

## SMT12F Series

31.2 Watts Non-Isolated DC-DC Converters

### Data Sheet

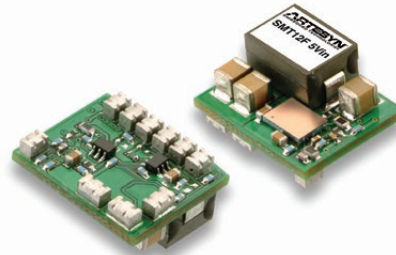
**Total Power:** 31.2 Watts  
**Input Voltage:** 2.97 - 3.63 Vdc  
**# of Outputs:** Single

### SPECIAL FEATURES

- Designed to meet ultra fast transient requirements up to 300 A/ $\mu$ s step load transients
- 12 A current rating
- Input voltage range: 2.97 - 5.5 Vdc
- Output voltage range: 0.9 - 3.3 V
- Ultra-high efficiency: 96% @ 5 Vin and 3.3 Vout
- Extremely low internal power dissipation
- Minimal thermal design concerns
- Ideal solution where board space is at a premium or tighter card pitch is required
- Industry standard surface-mount footprint
- Available RoHS compliant
- Two year warranty

### SAFETY

- UL, cUL CAN/CSA 22.2 No. E174104
- UL 60950 File No. E174104
- TÜV Product Service (EN60950) Certificate No. B 04 04 38572 041
- CB report and certificate to IEC60950 DE3-51686M1



### Electrical Specifications

Input		
Input voltage range	5 Vin 3.3 Vin	3.0 - 5.5 Vdc 2.97 - 3.63 Vdc
Input current	No load	100 mA
Input current (max.)		8.5 A max. @ Io max. and Vout = 3.3 V
Input reflected ripple		100 mA rms
Remote ON/OFF		See Note 1
Start-up time		15 ms
Output		
Voltage adjustability Wide Trim	5.0 Vin 3.3 Vin	0.9 - 3.3 Vdc 0.8 - 2.6 Vdc
Setpoint accuracy		$\pm 0.5\%$ typical
Line regulation		$\pm 1.0\%$ typical
Load regulation		$\pm 1.0\%$ typical
Minimum load		0 A
Overshoot/undershoot		None
Ripple and noise (See Note 5)	5 to 20 MHz	40 mV pk=pk 25 mV rms max.
Temperature co-efficient		$\pm 0.01\%$ / °C
Transient response (Vout = 3.3 V)	di/dt 300 A/ $\mu$ s	12 A load step 100 mV deviation <15 $\mu$ s settling time to within $\pm 1.0\%$
Remote sense		10% Vo compensation

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

### General Specifications

Efficiency	5.0 Vin 3.3 Vin	95% typical 92% typical
Insulation voltage		Non-isolated
Switching frequency		600 kHz typical
Approvals and standards		EN60950 UL/cUL60950
Material flammability		UL94V-0
Dimensions	L x W x H	16.00 x 13.46 x 7.93 mm 0.63 x 0.52 x 0.31 inches
Weight		3 g (0.11 oz)
Coplanarity		100 µm
MTBF	Telcordia SR-332	10,000,000 hours

### Environmental Specifications

Thermal performance	Operating ambient temperature	-40 °C to +85 °C
See Note 2	Non-operating temperature	-40 °C to +125 °C
<b>Protection</b>		
Short-circuit	Continuous	
Thermal	Automatic recovery	

### EMC Characteristics

Electrostatic discharge	EN61000-4-2, IEC801-2
Conducted immunity	EN61000-4-6
Radiated immunity	EN61000-4-3

### Ordering Information

Model Number <sup>(6)</sup>	Output Power (Max.)	Input Voltage	Output Voltage	Output Current (Min.)	Output Current (Max.)	Efficiency (Typical)	Regulation	
							Line	Load
SMT12F-05W3V3J	39.6 W	3.0 - 5.5 Vdc	0.9 - 3.3 Vdc	0 A	12 A	95%	±1.0%	±1.0%

### Part Number System with Options

Product Family	Rated Output Current	Performance	Input Voltage	Type of Output	Output Voltage	Packaging Options
<b>SMT</b>	<b>12</b>	<b>F</b>	<b>05</b>	<b>W</b>	<b>3V3</b>	<b>J</b>
SMT - Surface-mount	12 = 12 Amps	F = Enhanced/Fast Transient	03 = 2.97 - 3.63 Vdc 05 = 3.0 - 5.5 Vdc	S = Single fixed W = Wide	3.3 = 0.9 - 3.3 Vdc	J = Pb-free RoHS 6/6 compliant

### Output Voltage Adjustment

The ultra-wide output voltage trim range offers major advantages to users who select the SMT12F. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 0.9 Vdc to 2.6 Vdc or 0.9 Vdc to 3.3 Vdc. When the SMT12F-05W3V3J converter leaves the factory the output has been adjusted to the default voltage of 3.3 V. When the SMT12F-03W2V6J converter leaves the factory the output has been adjusted to the default voltage of 2.6 V.

