Data Sheet
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Titania ™ Power Modules

Austin Series Non-Isolated SMT DC - DC Power Modules: 3.3 Vdc and 5.0 Vdc Input, 1.5 Vdc - 3.3 Vdc Output, 6A

The Austin Power Module Series provides precise voltage and fast transient response in the industry's smallest footprint while offering very high reliability and high efficiency.

Applications

- Workstations
- Servers
- Desktop computers
- DSP applications
- Distributed power architectures
- Telecommunications equipment
- Adapter cards
- LAN/WAN applications
- Data processing applications

Features

- 300A/µs load transient response
- Small size and very low profile
- Minimal space on printed circuit board
- Nominal dimensions: 44.6 mm x 12.7 mm x 5.46 mm (1.756 in x .500 in x .214 in.)
- High reliability: 200 FITs/5 million hour MTBF
- High efficiency
  3.3 V_{IN}
    86% typical @ 2.5V, 6A
    74% typical @ 1.5V, 6A
  5 V_{IN}
    85% typical @ 3.3V, 6A
    73% typical @ 1.8V, 6A
- Single control pin for margining and on/off control
- Overcurrent foldback
- Thermal shutdown
- No external bias required
- Low inductance surface mount connections
- Parallelable
- *UL*† 60950, CSA‡ C22.2 No. 60950-00, and VDE 0805 (IEC60950)§

Description

The Austin Power Module Series is designed to meet the precise voltage and fast transient requirements of today's high performance DSP and microprocessor circuits and system board level applications. Advanced circuit techniques, high frequency switching, custom passive and active components, and very high density, surface-mount packaging technology deliver high quality, ultra compact, DC-DC conversion.

† *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.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability. Input voltage range of V_{IN} = 3.0V — 3.6V is listed as 3.3 V_{IN} and input voltage range of V_{IN} = 4.5V — 5.5V is listed as 5.0 V_{IN}.

Table 1. Absolute Maximum Ratings.

Parameter	Device	Symbol	Min	Max	Unit
Input Voltage (continuous)	3.3 V_{IN} 5.0 V_{IN}	V_{IN} V_{IN}	– 0.3 – 0.3	4.5 6.5	Vdc Vdc
Forced Output Voltage	All	V_{OF}	– 0.3	6.0	Vdc
OUTEN/ADJ Terminal Voltage	All	$V_{OUTEN/ADJ}$	– 0.3	2.0	Vdc
Storage Temperature*	All	$T_{A/STG}$	– 40	125	°C
Operating Ambient Temperature Based on maximum device*	All	T_A	– 40	80	°C

* Temperatures, (See Thermal Ratings Section)

Electrical Specifications

Table 2. Input Specifications

Parameter	Device	Symbol	Min	Typ	Max	Unit
Operating Input Voltage	3.3 V_{IN} 5.0 V_{IN}	V_{IN} V_{IN}	3.0 4.5	3.3 5.0	3.6 5.5	V V
Input Ripple Rejection (120 Hz)				50		dB
Operating Input Current (0A ≤ I_{OUT} < 5A) (3.0 V < V_{IN} < 3.6V) (4.5V < V_{IN} < 5.5V)	 3.3 V_{IN} 5.0 V_{IN}	 I_{IN} I_{IN}	 — —	 — —	 5.5 5.0	 A A
Quiescent Input Current (I_{OUT} = 0) (3.0V < V_{IN} < 5.5V)	All	I_Q	—	15	—	mA

Fusing Considerations

CAUTION: This power module is not internally fused. An input line fuse must always be used.

This power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of a sophisticated power architecture. To preserve maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The safety agencies require a normal blow fuse with a maximum rating of 10A (see Safety and Reliability Specifications).

Output Control

The control pin is a dual-function port that serves to enable/disable the converter or provide a means of adjusting the output voltage over a prescribed range. When the control pin is grounded, the converter is disabled. With the pin left open, the converter regulates to its specified output voltage. For any other voltage applied to the pin, the output voltage follows this relationship:

$$V_{OUT} = \left(\frac{V_{CONTROL}}{1.5}\right) \bullet V_{OUTNOM}$$

The Thevenin equivalent input resistance of the control pin is approximately 7.68K ohms and the open circuit voltage is 1.5V.

The equation to margin low by connecting a resistor from the control pin to ground is:

$$RLOW = 7.68K\left[\frac{VOUT/VOUT\ nom}{1 - VOUT/\ VOUT\ nom}\right]$$

To margin low by 5%, R_{LOW} = 146K.

The equation to margin high by connecting a resistor, R_{HIGH}, from the control pin to the input voltage, V_{IN} is:

$$RHIGH = \left[\frac{7.68K}{VOUT/VOUTnom - 1}\right] \quad \left[\frac{VIN}{1.5} - 1\right] - 7.68K$$

To maintain high of 5%, R_{HIGH} = 351K for V_{IN} = 5 volts and R_{HIGH} = 177K for V_{IN} = 3.3 volts. Trim resistor tolerance will obviously affect output voltage. To determine the magnitude of this effect, simply use the extreme values in the above equations.

Because trimming affects the system reference, trimming beyond +/- 10% is unacceptable and +/- approximately 5% is desirable. One affect trimming has, aside from output voltage adjustment, is changing the current limit inception point. Trimming the unit down beyond 5% requires derating available current by 1% for every percent beyond 5 that the module is trimmed down. For example, if a module is trimmed down 7%, then output current would have to be derated 2%. If paralleled modules are to be trimmed using the control pin, divide the calculated trim resistance for a single unit by the number of modules paralleled. For example, if two paralleled units are to be trimmed 5% low, then a resistance of 146K divided by 2 should be used.

Output Regulation

These modules have intentional output resistance to facilitate improved transient response and paralleling. This means that the output voltage will decrease with increasing output current. For this reason, the total DC regulation window at a given operating and ambient temperature is comprised of a no load setpoint and a voltage drop due to module output resistance. Regulation data provided in Table 3 includes both the initial setpoint and voltage drop. Because Table 3 includes output resistance drop, the maximum column is always a no-load condition and the minimum column is always a full-load condition. No module could pass production test with a full-load regulation point equal to the maximum column. This means that at any operating current, the regulation will always be better than the total window specified in Table 3.

Table 3. Output Specifications

Parameter	Device	Symbol	Min	Typical	Max	Unit
Output voltage	3.3V	V_{OUT}	3.200	3.3	3.400	V
These specifications are under all	2.5V	V_{OUT}	2.425	2.5	2.575	V
specified input voltage, load current,	2.0V	V_{OUT}	1.940	2.0	2.060	V
and temperature conditions. They do	1.8V	V_{OUT}	1.746	1.8	1.854	V
not include ripple or transient.	1.5V	V_{OUT}	1.455	1.5	1.545	V
Output current	—	I_{OUT}	0	—	6.0	A
Output ripple	3.3V_{IN}	V_{RIPPLE}	—	—	80	mVp-p
(See Figure 1)	5.0V_{IN}	V_{RIPPLE}	—	—	100	mVp-p

Static Voltage Regulation

The ouput voltage measured at the converter output pins on the system board will be within the range shown in Table 3, except during turn-on and turn-off. Static voltage regulation includes:

- DC Output initial voltage
- Input voltage range
- 3.0V – 3.6V
- 4.5V – 5.5V
- Load regulation from 0A – 5A

Output Ripple and Noise

Output ripple and noise is defined as periodic or random deviation from the nominal voltage at the output pins while under constant load and input line. Typical full load output ripple and noise waveforms are shown in Figures 3 — 11.

Output Overcurrent Protection/Overtemperature Protection

Current limiting is provided for momentary overloads and short circuits. A sustained overload may cause the thermal shutdown circuit to activate. The current limit inception is nominally 7 amperes with the power semiconductors at rated temperature in a 25 °C ambient environment. The thermal circuitry will shut down the module at 110 °C minimum on the power semiconductors' top surfaces measured using an infrared camera as described in the Thermal Ratings Section.

Input/Output Decoupling

An input capacitance of 100 µF, with an ESR of less than 100 milliohms, and at least 1 µF ceramic or equivalent is recommended for the input to the modules. The 100 µF should always be used unless main bulk buss capacitors are located close to the module. This capacitor provides decoupling in the event of a fault to the module output. Input voltage should never go below 2.5 volts or internal protection circuitry may fail to act. To achieve noise levels shown in Figures 2 – 11, one 100 µF tantalum capacitor and two 1 µF ceramic capacitors were used. 0.75 inches of 0.14 inch wide track (with no ground beneath) was used as an inductor between the input pin of the module and the decoupling capacitors (see Figure 1). An impedance vs. frequency plot has been provided for the 100 µF capacitor to aid in selecting equivalent parts.

Output decoupling used to achieve noise levels shown in Figures 2 — 11 was 1 µF in series with 0.5Ω and .01 µF. Ringing on the output due to common impedance with the input decoupling circuit was damped using the 1 µF/ 0.5Ω series combination. An equivalent damping network is recommended. Care should be taken that selected output decoupling capacitors do not form troublesome L-C resonant networks with track inductance. Austin Power Modules may be used with up to 10,000 µF of capacitance. the modules are designed to remain stable with any capacitor/ESR combination.

