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)

RoHS Compliant

Applications

- Distributed Power Architectures
- Data Networking Equipment
- Telecommunications Applications

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)	Vin=12V，Vo=3.3V，Io=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
I2t 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	di/dt = 0.5 A/us; Vin = 12 V; Vout=3.3V; with a 220 uF Oscan capacitor at the output	-	80	150	mV
Settling Time		-	200	300	us
ΔV 100%~50% of Max Load		-	80	150	mV
Settling Time		-	200	300	us

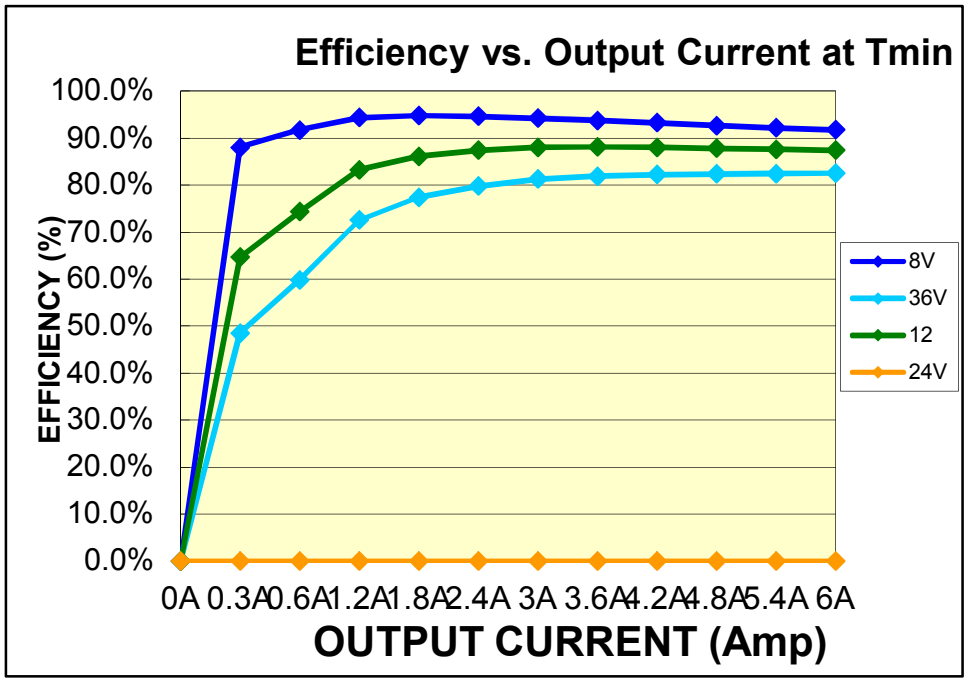
5. GENERAL SPECIFICATION

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_{OVTH}	116	121	127	%
Weight		-	TBD	-	g
MTBF		-	TBD	-	hours
Dimensions Inches (L × W × H) Millimeters (L × W × H)			0.885 x 0.512 x 0.320 22.48 x 13.00 x 8.13		Inches mm