Vin	Vout	Unit
4.5 - 5.5 Vdc	0.9 - 3.3 Vdc	05W3V3J
< 4.5 Vdc	0.9 - 2.0 Vdc	05W3V3J

#### Notes:

- The SMT12F features an 'Active Low' Remote ON/OFF operation. If you are not using the Remote ON/OFF pin, leave the pin open (the converter will be on). The Remote ON/OFF pin is referenced to ground. The following conditions apply for the SMT12F:

Configuration	Converter Operation
Remote pin open circuit	Unit is ON
Remote pin pulled low	Unit is ON
Remote pin pulled high	Unit is OFF

A 'Active High' Remote ON/OFF version is also possible with this converter. To order please place the suffix '-R' at the end of the model number, e.g. SMT12F-05W3V3RJ.

- See Figures 1 and 2 for sample derating curves. For the full set of derating curves see Application Note 165.
- A 22 µF ceramic input capacitor may be required for test purposes only. See Performance Application Note 165 for further details.
- An external output capacitor is required for basic operation. Required capacitance is a minimum of 110 µF to meet the performance parameters. This can be made up of any combination of 22 µF or 44 µF multi-layer ceramic capacitors in the appropriate voltage rating.
- Ripple and Noise is worst case measurement. Typical value is 26 mV pk-pk.
- NOTICE: Some models do not support all options. Please contact your local Artesyn Embedded Technologies representative or use the on-line model number search tool at <http://www.Artesyn.com/power> to find a suitable alternative.

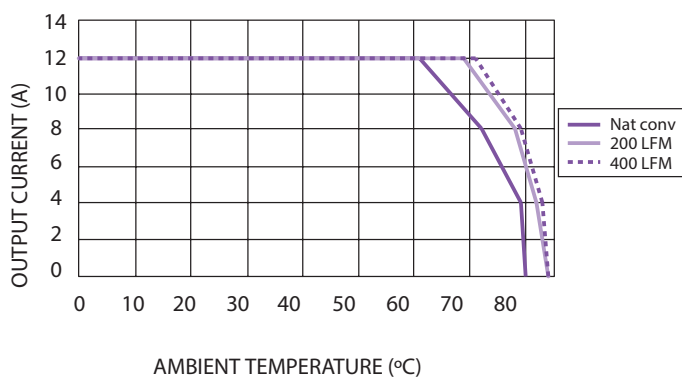
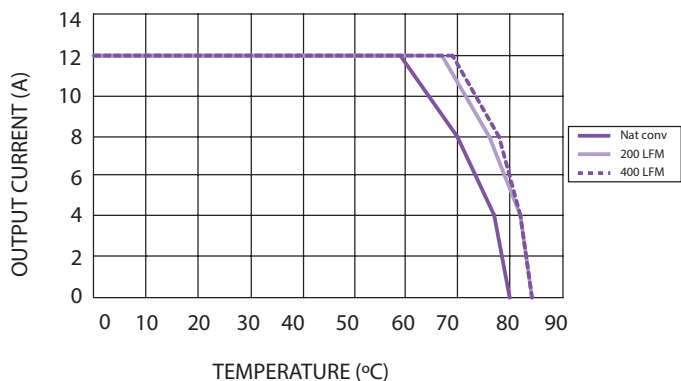


Figure 1 - Derating Curve  
 Vin = 5 V, Output Voltage = 1.8 V (See Note A)

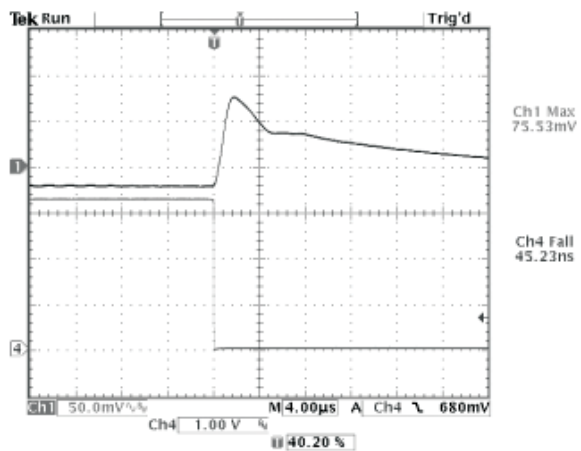


Figure 3 - Typical Transient Response (source)  
 12 A load Step  $di/dt = 300 \text{ A}/\mu\text{s}$   
 Channel 1: Deviation on unit = 2.3% Settling Time = 16 μs  
 Vin = 5 V, Vout = 1.5 V

