

SMT12F Series

3.3 Vin and 5 Vin
single output

Total Power: 31.2W
Input Voltage: 2.97-3.63 Vdc
of Outputs: Single

Special Features

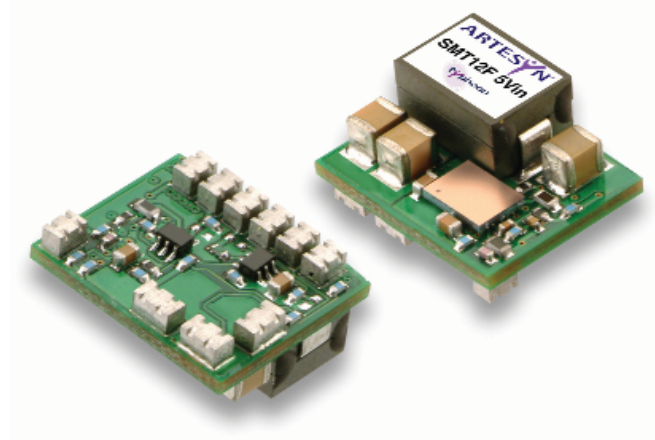
- Designed to meet ultra fast transient requirements up to 300 A/ μ s step load transients
- 12 A current rating
- Input voltage range: 2.97 Vdc to 5.5 Vdc
- Output voltage range: 0.9 Vdc to 3.3 Vdc
- Extremely low internal power dissipation
- Minimal thermal design concerns
- Ideal solution where board space is at a premium or tighter card pitch is required
- Available RoHS compliant
- 2 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 DE3-52484



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The SMT12F series is a new range of ultra-compact non-isolated point-of-load converters for space-critical applications. The new SMT12F Typhoon™ family surface-mount converter has a footprint of just 13.5 x 16 mm - and unlike competitive products on the market, requires only the addition of a small number of ceramic output capacitors to realise a complete high-performance point-of-load (POL) solution. The SMT12F is primarily intended for use on very densely packed, high functionality boards and for powering advanced silicon including network and communication processors, DSPs, FPGAs and ASICs. A key advantage of the SMT12F is that it only needs the addition of five 22 μ F ceramic output capacitors to provide a complete full-specification, high efficiency POL solution with transient response capabilities that extend up to 300 A/ μ s. The total board space required for the module and capacitors is a mere 300 mm², facilitating easy co-location with the load.



Specifications

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

OUTPUT SPECIFICATIONS

Voltage adjustability	5.0 Vin	0.9-3.3 Vdc
Wide trim (See Note 6)	3.3 Vin	0.9-2.6 Vdc
Setpoint accuracy	±0.5% typ.	
Line regulation	±1.0% typ.	
Load regulation	±1.0% typ.	
Total error band	±3.0% typ.	
Minimum load	0 A	
Overshoot/undershoot	None	
Ripple and noise (See Note 5)	5 Hz to 20 MHz	40 mV pk-pk 25 mV rms
Temperature co-efficient	±0.01%/°C	
Transient response (Vout = 3.3 V)	di/dt 300 A/μs	12 A load step 100 mV deviation <15 μs settling time to within ±1.0%
Remote sense	10% Vo compensation	

INPUT SPECIFICATIONS

Input voltage range (See Note 6)	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	

EMC CHARACTERISTICS

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

GENERAL SPECIFICATIONS

Efficiency	5 Vin 3.3 Vin	95% typ. 92% typ.
Insulation voltage	Non-isolated	
Switching frequency	600 kHz	
Approvals and standards	EN60950 UL/cUL60950	
Material flammability	UL94V-0	
Dimensions	(LxWxH)	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 (See Note 2)	Operating ambient, temperature Non-operating	-40 °C to +85 °C -40 °C to +125 °C
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PROTECTION