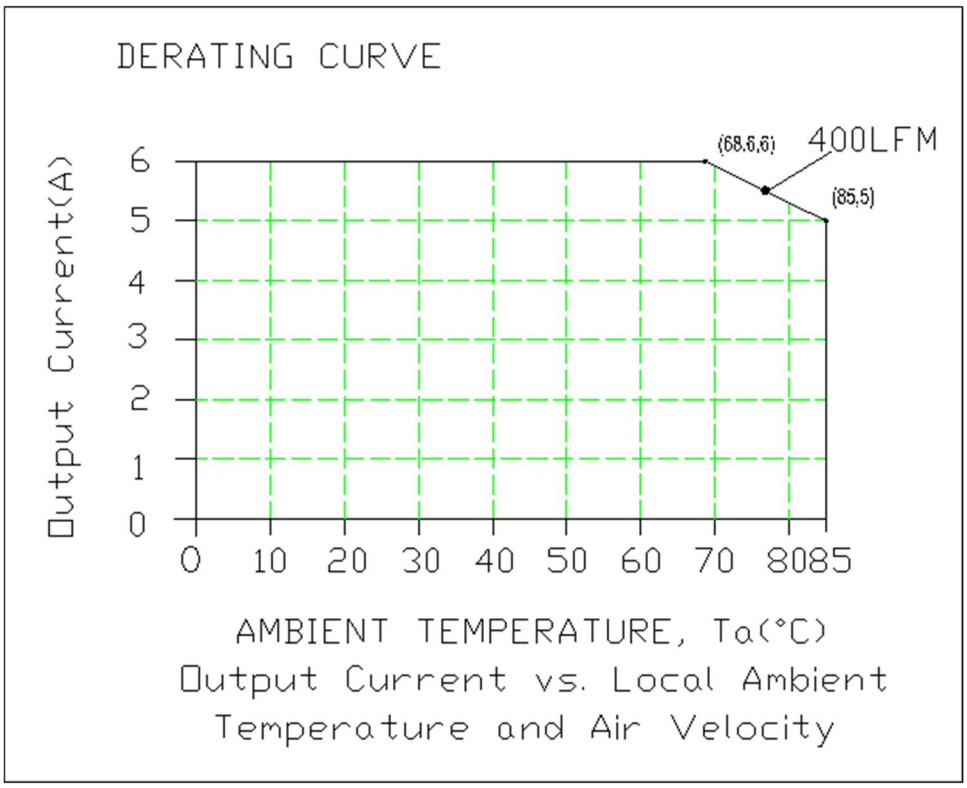
6. CONTROL/SUPERVISORY SPECIFICATIONS

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

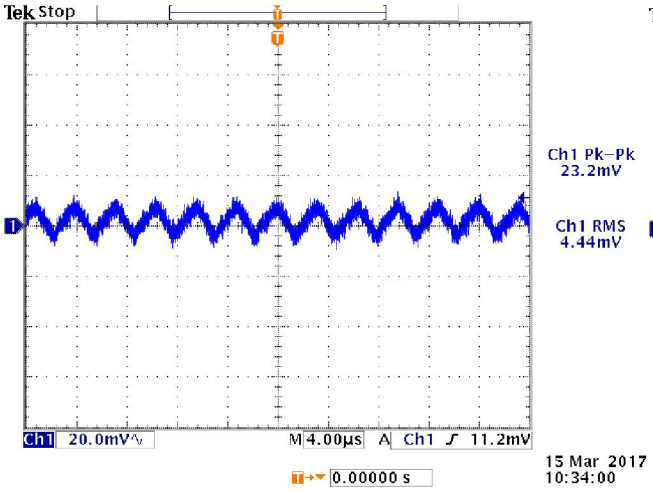


8. THERMAL DERATING CURVE

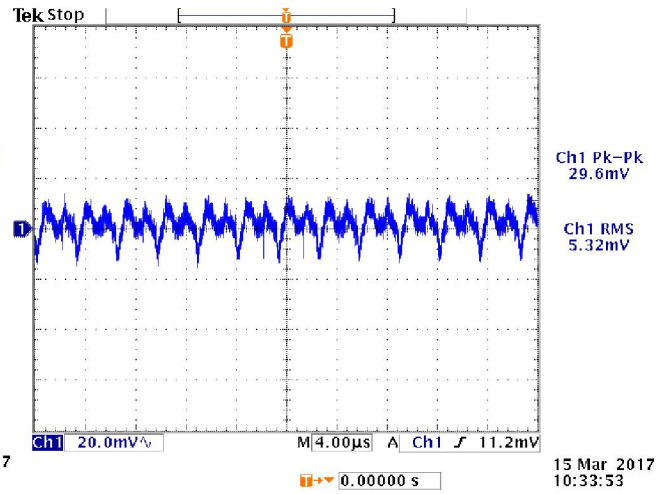


Vin=12V, Vo=3.3V

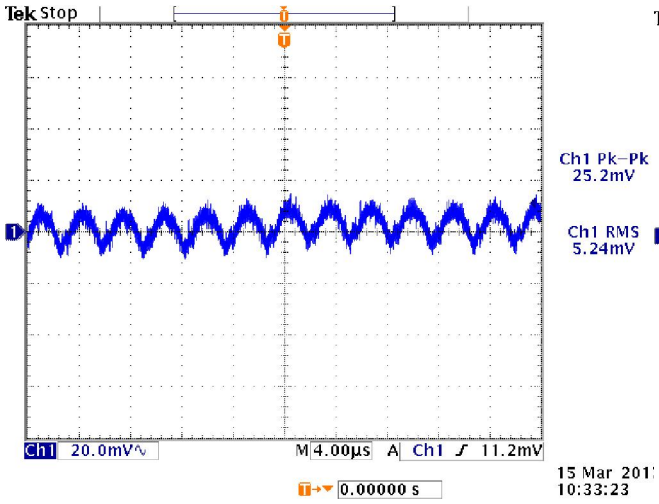
9. RIPPLE AND NOISE WAVEFORM



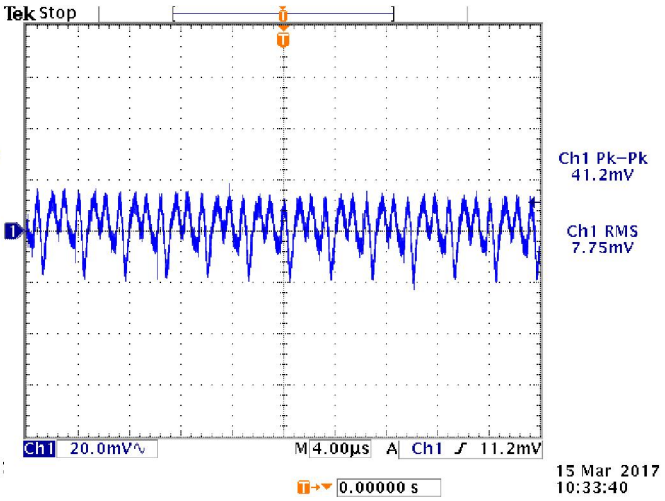
