PT/PS POL SERIES

Up to 100 Watt

FEATURES

- Industry standard open frame thru-hole or SMT footprint
- Programmable output voltage via external resistor
- No minimum load requirement
- Up to 94 % Efficiency
- Continuous short-circuit and over-current protection
- Fixed switching frequency, Output voltage sequencing
- -40°C to +85°C industrial temperature range
- Negative and positive On/Off logic control, Power Good
- Sense Compensation, Over-temperature protection
- Monotonic start-up with output pre-bias
- UL/IEC/EN60950 available
- Customized versions available

PRODUCT OVERVIEW

The PT/PS series of Point of Load (POL), non-isolated DC-DC converters, provides regulated user selectable output voltages of 0.75 to 5 Volts over a wide input range of 6 to 14 Volts. This series offers Ultra-high efficiency and high power density DC/DC converters. The efficiency is achieved by using synchronous rectification and drive control techniques. The PT/PS series topology is based on a non-isolated synchronous buck converter in which the control loop is optimized for unconditional stability, fast transient response, very tight line and load regulation. At start up, the PT/PS series converters do not draw any reverse current in a typical pre-bias application.

This POL series is rated to perform over the ambient temperature range of –40°C to +85°C. The modules are fully protected against short circuit and over-temperature conditions. The converter will shut down automatically if the converter is overloaded or the ambient temperature gets too high. There is also an ON/OFF input pin that allows the converter to be shut down.

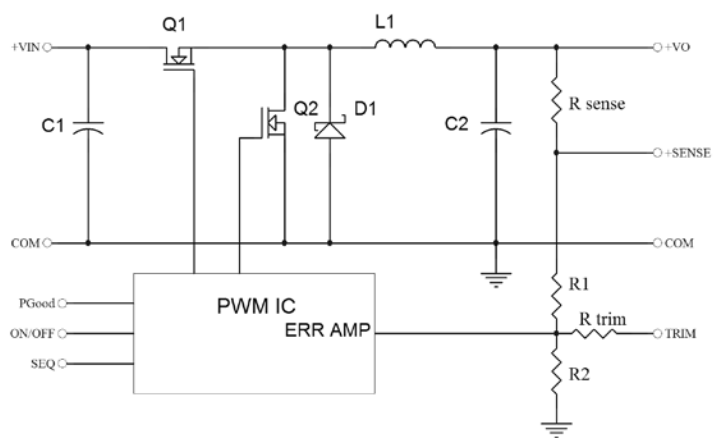
APPLICATIONS:

- Distributed Power Architectures
- Mobile telecommunication
- Industrial

Please contact DATEL if your application requires different output voltage or any other special feature.

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT MAX	EFFICIENCY %	PIN OPTIONS	OPTIONS
PT12-20	6-14 VDC	0.7525 – 5 VDC	20 A	90	Thru-Hole	N, P, G
PS12-20	6-14 VDC	0.7525 – 5 VDC	20 A	90	SMT	N, P, G

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	CONDITIONS	Model	Min.	Typical	Max.	Units
Input Voltage	Continuous DC Voltage	ALL	0		16	V
Operating Temperature		ALL	-40		+85	°C
Storage Temperature		ALL	-55		+125	°C

INPUT CHARACTERISTICS

PARAMETER	CONDITIONS	Model	Min.	Typical	Max.	Units
Operating Input Voltage	Vo≦4.5V Vo≧5.0V	ALL	6.0 6.5	12 12	14 14	Volts
Input Under-Voltage Lockout						
Turn-On Voltage Threshold		ALL		5.0		Volts
Turn-Off Voltage Threshold		ALL		4.0		Volts
Lockout Hysteresis Voltage		ALL		1.0		Volts
Maximum Input Current	Vin=0 to 14Vdc , Io=Io,max.	ALL			19	A
No-Load Input Current	Vo=0.7525V Vo=1.2V Vo=1.5V Vo=1.8V Vo=2.0V Vo=2.5V Vo=3.3V Vo=5.0V	ALL		40 50 50 50 60 65 75 95		mA
Off Converter Input Current	Shutdown input idle current	ALL			10	mA
Inrush Current (I^2t)		ALL			0.4	A^2s
Input Reflected-Ripple Current	P-P thru 1uH inductor, 5Hz to 20MHz	ALL		220		mA

