%
ESCN48150-S-E		0.94	15	2.6		88%
ESCN48240-S-E		0.95	24	1.6		87%
ESCN48120-D-E		0.94	±12	±1.6		88%
ESCN48150-D-E		0.94	±15	±1.3		88%
ESCN48240-D-E		0.95	±24	±0.8		87%
ESCN18033-6-E	9-36 (18)	2.55	3.3	12.1		87%
ESCN18050-4-E		2.46	5	8		90%
ESCN18120-S-E		2.49	12	3.3		89%
ESCN18150-S-E		2.52	15	2.6		88%
ESCN18240-S-E		2.55	24	1.6		87%
ESCN18120-D-E		2.52	±12	±1.6		88%
ESCN18150-D-E		2.52	±15	±1.3		88%
ESCN18240-D-E		2.55	±24	±0.8		87%
ESCN36033-6-E	18-75 (36)	1.26	3.3	12.1	88%	
ESCN36050-4-E		1.23	5	8	90%	
ESCN36120-S-E		1.24	12	3.3	89%	
ESCN36150-S-E		1.24	15	2.6	89%	
ESCN36240-S-E		1.27	24	1.6	87%	
ESCN36120-D-E		1.26	±12	±1.6	88%	
ESCN36150-D-E		1.26	±15	±1.3	88%	
ESCN36240-D-E		1.27	±24	±0.8	87%	

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

✘ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	ESCN24 models	18	24	36	VDC
	ESCN48 models	36	48	75	VDC
	ESCN18 models	9	18	36	VDC
	ESCN36 models	18	36	75	VDC
Under-Voltage Lockout Turn-ON Threshold	ESCN24 models	17.8			VDC
	ESCN48 models	35			VDC
	ESCN18 models	8.8			VDC
	ESCN36 models	17.8			VDC
Under-Voltage Lockout Turn-OFF Threshold	ESCN24 models			16	VDC
	ESCN48 models			34	VDC
	ESCN18 models			8	VDC
	ESCN36 models			16	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	10% Load(2:1)			±1.0	%
	50% Load(4:1)			±1.5	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0	3.0	%Vo(pk-pk)
			0.4	1.0	%Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	50-75% load step change(2:1)		100	200	µSec.
	25% load step change(4:1)			800	µSec.
Transient Peck Deviation	50-75% load step change(2:1)			±2	%Vo
	25% load step change(4:1)			±2	%Vo
Start-Up Time			2	5	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		100	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight				TBD	g (oz.)
Efficiency	See model selection guide				
Dimensions	2.0" x 1.0" x 0.4" (50.8 x 25.4 x 10.2mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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Features

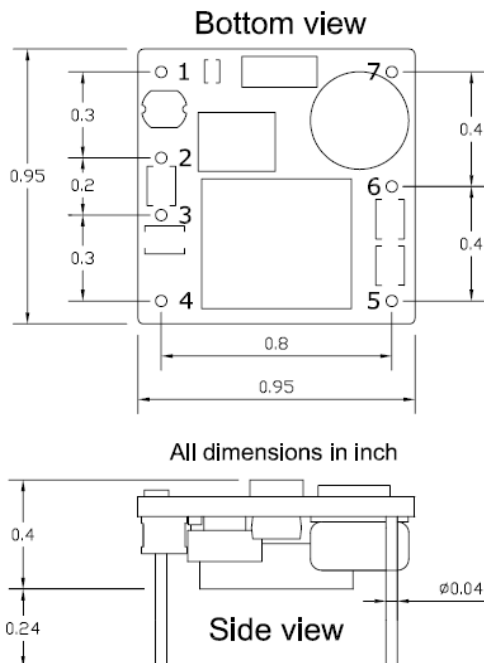
- High efficiency – **90% @ 5V Full Load**
- Save **50%** board space
- Standard pin out; **Fully replaceable** with 2"x1" package
- **2250VDC I/O Insulation** (basic insulation)
- Patented architecture and control circuitry
- 3.3V, 5V, 12V, 15V, $\pm 12V$, $\pm 15V$ outputs
- High power up to **20W**
- Free air convection form **-40°C to +60°C**
- Input under-voltage lockout
- Output current limit and short circuit protection
- **IEC950, EN60950 and UL1950 pending**

Description

The new ESO series converters are targeted specifically at the telecommunication, industrial electronics, mobile telecommunication, and distributed power markets. These 12 members accept two wide input ranges from 18-36 & 36-75 VDC and provide single or dual outputs. All models feature fixed switching frequency operation, input under voltage lockout, over-temperature protection, output over-voltage protection, output current limiting, and short circuit protection.

The converters combine creative design concept and conservative component selection to achieve very high reliability, high performance and low cost.

Package Specifications



Pin Connections

Pin#	Single	Dual
1	No Pin	No Pin
2	+Vin	+Vin
3	-Vin	-Vin
4	Enable	Enable
5	-Vout	-Vout
6	Trim	Comm
7	+Vout	+Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
ESO24033-6-E	18-36 (24)	0.94	3.3	6.1	20	88%
ESO24050-4-E		0.93	5	4		89%
ESO24120-S-E		0.94	12	1.66		88%
ESO24150-S-E		0.94	15	1.33		88%
ESO24120-D-E		0.94	±12	±0.83		88%
ESO24150-D-E		0.94	±15	±0.66		88%
ESO48033-6-E	36-75 (48)	0.46	3.3	6.1		89%
ESO48050-4-E		0.46	5	4		89%
ESO48120-S-E		0.47	12	1.66		88%
ESO48150-S-E		0.47	15	1.33		88%
ESO48120-D-E		0.47	±12	±0.83		88%
ESO48150-D-E		0.47	±15	±0.66		88%
ESO18033-6-E	9-36 (18)	1.27	3.3	6.1		87%
ESO18050-4-E		1.26	5	4		88%
ESO18120-S-E		1.27	12	1.66		87%
ESO18150-S-E		1.27	15	1.33		87%
ESO18120-D-E		1.27	±12	±0.83		87%
ESO18150-D-E		1.27	±15	±0.66		87%
ESO36033-6-E	18-75 (36)	0.63	3.3	6.1	88%	
ESO36050-4-E		0.62	5	4	89%	
ESO36120-S-E		0.63	12	1.66	87%	
ESO36150-S-E		0.63	15	1.33	87%	
ESO36120-D-E		0.63	±12	±0.83	87%	
ESO36150-D-E		0.63	±15	±0.66	87%	