Ripple and noise at no load, Vin=12V



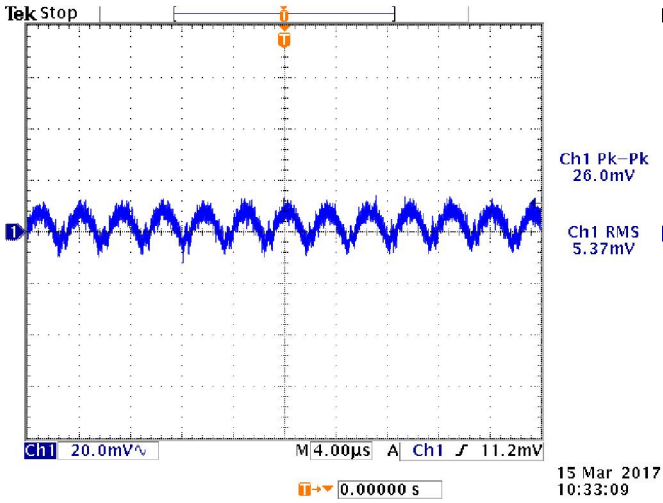
Ripple and noise at full load, Vin=12V



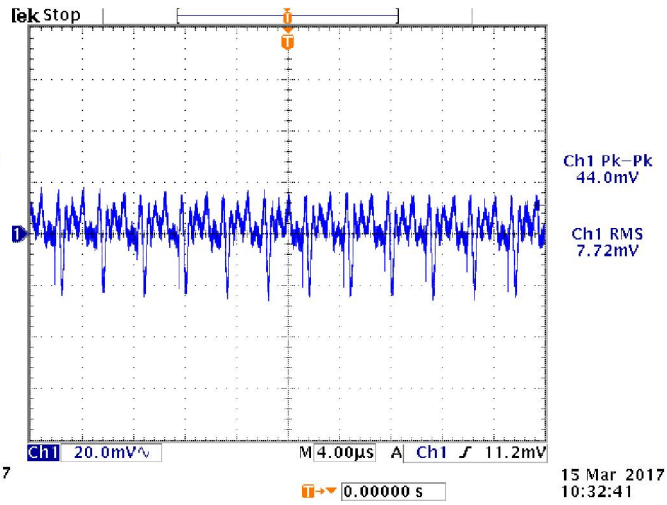
Ripple and noise at no load, Vin=24V



Ripple and noise at full load, Vin=24V

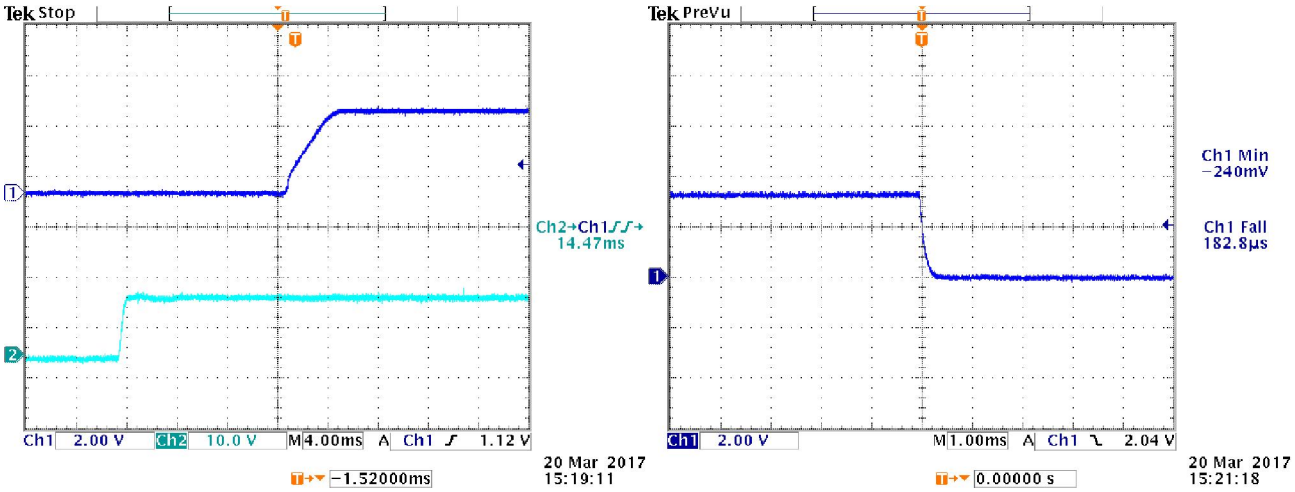


Ripple and noise at no load, Vin=36V



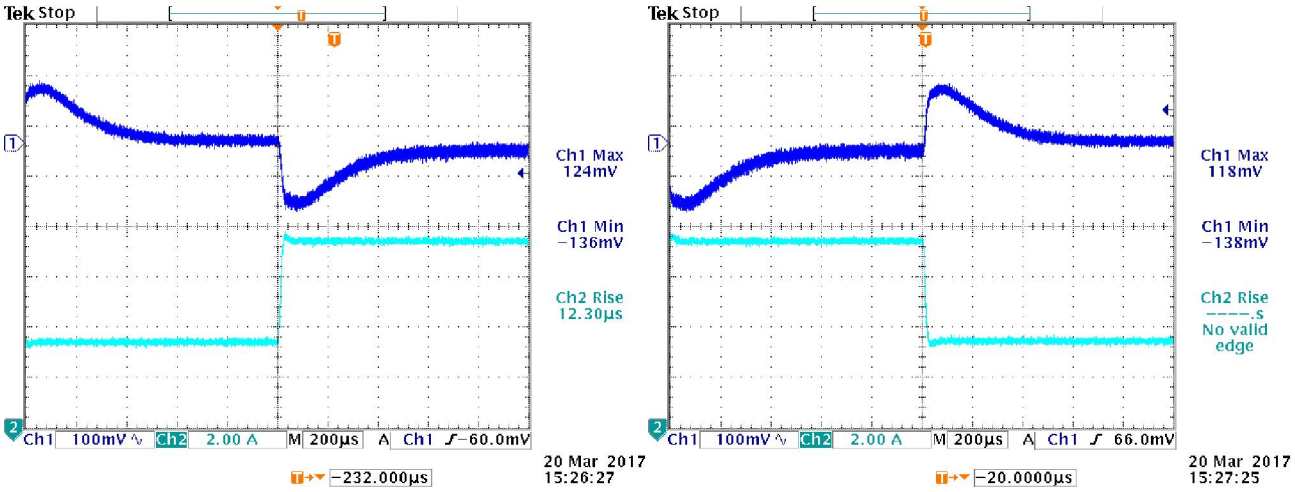
Ripple and noise at full load, Vin=36V

