



SRBH-06H1A1

Non-Isolated DC-DC Converter

The SRBH-06H1A1 is part of the low cost non-isolated dc/dc power converter series providing up to 6A output current.

The output is closely regulated and the efficiency of 3.3Vdc output is typically 89% at full load.

Typical features include remote on/off, input under voltage lockout, over current protection and short circuit protection.

Key Features & Benefits

- 8-36 VDC Input / 3.3-5 VDC @ 6 A Output
- Non-isolated output
- High Efficiency
- High Power Density
- Excellent Thermal Performance
- OCP/SCP
- Remote On/Off
- Input Under Voltage Lockout
- Low Cost
- Class 2, Category 2, Non-Isolated DC/DC Converter (refer to IPC-9592B)



Applications

- Distributed Power Architectures
- Data Networking Equipment
- Telecommunications Applications



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1. MODEL SELECTION

MODEL NUMBER	OUTPUT VOLTAGE	INPUT VOLTAGE	MAX. OUTPUT CURRENT	MAX. OUTPUT POWER	TYPICAL EFFICIENCY
SRBH-06H1A1	3.3V -5V	8 V- 36 V	6 A	30 W	89%(Vo=3.3, Io=6A)

NOTE: Add "G" suffix at the end of the model number to indicate Tray Packaging or "R" indicating Tape and Reel packaging.

PART NUMBER EXPLANATION

S	R	BH	-	06	H	1A	1	x
Mounting Type	RoHS Status	Series Name		Output Current	Input Range	Output Voltage	Active Logic	Package Type
SMD	RoHS	Arrow Head		6A	8V – 36V	3.3V -5.0V	Active High	G – Tray Package R – Tape & Reel

2. ABSOLUTE MAXIMUM RATINGS

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Continuous Non-operating Input Voltage		-0.3	-	38	V
Remote On/Off		-0.3	-	12	V
Ambient Temperature		-40	-	85	°C
Storage Temperature		-40	-	125	°C
Altitude		-	-	2000	m

NOTE: Ratings used beyond the maximum ratings may cause a reliability degradation of the converter or may permanently damage the device.

3. INPUT SPECIFICATIONS

All specifications are typical at 25°C unless otherwise stated.

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Operating Input Voltage		8	-	36	V
Input Current (full load)	V _{in} =12V, V _o =3.3V, I _o =6A	-	1.9	-	A
Input Current (no load)		-	30	-	mA
Remote Off Input Current		-	TBD	-	mA
Input Reflected Ripple Current (rms)	1uH, 2*100 uF/50 V electrolytic capacitors, 3*4.7 uF/50V ceramic capacitor at the input.	-	50	-	mA
Input Reflected Ripple Current (pk-pk)		-	70	-	mA
I _{2t} Inrush Current Transient		-	TBD	-	A2s
Turn on Voltage Threshold	Input under voltage lockout (UVLO).	-	7.5	-	V
Turn off Voltage Threshold		-	4	-	V

CAUTION: All specifications are typical at nominal input, full load at 25°C unless noted.

4. OUTPUT SPECIFICATIONS

All specifications are typical at nominal input, full load at 25°C unless otherwise stated.

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Output Voltage Set Point	Vin=12 V, Io=50% full load	3.234	3.300	3.366	V
Load Regulation		-	±5	±10	mV
Line Regulation		-	±5	±10	mV
Regulation Over Temperature	-40 °C to +85 °C	-	30	50	mV
Ripple and Noise (pk-pk)	Vout=3.3V	-	60	100	mV
Ripple and Noise (rms)		-	25	50	mV
Output Current Range		0	-	6	A
Output DC Current Limit	Hiccup mode	8	10	12	A
Turn on Time(from Vin)		-	6	10	ms
Turn on Time(from Enable)		-	1	-	ms
Output capacitance		220	-	1200	uF
Transient Response					
ΔV 50%~100% of Max Load		-	80	150	mV
Settling Time	di/dt = 0.5 A/us; Vin = 12 V; Vout=3.3V; with a 220 uF Oscan capacitor at the output	-	200	300	us
ΔV 100%~50% of Max Load		-	80	150	mV
Settling Time		-	200	300	us