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications
Input

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	ESO18 models	9	18	36	VDC
	ESO24 models	18	24	36	VDC
	ESO36 models	18	36	75	VDC
	ESO48 models	36	48	75	VDC
Under-Voltage Lockout Turn-ON Threshold	ESO18 models	8.8			VDC
	ESO24 models/ ESO36 models	17.8			VDC
	ESO48 models	35			VDC
Under-Voltage Lockout Turn-OFF Threshold	ESO18 models			8	VDC
	ESO24 models/ ESO36 models			16	VDC
	ESO48 models			34	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

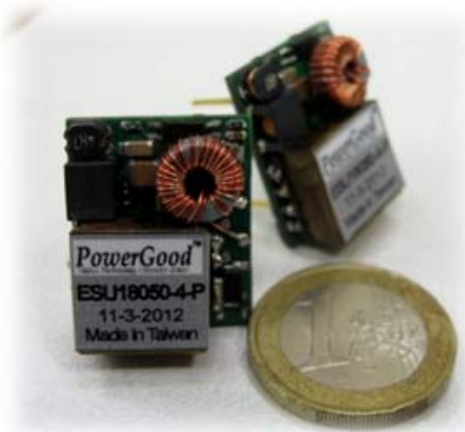
Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	10% Load			±1.0	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0	3.0	%Vo(pk-pk)
			0.4	1.0	%Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	50-75% load step change		100	200	µSec.
Transient Peck Deviation	50-75% load step change			±2	%Vo
Start-Up Time			100	200	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		100	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1000	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.	TBD			Hours
Weight				TBD	g (oz.)
Efficiency	See model selection guide				
Dimensions	0.95" x 0.95" x 0.4" (24.2 x 24.2 x 10.1mm)				

It is recommended to protect the input by fuses or other protection devices.

The information and specifications contained in this data sheet are believed to be correct at time of publication. All specifications are subject to change without notice. No rights under any patent accompany the sale of any such products or information contained herein.



Features

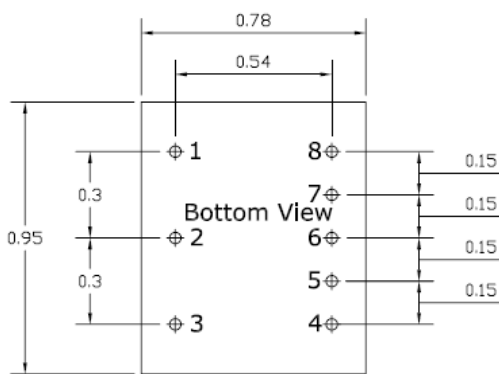
- High efficiency – **Synchronous Rectifier Topology**
- **2250V Isolated Insulation** (input to output)
- Patented architecture and control
- **On-board** Input differential **PI-filter**
- Ultra wide 2:1 & 4:1 input ranges
- Industry-Standard **DOSA** pinout
- Standard **1/32th Brick** Foot-print: 0.78” by 0.95”
- PTH versions
- Fixed-frequency Operation
- Hiccup Overcurrent protection
- Fully protected: OVP, OTP, OCP and UVLO
- Remote Sense & Remote Enable Control
- **IEC950, EN60950 and UL1950 pending**

Description

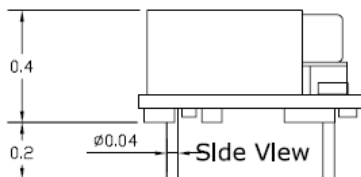
ESU Series high-current, high-efficiency, isolated converters are designed to compatible with industry **1/32th Brick Standard** footprint and pin assignment. The ultra-wide 18 to 75 input range facilitates operation from 24V and 48V; eliminating the need for multiple host-system circuit-pack designs, and reducing the number of brick part numbers in inventory, in applications such as wireless base stations.

Features are basic insulation, start-up into highly-capacitive loads, and low conducted and radiated EMI. Interface features include: remote on/off, remote output voltage sensing, and industry-standard output trim. Protections include: over-voltage, under-voltage, over-current, and over-temperature.

Package Specifications



All dimensions in inch



Pin Connections

Pin#	Function
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Trim
7	-Sense
8	-Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
ESU48033-9-E	36-75 (48)	0.71	3.3	9.1	30	87%
ESU48050-6-E		0.71	5	6		88%
ESU48120-2-E		0.71	12	2.5		87%
ESU48150-2-E		0.71	15	2		87%
ESU36033-9-E	18-75 (36)	0.95	3.3	9.1		87%
ESU36050-6-E		0.94	5	6		88%
ESU36120-2-E		0.95	12	2.5		87%
ESU36150-2-E		0.95	15	2		87%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	ESU36 models ESU48 models	18 36	36 48	75 75	VDC VDC
Under-Voltage Lockout Turn-ON Threshold	ESU36 models ESU48 models	17.8 35			VDC VDC
Under-Voltage Lockout Turn-OFF Threshold	ESU36 models ESU48 models			16 34	VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.5	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	3.0 1.0	%Vo(pk-pk) %Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			400	µSec.
Transient Peck Deviation	25% load step change			2	%Vo
Start-Up Time			50	100	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		100	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight				TBD	g (oz.)
Efficiency	See model selection guide				
Dimensions	0.78" x 0.95" x 0.4" (19.8 x 24.1 x 10.2mm)				

It is recommended to protect the input by fuses or other protection devices.