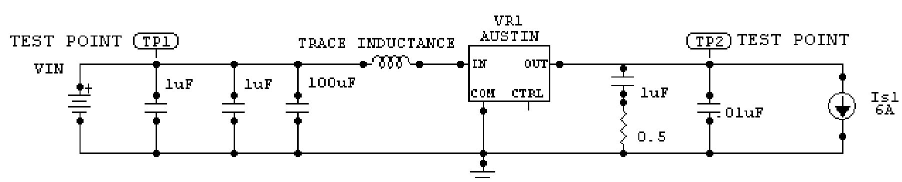

Figure 1. Input/Output Decoupling Circuit

Input/Output Ripple Performance

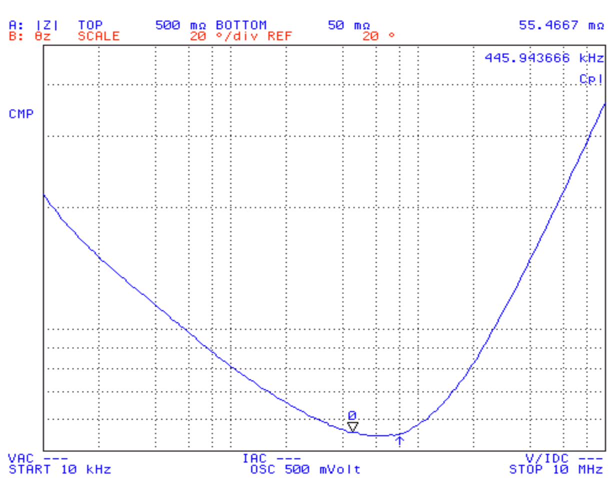

Figure 2. Impedance vs. Frequency for 100 µF Input Capacitor

Input/Output Ripple Performance (continued)

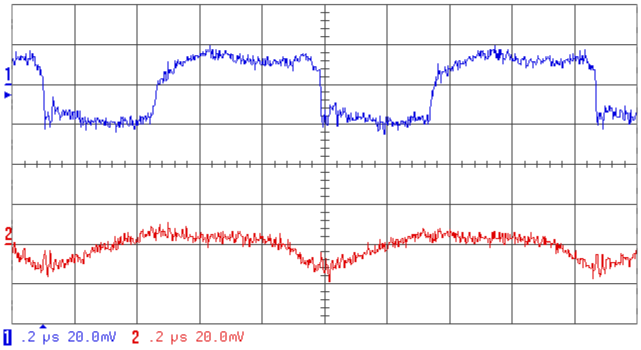

Figure 3. Typical Ripple Performance
3.3 VIN, 1.5 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

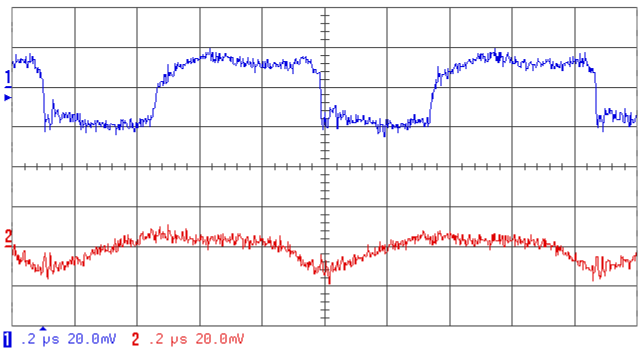

Figure 4. Typical Ripple Performance
3.3 VIN, 1.8 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

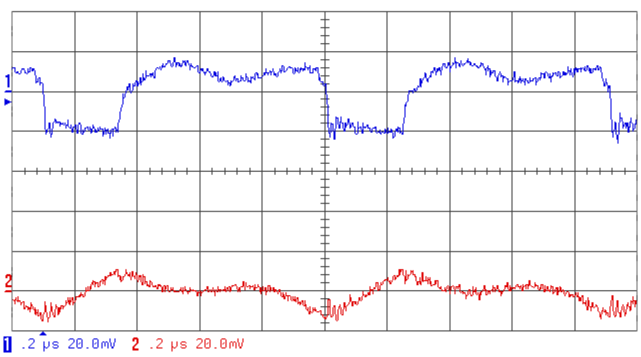

Figure 5. Typical Ripple Performance
3.3 VIN, 2.0 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

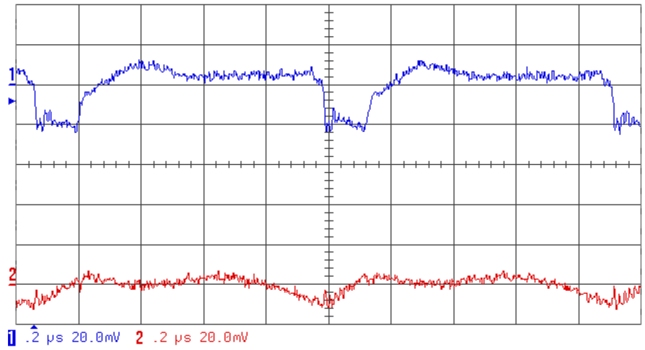

Figure 6. Typical Ripple Performance
3.3 VIN, 2.5 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

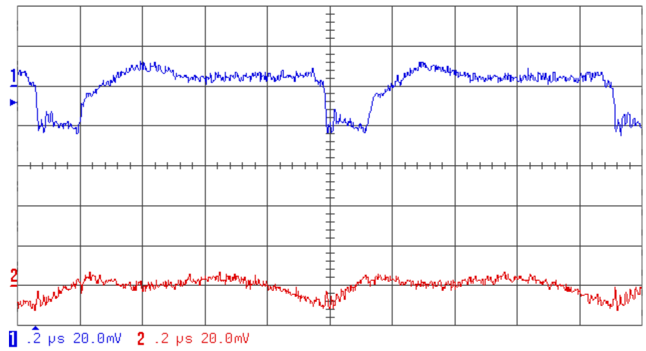

Figure 7. Typical Ripple Performance
5.0 VIN, 1.5 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

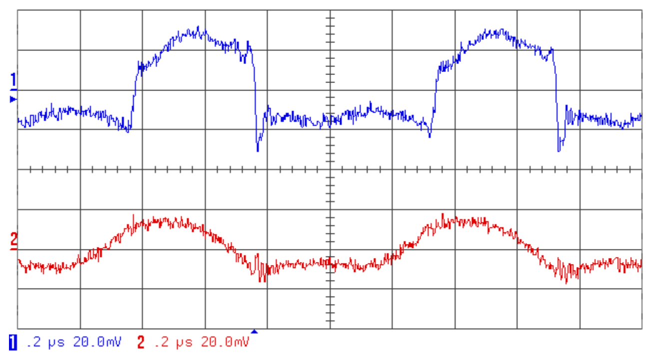

Figure 8. Typical Ripple Performance
5.0 VIN, 1.8 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

Input/Output Ripple Performance (continued)

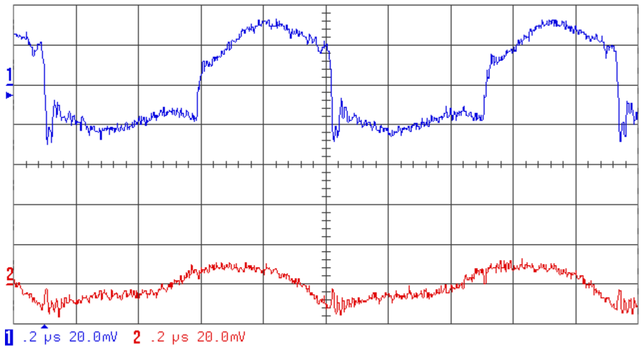

Figure 9. Typical Ripple Performance
5.0 VIN, 2.0 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

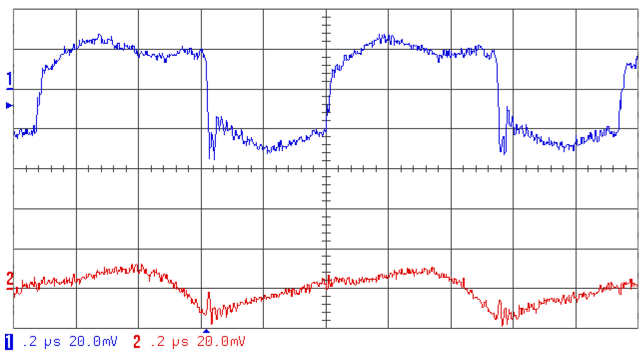

Figure 10.Typical Ripple Performance
5.0 VIN, 2.5 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

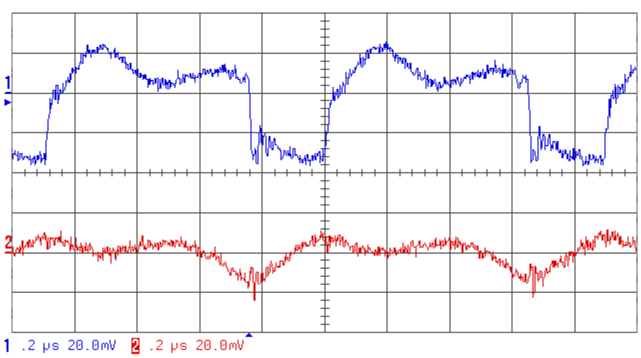

Figure 11.Typical Ripple Performance
5.0 VIN, 3.3 VOUT
Blue (upper) = Output and Red (lower) = Input 0.2 us/div 20 mv/div

Input Reflected Ripple Current

Figures 13 and 14 show typical input reflected ripple current measurement waveforms and spectras. Figure 12 depicts the circuit used to produce these results. Current was measured using a LeCroy AP015 current probe.

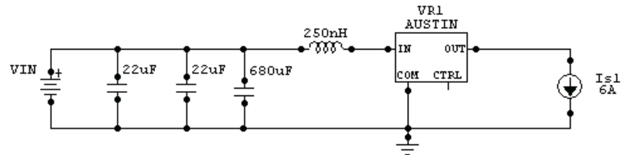

Figure 12.Input Reflected Ripple Current Circuit

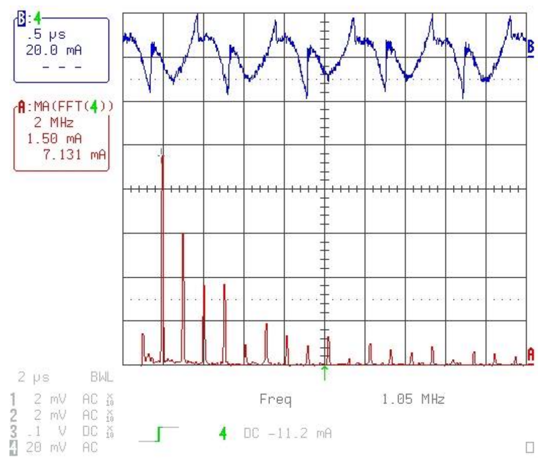

Figure 13.Typical Input Reflected Ripple Current
5.0 VIN, 1.5 VOUT
Blue (upper) = IOUT 20 mA/div, .5 us/div
Red (lower) = IOUT spectra 1.5 mA/div, 2 Mhz/div

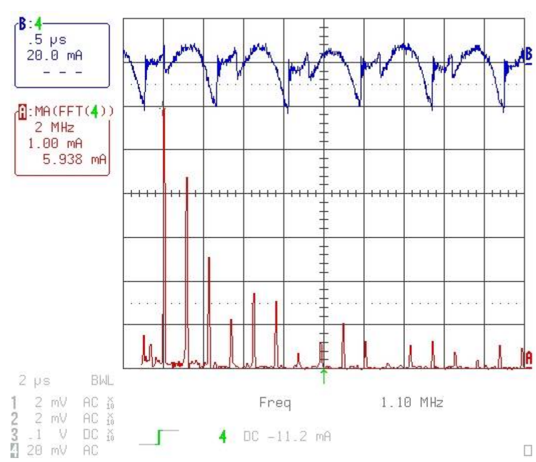

Figure 14.Typical Input Reflected Ripple Current
5.0 VIN, 3.3 VOUT

Blue (upper) = IOUT 20 mA/div, .5 us/div
Red (lower) = IOUT spectra 1.5 mA/div, 2 Mhz/div

Transient Response Performance

Figures 16 — 24 depict typical transient responses obtained using the circuit shown in Figure 15.

