Features

- Non-isolated DC-DC converter
- 3-14Vdc input voltage range
- Programmable output voltage from 0.9-5.5Vdc
- Power conversion efficiency up to 89.5%
- Short Circuit protection and remote ON/OFF function
- Operating temperature from -40℃ to 82℃

Application

- Industry control application
- MCU control application
- Cost efficient application

Selection Guide

Part number	Input voltage	Output voltage	Output current @full load	Input current @no load	Efficiency(1) (typ.)	Capacitive load(2) (max)
ATN-12T1000J	3-14Vdc Nom. 12Vdc	0.9-5.5Vdc Nom. 5Vdc	1000 mA	15mA	89.5%	200μF

1. The efficiency is test by nominal input, 5Vout and full load @25°C.
2. The capacitive load is test by minimum input and constant resistive load.
3. All specifications valid at 12V input, full load and 25°C after warm-up time unless otherwise stated.
4. Special input and output voltage combinations available by request, please check with our sales.

Part Number

ATN-12 T 1000 J

12: Nominal input voltage

1000: Output current

Specifications

	Parameter	Conditions	Min.	Typ.	Max.	Unit
Input	Input voltage range		3	12	14	VDC
	Start-up time				6	mS
	Start-up voltage		3			VDC
	Remote ON/OFF	DC-DC ON DC-DC OFF		Open or 1.6V < Vctrl < 5V Short or 0V < Vctrl < 0.1V		
Output	Input current (remote off mode)				1	mA
	Voltage accuracy			±3		%
	Output voltage trim [1]		0.9		5.5	Vdc
	Minimum load		0			%
	Line regulation	LL-HL			±0.3	%
	Load regulation	10-100% Load			±0.3	%
	Ripple & Noise [2]	20MHz BW			40	mVp-p
	Operating frequency	100% Load at Nominal Vin		800		KHz
Environment	Operating temperature	derating curve	-40		82	˚C
	Storage temperature		-55		125	˚C
	Relative Humidity		5		95	%RH
	Vibration			MIL-STD-202G		
Function	Short circuit protection			continuous, automatic recovery		
	5safety approvals			EN 62368-1		
	MTBF	MIL-HDBK217F	2600			kHrs
Physical	Dimension	LxWxH		12.4x12.4x4 mm		
	Weight			1g		
	Case material			Open frame		
	Cool method			Natural convection		

1. [1] The output voltage range is limited by Vin. (Vout≦Vin*0.7)
2. [2] The ripple & noise are measured with 0.1μF capacitor at 20MHz BW, show at Vout= 1V.
3. All specifications valid at nominal input voltage, full load and 25˚C after warm-up time unless otherwise stated.
4. The product information and specifications are subject to change without prior notice.

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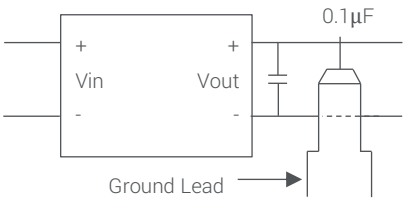
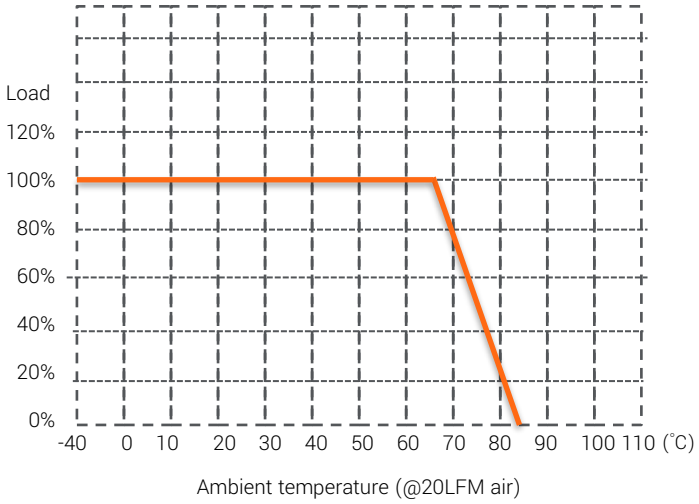
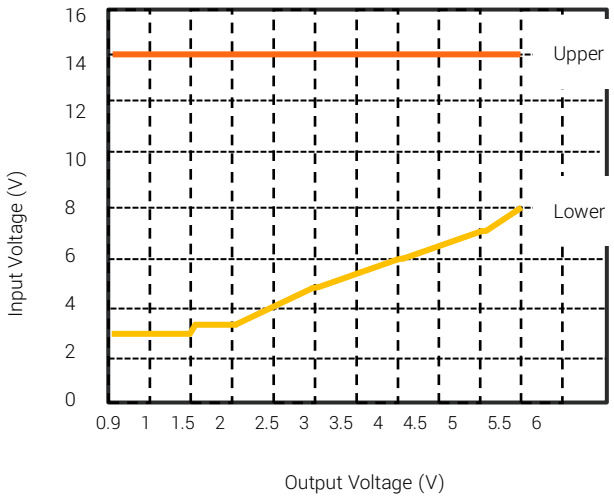
Measure Method



