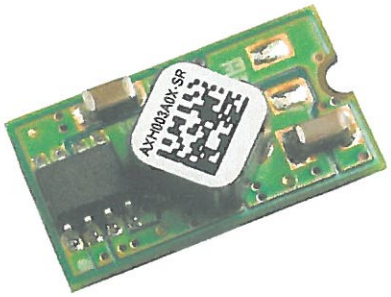
**Data Sheet**
**August 1, 2006**

# Austin Minilynx™ SMT Non-isolated Power Modules: 2.4Vdc –5.5Vdc input; 0.75Vdc to 3.63Vdc Output;3A Output Current

## RoHS Compliant




## Applications

- Distributed power architectures
- Intermediate bus voltage applications
- Telecommunications equipment
- Servers and storage applications
- Networking equipment
- Enterprise Networks
- Latest generation IC's (DSP, FPGA, ASIC) and Microprocessor powered applications

## Features

- Compliant to RoHS EU Directive 2002/95/EC (-Z versions)
- Compliant to ROHS EU Directive 2002/95/EC with lead solder exemption (non-Z versions)
- Delivers up to 3A output current
- High efficiency – 94% at 3.3V full load ($V_{IN}$ = 5.0V)
- Small size and low profile:

  20.3 mm x 11.4 mm x 7.27 mm

  (0.80 in x 0.45 in x 0.286 in)
- Low output ripple and noise
- High Reliability:

  Calculated MTBF = 11.9M hours at 25°C Full-load
- Constant switching frequency (300 kHz)
- Output voltage programmable from 0.75 Vdc to 3.63Vdc via external resistor
- Line Regulation: 0.4% (typical)
- Load Regulation: 0.4% (typical)
- Temperature Regulation: 0.4 % (typical)
- Remote On/Off
- Output overcurrent protection (non-latching)
- Wide operating temperature range (-40°C to 85°C)
- *UL** 60950-1Recognized, *CSA*† C22.2 No. 60950-1-03 Certified, and *VDE*‡ 0805:2001-12 (EN60950-1) Licensed
- ISO** 9001 and ISO 14001 certified manufacturing facilities

## Description

Austin MiniLynx™ SMT (surface mount technology) power modules are non-isolated dc-dc converters that can deliver up to 3A of output current with full load efficiency of 94.0% at 3.3V output. These modules provide a precisely regulated output voltage programmable via an external resistor from 0.75Vdc to 3.63Vdc over a wide range of input voltage ($V_{IN}$ = 2.4 – 5.5Vdc). Their open-frame construction and small footprint enable designers to develop cost- and space-efficient solutions.

* *UL* is a registered trademark of Underwriters Laboratories, Inc.
† *CSA* is a registered trademark of Canadian Standards Association.
‡ *VDE* is a trademark of Verband Deutscher Elektrotechniker e.V.
** ISO is a registered trademark of the International Organization of Standards

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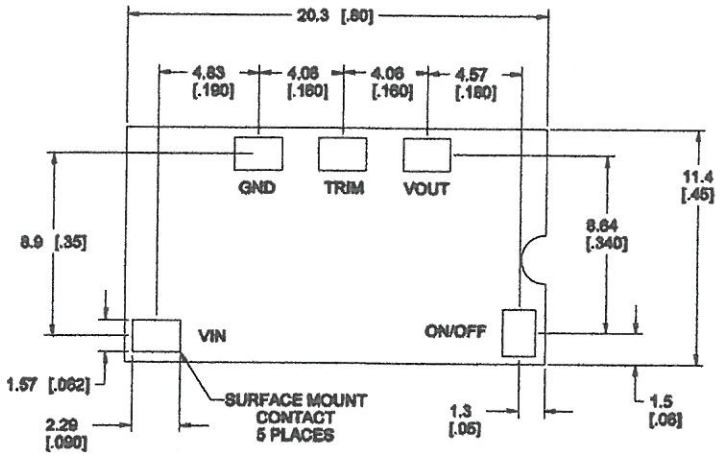
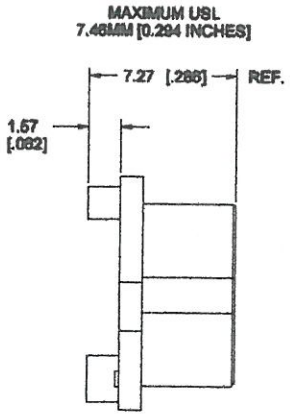
## Mechanical Outline