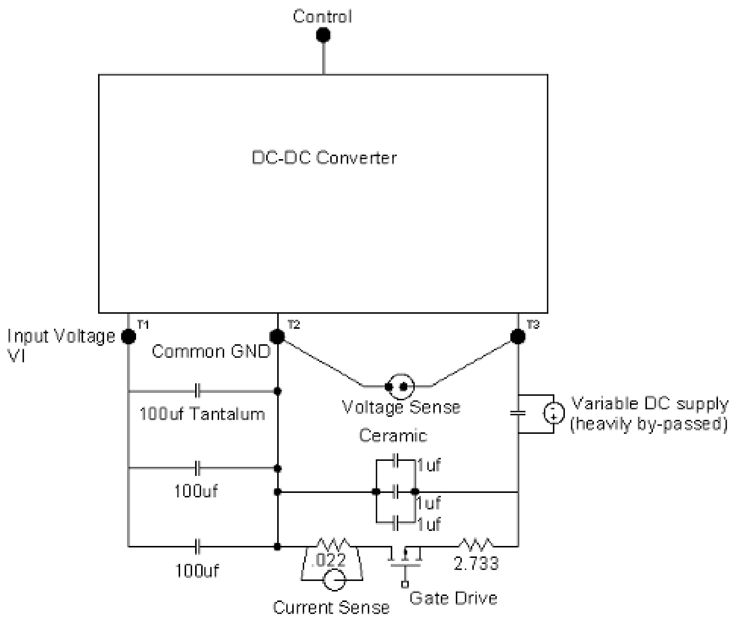

Figure 15. Load Transient Circuit

Note:Provides 0.25A to 3.25A load step @ 300 A/µs

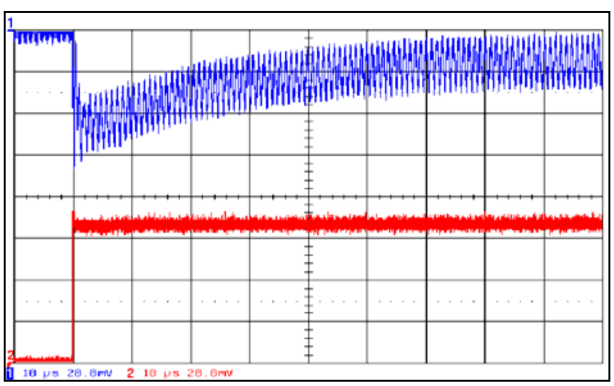

Figure 16.Typical Transient Response
3.3 VIN, 1.5 VOUT
Blue (upper) = VOUT 20 mV/div Red (lower) = 1 A/div 10 us/div

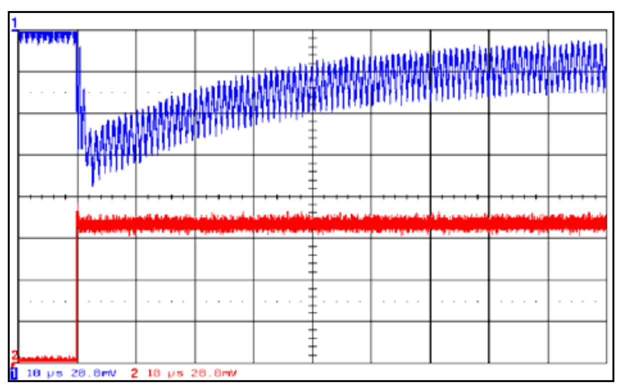

Figure 17.Typical Transient Response
3.3 VIN, 1.8 VOUT
Blue (upper) = VOUT 20 mV/div Red (lower) = 1 A/div 10 us/div

Transient Response Performance (continued)

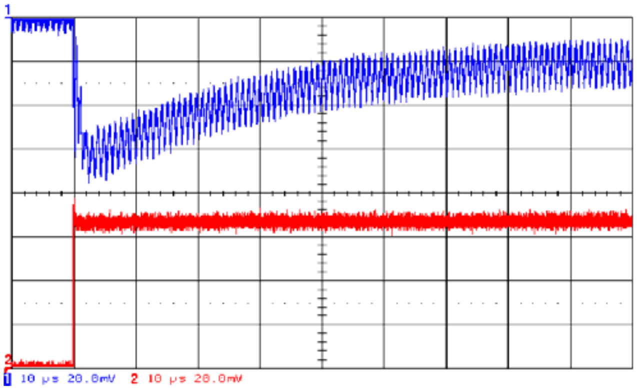

Figure 18.Typical Transient Response
3.3 V_{IN}, 2.0 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

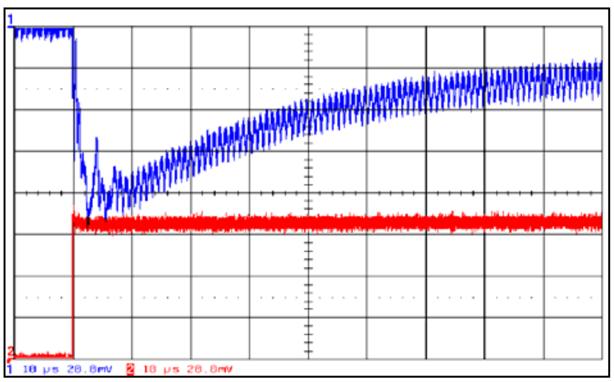

Figure 19.Typical Transient Response
3.3 V_{IN}, 2.5 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

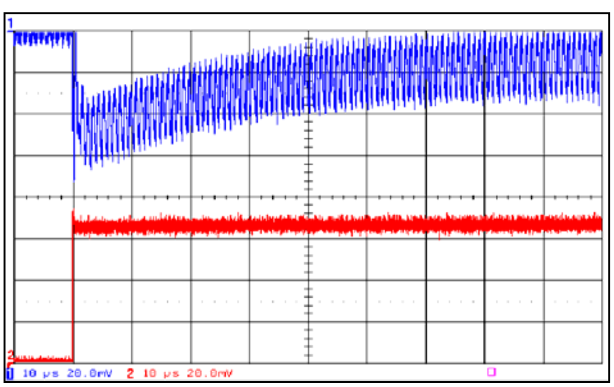

Figure 20.Typical Transient Response
5 V_{IN}, 1.5 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

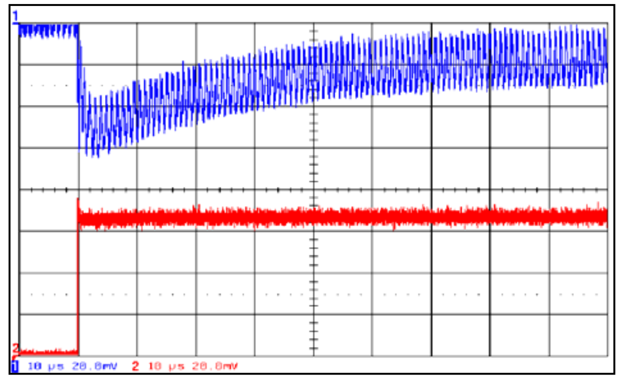

Figure 21.Typical Transient Response
5 V_{IN}, 1.8 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

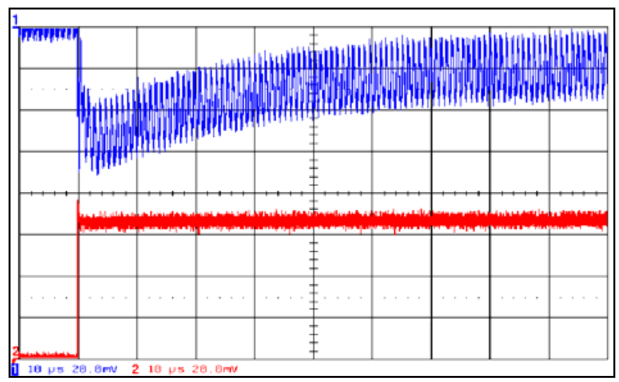

Figure 22.Typical Transient Response
5 V_{IN}, 2.0 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

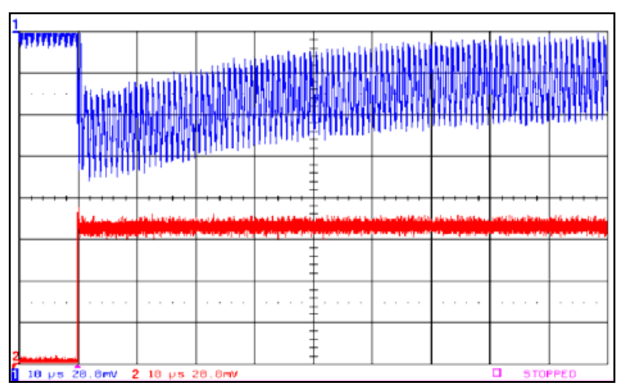

Figure 23.Typical Transient Response
5 V_{IN}, 2.5 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

Transient Response Performance (continued)

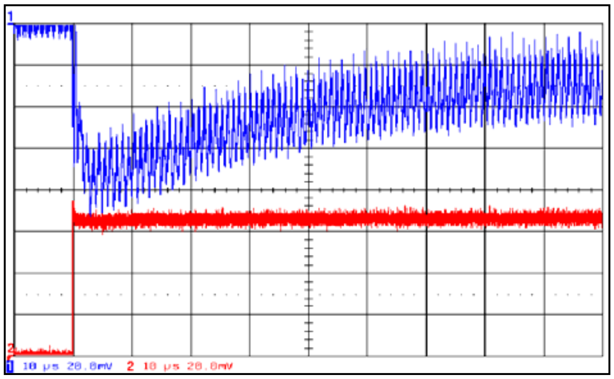

Figure 24.Typical Transient Response
5 V_{IN}, 3.3 V_{OUT}
Blue (upper) = V_{OUT} 20 mV/div Red (lower) = 1 A/div 10 us/div

Thermal Ratings

Austin Power Modules are rated to operate in ambient temperatures from –40°C to 80°C. The derating curves below are provided as design aids for proper application of the power modules. To insure adequate cooling, the module temperature should be measured in the system configuration. Ideally, temperature will be measured using an infrared temperature probe (such as the FLUKE 80T-IR) or imaging system under the maximum ambient temperature and the minimum air flow conditions. Diode and FET case temperatures measured on the top surface's hottest spot should not exceed 105 °C. An alternative method of measuring temperature is the use of thermocouples. For best results, a small thermocouple should be attached to the leads of each FET and diode using a small amount of cyanoacrylate adhesive.