10. Startup & Shutdown

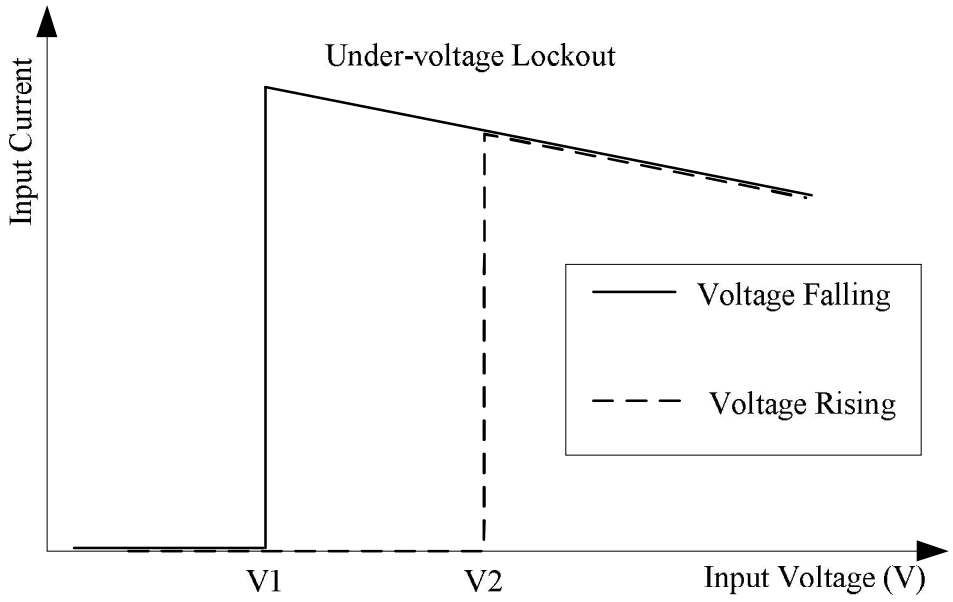


Note: *Test Condition: Vin=12V, Iout=6A, with a 220uF oscan capacitor at the output.*

11. Transient Response Waveforms



12. INPUT UNDER-VOLTAGE LOCKOUT



V1=5V V2=7.5V

13. OUTPUT VOLTAGE TRIM

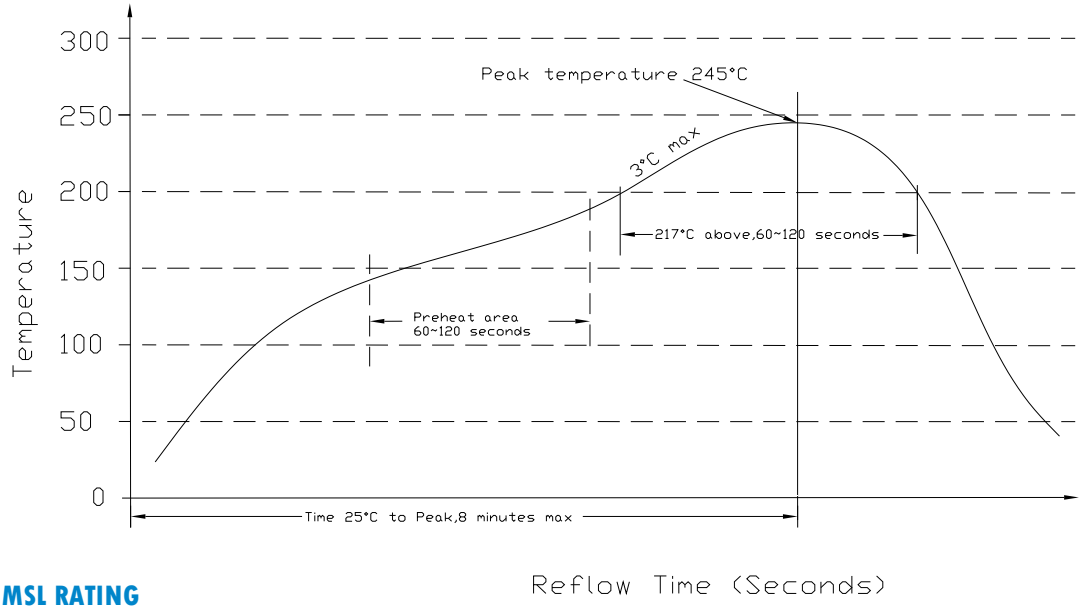
Equations for calculating the trim resistor (in kΩ) given the desired adjusted voltage (Vadj) and the nominal output voltage of the converter (Vnom=3.3V) are shown below. The Trim Down resistor should be connected between the Trim pin and Vout. The Trim Up resistor should be connected between the Trim 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℃ while the part can withstand peak temperature of 260℃ 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.

