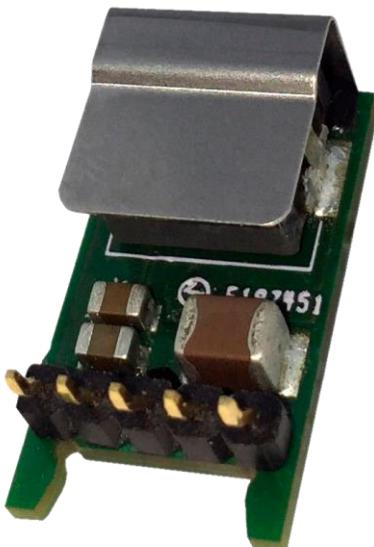




SRPE-03E1A0

Non-Isolated DC-DC Converter

The Bel SRPE-03E1A0 is part of the non-isolated DC-DC converter power module series. The modules use a SMD package. These converters are available in a range of output voltages from 0.6 VDC to 5.5 VDC over a wide range of input voltage ($V_{IN} = 5.5$ VDC - 13.2 VDC). The efficiency is typically 92% at 3.3 Vout ($V_{in} = 12$ VDC) at full load.



Key Features & Benefits

- 5.5 VDC - 13.2 VDC Input
- 0.6 VDC - 5.5 VDC @ 3 A Output
- Non-Isolated
- High Efficiency
- Fixed Frequency
- Low Cost
- Wide Input
- Under-Voltage Lockout
- Wide Trim
- OCP/SCP
- Remote On/Off
- Class 2, Category 2 (refer to IPC-9592B)

Applications

- Networking
- Computers and peripherals
- Telecommunications

1. MODEL SELECTION

MODEL NUMBER	OUTPUT VOLTAGE	INPUT VOLTAGE	MAX. OUTPUT CURRENT	MAX. OUTPUT POWER	TYPICAL EFFICIENCY
SRPE-03E1A0	0.6 V - 5.5 V	5.5 V - 13.2 V	3 A	16.5 W	92%

NOTE: Add "G" suffix at the end of the model numbers listed above to indicate "Tray Packaging".

1.1 PART NUMBER EXPLANATION

S	R	PE	-	03	E	1A	0	X
Surface mount	RoHS 6	Series name, SMD		Series code	Wide input range (5.5 - 13.2 V)	Wide output range (0.6 - 5.5 V)	Suffix	Package

2. ABSOLUTE MAXIMUM RATINGS

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

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNITS
Continuous non-operating Input Voltage		-0.3	-	15	V
Remote On/Off		-0.3	-	15	V
Ambient Temperature		0	-	50	°C
Storage Temperature		-55	-	125	°C
Altitude		-	-	2000	m

NOTE: Use 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	UNIT
Input Voltage		5.5	-	13.2	V
Input Current (full load)	This power module is not internally fused. An input line fuse must always be used	-	-	2.6	A
Input Current (no load)		-	10	150	mA
Remote Off Input Current		-	1	5	mA
Input Reflected Ripple Current (rms)	With simulated source impedance of 1000 nH, 5 Hz to 20 MHz. Use a 1000 uF/25V AL-Cap with ESR = 0.03 ohm max and 2*100 uF/25 V	-	5	15	mA
Input Reflected Ripple Current (pk-pk)	Tan cap with ESR = 0.013 ohm max, at 100 KHz @ 25°C.	-	15	30	mA
I ² t Inrush Current Transient		-	-	1	A ² s
Turn-on Voltage Threshold		4.15	4.2	4.45	V
Turn-off Voltage Threshold		3.7	4	4.2	V