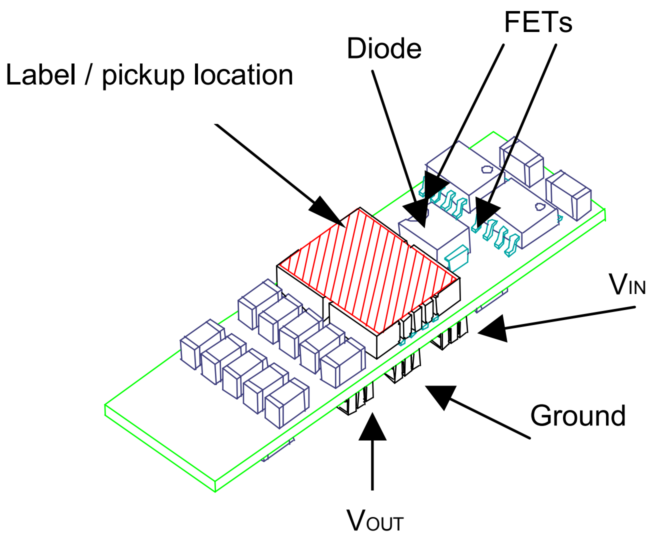

Figure 25. Thermocouple Location

Thermal Ratings (continued)

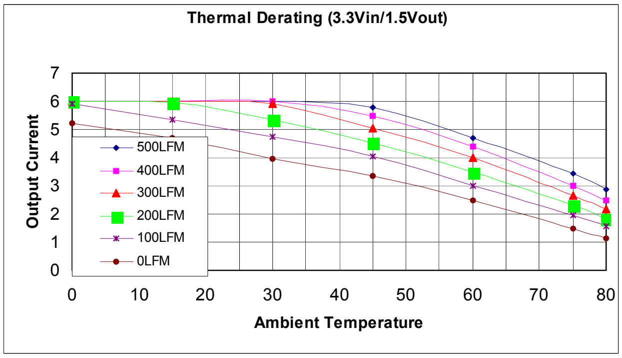

Figure 26. Thermal Derating for 3.3 VIN, 1.5 VOUT

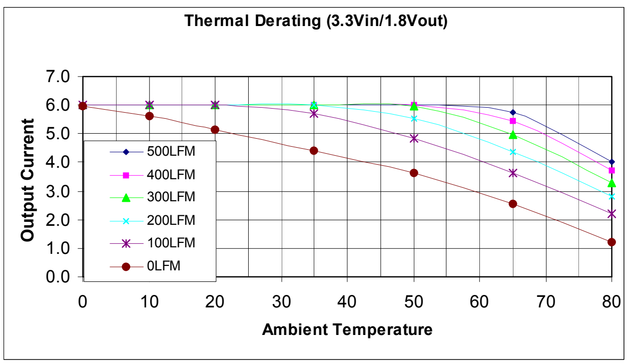

Figure 27. Thermal Derating for 3.3 VIN, 1.8 VOUT

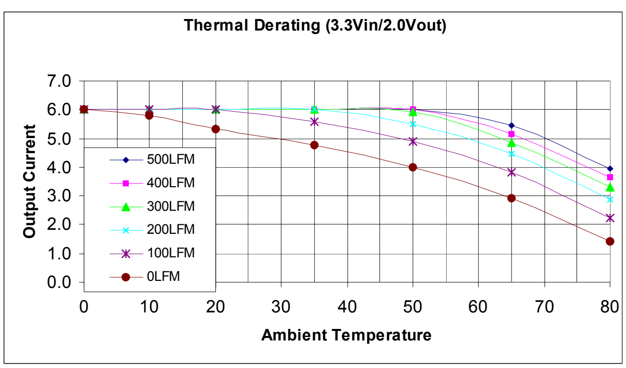

Figure 28. Thermal Derating for 3.3 VIN, 2.0 VOUT

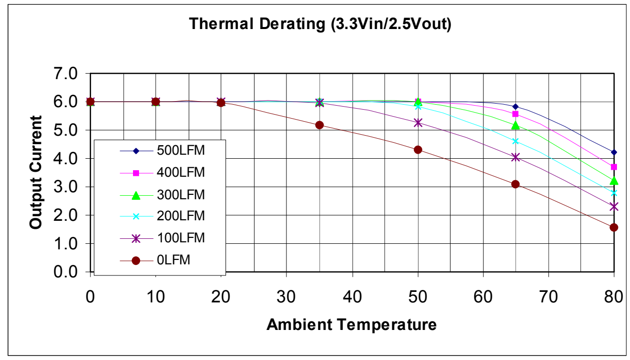

Figure 29. Thermal Derating for 3.3 VIN, 2.5 VOUT

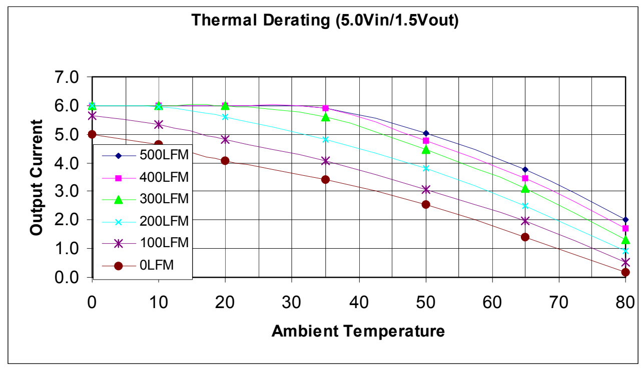

Figure 30. Thermal Derating for 5 VIN, 1.5 VOUT

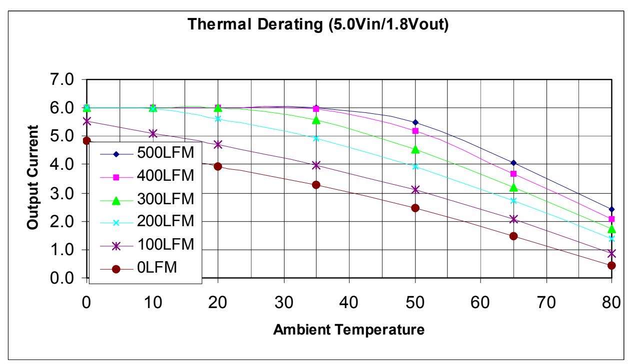

Figure 31. Thermal Derating for 5 VIN, 1.8 VOUT

Thermal Ratings (continued)

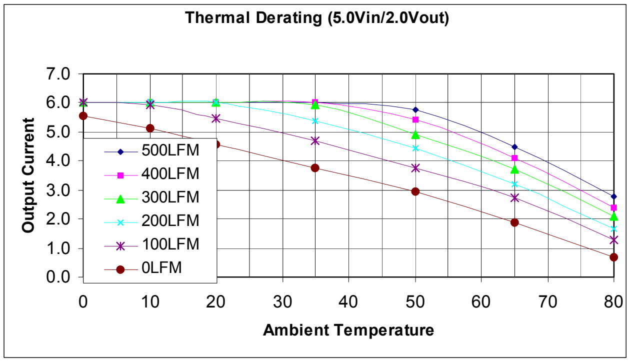

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Figure 32. Thermal Derating for 5 VIN, 2.0 VOUT

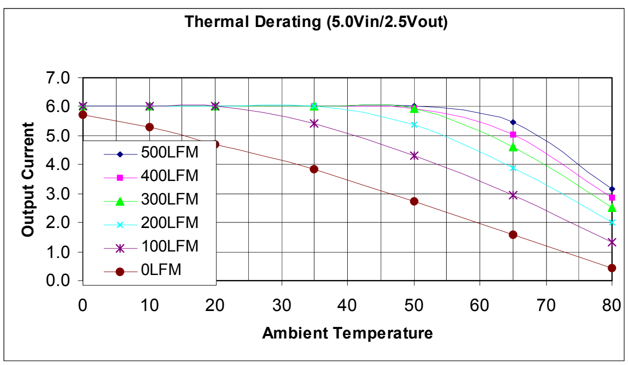

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Figure 33. Thermal Derating for 5 VIN, 2.5 VOUT

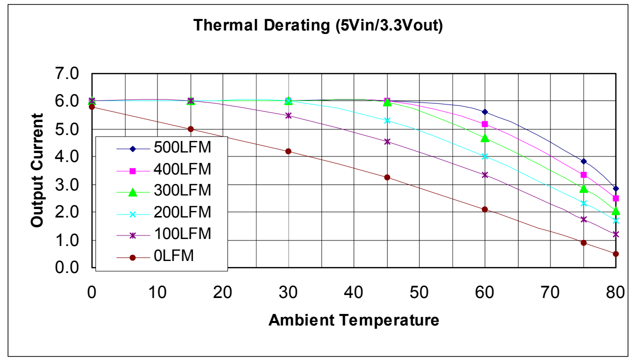

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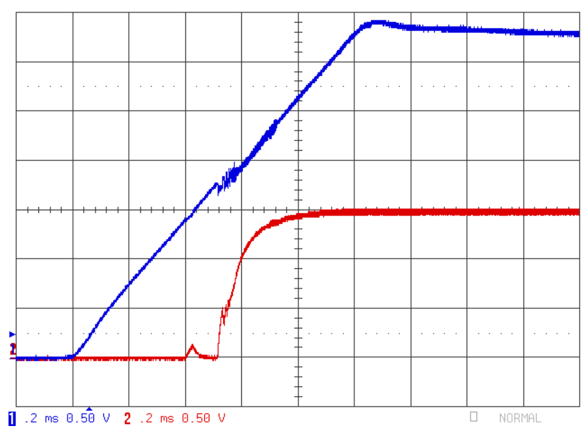
Figure 34. Thermal Derating for 5 VIN, 3.3 VOUT

Start-Up Characteristic

The module can be started by applying input voltage first, then using the control pin to turn the module on, or by applying input voltage with the control pin in the “on” state. It is recommend to apply input, then turn the module on with the control pin for the best start up characteristics, especially when used at operating ambient temperature of –40 °C. The following figures demonstrate the start-up characteristic of each module into the maximum load. Each converter is shown with an input ramp of 1 ms and 20 ms



1-0???