OUTPUT CHARACTERISTIC

PARAMETER	CONDITIONS	Model	Min.	Typical	Max.	Units
Operating Input Voltage	Vo≦4.5V Vo≧5.0V	ALL	6.0 6.5	12 12	14 14	Volts
Input Under-Voltage Lockout						
Turn-On Voltage Threshold		ALL		5.0		Volts
Turn-Off Voltage Threshold		ALL		4.0		Volts
Lockout Hysteresis Voltage		ALL		1.0		Volts
Maximum Input Current	Vin=0 to 14Vdc , Io=Io,max.	ALL			19	A
No-Load Input Current	Vo=0.7525V Vo=1.2V Vo=1.5V Vo=1.8V Vo=2.0V Vo=2.5V Vo=3.3V Vo=5.0V	ALL		40 50 50 50 60 65 75 95		mA
Off Converter Input Current	Shutdown input idle current	ALL			10	mA
Inrush Current (I^2t)		ALL			0.4	A^2s
Input Reflected-Ripple Current	P-P thru 1uH inductor, 5Hz to 20MHz	ALL		220		mA
Output Voltage Set Point	Vin=Nominal Vin , Io=Io.max, Tc=25°C	ALL	-1.5%	Vo, set	+1.5%	Volts
Output Voltage Trim Adjustment Range	Selected by an external resistor	ALL	0.7525		5.0	Volts
Output Voltage Load Regulation	Io = Io.min to Io.max	ALL	-0.5		+0.5	%
Output Voltage Line Regulation	Vin = low line to high line	ALL	-0.2		+0.2	%

OUTPUT CHARACTERISTIC

PARAMETER	CONDITIONS	Model	Min.	Typical	Max.	Units
Temperature Coefficient	Ta=-40°C to 85°C	ALL	-0.03		+0.03	%/°C
Output Voltage Ripple and Noise	5Hz to 20MHz bandwidth					
Peak-to-Peak	Full Load, 1uF ceramic and 10uF tantalum	ALL			75	mV
RMS	Full Load, 1uF ceramic and 10uF tantalum	ALL			30	mV
External Capacitive Load	Low ESR	ALL			8000	µF
Operating Output Current Range		ALL	0		20	A
Output DC Current-Limit Inception	Output Voltage =90% Nominal Output Voltage	ALL	24	30	36	A
Shout Circuit Protection	Continuous with Hiccup Mode					
Sequency Slew Rate Capability	dVSEQ/dt		0.1		1.0	V/ms
Sequencing Delay Time			10			ms
Tracking Accuracy	Power up Power down	ALL			200 400	mV
Power Good Signal	Asserted Logic High Vo	Suffix “P”	90		110	%

FEATURE CHARACTERISTICS

PARAMETER	CONDITIONS	Model	Min.	Typical	Max.	Units
Output Voltage Transient Response						
Error Brand	50% Step Load Change, di/dt=2.5A/us	ALL			200	mV
Setting Time (within 1% V out nominal)	50% Step Load Change, di/dt=2.5A/us	ALL			200	µs
Efficiency 100% Load	Vo=0.7525V Vo=1.2V Vo=1.5V Vo=1.8V Vo=2.0V Vo=2.5V Vo=3.3V Vo=5.0V	ALL		78 84 87 88 89 90 92 94		%
Isolation Input to Output	Non-isolation	ALL	0			Volts
Switching Frequency		ALL		300		KHz
ON/OFF Control, Positive Logic Remote On/Off Logic Low (Module Off) Logic High (Module On)	or Open Circuit	PT/PS12S05-20 PT/PS12S05-20P PT/PS12S05-20 PT/PS12S05-20P	0		0.4 Vin	Volts Volts
ON/OFF Control, Negative Logic Remote On/Off Logic Low (Module On) Logic High (Module Off)	or Open Circuit	PT/PS12S05-20 PT/PS12S05-20N PT/PS12S05-20 PT/PS12S05-20N	0 2.8		0.4 Vin	Volts Volts
ON/OFF Current (for both remote on/off logic)	Ion/off at Von/off=0.0V	ALL			1	mA
Leakage Current (for both remote on/off logic)	Logic High, Von/off=14V	ALL			1	mA
Turn-On Delay and Rise Time						
Turn-On Delay Time, From On/Off Control	Von/off to 10%Vo,set	ALL		3		ms
Turn-On Delay Time, From Input	Vin, min. to 10%Vo,set	ALL		3		ms
Output Voltage Rise Time	10%Vo,set to 90%Vo,set	ALL		4		ms
Over Temperature Protection		ALL		130		°C
MTBF	Io=100%of Io.max; Ta=25°C per MIL-HDBK-217F	ALL		0.9		M hours
Weight		ALL		11		grams
Dimensions SIP packages	2.4x0.51x0.327 inches (61x12.95x8.3 mm)					Inches/ mm
Dimensions SMT packages	1.7x0.53x0.366 inches(43.2x13.46x9.3 mm)					Inches/ mm