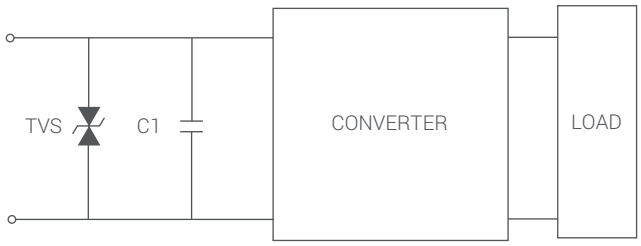
Derating Curve



Output Voltage vs. Input Voltage Set Point Area Plot



EFT and surge external input capacitor required



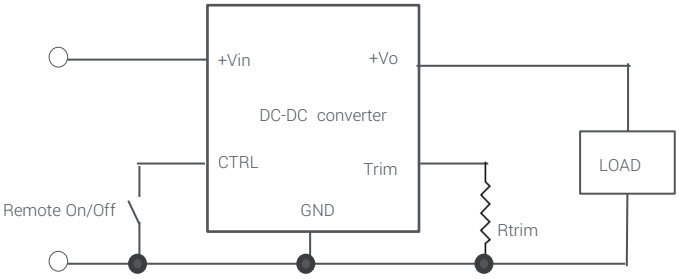
TVS	C1
5.0SMLJ22CA-TP	2200μF

Example Application Circuit

Output Voltage Trim

The trim resistor equation

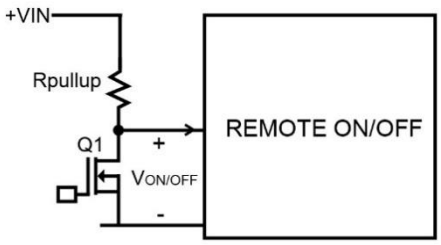
$$\text{Rtrim (k}\Omega) = \frac{49.1355}{\text{Vo}-0.895} - 10.7$$



Output voltage	Calculated Rtrim (kΩ)
5.5V	0
5V	1.3
3.3V	9.8
2.5V	20.2
1.8V	44.2
1.5V	71.3
1.2V	150
0.895V	∞ (Open)

The output voltage may be adjusted over a limited range by connection an external trim resistor (Rtrim) between the trim pin and ground.

Remote ON/OFF



The circuit configuration for using the Remote On/Off pin is shown in figure. And the logic type active mode as the description below.

DC/DC ON : Q1 OFF
DC/DC OFF : Q1 ON

Surface Mount Information

Pick and Place

The 1A Open Frame modules use an open frame construction and are designed for a fully automated assembly process. We suggest the pick and place operations is inductor.

MSL Rating

The 1A Open Frame modules have a MSL rating of 3.

Storage and Handling

The recommended storage environment and handling procedures for moisture-sensitive surface mount packages is detailed in J-STD-033 (Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices).

Moisture barrier bags (MBB) with desiccant are required for MSL ratings of 3 or greater. These sealed packages should not be broken until time of use. Once the original package is broken, the floor life of the product at conditions of ≦ 30°C and 60% relative humidity 168 hours varies according to the MSL rating (see J-STD-033). The shelf life for dry packed SMT packages will be a maximum of 12 months from the bag seal date, when stored at the following conditions: < 40° C, < 90% relative humidity.

Post Solder Cleaning and Drying Considerations

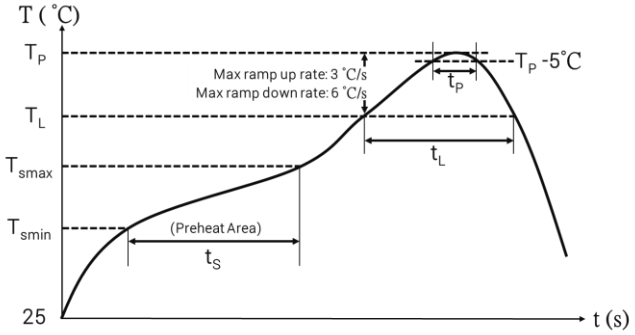
To avoid contamination on the soldering pads extra care has to be taken when handling the boards. Clean soldering surfaces don not generate as much gases when the flux reduce the metal oxides or react with contaminants during the soldering process.

Nozzle

The module weight has been kept to a minimum by using open frame construction. Variables such as nozzle size, tip style, vacuum pressure and placement speed should be considered to optimize this process.