Figure 35.Input/Output Start-Up Characteristic: 3.3 VIN, 1.5 VOUT, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

Start-Up Characteristic (continued)

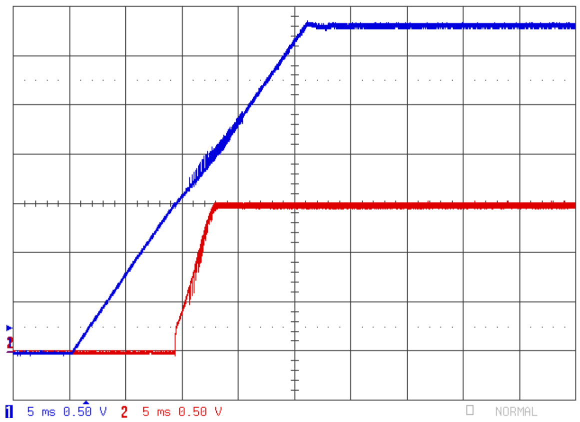


Figure 36.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 1.5 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

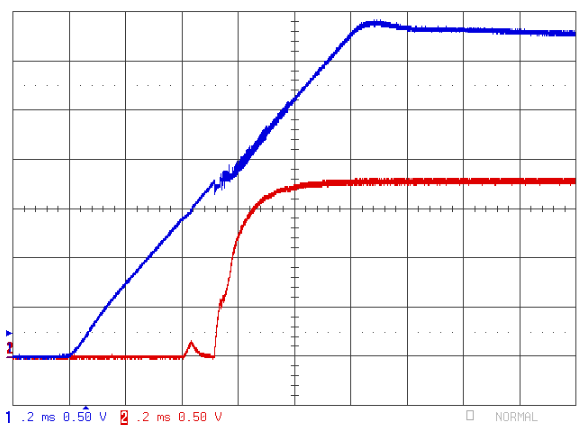


Figure 37.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 1.8 V_{OUT}, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

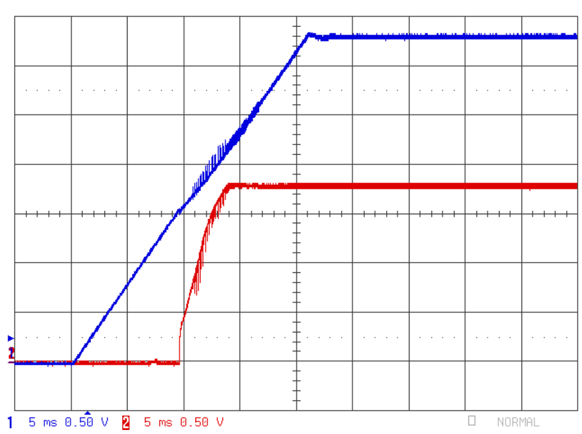


Figure 38.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 1.8 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

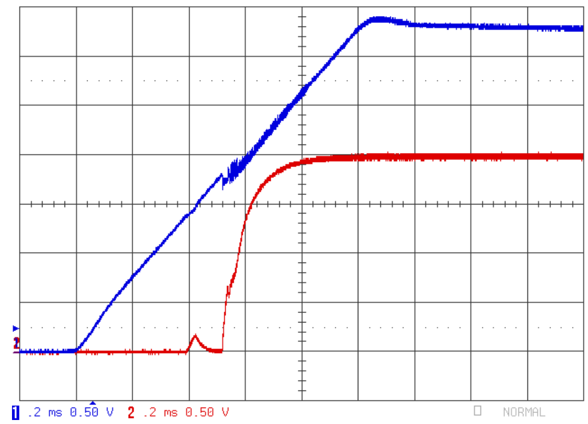


Figure 39.Input/Output Start-Up Characteristic: 3.3 VIN, 2.0 VOUT, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

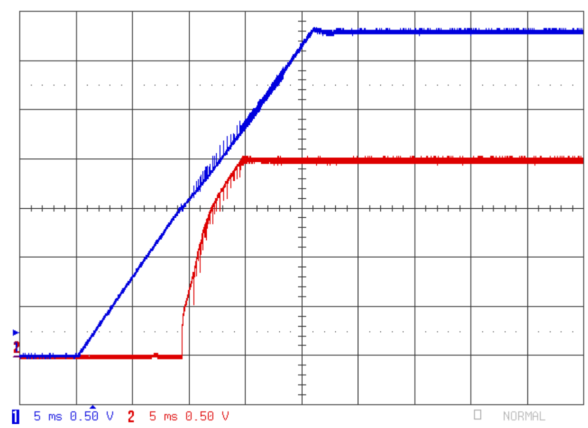


Figure 40.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 2.0 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

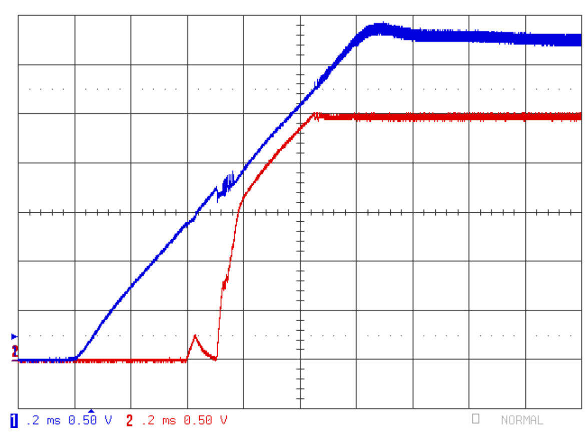


Figure 41.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 2.5 V_{OUT}, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

Start-Up Characteristic (continued)

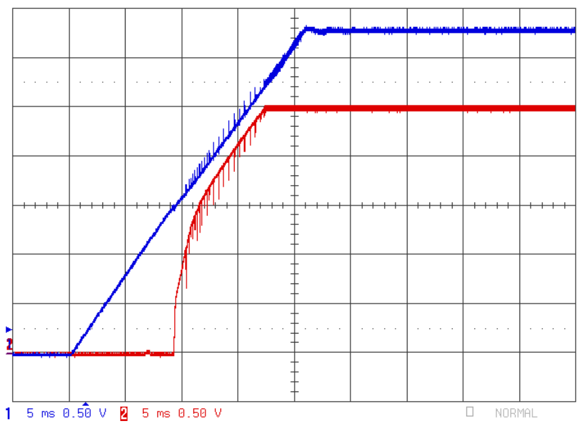


Figure 42.Input/Output Start-Up Characteristic: 3.3 V_{IN}, 2.5 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

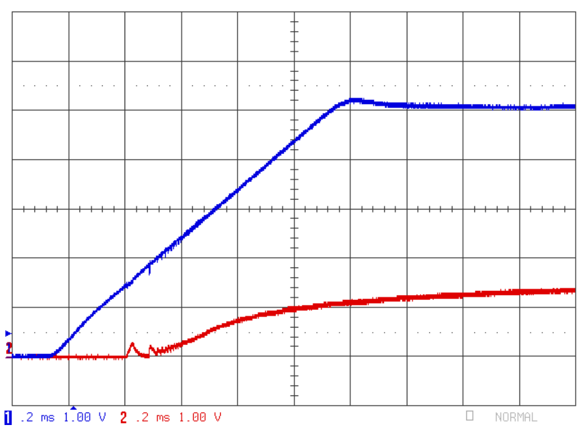


Figure 43.Input/Output Start-Up Characteristic: 5.0 V_{IN}, 1.5 V_{OUT}, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

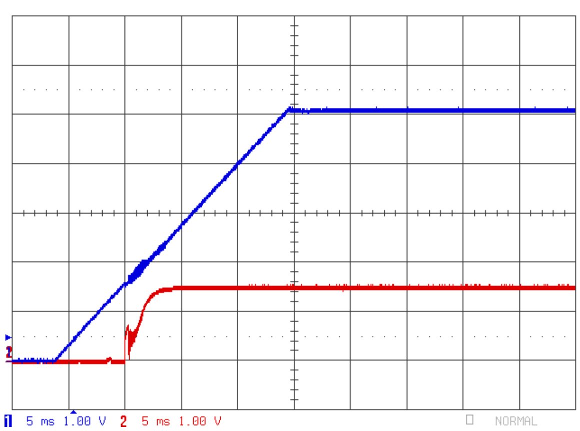


Figure 44.Input/Output Start-Up Characteristic: 5.0 V_{IN}, 1.5 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

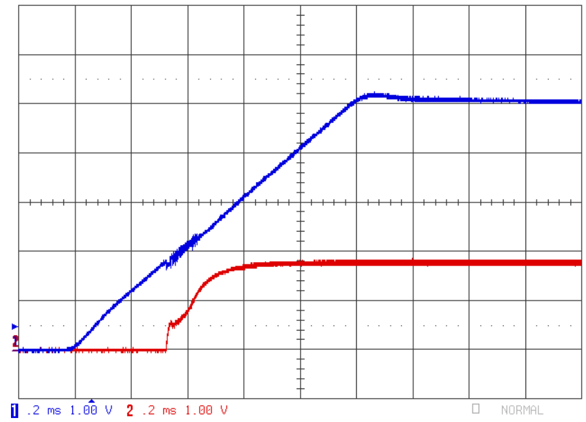


Figure 45.Input/Output Start-Up Characteristic: 5.0 V_{IN}, 1.8 V_{OUT}, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