Operating Temperature Range

DATEL's PT/PS series highly efficient converters operate over a wide ambient temperature environment (-40°C to + 85°C). Design consideration must be given to the de-rating curves when ascertaining maximum power that can be drawn from the converter. The maximum power drawn is influenced by a number of factors, such as:

- Output load current
- Input voltage range
- Air velocity (forced or natural convection).
- Mounting orientation of converter PCB with respect to the Airflow.
- PCB design of motherboard, especially ground and power planes, which can acts as effective heat sinks for the converter.

Over-Temperature Protection (OTP)

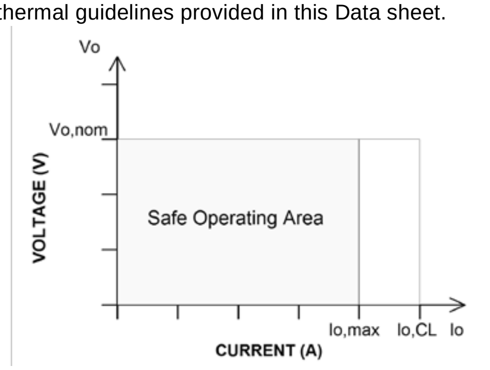
The PT/PS Series converters are equipped with non-latching over-temperature protection. There is a temperature sensor inside the converter and it monitors the temperature of the hot spot (typically, top switch). If the temperature exceeds a threshold of 130°C (typical) the converter will shut down, disabling the output. When the temperature decreases again, the converter will automatically restart. The over-temperature condition can be induced by a variety of reasons such as external overload condition or a system fan failure.

Output Voltage Adjustment

The output Voltage of the PT/PS can be adjusted in the range 0.7525V to 5.0V by connecting a single resistor on the motherboard (shown as R_{trim}) in Figure 18. When Trim resistor is not connected, the output voltage defaults to 0.7525V

Safe Operating Area (SOA)

The graph below provides a graphical representation of the Safe Operating Area (SOA) of the converter. This representation assumes ambient operating conditions such as airflow are met as per the thermal guidelines provided in this Data sheet.



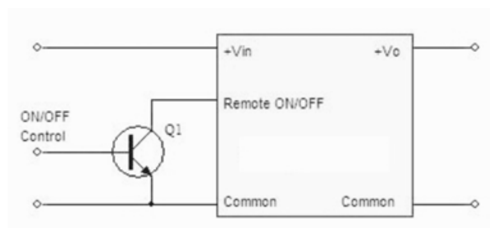
Maximum Output Current Safe Operating Area

Over Current Protection

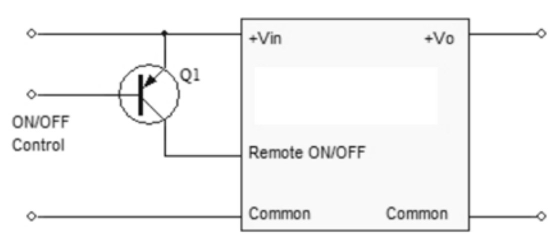
All different voltage models have a full continuous short-circuit protection. The unit will auto recover once the short circuit is removed. To provide protection in a fault condition, the unit is equipped with internal over-current protection. The unit operates normally once the fault condition is removed. The power module will supply up to 150% of rated current. In the event of an over current converter will go into a hiccup mode protection.