4. OUTPUT SPECIFICATIONS

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

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT	
Output Voltage Set Point	Vo, set ≥ 0.9 VDC Vo, set < 0.9 VDC	Setpoint test condition: Vin = 12 V, Iout = half load, Ta = 25°C	-2 -3	- -	2 3	%Vo,set
Load Regulation	Vo ≥ 3.3 VDC Vo < 3.3VDC	Vin = 12 V, Io = 0 – 3 A, Ta = 25°C	-1.5 -20	- 20	1.5 mV	%Vo,set
Line Regulation	Vo ≥ 3.3 VDC Vo < 3.3VDC	Vin = 8 - 13.2 V, Io = 1.5 A, Ta = 25°C Vin = 5.5 - 13.2 V, Io = 1.5 A, Ta = 25°C	-1.5 -15	- -	1.5 15	%Vo,set mV
Regulation Over Temperature			-	0.8	-	%Vo,set
Output Ripple and Noise (pk-pk)		0-20 MHz BW, with 360 µF ceramic capacitor at output.	-	20	50	mV
Output Ripple and Noise (rms)			-	5	20	mV
Output Current Range			0	-	3	A
Output DC Current Limit			3.5	4	6	A
Output Short-Circuit Current (Vo ≤ 20 mV) (Hiccup Mode)			-	-	2	ADC
Rise time			-	2	2.5	ms
Turn On Time			-	3	5	ms
Overshoot at Turn on			-	0	3.5	%
Output Capacitance			200	-	1000	uF
Transient Response						
ΔV50% ~ 100% of Max Load	Overshoot		-	30	60	mV
	Settling Time	di/dt = 0.25 A/us, Vin = 12 VDC, Ta = 25°C, with 360 µF ceramic capacitor at output.	-	20	50	us
ΔV100% ~ 50% of Max Load	Overshoot		-	30	60	mV
	Settling Time		-	20	50	us

5. GENERAL SPECIFICATIONS

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

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT
Efficiency	5.5 V 3.3 V 0.6 V	The efficiency is measured at Vin = 12 V, full load and Ta = 25°C.	92 90 72	94 92 74	%
Switching Frequency		-	650	-	kHz
Output Voltage Trim Range (Wide Trim)	This voltage is achieved by trimming up output slowly.	0.6	-	5.5	V
Weight		-	2.5	-	g
FIT	Calculated Telcordia SR-332, Issue 2 (Vin = 12 V, Vo = 5.5 V, Io = 12 A, Ta = 40°C, no forced air, 90% confidence Level, FIT = 10⁹/MTBF)		16.8		-
Dimensions	Inches (L × W × H) Millimeters (L × W × H)	0.41 x 0.65 x 0.339 10.41 x 16.51 x 8.60			-