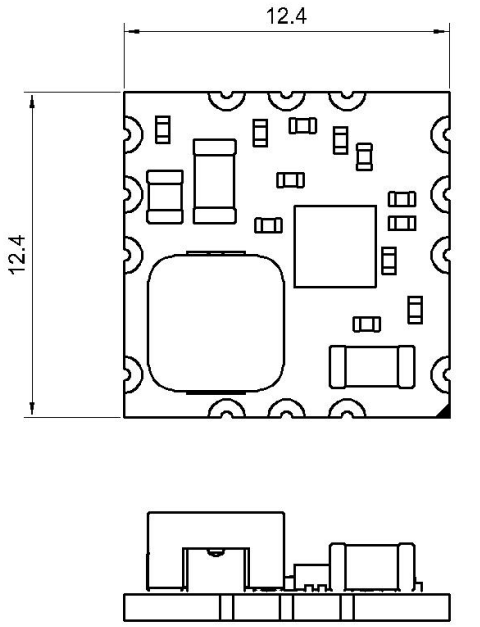
Lead-free Reflow Profile

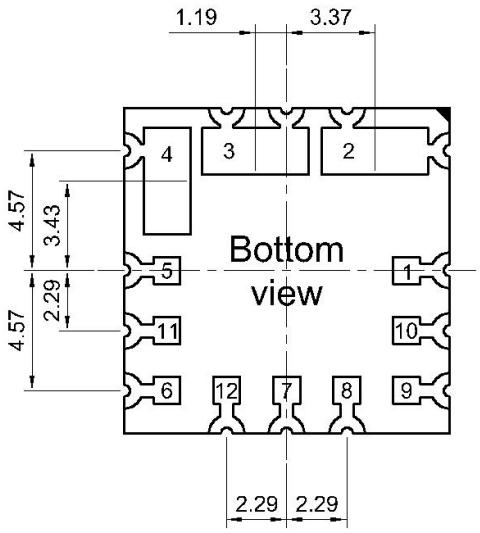
Power Systems will comply with J-STD-020 (Moisture/Reflow Sensitivity Classification for non-hermetic Solid State Surface Mount Devices) for both Pb-free solder profiles and MSL classification procedures. This standard provides a recommended forced-air-convection reflow profile based on the volume and thickness of the package. The suggested Pb-free solder paste is Sn/Ag/Cu (SAC). The recommended linear reflow profile using Sn/Ag/Cu solder is shown. Soldering outside of the recommended profile requires testing to verify results and performance.



Profile	Pb-Free Assembly
Average ramp-up rate (Tsmax to TP)	3°C/s max.
Preheat Temperature Min. (Tsmin) Temperature Max. (Tsmax) Ts (Tsmin to Tsmax)	 150°C 200°C 60-120s
Temperature (TP)	245°C
Time maintained above Temperature (TL) Time (tl)	 217°C 60-150s
Time within 5°C of the specified Peak temperature (TP)	20-40s
Ramp down rate (TP to TL)	6°C/s max
Time 25°C to peak temperature	8 minutes max.

Mechanical Dimension and Pinning



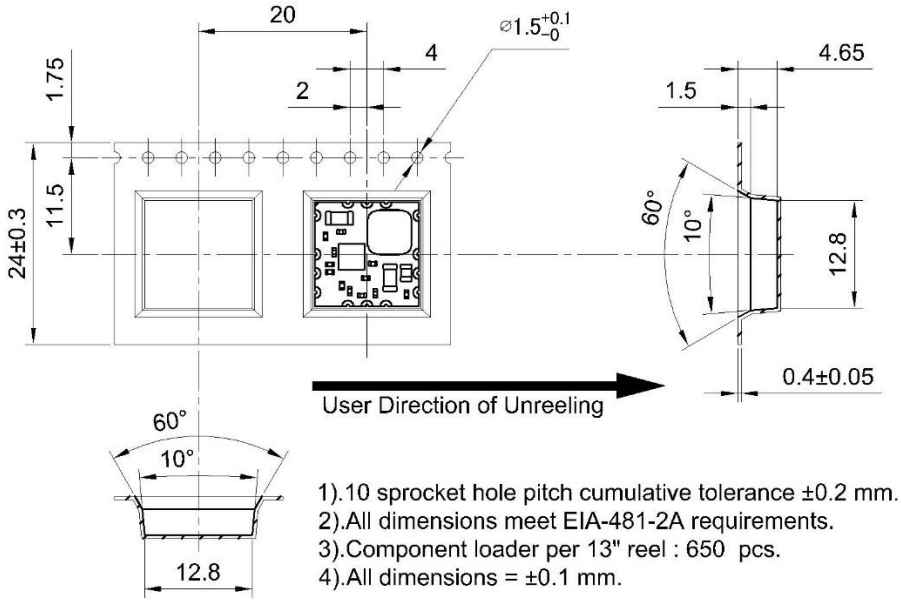


Projection : Third angle projection
Unit : mm
Tolerance :±0.25
Pad 1&5~12=1.02x1.02
Pad 2~4=4.06x1.78