Remote ON/OFF

The remote ON/OFF input feature of the converter allows external circuitry to turn the converter ON or OFF. Active-high remote ON/OFF is available as standard. The PT/PS are turned on if the remote ON/OFF pin is high (=Vin), or left open. Setting the pin low (<0.4Vdc) will turn the converter 'Off'. The signal level of the remote on/off input is defined with respect to ground. If the remote on/off feature is not used, leave the pin open (module will be on). The part number suffix "N" is Negative remote ON/OFF version. The unit is guaranteed OFF over the full temperature range if this voltage level exceeds 2.8Vdc. The converters are turned on If the ON/OFF pin input is low (<0.4Vdc) or left open. The recommended remote ON/OFF drive circuit are shown in the two figures below.



Positive Remote ON/OFF Input Drive Circuit



Negative Remote ON/OFF Input Drive Circuit

Under-Voltage Lockout (UVLO)

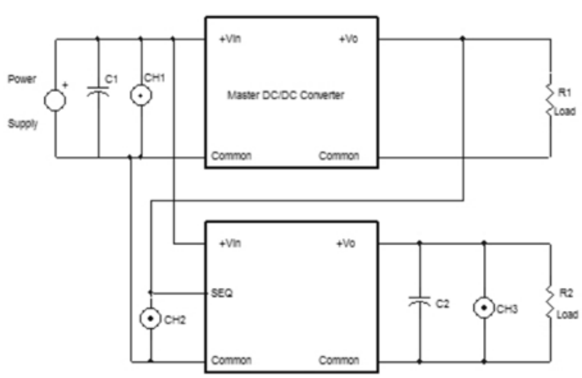
The voltage at the Vcc pin determines the start of the operation of the Converter. When the input Vcc rises and exceeds about 5.0V the converter initiates a soft start. The UVLO function in the converter has a hysteresis (about 1V) built in to provide noise immunity at start-up.

Output Voltage Sequencing (Tracking)

The PT/PS series includes a sequencing feature, which can produce various types of output voltage sequencing in customer applications. This feature is accomplished through the additional sequencing pin. If the sequencing feature is not used, tie the SEQ pin to +Vin. When a signal voltage is applied to the SEQ pin, the output voltage tracks this voltage until the output reaches the set point voltage. The SEQ voltage needs to be set higher than the set point of the module. The output voltage will follow the voltage on the SEQ pin. For multiple modules application, one can connect SEQ pin and input signal voltage together to apply on the SEQ pin. Customers can get multiple modules to track their output voltages and follow the voltage on the SEQ pin.

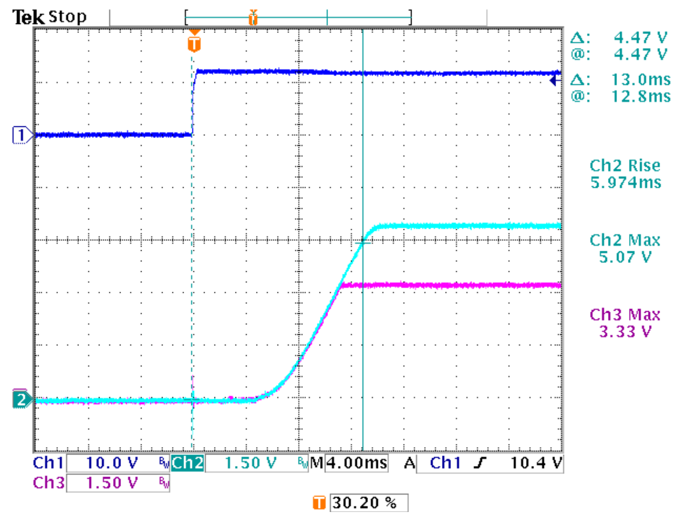
To control this module for sequencing and when the input voltage applied to the module, the on/off pin is left unconnected so that the module is ON by default. After applying input voltage to the module, a minimum of 10msec delay is required before applying voltage on the SEQ pin and slew rate of the voltage on the SEQ pin see technical specifications " dV_{SEQ}/dt ". After 10msec delay, an Analog voltage is applied to the SEQ pin and the output voltage of the module will track this voltage until output voltage reaches the set point voltage. To initiate simultaneous shutdown of the modules, the SEQ pin voltage is lowered in a controlled manner. The output voltages of the modules track the voltages below their set-point voltages. A valid input voltage must be maintained until the tracking and output voltages reach ground potential to ensure a controlled shutdown of the modules.