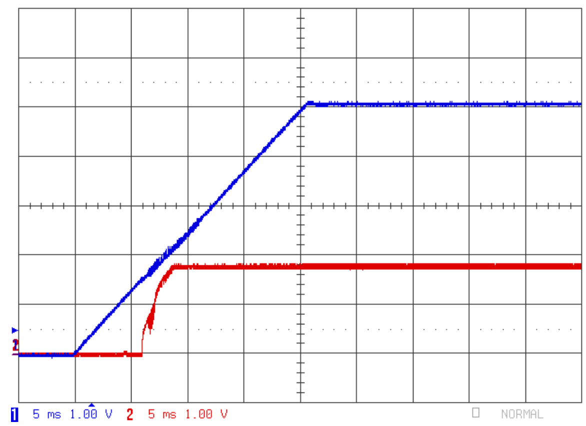


Figure 46.Input/Output Start-Up Characteristic: 5.0 V_{IN}, 1.8 V_{OUT}, 20 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

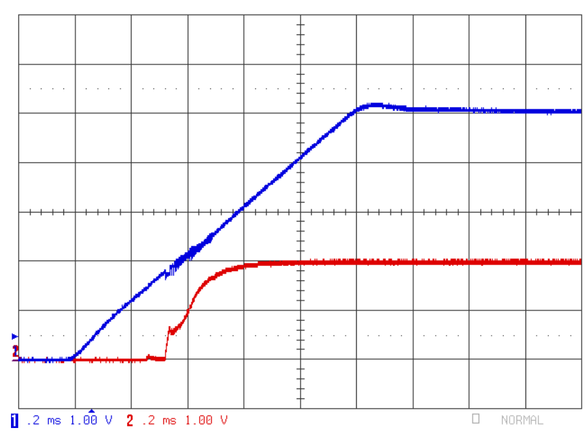


Figure 47.Input/Output Start-Up Characteristic: 5.0 V_{IN}, 2.0 V_{OUT}, 1 ms input ramp

Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

Start-Up Characteristic (continued)

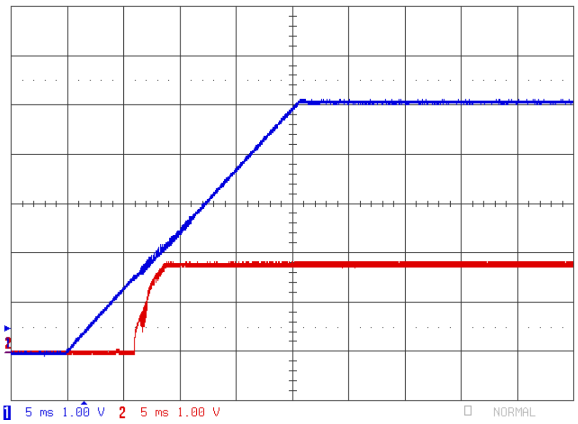


Figure 48.Input/Output Start-Up Characteristic:
5.0 V_{IN}, 2.0 V_{OUT}, 20 ms input ramp
Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

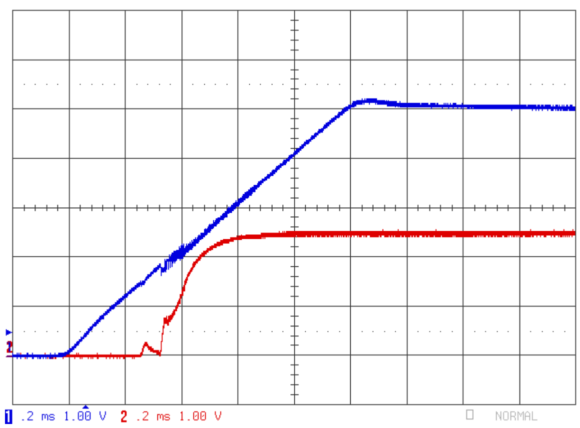


Figure 49.Input/Output Start-Up Characteristic:
5.0 V_{IN}, 2.5 V_{OUT}, 1 ms input ramp
Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

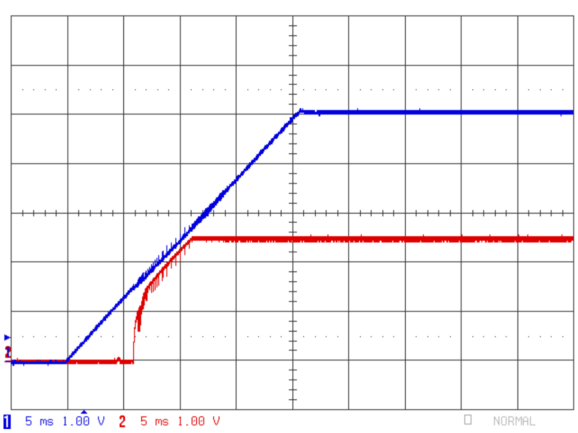


Figure 50.Input/Output Start-Up Characteristic:
5.0 V_{IN}, 2.5 V_{OUT}, 20 ms input ramp
Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

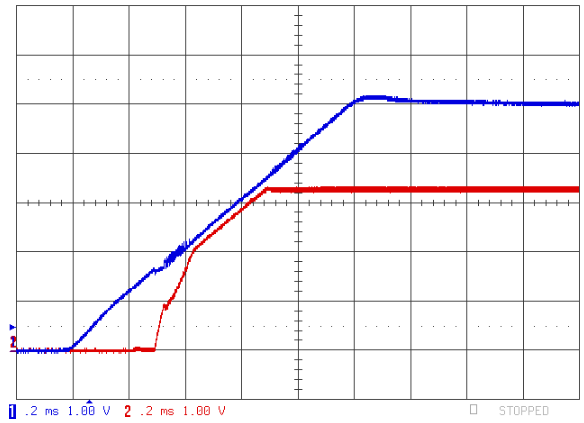


Figure 51.Input/Output Start-Up Characteristic:
5.0 V_{IN}, 3.3 V_{OUT}, 1 ms input ramp
Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

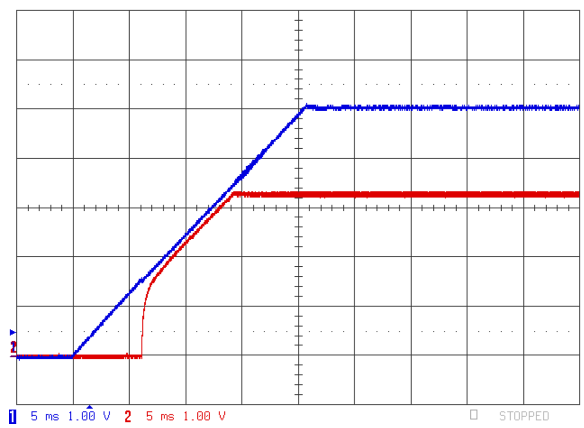


Figure 52.Input/Output Start-Up Characteristic:
5.0 V_{IN}, 3.3 V_{OUT}, 20 ms input ramp
Upper = VIN 0.5 V/div and Lower = VOUT 0.5 V/div 0.2 ms/div

Efficiency

Figures 53 — 61 show typical efficiency charts for Austin Power Modules at different input voltages. The data reflects a 25 °C ambient temperature. Efficiencies will decrease approximately 2% at maximum temperatures. Efficiency is measured in production at 25 °C and full load.

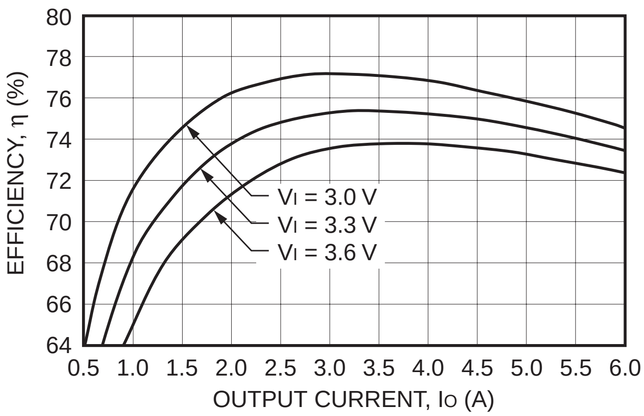


Figure 53. Efficiency: 3.3 V_{IN}, 1.5 V_{OUT}

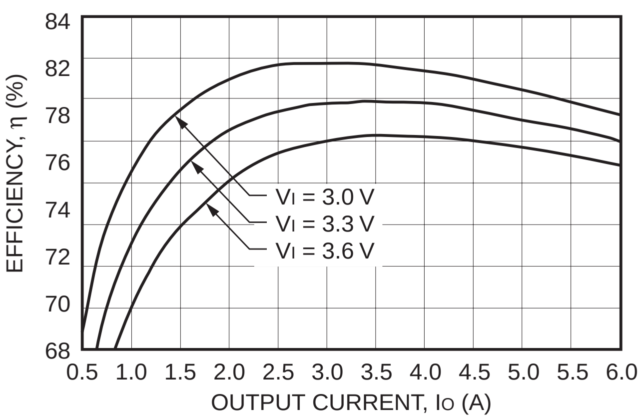


Figure 54. Efficiency: 3.3 V_{IN}, 1.8 V_{OUT}

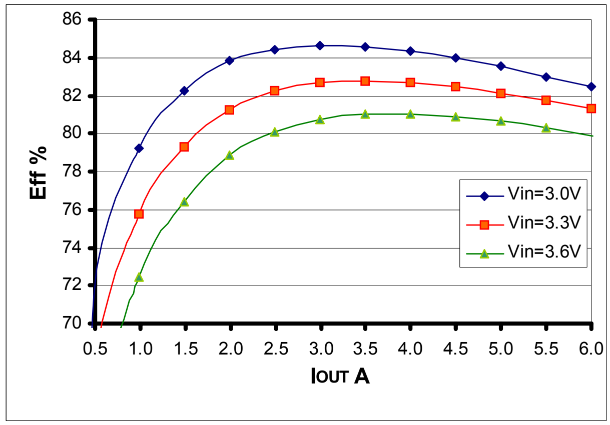


Figure 55. Efficiency: 3.3 V_{IN}, 2.0 V_{OUT}

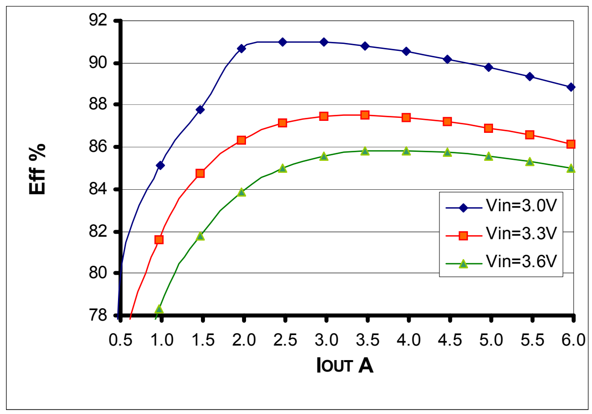


Figure 56. Efficiency: 3.3 V_{IN}, 2.5 V_{OUT}

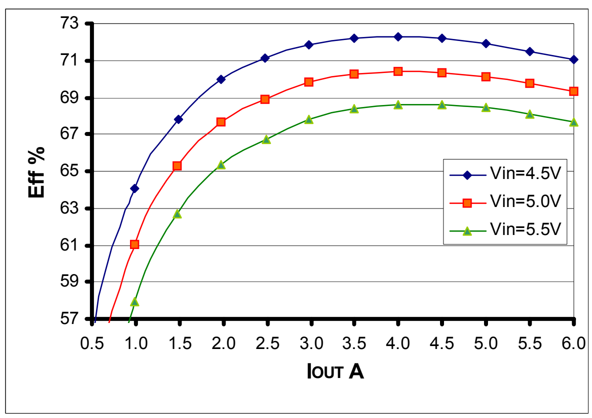


Figure 57. Efficiency: 5.0 V_{IN}, 1.5 V_{OUT}

Efficiency (continued)