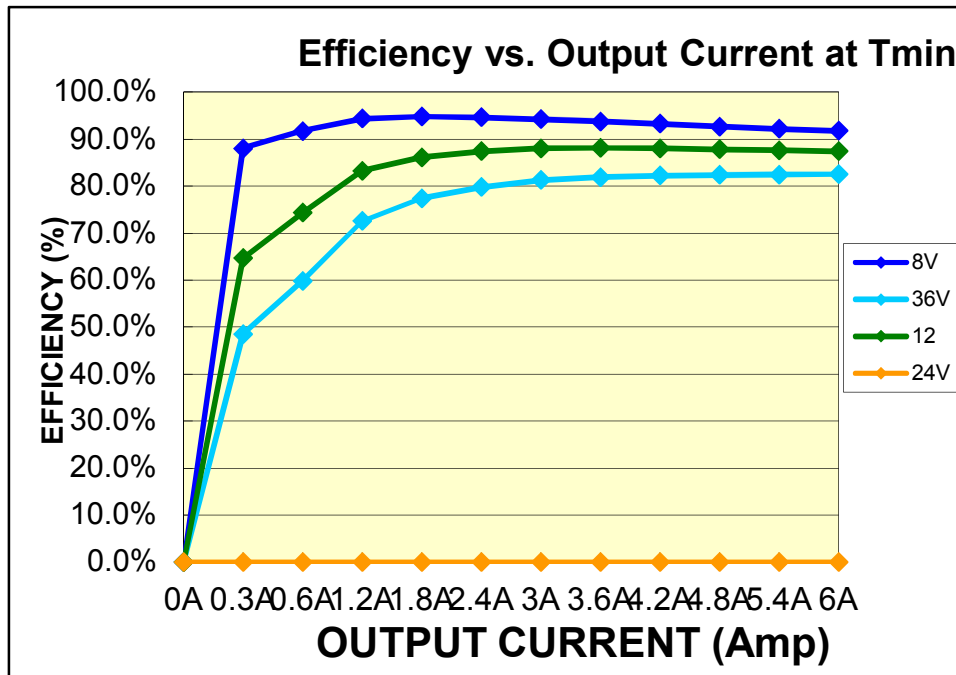
5. GENERAL SPECIFICATION

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Efficiency	Vin=12V Vo=3.3V full load	87	89	-	%
Switching Frequency		-	300	-	KHz
Output Trim Range		3.3	-	5	V
Over Voltage Protection	V _{OVT}	116	121	127	%
Weight		-	TBD	-	g
MTBF		-	TBD	-	hours
Dimensions					
Inches (L × W × H)		0.885 x 0.512 x 0.320			Inches
Millimeters (L × W × H)		22.48 x 13.00 x 8.13			mm