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Features

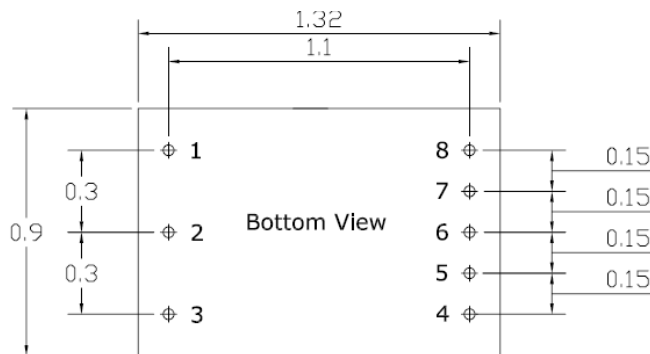
- High efficiency – **Synchronous Rectifier Topology**
- **2250V Isolated Insulation** (input to output)
- Patented architecture and control
- **On-board** Input differential **PI-filter**
- 2:1 input ranges
- Industry-Standard **DOSA** pinout
- Standard **1/16th Brick** Foot-print:0.9” by 1.3”
- PTH versions
- Fixed-frequency Operation
- Hiccup Overcurrent protection
- Fully protected: OVP, OTP, OCP and UVLO
- Remote Sense & Remote Enable Control
- **IEC950, EN60950 and UL1950 pending**

Description

EST Series high-current, high-efficiency, isolated converters are designed to compatible with industry **Sixteenth Brick Standard** footprint and pin assignment. The ultra-wide 18 to 75 input range facilitates operation from 24V and 48V; eliminating the need for multiple host-system circuit-pack designs, and reducing the number of brick part numbers in inventory, in applications such as wireless base stations.

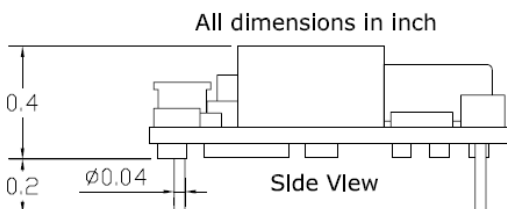
Features are basic insulation, start-up into highly-capacitive loads, and low conducted and radiated EMI. Interface features include: remote on/off, remote output voltage sensing, and industry-standard output trim. Protections include: over-voltage, under-voltage, over-current, and over-temperature.

Package Specifications



Pin Connections

Pin#	Function
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Trim
7	-Sense
8	-Vout



Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
EST48033-15-E	36-75 (48)	1.1	3.3	15.1	50	89%
EST48050-10-E		1.1	5	10		90%
EST48120-04-E		1.1	12	4.1		88%
EST36033-15-E	18-75 (36)	1.6	3.3	15.1	50	88%
EST36050-10-E		1.6	5	10		89%
EST36120-04-E		1.6	12	4.1		87%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	EST36 models EST48 models	18 36	36 48	75 75	VDC VDC
Under-Voltage Lockout Turn-ON Threshold	EST36 models EST48 models	17.8 35			VDC VDC
Under-Voltage Lockout Turn-OFF Threshold	EST36 models EST48 models			16 34	VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	PI Filter			

Output

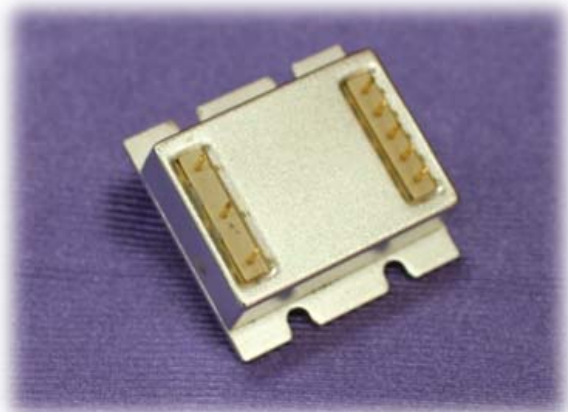
Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.5	%
Line Regulation	Low line to High line			±0.3	%
Load Regulation	10% to 100% load			±0.5	%
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	3.0 1.0	%Vo(pk-pk) %Vo(RMS)
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			400	µSec.
Transient Peck Deviation	25% load step change			2	%Vo
Start-Up Time			50	100	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-40		100	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBC		Hours
Weight				18.0	g (oz.)
Efficiency	See model selection guide				
Dimensions	0.9" x 1.32" x 0.4" (22.9 x 33.5 x 10.2mm)				

It is recommended to protect the input by fuses or other protection devices.