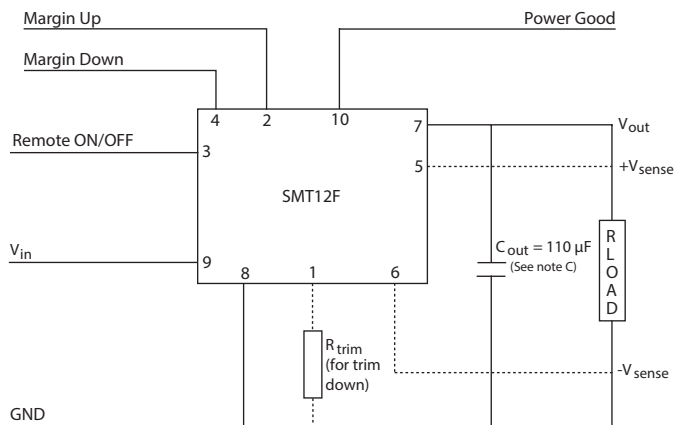
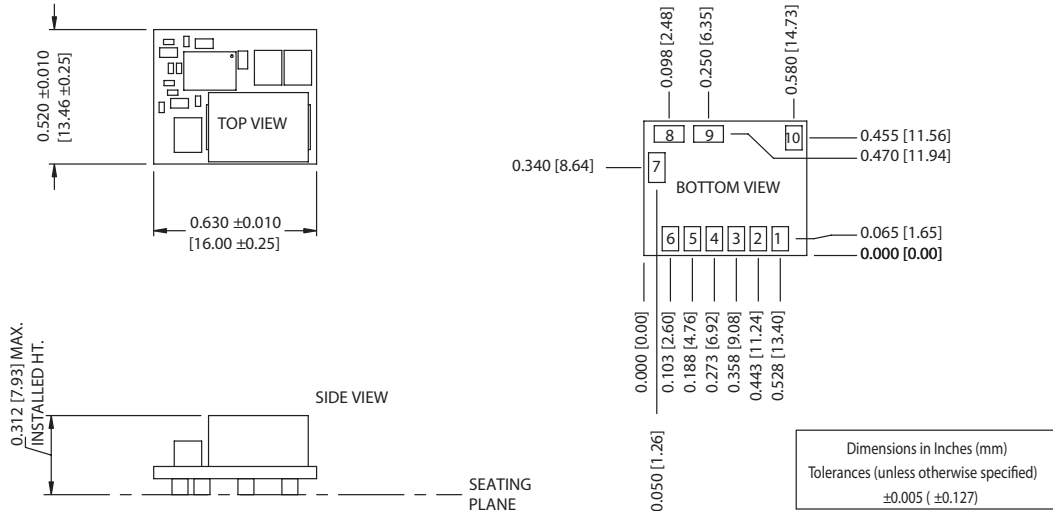


Figure 4 - Standard Application Drawing

Notes:

- A. Derating curves represent the conditions at which internal components are within the Artesyn derating guidelines.
- B. Vin = 5 V, Vout = 1.5 V

Mechanical Drawings



Pin No.	Pin Description	Pin No.	Pin Description
1	Trim: A 1% 0.1 W resistor must be directly connected between this pin and pin 8 (GND) to set the output voltage to a lower value than 3.3 V. The temperature stability of the resistor should be 100 ppm/°C or better. The set point range for the 3.3 V model is from 3.3 - 0.9 V. The resistor required for a given output voltage may be calculated from the following formula: $R_{trim} = \frac{110 \times V_{out} (Desired) \text{ k}\Omega}{3.28 - V_{out} (Desired)}$ If left open circuit the output voltage will default to 3.3 V. The set point range for the 2.6 V model is from 2.6-0.9 V. The resistor required for a given output voltage may be calculated from the following formula: $R_{trim} = \frac{60.4 \times V_{out} (Desired) \text{ k}\Omega}{2.6 - V_{out} (Desired)}$ If left open circuit the output voltage will default to 2.6 V. For further information on output voltage adjustment consult the Application Note 165.	6	V sense -: The VSense should be connected to the ground of a bypass capacitor near the load or left open circuit.
2	Margin+: When this input is asserted to High, the output voltage is increased by 5%. This function is independent of trim and sense.	7	+Vout: The regulated positive power output with respect to the GND node.
3	Remote ON/OFF: Applying a high level signal to this input disables the module's output and turns off the output voltage. When the Remote ON/OFF control is active, the input current drawn by the regulator is significantly reduced. If the Remote ON/OFF pin is left open circuit, the module will produce an output whenever a valid input source is applied.	8	Ground: This is the common ground connection for the Vin and Vout power connections. It is also the 0 Vdc reference for the control inputs.
4	Margin-: When this input is asserted high, the output voltage is decreased by 5% from the nominal. This functions is independant of trim and sense.	9	+Vin: The positive input voltage power node to the module, which is referenced to common GND.
5	V sense +: The sense input allows the regulation circuit to compensate for voltage drop between the module and the load. For optimal voltage accuracy Vo Sense should be connected to Vout node of bypass capacitor. It can also be left disconnected.	10	Power Good: This pin indicates the status of the output voltage. Power Good is driven low if output voltage deviates outside of specified limits.

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