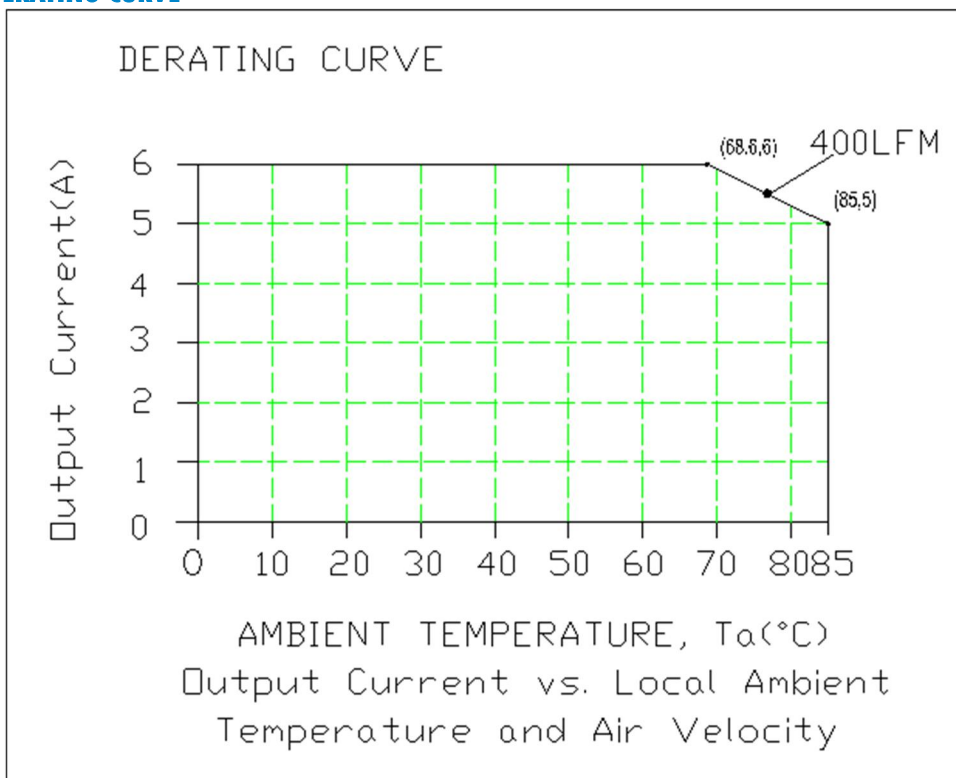
6. CONTROL/SUPERVISORY SPECIFICATIONS

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Enable					
Signal Low (Unit Off)	ENABLE pin open, unit off	-0.3	-	1	V
Signal High(Unit On)		2.8	-	12	V
Sourcing current		-	-	10	uA