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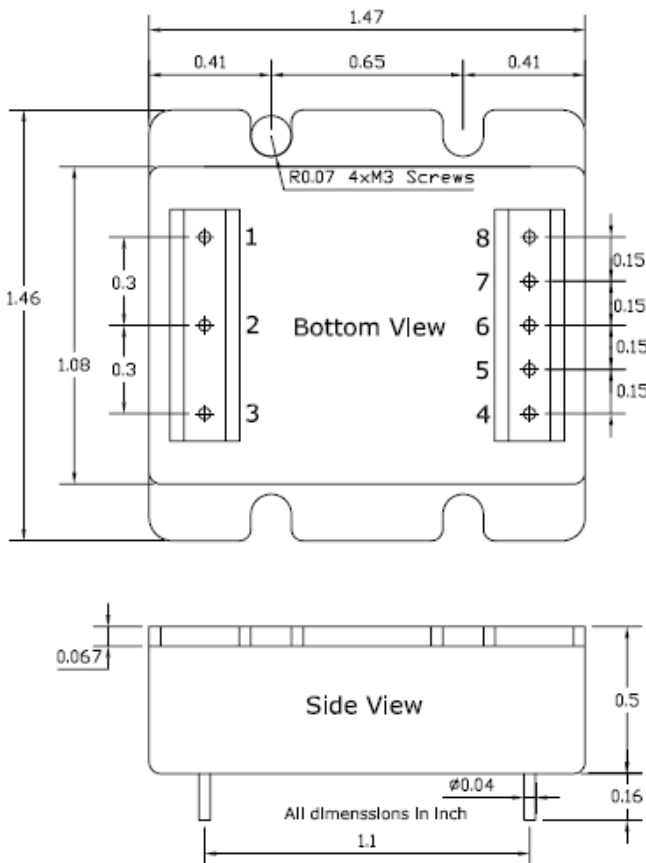
Features

- Industry-Standard DOSA pinout
- High efficiency – **Synchronous Rectifier Topology**
- Fixed switching frequency provides predictable EMI
- No life-span constrained Capacitor inside
- Output current limit and short circuit protection
- Output over-voltage protection
- Remote sense for the output voltage
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Thermal shutdown
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

STB Sixteenth-Brick converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Function
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Trim
7	-Sense
8	-Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
STB48033-15-E	36-75 (48)	1.1	3.3	15.1	50	89%
STB48050-10-E		1.1	5	10		90%
STB48120-04-E		1.1	12	4.1		88%
STB48150-03-E		1.1	15	3.3		88%
STB18033-15-E	9-36 (18)	3.1	3.3	15.1	50	88%
STB18050-10-E		3.1	5	10		89%
STB18120-04-E		3.1	12	4.1		87%
STB18150-03-E		3.1	15	3.3		87%
STB36033-15-E	18-75 (36)	1.6	3.3	15.1	50	88%
STB36050-10-E		1.6	5	10		89%
STB36120-04-E		1.6	12	4.1		87%
STB36150-03-E		1.6	15	3.3		87%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Operating Input Voltage ranges	STB48 models	36	48	75	VDC
	STB18 models	9	18	36	VDC
	STB36 models	18	36	75	VDC
Under-Voltage Turn-ON Threshold	STB48 models	35			VDC
	STB18 models	8.8			VDC
	STB36 models	17.8			VDC
Under-Voltage Turn-OFF Threshold	STB48 models			34	VDC
	STB18 models			8	VDC
	STB36 models			16	VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	Pi Filter			

Output

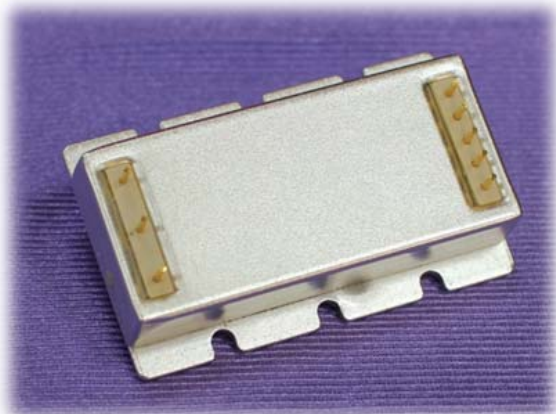
Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.5	%Vo
Output Voltage adjust range	50% load			±10	%Vo
Line Regulation	Low line to High line			±0.3	%Vo
Load Regulation	10% to 100% load			±0.5	%Vo
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0	2.0	%Vo pk-pk
			0.4	1.0	%Vo RMS
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			400	µSec.
Transient Peck Deviation	25% load step change			2	%Vo
Start-Up Time			50	100	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-45		110	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	10			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Dimensions	1.47" x 1.46" x 0.5" (37.3 x 37.1 x 12.7mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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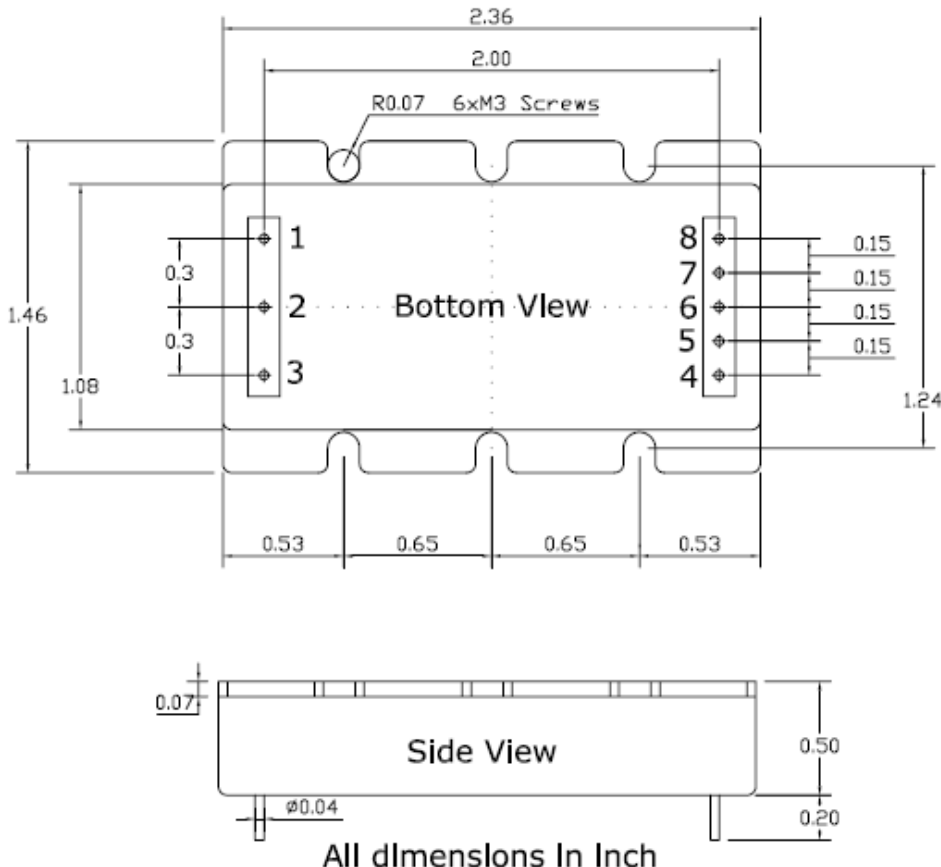
Features