6. EFFICIENCY DATA

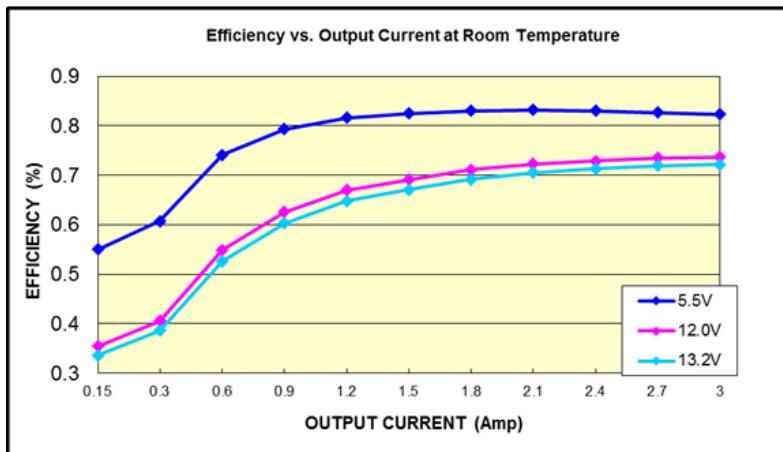


Figure 1. $V_{out}: 0.6 \text{ V}$

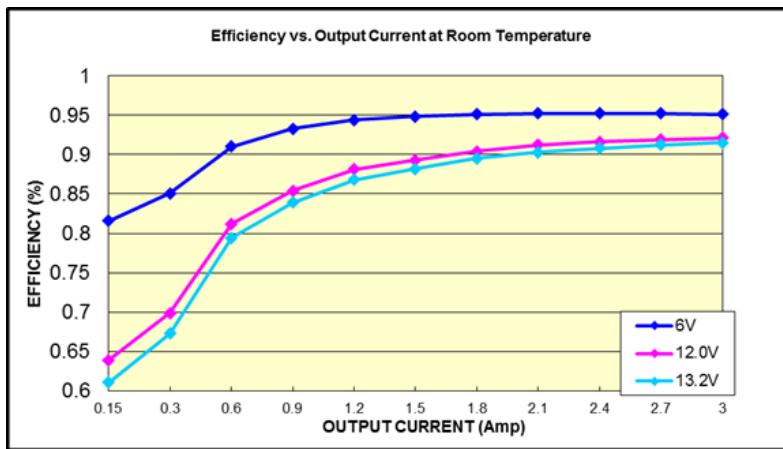


Figure 2. $V_{out}: 3.3 \text{ V}$

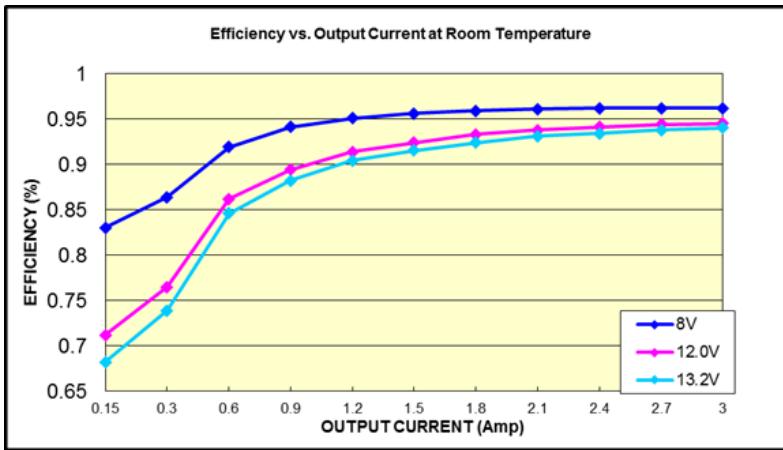


Figure 3. $V_{out}: 5.5 \text{ V}$

7. INPUT UNDER-VOLTAGE LOCKOUT