Short-circuit	Continuous
Thermal	Automatic recovery

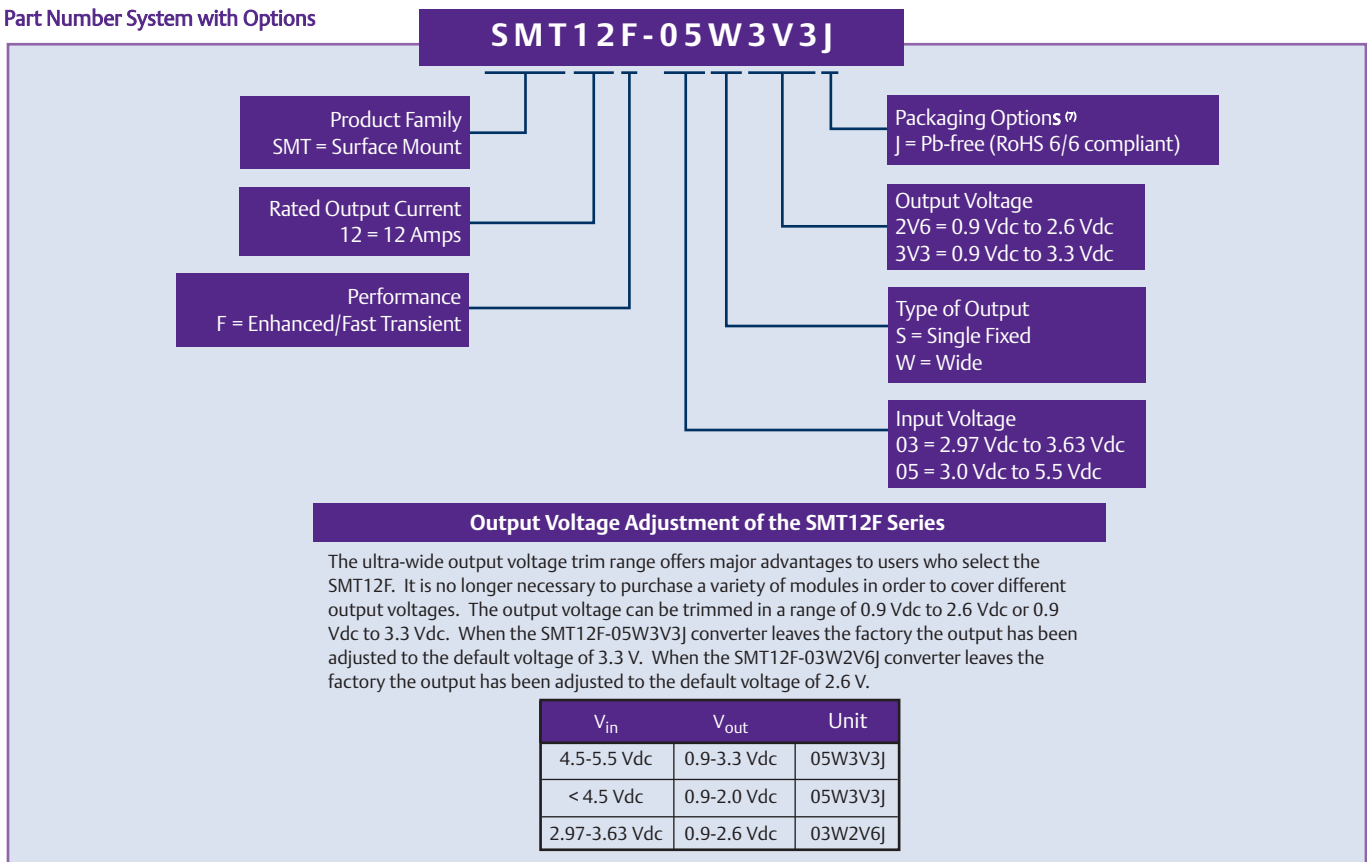
Specifications

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OUTPUT POWER (MAX.)	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYP.)	REGULATION		MODEL NUMBER ^(7,8)
						LINE	LOAD	
31.2 W	2.97-3.63 Vdc	0.9-2.6 Vdc	0 A	12 A	92%	±1.0%	±1.0%	SMT12F-03W2V6J
39.6 W	3.0-5.5 Vdc	0.9-3.3 Vdc	0 A	12 A	95%	±1.0%	±1.0%	SMT12F-05W3V3J