- High efficiency – **Synchronous Rectifier Topology**
- Fixed switching frequency provides predictable EMI
- No life-span constrained Capacitor inside
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Remote sense for the output voltage
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Thermal shutdown
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

SQB Quarter-Brick converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Function
1	-Vin
2	Enable
3	+Vin
4	+Vout
5	+Sense
6	Trim
7	-Sense
8	-Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
SQB018033-20-E	9-36 (18)	4.2	3.3	20	66	88%
SQB018050-20-E		6.2	5	20	100	89%
SQB018120-10-E		7.7	12	10	125	90%
SQB018150-08-E		7.7	15	8.3		90%
SQB018240-05-E		7.7	24	5.2		90%
SQB018280-04-E		7.7	28	4.5		90%
SQB018480-02-E		7.7	48	2.6		90%
SQB024033-25-E	18-36 (24)	3.8	3.3	25	82	89%
SQB024050-20-E		4.6	5	20	100	90%
SQB024120-13-E		6.9	12	12.5	150	90%
SQB024150-10-E		6.9	15	10		90%
SQB024240-06-E		6.9	24	6.3		90%
SQB024280-05-E		6.9	28	5.4		90%
SQB024480-03-E		6.9	48	3.1		90%
SQB110033-25-E	40-160 (110)	0.8	3.3	25	82	88%
SQB110050-20-E		1	5	20	100	90%
SQB110120-13-E		1.5	12	12.5	150	90%
SQB110150-10-E		1.5	15	10		90%
SQB110240-06-E		1.5	24	6.3		90%
SQB110280-05-E		1.5	28	5.4		90%
SQB110480-03-E		1.5	48	3.1		90%
SQB270033-25-E	150-450 (270)	0.3	3.3	25	82	89%
SQB270050-20-E		0.4	5	20	100	90%
SQB270120-13-E		0.6	12	12.5	150	90%
SQB270150-10-E		0.6	15	10		90%
SQB270240-06-E		0.6	24	6.3		90%
SQB270280-05-E		0.6	28	5.4		90%
SQB270480-03-E		0.6	48	3.1		90%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Transient Input Voltage ranges	SQB18 models SQB24 models SQB110 models SQB270 models			50 50 200 500	VDC VDC VDC VDC
Operating Input Voltage ranges	SQB18 models SQB24 models SQB110 models SQB270 models	9 18 40 150	18 24 110 270	36 36 160 450	VDC VDC VDC VDC
Under-Voltage Turn-ON Threshold	SQB18 models SQB24 models SQB110 models SQB270 models	8.8 17.8 39 145			VDC VDC VDC VDC
Under-Voltage Turn-OFF Threshold	SQB18 models SQB24 models SQB110 models SQB270 models			8 16 38 140	VDC VDC VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	Pi Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.0	%Vo
Output Voltage adjust range	50% load			±10	%Vo
Line Regulation	Low line to High line			±0.3	%Vo
Load Regulation	10% to 100% load			±0.5	%Vo
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	2.0 1.0	%Vo pk-pk %Vo RMS
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			1	mSec.
Transient Peck Deviation	25% load step change			1.5	%Vo
Start-Up Time			5	20	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-45		110	°C
Isolation Voltage	All models, 1 Minute			2250	VDC
Isolation Resistance	All models, 500VDC	100			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Dimensions	1.46" x 2.36" x 0.5" (37.1 x 59.9 x 12.7mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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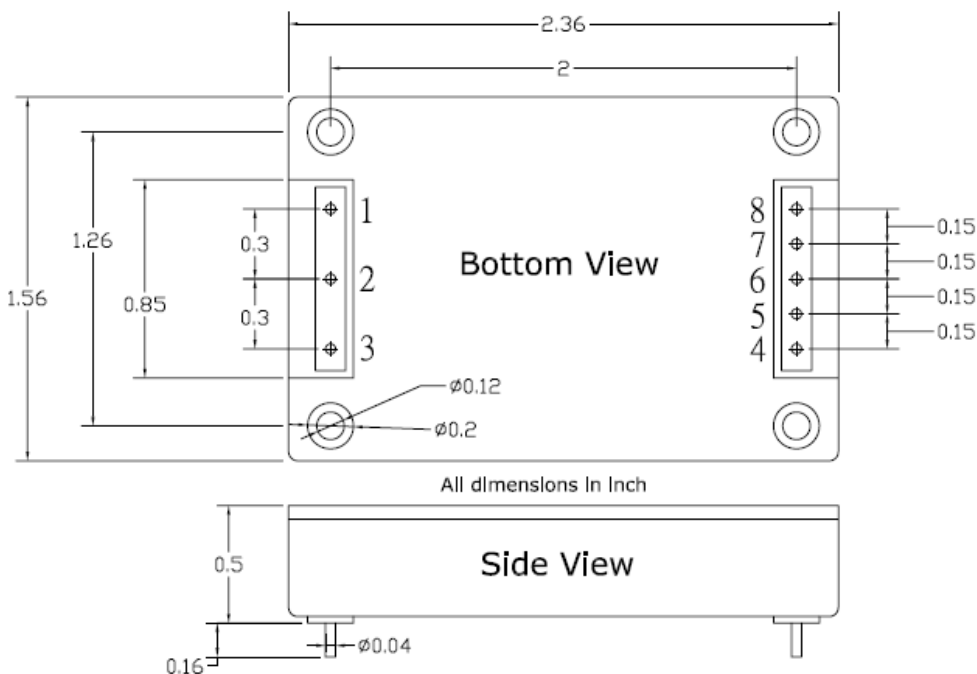
Features