Dimensions are in inches and (millimeters).
Tolerances: x.xx in. ± 0.02 in. (x.x mm ± 0.5 mm) [unless otherwise indicated]
x.xxx in ± 0.010 in. (x.xx mm ± 0.25 mm)




BOTTOM VIEW




SIDE VIEW

**Co-planarity (max): 0.102 [0.004]**

## Feature Description

### Remote On/Off

The Austin MiniLynx™ SMT power modules feature an On/Off pin for remote On/Off operation. Two On/Off logic options are available in the Austin MiniLynx™ series modules. Positive Logic On/Off signal, device code suffix "4", turns the module ON during a logic High on the On/Off pin and turns the module OFF during a logic Low. Negative logic On/Off signal, no device code suffix, turns the module OFF during logic High on the On/Off pin and turns the module ON during logic Low.

For positive logic modules, the circuit configuration for using the On/Off pin is shown in Figure 30. The On/Off pin is an open collector/drain logic input signal (Von/Off) that is referenced to ground. During a logic-high (On/Off pin is pulled high internal to the module) when the transistor Q1 is in the Off state, the power module is ON. Maximum allowable leakage current of the transistor when Von/off = $V_{IN,max}$ is 10μA. Applying a logic-low when the transistor Q1 is turned-On, the power module is OFF. During this state VOn/Off must be less than 0.3V. When not using positive logic On/off pin, leave the pin unconnected or tie to $V_{IN}$.

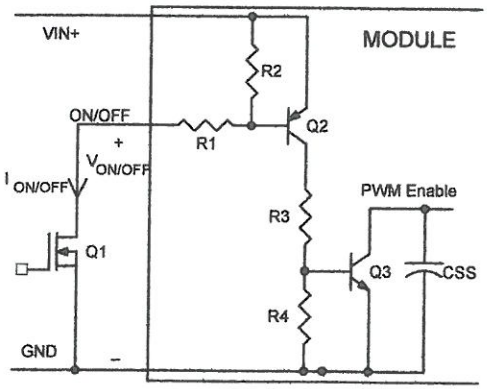



**Figure 30. Circuit configuration for using positive logic On/OFF.**

For negative logic On/Off devices, the circuit configuration is shown is Figure 31. The On/Off pin is pulled high with an external pull-up resistor (typical $R_{pull-up}$ = 5k, +/- 5%). When transistor Q1 is in the Off state, logic High is applied to the On/Off pin and the power module is Off. The minimum On/off voltage for logic High on the On/Off pin is 1.5Vdc. To turn the module ON, logic Low is applied to the On/Off pin by turning ON Q1. When not using the negative logic On/Off, leave the pin unconnected or tie to GND.

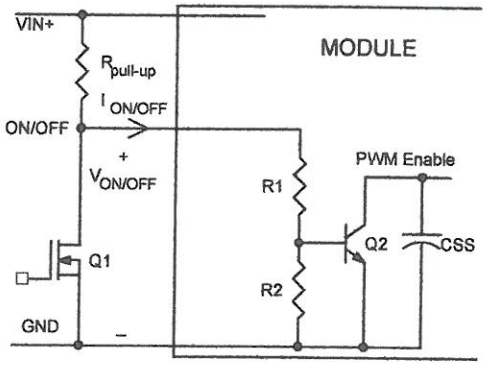



**Figure 31. Circuit configuration for using negative logic On/OFF.**

### Overcurrent Protection

To provide protection in a fault (output overload) condition, the unit is equipped with internal current-limiting circuitry and can endure current limiting continuously. At the point of current-limit inception, the unit enters hiccup mode. The unit operates normally once the output current is brought back into its specified range. The typical average output current during hiccup is 3.5A.