7. EFFICIENCY DATA

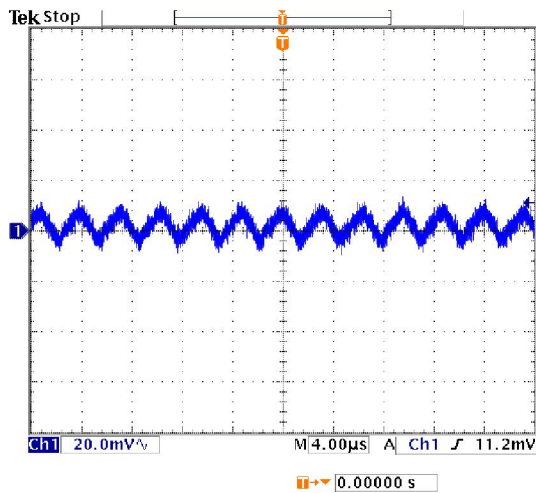
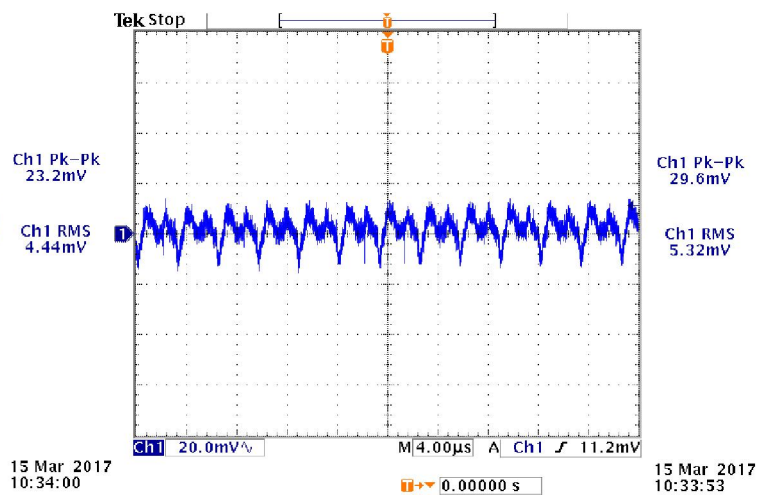
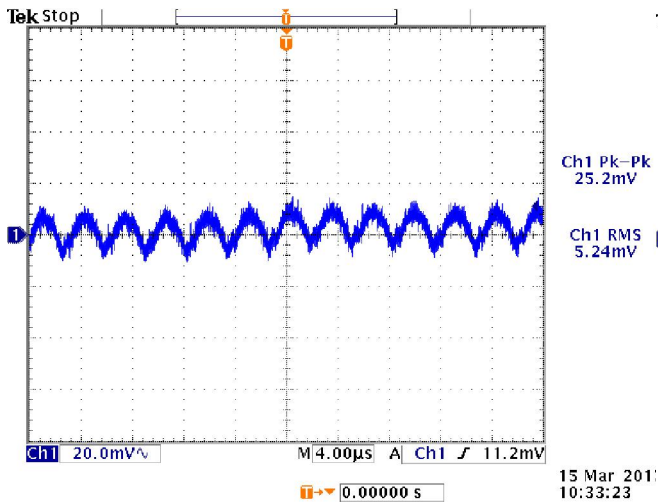
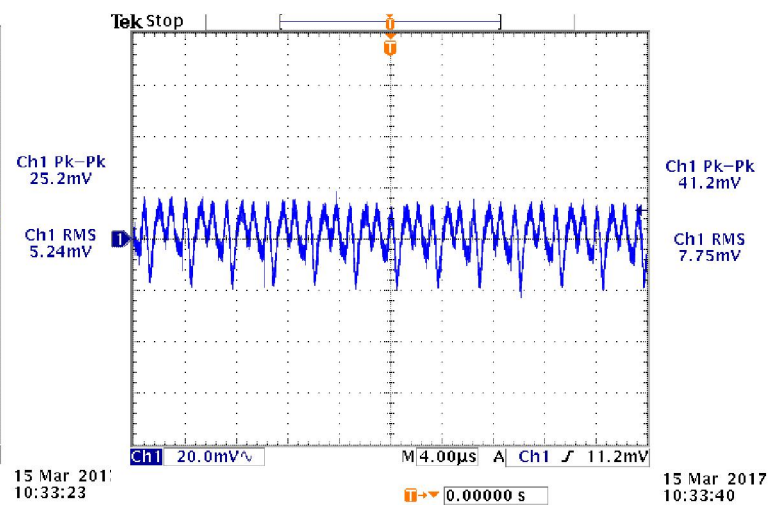
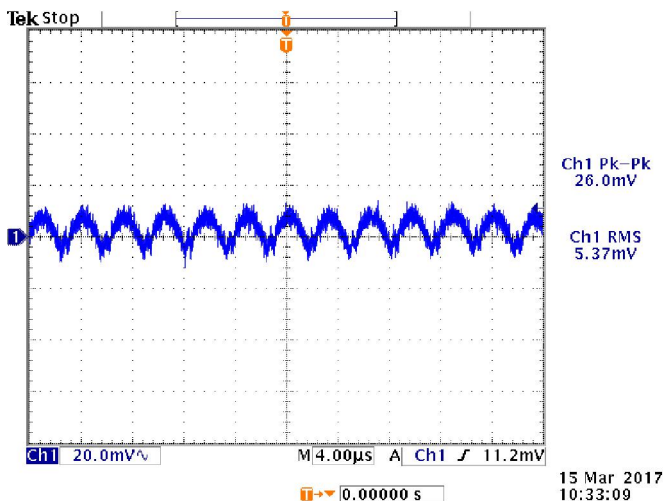
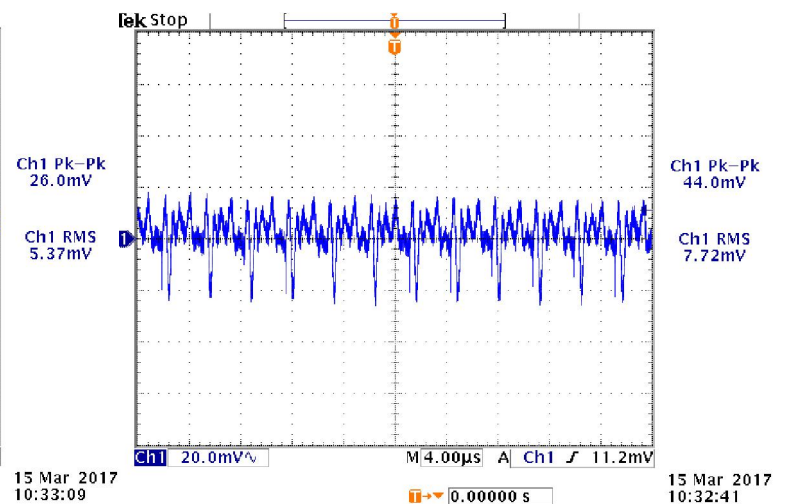