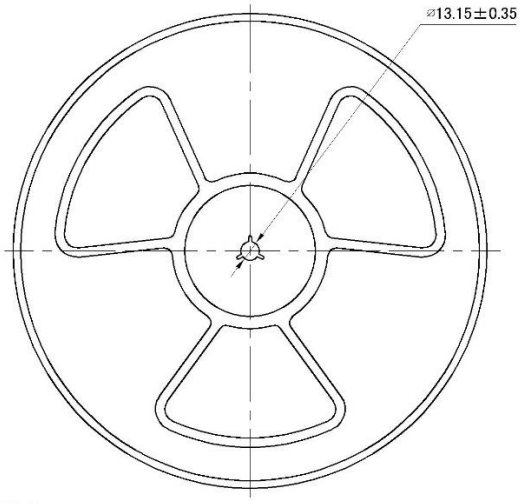
Pin	Function
1	CTRL
2	Vin
3	GND
4	Vout
5	NC
6	TRIM
7	GND
8	NC
9	NC
10	NC
11	GND
12	NC

NC= No Connection

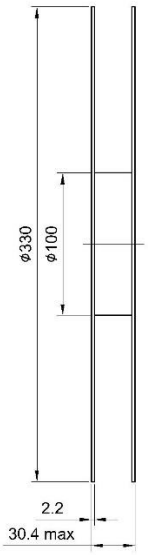
PACKAGE



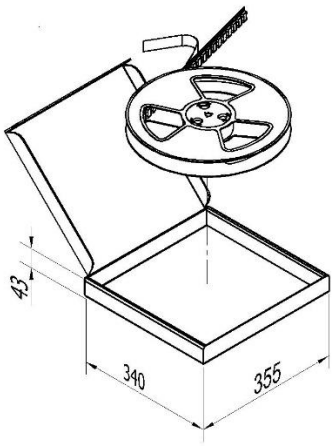
1).10 sprocket hole pitch cumulative tolerance ±0.2 mm.
2).All dimensions meet EIA-481-2A requirements.
3).Component loader per 13" reel : 650 pcs.
4).All dimensions = ±0.1 mm.



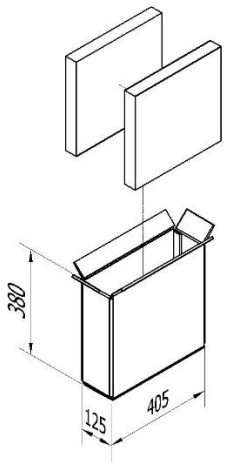
Unit : mm
Package : 1 Tape Reel = 650 pcs



Unit:mm



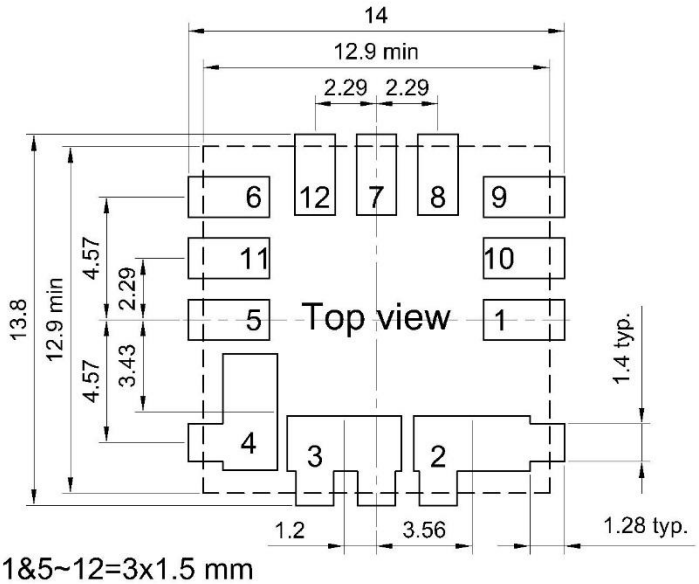
1 Tape Reel = 650 converters



Carton accommodates
2 boxes 1300 converters per carton

CTC is the professional and one among world's leading manufacturers of DC-DC/ AC-DC converters.
The products were used in Computers, Industrial controls, Medical equipment, Transportation, EV, ECO-power, Aero-space application and communication.

FOOTPRINT



Pad 1&5~12=3x1.5 mm
Pad 2&4=4.32x2.04 mm
Pad 3=4.26x2.04 mm