- High efficiency – **Synchronous Rectifier Topology**
- Single, Dual, & Multiple Outputs available
- Ultra wide 8:1 input range
- Fixed switching frequency provides predictable EMI
- No life-span constrained Capacitor inside
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Remote sense for the output voltage
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Thermal shutdown
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

● **Description**

MQB Quarter-Brick converter series is composed of Isolated, board-mountable, fixed switching frequency dc-dc converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Type \ Pin #	1	2	3	4	5	6	7	8
Single	-Vin	Enable	+Vin	+Vout	+Sense	Trim	-Sense	-Vout
Bipolar	-Vin	Enable	+Vin	+Vout	NC	Common	NC	-Vout
Dual	-Vin	Enable	+Vin	HVout	HV Trim	Common	LV Trim	LVout
Triple	-Vin	Enable	+Vin	+Vout	-Vout	Common	SV Trim	SVout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL	
	Voltage(V)	Current(A)	Voltage	Current	Power	Typ.(%)	
	Range	Full load	(V)	(A)	(W)		
MQB028050-S-E	9-75 (28)	2.05	+5	10	50	87%	
MQB028120-S-E		2.46	+12	5	60	87%	
MQB018033050-D-E	9-36 (18)	5.5	+3.3	10	33	88%	
MQB018050120-D-E			6.9	+5	10		50
		+12		5	60	88%	
MQB018120120-B-E		7.5	+12	5	60		88%
MQB018050120-T-E			6.3	-12	5	60	
		+5		10	50	88%	
MQB024033050-D-E		4.16	±12	+5	10		50
				+3.3	10	33	
MQB024050120-D-E	5.2	±12	+5	10	50	88%	
			+12	5	60		
MQB024120120-B-E	5.7	±12	+12	5	60	88%	
			-12	5	60		
MQB024050120-T-E	4.7	±12	+5	10	50	88%	
			±2	50			

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Transient Input Voltage ranges	MQB24 models MQB18 models MQB28 models			50 50 100	VDC VDC VDC
Operating Input Voltage ranges	MQB24 models MQB18 models MQB28 models	18 9 9	24 18 28	36 36 75	VDC VDC VDC
Under-Voltage Turn-ON Threshold	MQB24 models MQB18 models MQB28 models	17.8 8.8 8.8			VDC VDC VDC
Under-Voltage Turn-OFF Threshold	MQB24 models MQB18 models MQB28 models			16 8 8	VDC VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	Pi Filter			

Output

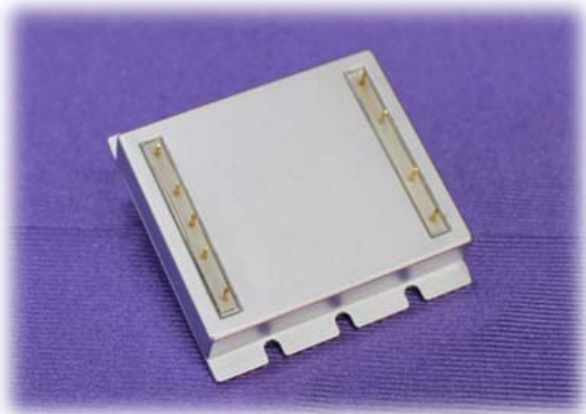
Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.0	%Vo
Output Voltage adjust range	50% load			±10	%Vo
Line Regulation	Low line to High line			±0.3	%Vo
Load Regulation	10% to 100% load			±0.5	%Vo
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	2.0 1.0	%Vo pk-pk %Vo RMS
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			1	mSec.
Transient Peck Deviation	25% load step change			1.5	%Vo
Start-Up Time			5	20	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-45		110	°C
Isolation Voltage	All models, 1 Minute			3000	VDC
Isolation Resistance	All models, 500VDC	100			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Dimensions	1.56" x 2.36" x 0.5" (39.6 x 59.9 x 12.7mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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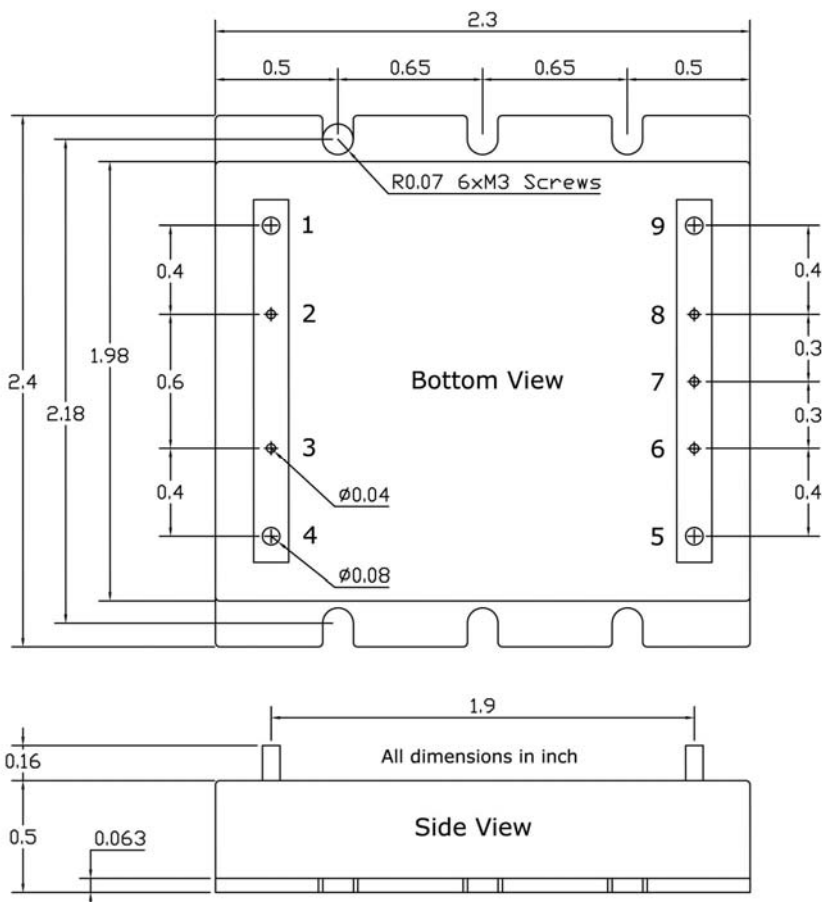
Features