8. THERMAL DERATING CURVE

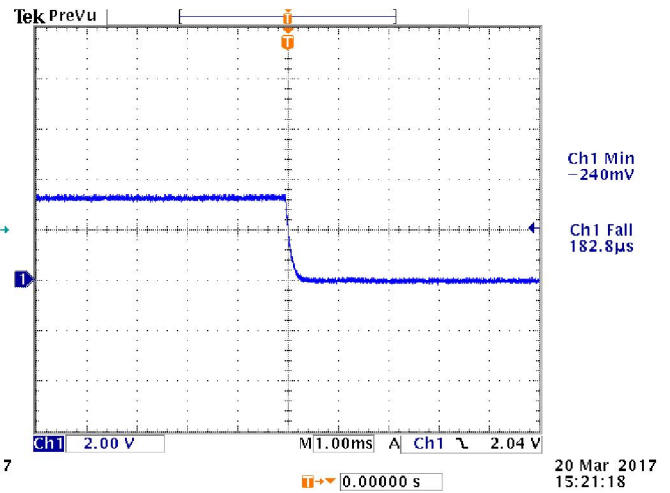
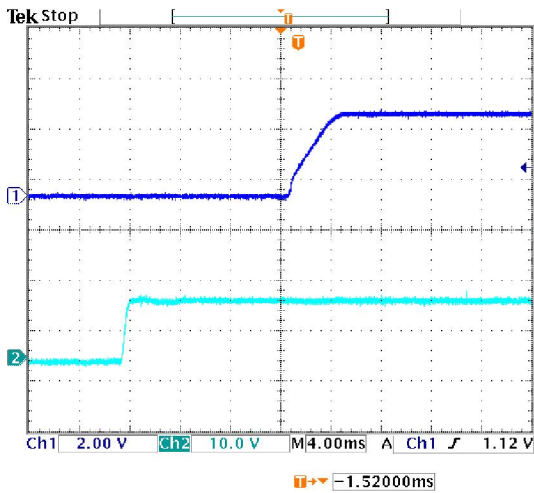


$V_{in}=12V$, $V_o=3.3V$

9. RIPPLE AND NOISE WAVEFORM

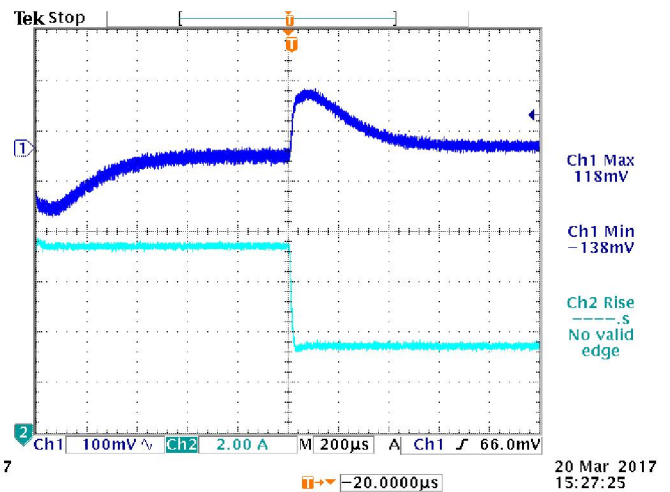
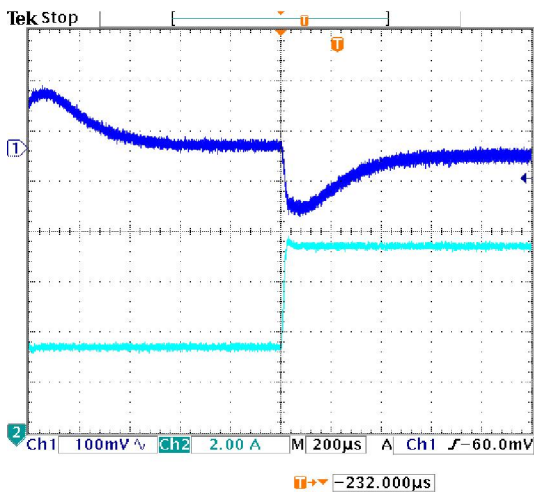
Ripple and noise at no load, $V_{in}=12V$ Ripple and noise at full load, $V_{in}=12V$ Ripple and noise at no load, $V_{in}=24V$ Ripple and noise at full load, $V_{in}=24V$ Ripple and noise at no load, $V_{in}=36V$ Ripple and noise at full load, $V_{in}=36V$