A typical example testing circuit using a master DC/DC converter and PT/PS Module as shown as below:



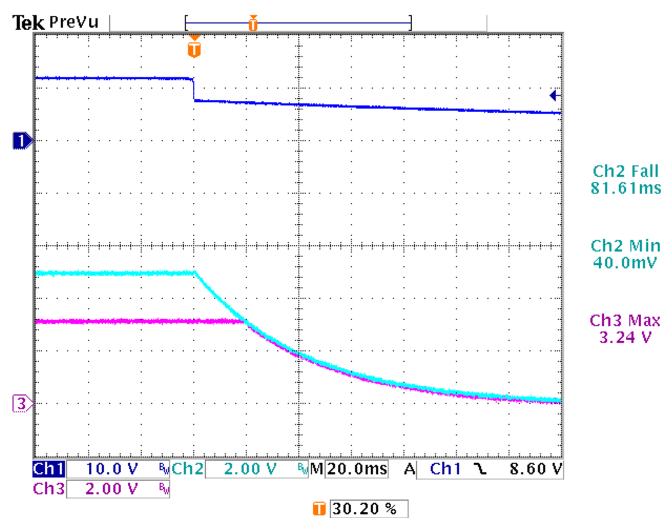
Example testing circuit of sequencing function

Power start up with SEQ signal
Input Voltage=12VDC
Master DC/DC output voltage (CH1) = 5VDC
Salve DC/DC output voltage (CH2) =3.3VDC
Sequencing voltage = 0.67V/msec



Example testing circuit of sequencing function

Power turn off with SEQ signal voltage
Input Voltage = 12VDC (CH1)
Master DC/DC output voltage (CH2) = 5VDC
Salve DC/DC output voltage (CH3) = 3.3VDC



Example testing circuit of sequencing function

SAFETY

Input Fusing and Safety Considerations

Agency Approvals: The power supply module shall be submitted to and receive formal approval from the following test agencies.

The power supply shall be approved by a nationally recognized testing laboratory to UL/CSA 60950 3rd Edition (North America) and EN60950 (International, CB Certificate from an internationally recognized test house in accordance with EN 60950).

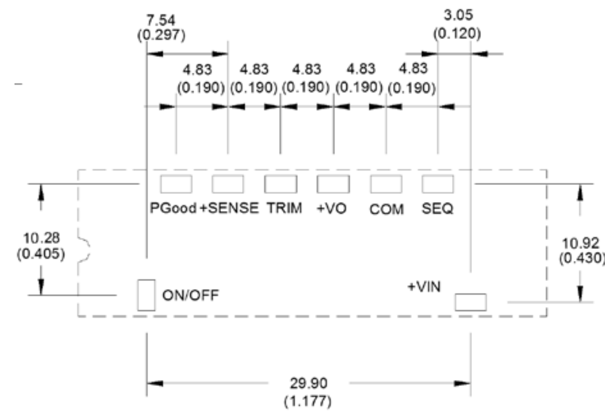
The PT/PS series converters do not have an internal fuse. However, to achieve maximum safety and system protection, always use an input line fuse. The safety agencies require a time-delay fuse with a maximum rating of 25A.

Layout Design Challenges.

In optimizing thermal design the PCB is utilized as a heat sink. Also some heat is transferred from the PT/PS module to the main board through connecting pins. The system designer or the end user must ensure that other components and metal in the vicinity of the PT/PS series meet the spacing requirements to which the system is approved.
Low resistance and low inductance PCB layout traces are the norm and should be used where possible. Due consideration must also be given to proper low impedance tracks between power module, input and output grounds. The recommended PT/PS footprints are shown in the figures below.