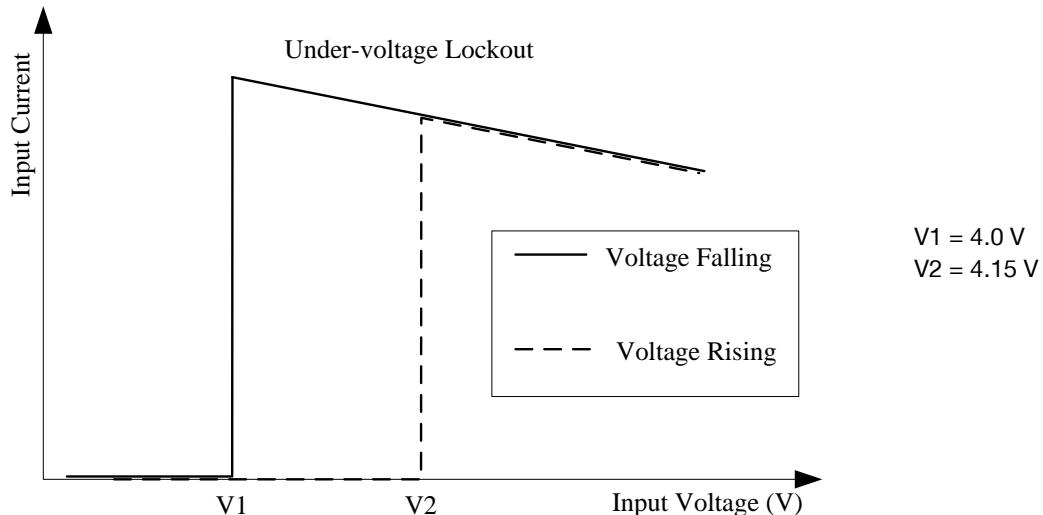


Figure 4. Input Under-Voltage Lockout

8. THERMAL DERATING CURVES

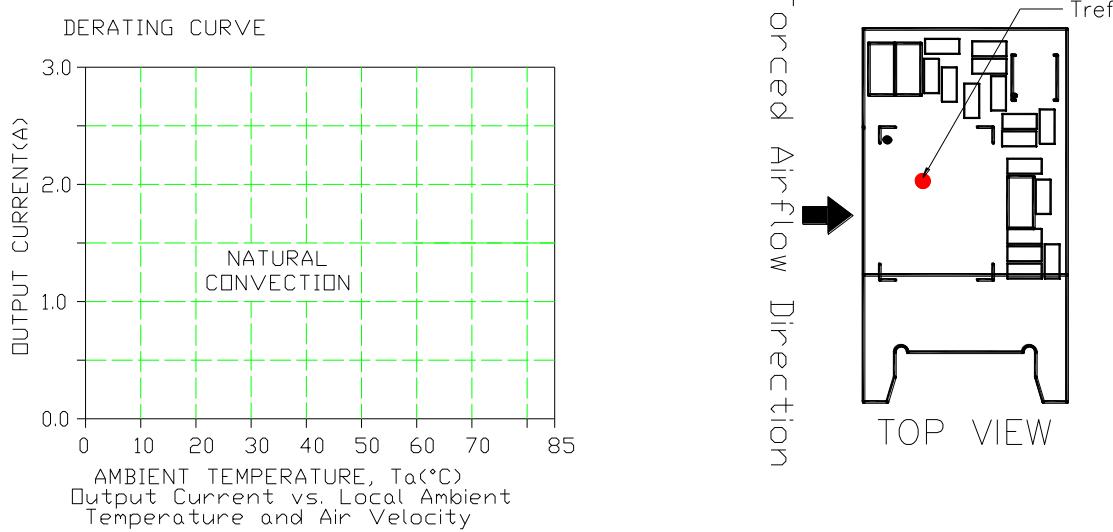
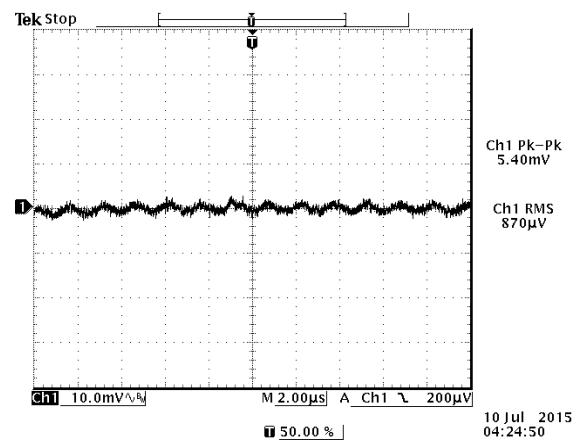
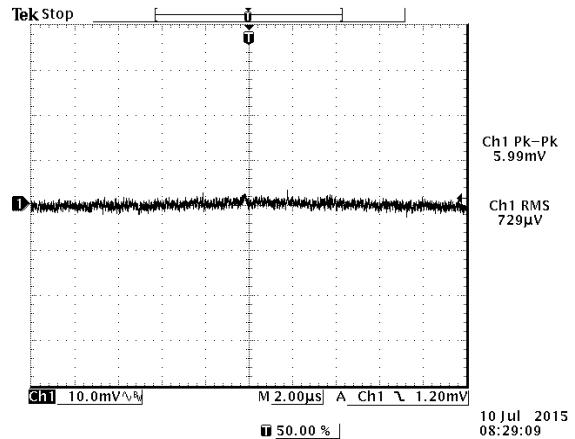
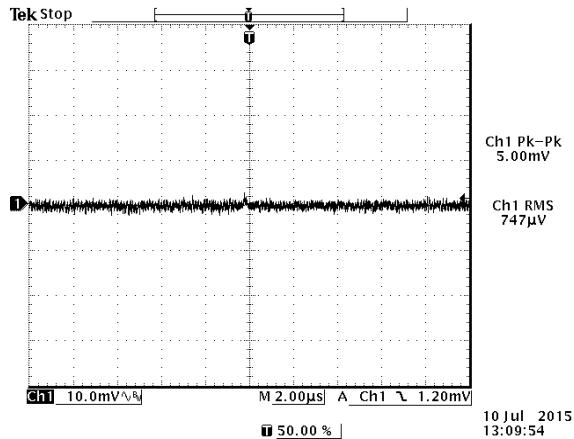