10. Startup & Shutdown

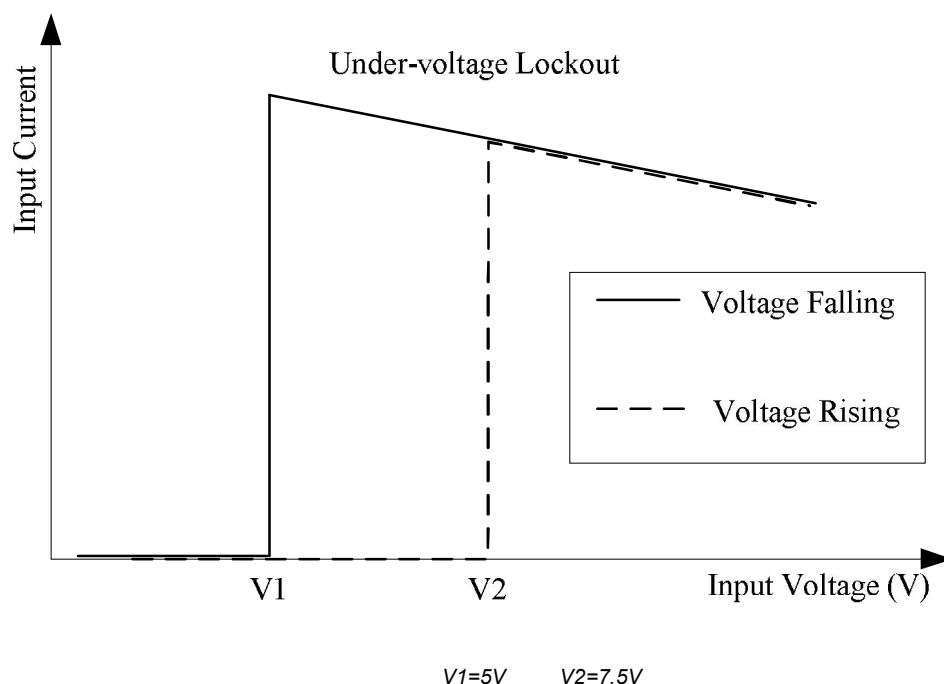


Note: Test Condition: $V_{in}=12V$, $I_{out}=6A$, with a 220µF oscon capacitor at the output.