### Input Undervoltage Lockout

At input voltages below the input undervoltage lockout limit, module operation is disabled. The module will begin to operate at an input voltage above the undervoltage lockout turn-on threshold.

### Overtemperature Protection

To provide over temperature protection in a fault condition, the unit relies upon the thermal protection feature of the controller IC. The unit will shutdown if the thermal reference point $T_{ref}$, exceeds 140°C (typical), but the thermal shutdown is not intended as a guarantee that the unit will survive temperatures beyond its rating. The module will automatically restart after it cools down.

### Output Voltage Programming

The output voltage of the Austin MiniLynx™ SMT can be programmed to any voltage from 0.75 Vdc to 3.63 Vdc by connecting a single resistor (shown as Rtrim in Figure 32) between the TRIM and GND pins of the module. Without an external resistor between TRIM pin and the ground, the output voltage of the module is 0.7525 Vdc. To calculate the value of the resistor *Rtrim* for a particular output voltage Vo, use the following equation:

$$Rtrim = \left[\frac{21070}{Vo - 0.7525} - 5110\right]\Omega$$

12V : $R_{trim} = \left[\frac{10500}{V_o - 0,7525} - 1000\right]\Omega$

5V: 3,30V → 3160 Ω

12V: 3,30V → 3122 Ω

## Feature Descriptions (continued)

### Output Voltage Programming (continued)

For example, to program the output voltage of the Austin MiniLynx™ module to 1.8 Vdc, *Rtrim* is calculated is follows:

$$Rtrim = \left[\frac{21070}{1.8-0.7525} - 5110\right]$$

$$Rtrim = 15.004k\Omega$$

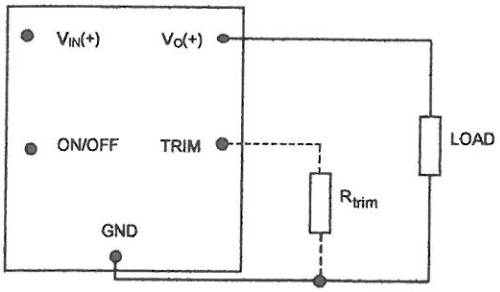



**Figure 32. Circuit configuration to program output voltage using an external resistor.**

Table 1 provides *Rtrim* values required for some common output voltages.

**Table 1**

| $V_{O,set}$ (V) | *Rtrim* (KΩ) |
|---|---|
| 0.7525 | Open |
| 1.2 | 41.973 |
| 1.5 | 23.077 |
| 1.8 | 15.004 |
| 2.5 | 6.947 |
| 3.3 | 3.160 |

Using 1% tolerance trim resistor, set point tolerance of ±2% is achieved as specified in the electrical specification. The Lynx Programming Tool, available at power.tycoelectronics.com under the Design Tools section, helps determine the required external trim resistor needed for a specific output voltage.

### Voltage Margining

Output voltage margining can be implemented in the Austin MiniLynx™ modules by connecting a resistor, $R_{margin-up}$, from the Trim pin to the ground pin for margining-up the output voltage and by connecting a resistor, $R_{margin-down}$, from the Trim pin to the Output pin for margining-down. Figure 33 shows the circuit configuration for output voltage margining. The Lynx Programming Tool, available at power.tycoelectronics.com under the Design Tools section, also calculates the values of $R_{margin-up}$ and $R_{margin-down}$ for a specific output voltage and % margin. Please consult your local Tyco Field Application Engineer or Account Manager for additional details.

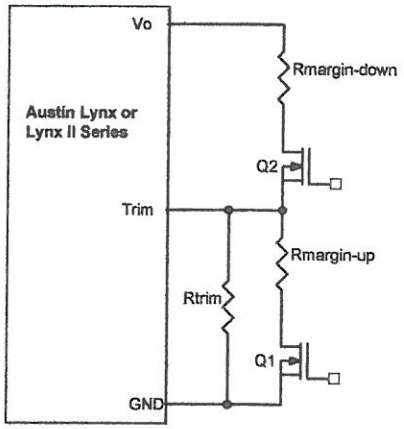



**Figure 33. Circuit Configuration for margining Output voltage.**