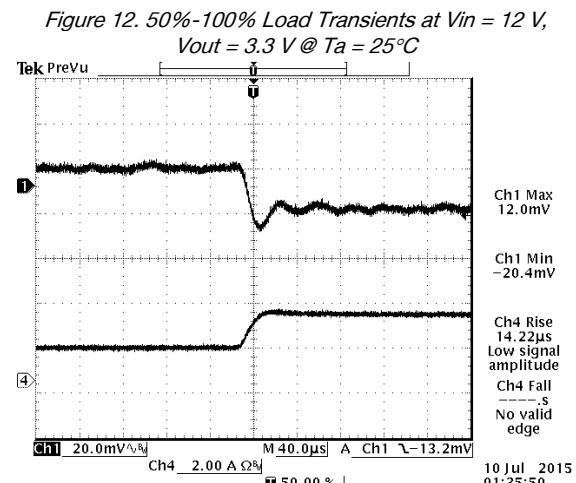
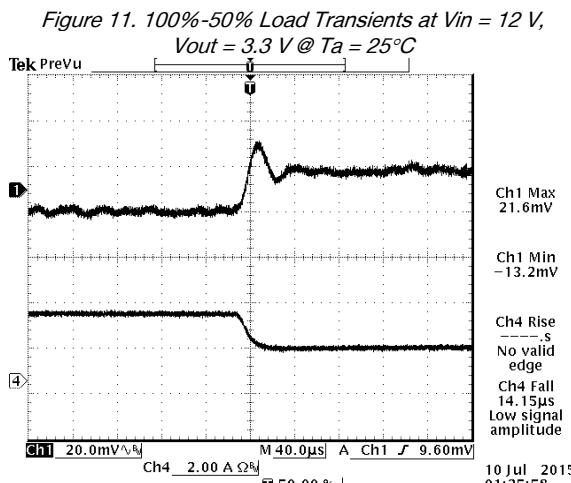
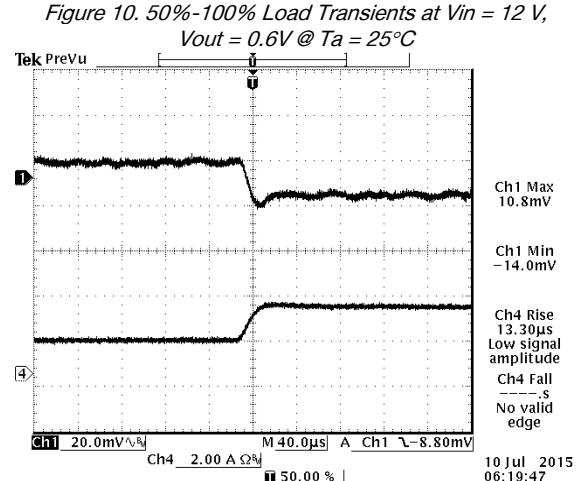
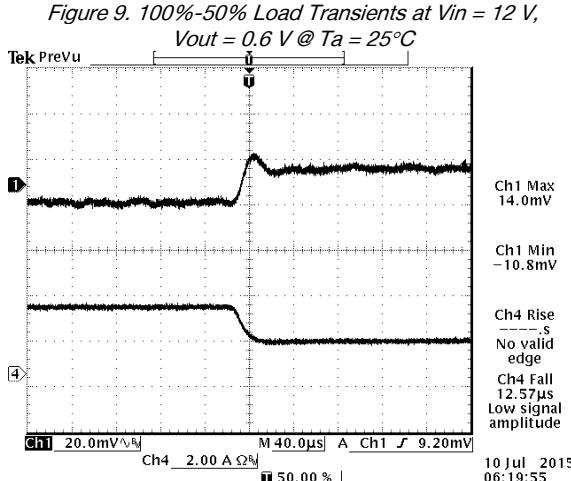
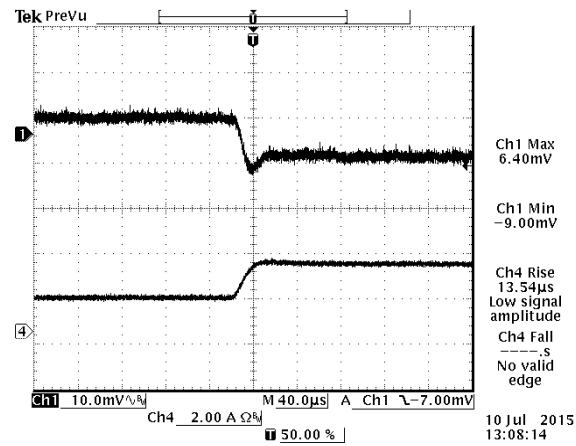
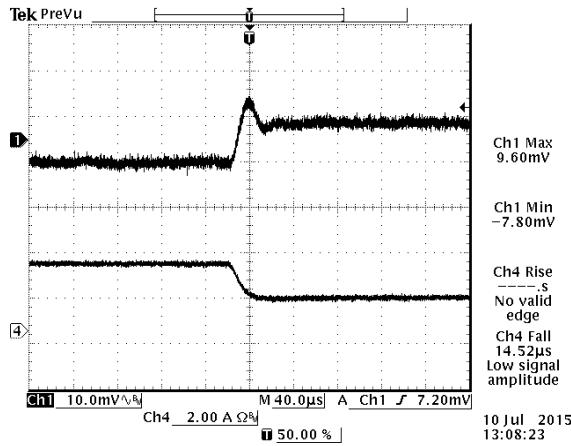
Figure 5. $V_{out} = 0.6 - 5.5$ V