11. Transient Response Waveforms



12. INPUT UNDER-VOLTAGE LOCKOUT



13. OUTPUT VOLTAGE TRIM

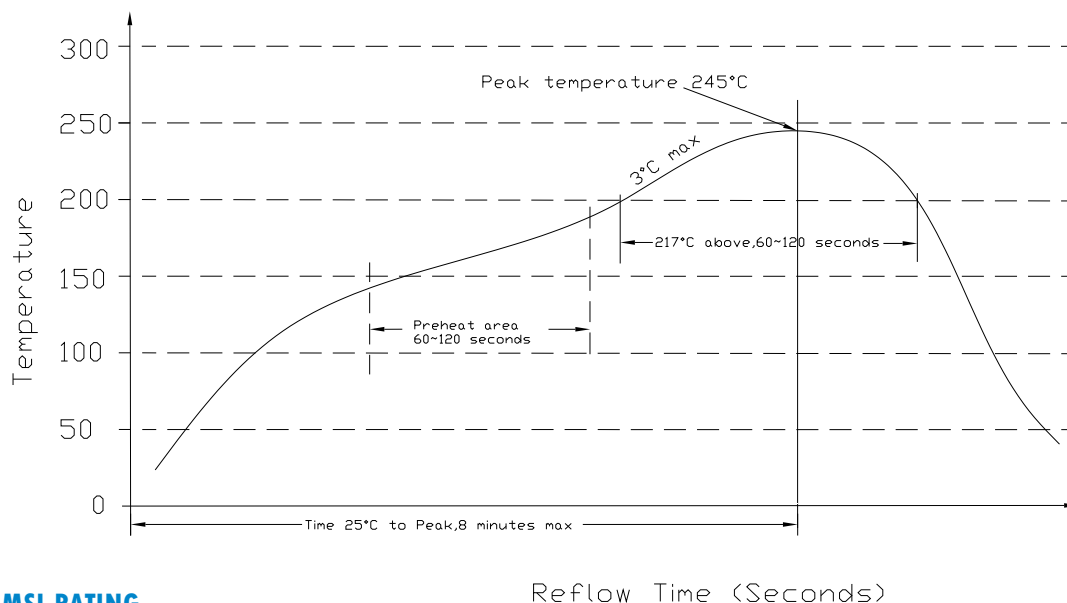
Equations for calculating the trim resistor (in k Ω) given the desired adjusted voltage (V_{adj}) and the nominal output voltage of the converter ($V_{nom}=3.3V$) are shown below. The Trim Down resistor should be connected between the Trim pin and V_{out} . The Trim Up resistor should be connected between the Trim pin and Ground. Only one of the resistors should be used for any given application.

$$R_{trimdown} = \frac{151.6}{V_{nom} - V_{adj}} - 70.2$$

$$R_{trimup} = \frac{33.7}{V_{adj} - V_{nom}} - 14$$

14. SOLDERING INFORMATION

The SRBH-06H1A1 modules are designed to be compatible with reflow soldering process. The suggested Pb-free solder paste is Sn/Ag/Cu(SAC). The recommended reflow profile using Sn/Ag/Cu solder is shown in the following. Recommended reflow peak temperature is 245°C while the part can withstand peak temperature of 260°C maximum for 10seconds. This profile should be used only as a guideline. Many other factors influence the success of SMT reflow soldering. Since your production environment may differ, please thoroughly review these guidelines with your process engineers.



MSL RATING

The SRBH-06H1A1 modules have a MSL rating of 3.