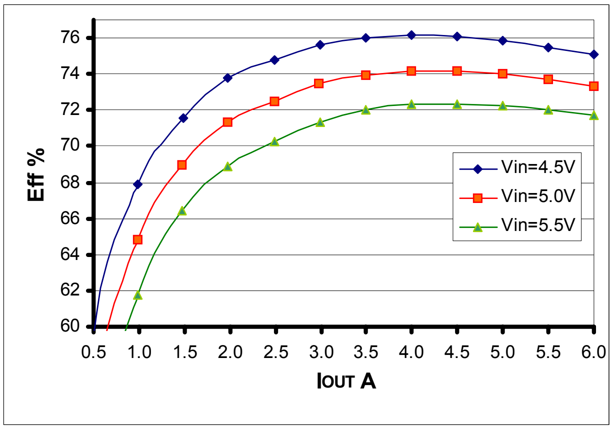


Figure 58. Efficiency: 5.0 VIN, 1.8 VOUT

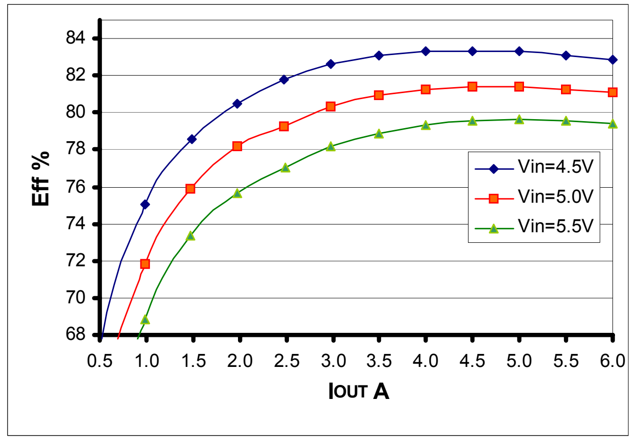


Figure 60. Efficiency: 5.0 VIN, 2.5 VOUT

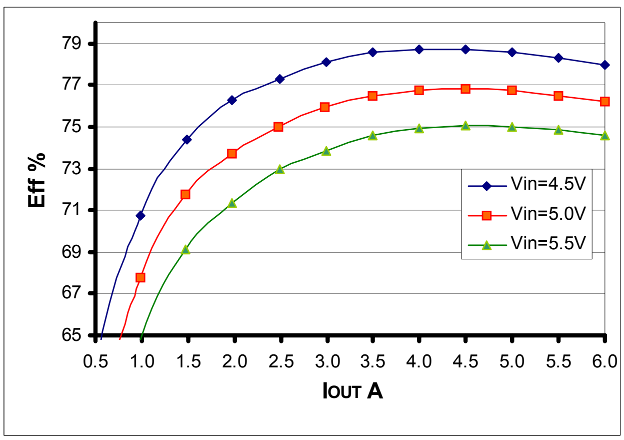


Figure 59. Efficiency: 5.0 VIN, 2.0 VOUT

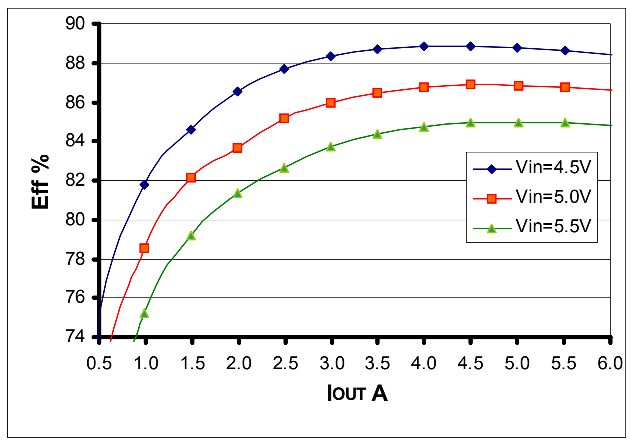


Figure 61. Efficiency: 5.0 VIN, 3.3 VOUT

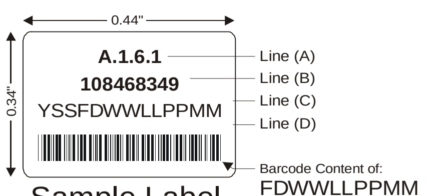
Parallel Operation

Up to five Austin Power Modules may be paralleled for extra output current needs. For N units operating in parallel, the output current rating will be equal to 6+(N-1)*4. For example, three modules can deliver 14 amps. For parallel operation, connect each control pin together. Care should be taken to make each module see the same approximate trace resistance to the load. In most cases, this requires that all converters be close together. Thermal derating can be approximated for parallel units by using the average current plus 1 amp for an individual module. For example, if three modules are carrying 12 amps, there is an average current of 3 amps so the derating curve at 4 amps would be used. Input and output decoupling should be scaled with the number of modules paralleled. If paralleled modules are to be trimmed using the control pin, divide the calculated trim resistance for a single unit by the number of modules paralleled. For example, if two paralleled units are to be trimmed 5% low, then a resistance of 146K divided by 2 should be used.

Mechanical Specifications

Table 4.

Parameter	Symbol	Min	Typical	Max	Unit
Physical Size *Dimensions listed are typical, with a tolerance of +/- 0.01 inches	L W H	— — —	*44.6 (1.756) 12.7 (0.5) 5.46 (0.215)	— — —	mm (in.) mm (in.) mm (in.)
Weight	—	—	4.0	—	grams (oz.)
Module I/O, Connector Coplanarity	—	—	—	4 (.158)	mm (in.)
Interconnecting	Low-inductance surface-mount connector				
Labeling	The label spans the magnetic component and contains the following: ■ Line A: Device code ■ Line B: Tyco COMCODE ■ Line C: Serial Number ■ Line D: Barcode				
Shock	Method: MIL-STD-202F, method 213B, individual mounted units, 50 G, V2 sine, 6 ms; twice for each orthogonal axis				
ion	Method: TR-EOP-000063, Sec. 5.4.4, individual mounted units, 5 to 50 Hz sweep @ 0.5 G, 50 to 500 Hz sweep @ 1.5 G; vibration introduced in all 3 orthogonal axes				



Y = Year (1=2001, 2=2002)
SS = Site (V2 - official mfg. Designation for SLR JR)
F = Family ("A" for Austin)
D = ID (Refer to Table 1 above)
WW = Calender Week
LL = Lot Number
PP = Panel Number (01-99)
MM = Module Number (01-78)

GENERAL NOTES

(A) Part Description: A.a.b.c.
A = Austin
a = Product ID Number

MODEL	D=ID	
	JADEC	TAPE & REEL
3.3/1.5	1	A
3.3/1.5	2	B
3.3/2.0	3	C
3.3/2.5	4	D
5.0/1.5	5	E
5.0/1.8	6	F
5.0/2.0	7	G
5.0/2.5	8	H
5.0/3.3	9	J

b = Revision Number (Customer Effecting Change)
c = Issue Number (Non-Customer Effecting Change

(B) Tyco COMCODE
(C) Serial Number
(D) Barcode

Example: 1V2AA**3125**1969
Would be: 2001 year, built at SLR JR, Austin 3.3/1.5 in tape &reel, mfg. week 31, lot no. 25, panel 19, module 69 (**WW**&**LL** to be in **BOLD** font)

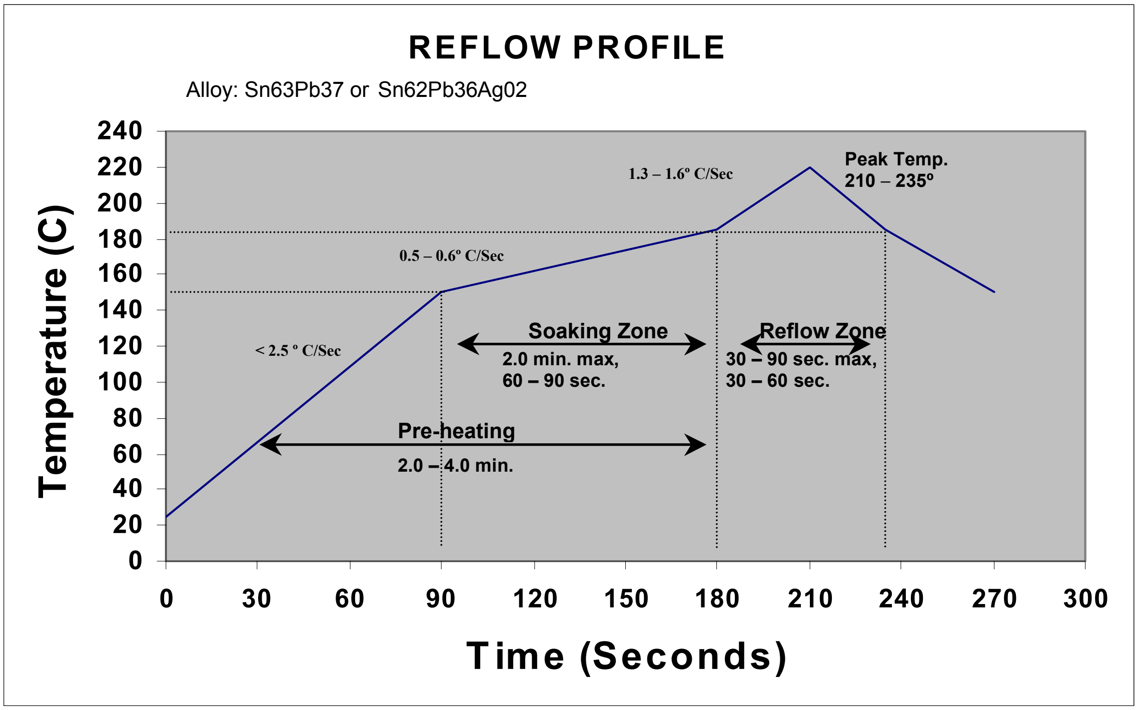
Figure 62. Detailed Drawing of Product ID Label

The input to these units is to be provided with a maximum 10A normal blow fuse in the ungrounded lead.