Part Number System with Options



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

Remote pin open circuit
Remote pin pulled low
Remote pin pulled high

Converter Operation

Unit is ON
Unit is ON
Unit is OFF

An 'Active High' Remote ON/OFF version is also possible with this converter. To order please place the suffix 'R' towards the end of the part 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

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.
- When V_{in} < 4.5 V, V_{out} max = 2.5 V for model SMT12F-03W2V6.
- TSE RoHS 5/6 (non Pb-free) compliant versions may be available on special request, please contact your local sales representative for details.
- NOTICE: Some models do not support all options. Please contact your local Artesyn representative or use the on-line model number search tool at <http://www.artesyn.com/powergroup/products.htm> to find a suitable alternative.

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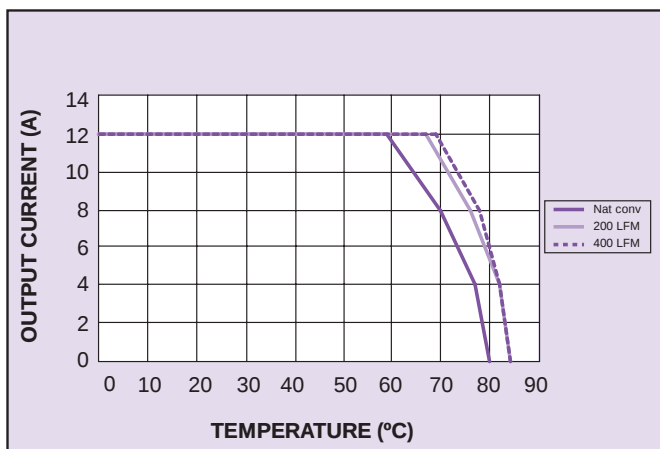


Figure 1 - Derating Curve
Vin = 5 V, Output Voltage = 1.8 V (See Note A)

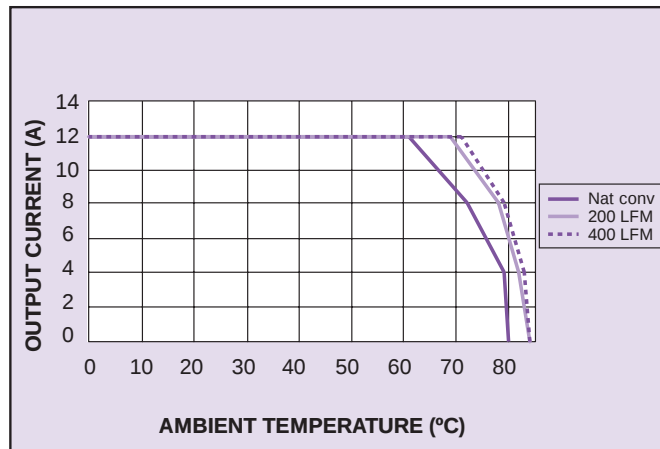


Figure 2 - Derating Curve
Vin = 5 V, Output Voltage = 1.5 V (See Note A)

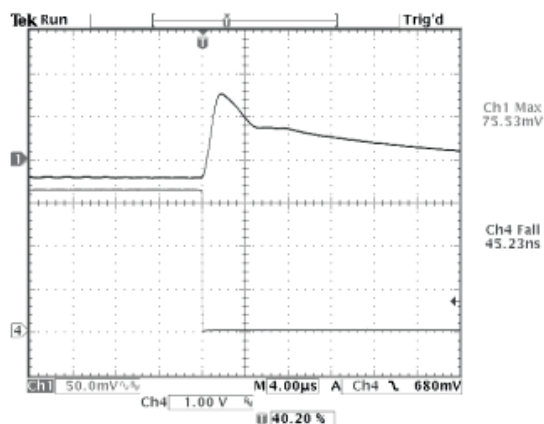


Figure 3 - Typical Transient Response (source)
12 A load Step $di/dt = 300 \text{ A}/\mu\text{s}$
Channel 1: Deviation on unit = 2.3%, Settling Time = 16 μs
Vin = 5 V, Vout = 1.5 V