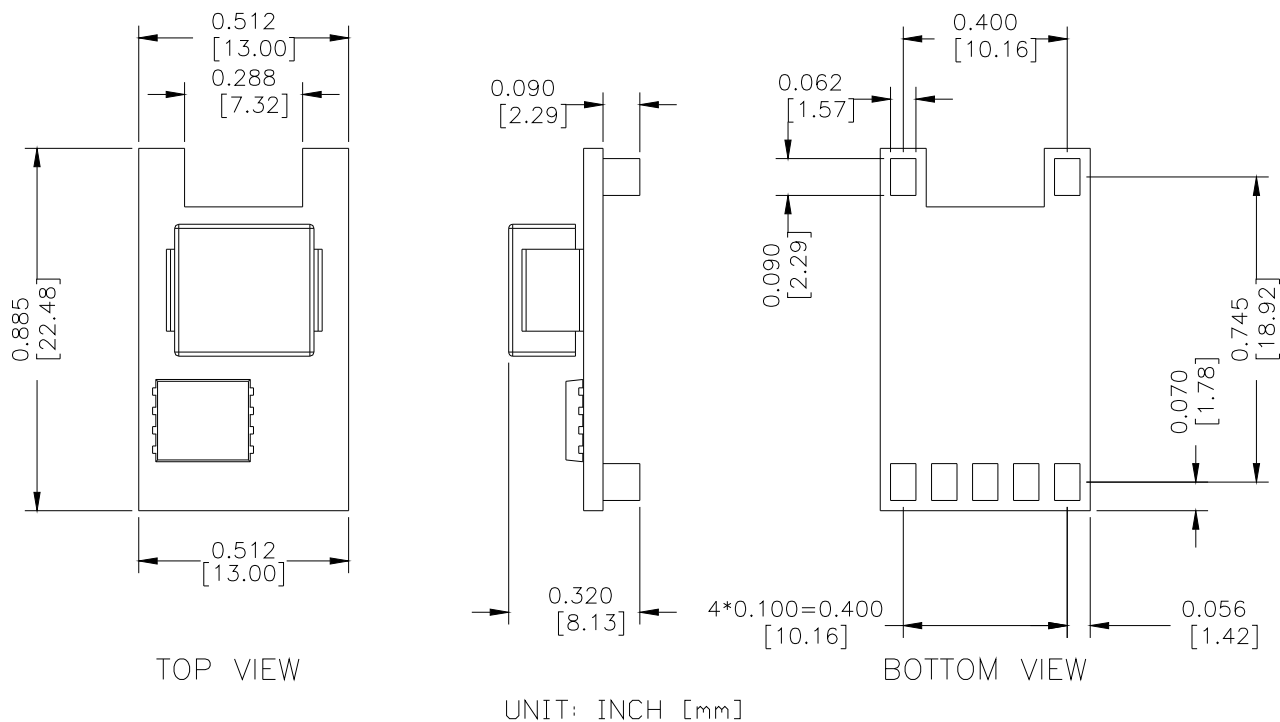
STORAGE AND HANDLING

The SRBH-06H1A1 modules are designed to be compatible with J-STD-033 Rev:A (Handling, Packing, Shipping and Use of Moisture /Reflow Sensitive surface Mount devices). Moisture barrier bags (MBB) with desiccant are applied. The recommended storage environment and handling procedure is detailed in J-STD-033.

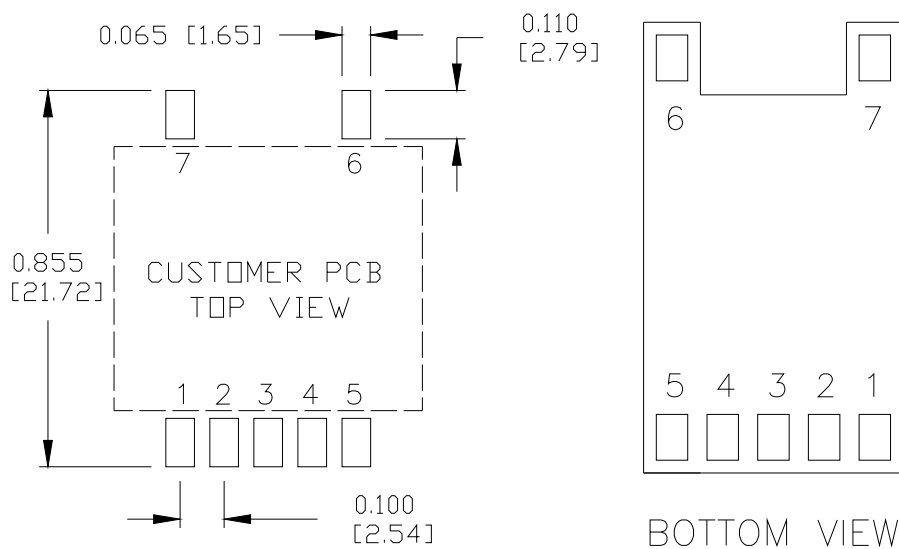
PRE-BAKING

This component has been designed, handled, and packaged ready for pb-free reflow soldering. If the assembly shop follows J-STD-033 guidelines, no pre-bake of this component is required before being reflowed to a PCB. However, if the J-STD-033 guidelines are not followed by the assembler, Bel recommends that the modules should be pre-baked @ 120~125°C for a minimum of 4 hours (preferably 24 hours) before reflow soldering.

15. MECHANICAL DIMENSIONS



RECOMMENDED PCB PAD LAYOUT



PIN CONNECTIONS

Pin	Function
1	Remote On/Off
2	Vin
3	GND
4	Vout
5	Trim
6	N/A
7	N/A

NOTES:

- 1) All Pins: Material - Copper Alloy;
Finish - Tin plated
- 2) Undimensioned components are shown for visual reference only.
- 3) All dimensions in inches; Tolerances: x.xx +/-0.02 in [0.51 mm]. x.xxx +/-0.010 in [0.25 mm].

For more information on these products consult: tech.support@psbel.com

NUCLEAR AND MEDICAL APPLICATIONS - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

TECHNICAL REVISIONS - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.



tech.support@psbel.com
belpowersolutions.com