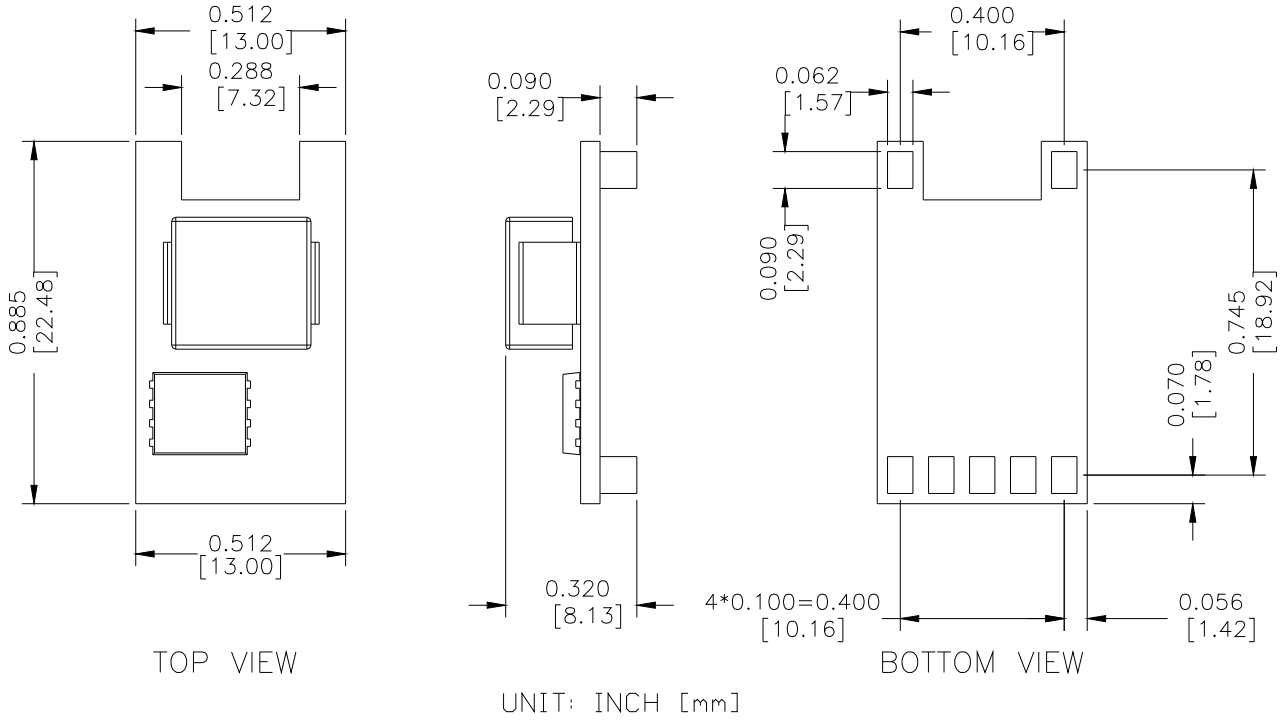
STORAGE AND HANDING

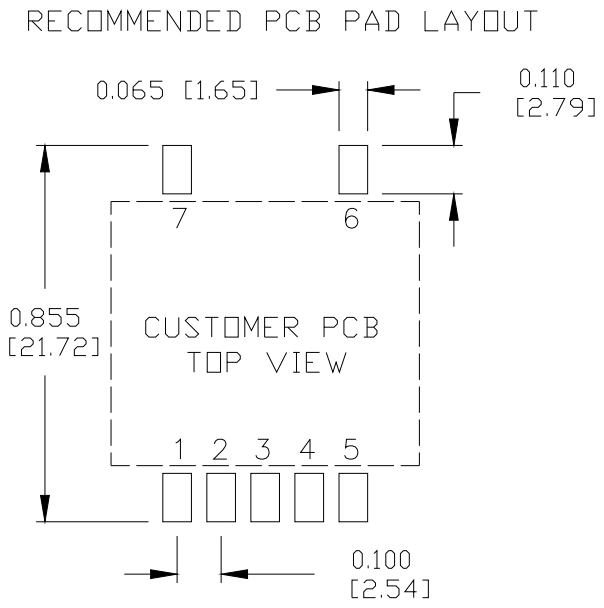
The SRBH-06H1A1 modules are designed to be compatible with J-STD-033 Rev:A (Handling, Packing, Shipping and Use of Moisture /Reflow Sensitive surface Mount devices). Moisture barrier bags (MBB) with desiccant are applied. The recommended storage environment and handling procedure is detailed in J-STD-033.

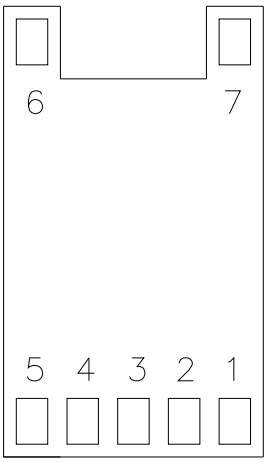
PRE-BAKING

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℃ for a minimum of 4 hours (preferably 24 hours) before reflow soldering.

15. MECHANICAL DIMENSIONS







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.