- High efficiency – **Synchronous Rectifier Topology**
- Fixed switching frequency provides predictable EMI
- **No life-span constrained Capacitor** inside
- Single wire connection for **Load Share**
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Remote sense for the output voltage
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Thermal shutdown
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

SHB Half-Brick converter series is composed of Isolated, board-mountable, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Function
1	-Vin
2	Load Share
3	Enable
4	+Vin
5	+Vout
6	+Sense
7	Trim
8	-Sense
9	-Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
SHB018033-40-E	9-36 (18)	8.3	3.3	40	132	88%
SHB018050-40-E		12.5	5	40	200	89%
SHB018120-21-E		15.4	12	21	250	90%
SHB018150-17-E		15.4	15	17		90%
SHB018240-10-E		15.4	24	10		90%
SHB018280-09-E		15.4	28	8.9		90%
SHB018480-05-E		15.4	48	5.2		90%
SHB024033-50-E	18-36 (24)	7.7	3.3	50	165	89%
SHB024050-50-E		11.6	5	50	250	90%
SHB024120-30-E		16.7	12	30	360	90%
SHB024150-24-E		16.7	15	24		90%
SHB024240-15-E		16.7	24	15		90%
SHB024280-13-E		16.7	28	13		90%
SHB024480-08-E		16.7	48	7.5		90%
SHB024240-20-E		23.1	24	20.8	500	90%
SHB024280-17-E		23.1	28	17.8		90%
SHB024480-10-E		23.1	48	10.4		90%
SHB110033-50-E	40-160 (110)	1.7	3.3	50	165	88%
SHB110050-50-E		2.5	5	50	250	90%
SHB110120-25-E		3.0	12	25	300	90%
SHB110150-20-E		3.0	15	20		90%
SHB110240-12-E		3.0	24	12.5		90%
SHB110280-10-E		3.0	28	10.7		90%
SHB110480-06-E		3.0	48	6.25		90%
SHB270033-50-E	150-450 (270)	0.7	3.3	50	165	89%
SHB270050-50-E		1	5	50	250	90%
SHB270120-30-E		1.5	12	30	360	90%
SHB270150-24-E		1.5	15	24		90%
SHB270240-15-E		1.5	24	15		90%
SHB270280-13-E		1.5	28	13		90%
SHB270480-08-E		1.5	48	7.5		90%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Transient Input Voltage ranges	SHB18 models SHB24 models SHB110 models SHB270 models			50 50 200 500	VDC VDC VDC VDC
Operating Input Voltage ranges	SHB18 models SHB24 models SHB110 models SHB270 models	9 18 40 150	18 24 110 270	36 36 160 450	VDC VDC VDC VDC
Under-Voltage Turn-ON Threshold	SHB18 models SHB24 models SHB110 models SHB270 models	8.8 17.8 39 145			VDC VDC VDC VDC
Under-Voltage Turn-OFF Threshold	SHB18 models SHB24 models SHB110 models SHB270 models			8 16 38 140	VDC VDC VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	Pi Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.0	%Vo
Output Voltage adjust range	50% load			±10	%Vo
Line Regulation	Low line to High line			±0.3	%Vo
Load Regulation	10% to 100% load			±0.5	%Vo
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	2.0 1.0	%Vo pk-pk %Vo RMS
Temperature Coefficient				±0.04	% / °C
Transient Recovery Time	25% load step change			1	mSec.
Transient Peck Deviation	25% load step change			1.5	%Vo
Start-Up Time			5	20	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-45		110	°C
Isolation Voltage	All models, 1 Minute			3000	VDC
Isolation Resistance	All models, 500VDC	100			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Dimensions	2.3" x 2.4" x 0.5" (58.4 x 61.0 x 12.7mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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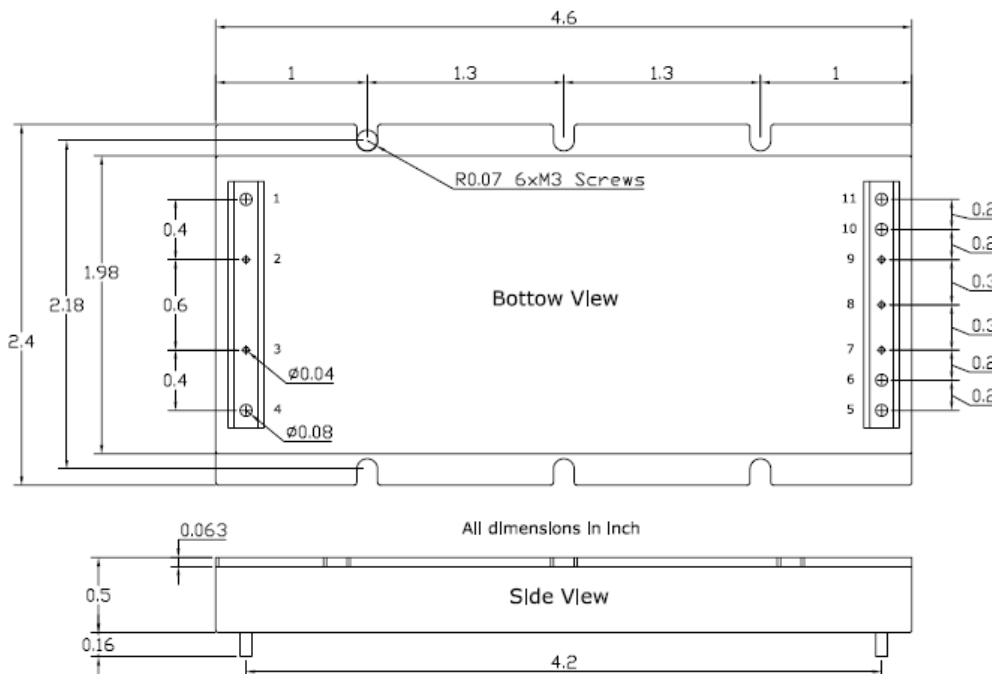
Features