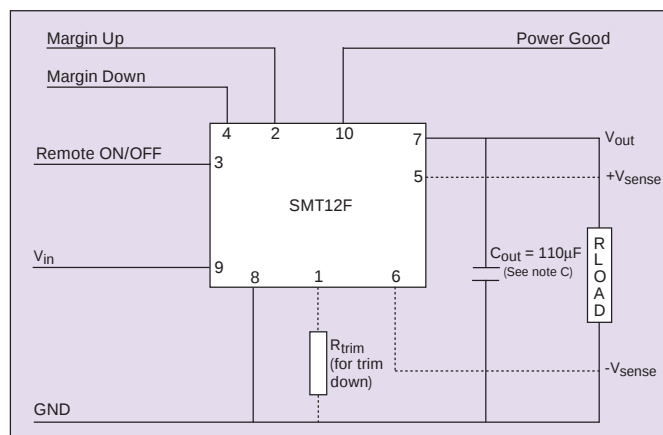


Figure 4 - Standard Application Drawing

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.

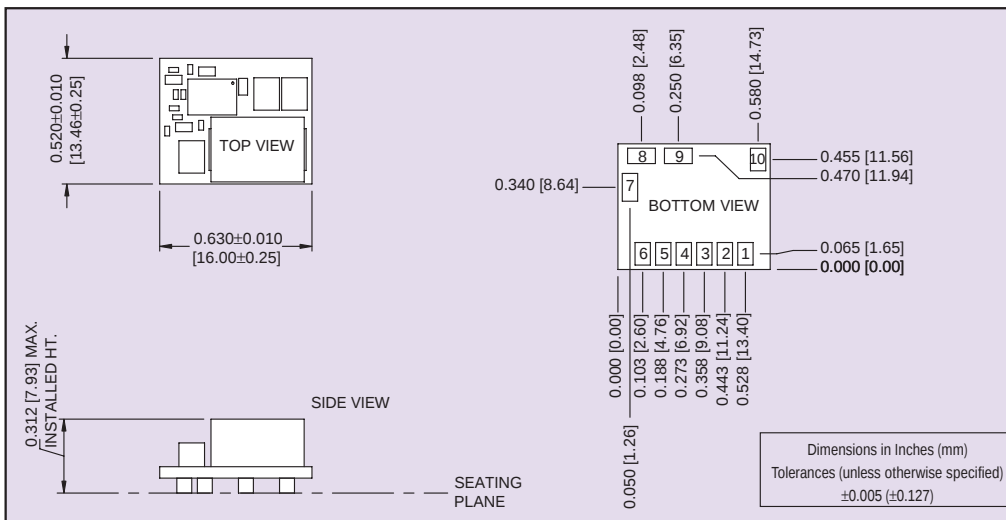


Figure 5 - Mechanical Drawing

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 V to 0.9 V. The resistor required for a given output voltage
- $$R_{\text{trim}} = \frac{110 \times V_{\text{out}} (\text{Desired})}{3.28 - V_{\text{out}} (\text{Desired})} \text{ k}\Omega$$
- may be calculated from the following formula.
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
- $$R_{\text{trim}} = \frac{60.4 \times V_{\text{out}} (\text{Desired})}{2.6 - V_{\text{out}} (\text{Desired})} \text{ k}\Omega$$
- calculated from the following formula
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.
- 2 **Margin+:** When this input is asserted to High, the output voltage is increased by 5%. This function is independent of trim and sense.

Pin No. Pin Description

- 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.
- 4 **Margin-:** When this input is asserted high, the output voltage is decreased by 5% from the nominal. This functions is independent of trim and sense.
- 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.
- 6 **V sense -:** The VSense should be connected to the ground of a bypass capacitor near the load or left open circuit.
- 7 **+Vout:** The regulated positive power output with respect to the GND node.
- 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.
- 9 **+Vin:** The positive input voltage power node to the module, which is referenced to common GND.
- 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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