9. RIPPLE AND NOISE WAVEFORM



NOTE: Test condition of the output ripple and noise: 0-20 MHz BW with a 360 μF ceramic cap at output.

10. TRANSIENT RESPONSE WAVEFORMS



NOTE: Test condition of the transient response: $di/dt = 0.25\text{ A}/\mu\text{s}$, with a $360\text{ }\mu\text{F}$ ceramic cap at output

11. REMOTE ON/OFF

PARAMETER	DESCRIPTION	MIN	TYP	MAX	UNIT
Signal Low (Unit Off)	Active High	-0.3	-	0.8	V
Signal High (Unit On)	Remote On/Off pin is open, the module is off.	2.4	-	18	V

Recommended remote on/off circuit for active high

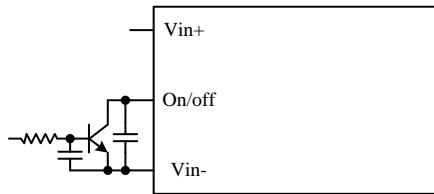


Figure 15. Control with open collector/drain circuit

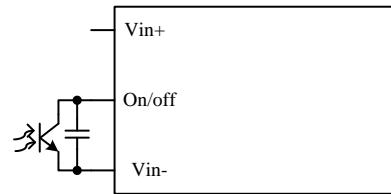


Figure 16. Control with photocoupler circuit

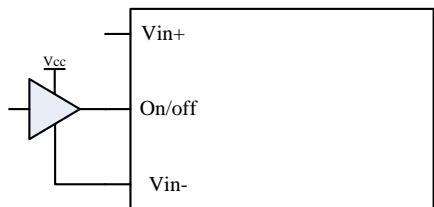


Figure 17. Control with logic circuit

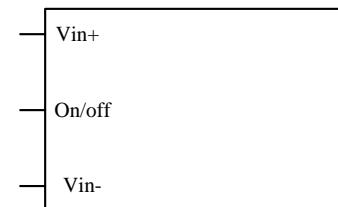
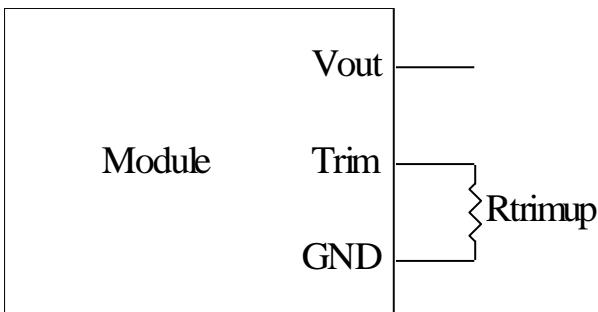


Figure 18. Permanently off

12. TRIM

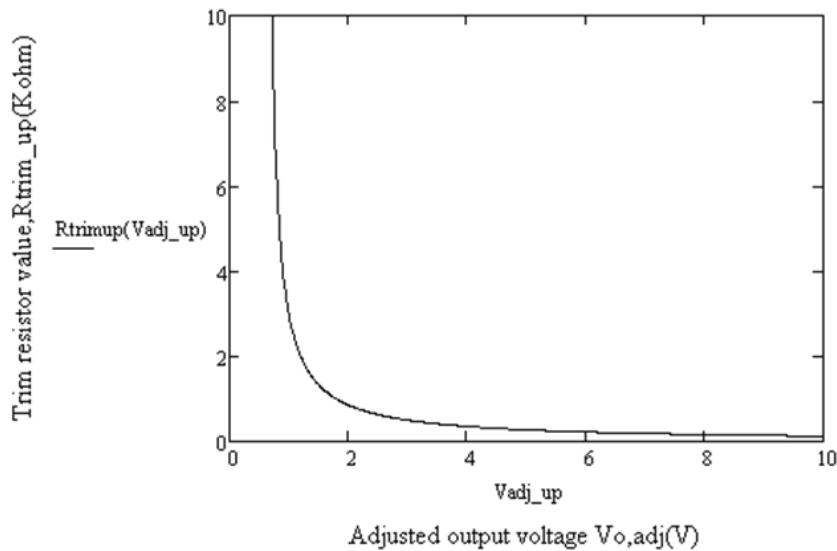
Trim up circuit (using an external resistor)