- High efficiency – **Synchronous Rectifier Topology**
- Fixed switching frequency provides predictable EMI
- **No life-span constrained Capacitor** inside
- Single wire connection for **Load Share**
- No minimum load requirement
- Output current limit and short circuit protection
- Output over-voltage protection
- Remote sense for the output voltage
- Output voltage trim range of -10%, +10%
- Input under-voltage lockout
- Input-to-output isolation 2250V
- Thermal shutdown
- RoHS compliant
- **UL60950-1 and EN60950-1 recognized (pending)**

Description

SFB Full-Brick converter series is composed of Isolated, board-mountable, fixed switching frequency DC-DC converters that use synchronous rectification to achieve extremely high power conversion efficiency. These DC-DC converter modules use advanced power processing, control and packaging technologies to enhance the performance, flexibility, reliability and cost effectiveness of mature power components. Each module is six-sided metal case enclosed to provide protection from the harsh environments seen in many industrial and transportation applications.

Package Specifications



Pin Connections

Pin#	Function
1	-Vin
2	Load Share
3	Enable
4	+Vin
5	+Vout
6	+Vout
7	+Sense
8	Trim
9	-Sense
10	-Vout
11	-Vout

Model Selection Guide

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Model	Input		Output			Efficiency @FL
	Voltage (V)	Current (A)	Voltage	Current	Power	
	Range (Typ.)	Full load	(V)	(A)	(W)	Typ.
SFB024120-60-E	18-36 (24)	33.3	12	60	720	90%
SFB024150-48-E		33.3	15	48		90%
SFB024240-30-E		33.3	24	30		90%
SFB024280-25-E		33.3	28	25.7		90%
SFB024480-15-E		33.3	48	15		90%
SFB270120-60-E	150-450 (270)	2.96	12	60	720	90%
SFB270150-66-E		3.70	15	60	900	90%
SFB270240-40-E		3.95	24	40	960	90%
SFB270280-34-E		3.95	28	34		90%
SFB270480-20-E		3.95	48	20		90%

Enable Polarity : “-P” for positive logic PI Input Filter, “-N” for negative logic PI Input Filter

※ For intermediate / higher values, other models or custom design, please contact the factory.

Electrical Specifications

Typical @ Ta=+25°C under nominal line voltage and full load conditions unless noted.

Input

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Transient Input Voltage ranges	SFB24 models SFB270 models			50 500	VDC VDC
Operating Input Voltage ranges	SFB24 models SFB270 models	18 150	24 270	36 450	VDC VDC
Under-Voltage Turn-ON Threshold	SFB24 models SFB270 models	17.8 145			VDC VDC
Under-Voltage Turn-OFF Threshold	SFB24 models SFB270 models			16 140	VDC VDC
Input Current	See model selection guide, Standby mode (OFF, UVLO) 5mA				
High Input Level	Enable Function Input	8		60	VDC
Low Input Level		0		1.2	VDC
Input Filter	All models	Pi Filter			

Output

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Output Voltage Accuracy	50% Load			±1.0	%Vo
Output Voltage adjust range	50% load			±10	%Vo
Line Regulation	Low line to High line			±0.3	%Vo
Load Regulation	10% to 100% load			±0.5	%Vo
Ripple & Noise (20MHz bandwidth)	Over Line, Load & Temp.		1.0 0.4	2.0 1.0	%Vo pk-pk %Vo RMS
Temperature Coefficient				±0.04	% /°C
Transient Recovery Time	25% load step change			1	mSec.
Transient Peck Deviation	25% load step change			1.5	%Vo
Start-Up Time			5	20	mSec.
Output Power Protection		100	120	140	%

General Specifications

Parameter	Notes and Conditions	Min.	Typ	Max.	Unit
Switching Frequency		220	260	300	KHz
Storage Temperature range	All models	-55		125	°C
Operating Case Temperature	All models	-45		110	°C
Isolation Voltage	All models, 1 Minute			3000	VDC
Isolation Resistance	All models, 500VDC	100			MΩ
Isolation Capacitance	All models			1500	pF
Humidity	All models			95	%
Calculated MTBF	BellCore TR-332 @ 50°C G.B.		TBD		Hours
Weight			TBD		g (oz.)
Dimensions	2.4" x4.6" x 0.5" (61.0 x 117.0 x 12.7mm)				
Case Material	Aluminum				

It is recommended to protect the input by fuses or other protection devices.

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