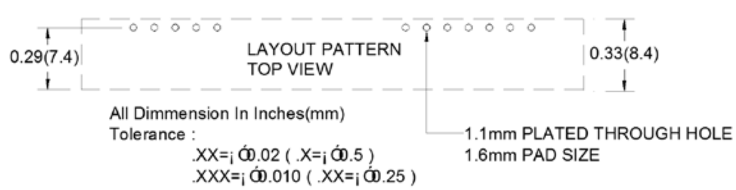
Recommended Pad Layout

Dimensions are in millimetes and(inches)



PAD SIZE
MIN:3.556x2.413(0.140x0.095)
MAX:4.19x2.79(0.165x0.110)

Recommended SMT Footprint

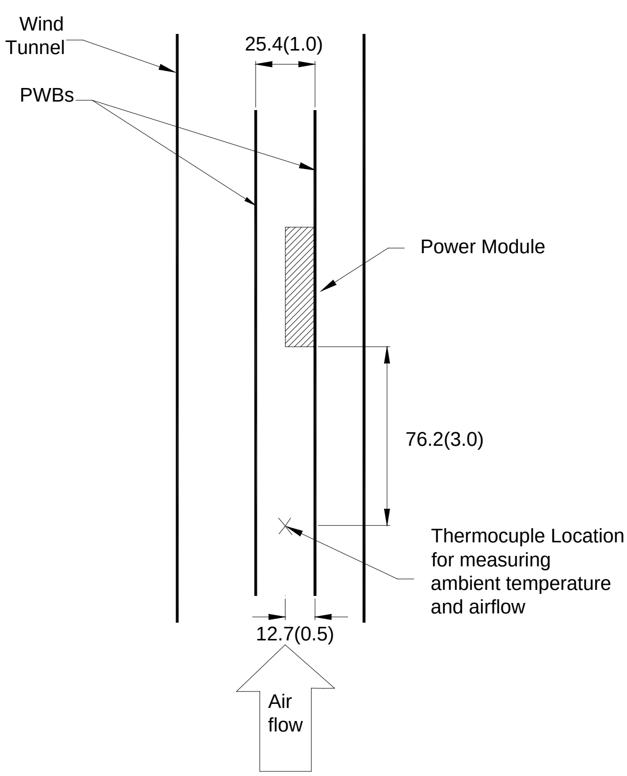


Recommended SIP Footprint

Convection Requirements for Cooling

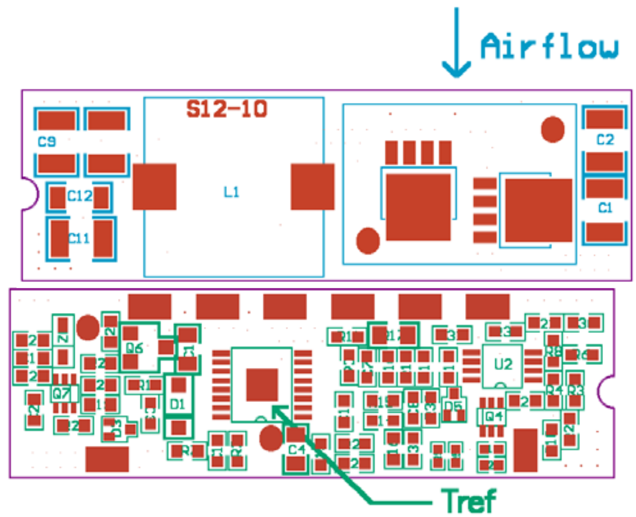
To predict the approximate cooling needed for the module, refer to the Power De-rating curves in the next pages. These de-rating curves are approximations of the ambient temperatures and airflows required to keep the power module temperature below its maximum rating. Once the module is assembled in the actual system, the module's temperature should be checked as shown in the figure below to ensure it does not exceed 120°C.
Proper cooling can be verified by measuring the power module's temperature at " Tref " as shown in the following figures

Temperature Measurement Location for SIP



Note : Dimensions are in millimeters and (inches)