$$R_{trim} = \frac{1.2}{V_o - 0.6} k\Omega$$

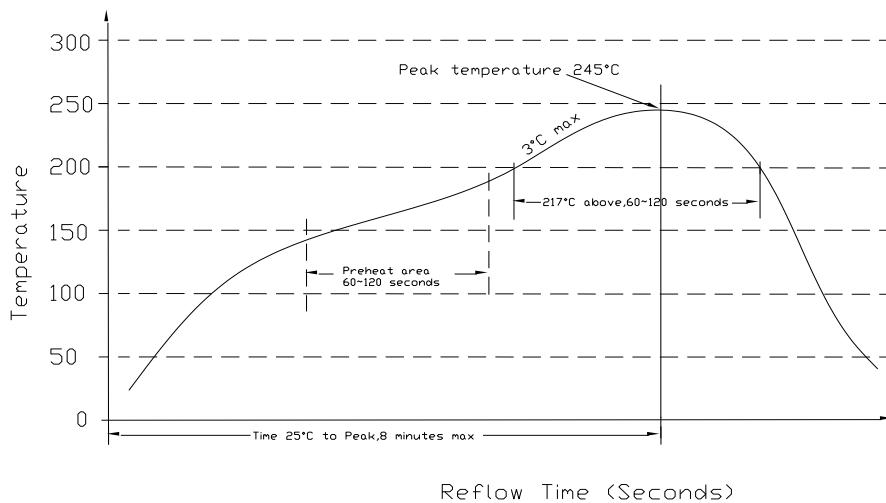
V_o is the desired output voltage
 R_{trim} is the required resistance between TRIM and GND

Figure 19. SRPE-03E1A0 Trim up Resistor Calculate



13. SOLDERING INFORMATION

The SRPE-03E1A0G modules are designed to be compatible with a Paste-In-Hole assembly 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 10 seconds. 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.



14. MSL RATING

The SRPE-03E1A0G modules have a MSL rating of 3.