Reflow Profile

An example reflow profile (using the 63/37 solder) for the Austin Power Module is:

- Pre-heating zone: room temperature to 183 °C (2.0 to 4.0 minutes maximum)
- Initial ramp rate: < 2.5 °C per second
- Soaking zone: 155 °C to 183 °C — 60 to 90 seconds typical (2.0 minutes maximum)
- Reflow zone ramp rate: 1.3 °C to 1.6 °C per second
- Reflow zone: 210 °C to 235 °C peak temperature — 30 to 60 seconds typical (90 seconds maximum)



Pad Size

Recommended surface mount pad size is a minimum of 0.120 in. x 0.075 in. and a maximum of 0.140 in. x 0.095 in.

Solder Paste Height

The recommended solder paste height as applied via standard SMT processes is 0.006” or higher.

Solder Paste Coverage

The recommended solder paste coverage over surface mount pads is 90%

Pick and Place Location

The product ID label is to be utilized for vacuum pick up of the Austin Power Module. The center location of this label is identified below.

Ordering Information

Please contact your Tyco Electronics' Account Manager or Field Application Engineer for pricing and availability.

Table 5. Coding Scheme for Ordering

Product Code	Comcode	Expanded Product Description
AUSTIN 5V 3.3V 5A T	108612961	5 V_{IN}; 3.3 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 5V 2.5V 5A T	108612953	5 V_{IN}; 2.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 5V 2.0V 5A T	108612946	5 V_{IN}; 2.0 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 5V 1.8V 5A T	108612938	5 V_{IN}; 1.8 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 5V 1.5V 5A T	108613266	5 V_{IN}; 1.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 3.3V 2.5V 5A T	108612912	3.3 V_{IN}; 2.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 3.3V 2.0V 5A T	108613258	3.3 V_{IN}; 2.0 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 3.3V 1.8V 5A T	108612920	3.3 V_{IN}; 1.8 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 3.3V 1.5V 5A T	108613241	3.3 V_{IN}; 1.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; Tape & Reel package
AUSTIN 5V 3.3V 5A J	108505710	5 V_{IN}; 3.3 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 5V 2.5V 5A J	108505702	5 V_{IN}; 2.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 5V 2.0V 5A J	108505694	5 V_{IN}; 2.0 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 5V 1.8V 5A J	108505686	5 V_{IN}; 1.8 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 5V 1.5V 5A J	108505678	5 V_{IN}; 1.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 3.3V 2.5V 5A J	108468372	3.3 V_{IN}; 2.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 3.3V 2.0V 5A J	108468364	3.3 V_{IN}; 2.0 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 3.3V 1.8V 5A J	108468356	3.3 V_{IN}; 1.8 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package
AUSTIN 3.3V 1.5V 5A J	108468349	3.3 V_{IN}; 1.5 V_{OUT}; 4 terminal surface mount; 5A I_{OUT}; 300 A/µsec transient response; JEDEC Tray package

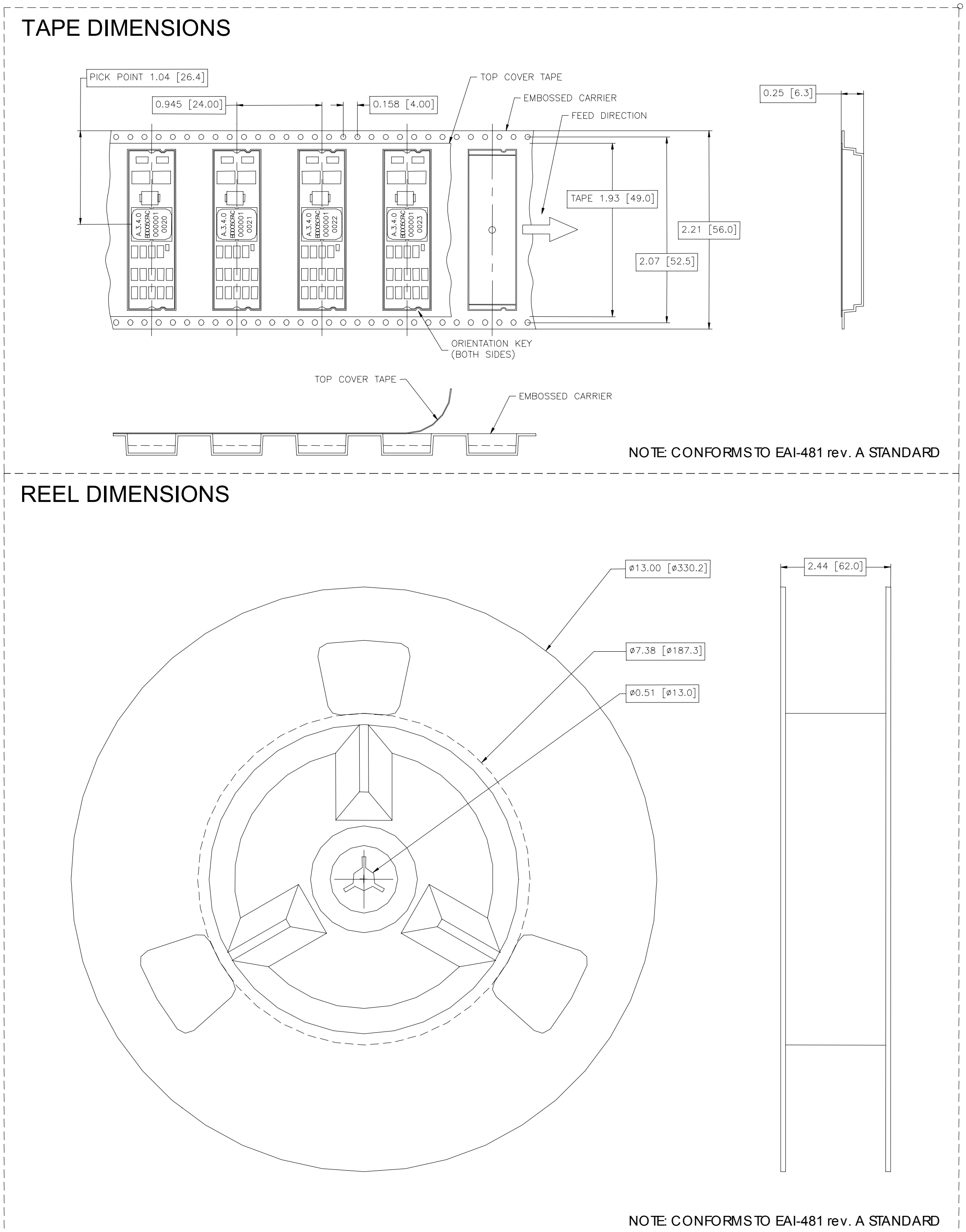


Figure 66 & 67. Austin Power Modules Packaging

The above drawings represent Carrier Tape and Reel configuration. austin Power Modules are shipped in quantities of 250 modules per tape and reel, or four JEDEC trays with 42 modules per tray, for a total of 168 modules.

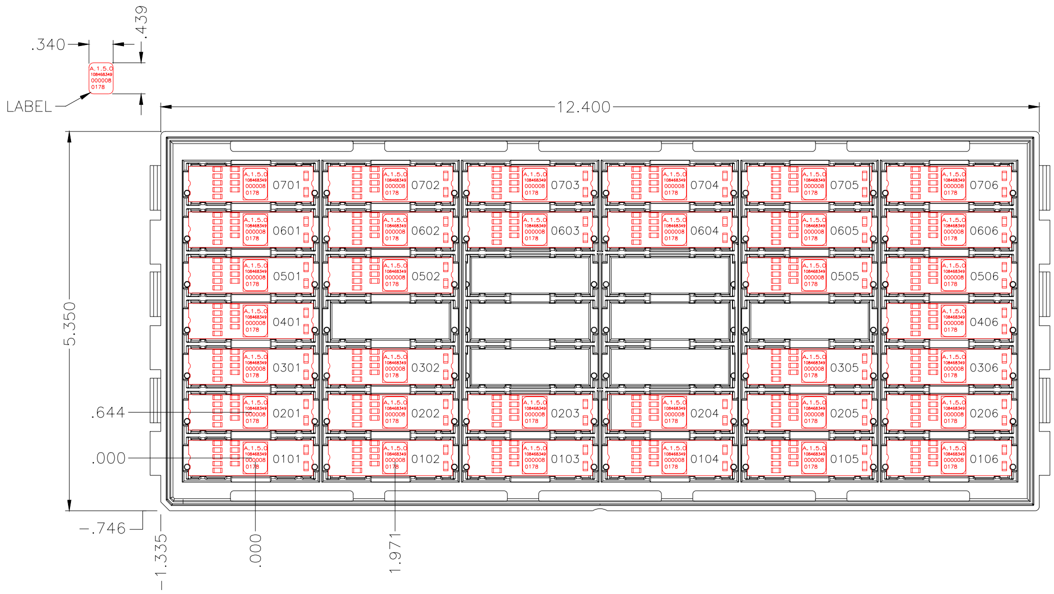


Figure 68. Austin Modules arranged in JEDEC-style tray

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