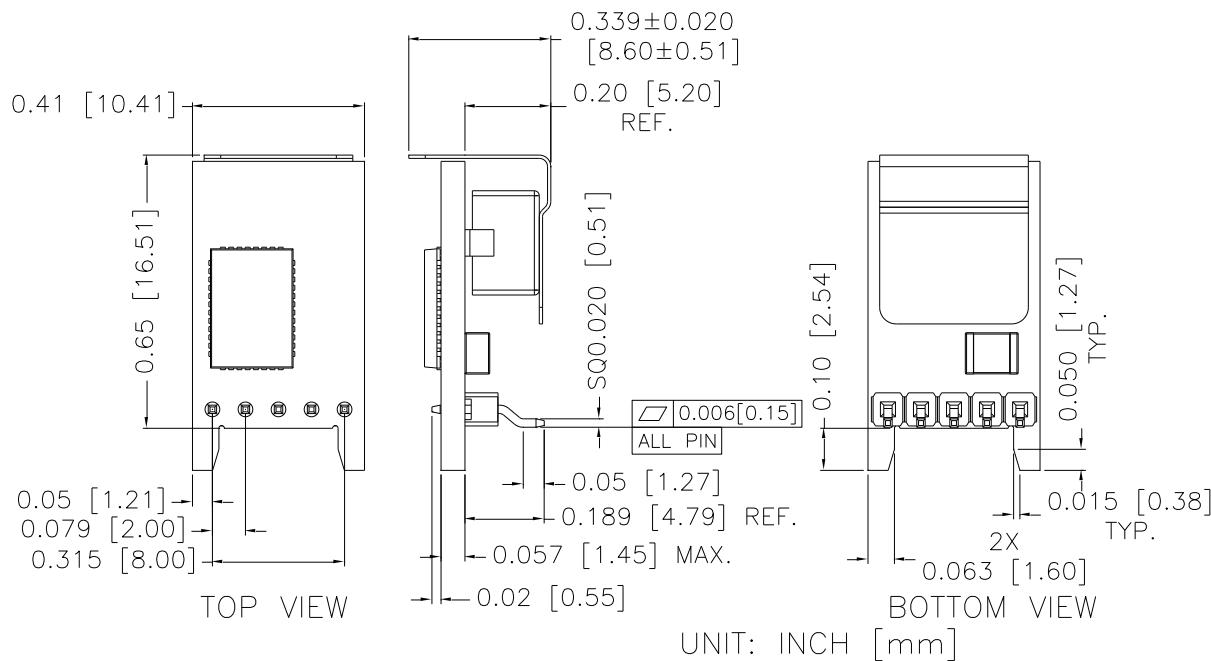
15. STORAGE AND HANDLING

The SRPE-03E1A0G 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.

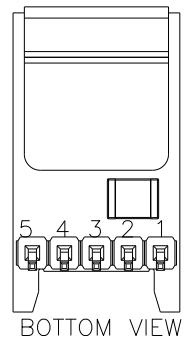
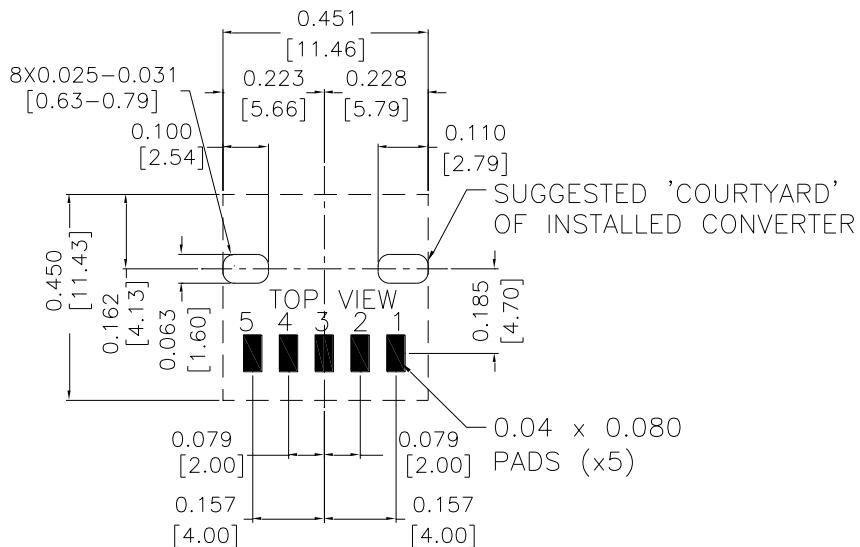
16. PRE-BAKING

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.

17. MECHANICAL DIMENSIONS

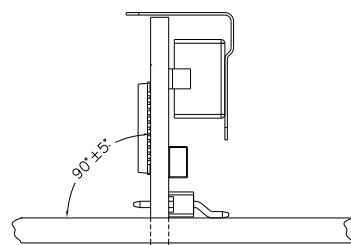
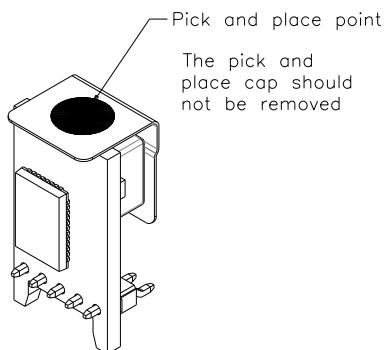


RECOMMENDED PAD LAYOUT



PIN CONNECTIONS

PIN	FUNCTION
1	Enable
2	Vin
3	GND
4	Vout
5	Trim



NOTES:

- 1) All Pins: Material - Copper Alloy; Finish – 3 micro inches minimum Gold over 50 micro inches minimum Nickel plate.
- 2) Undimensioned components are shown for visual reference only.
- 3) All dimensions in inches (mm); Tolerances: x.xx +/-0.02 in [0.5 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.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помошь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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