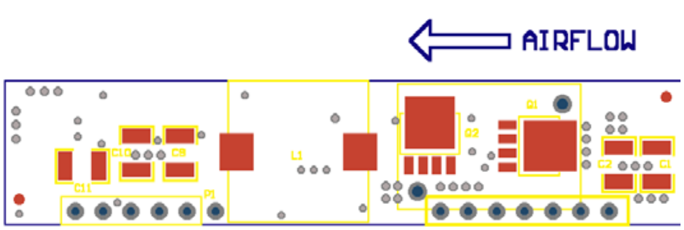
Thermal Test Setup



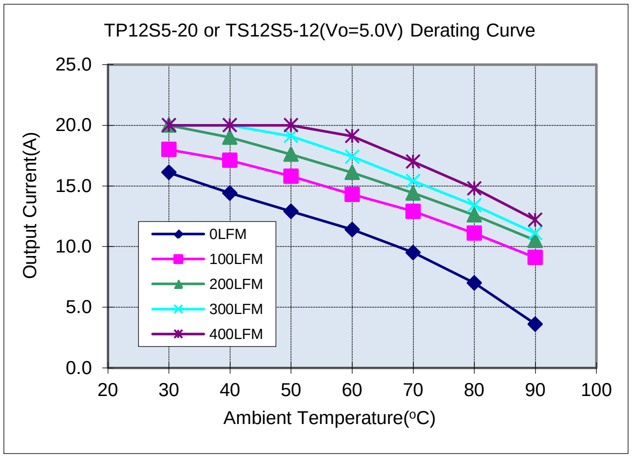
Temperature Measurement Location for SMT

Thermal Considerations

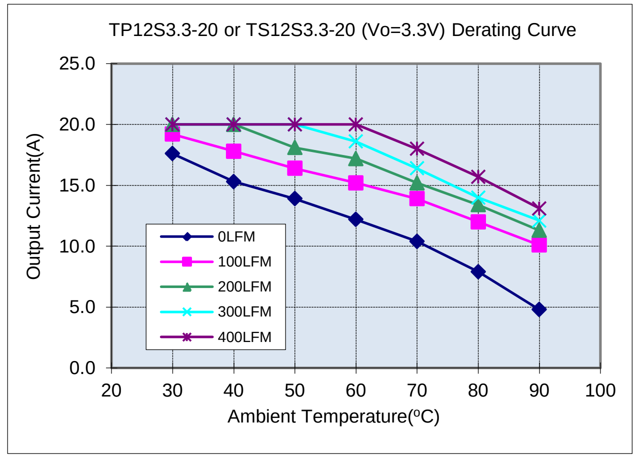
The power module operates in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. The thermal data presented is based on measurements taken in a set-up as shown in the above figure. The graphs on the following pages show the test data. Note that the airflow is parallel to the long axis of the module. The temperature at " Tref " location should not exceed +120 °C. The output power of the module should not exceed the rated power for the module (VO, set x IO, max). The thermal data presented is based on measurements taken in a wind tunnel. The test setup and EUT need to solder on 53.8mm x 43.2mm (2.12'' x 1.7'') test PCB. Also, the airflow is parallel to the long axis of the module.



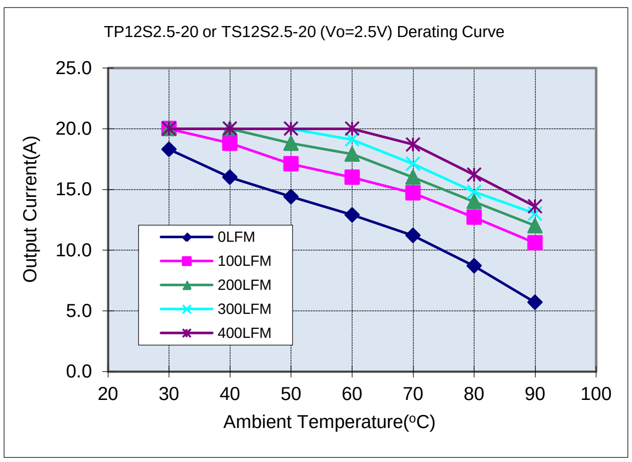
Power De-Rating Curves



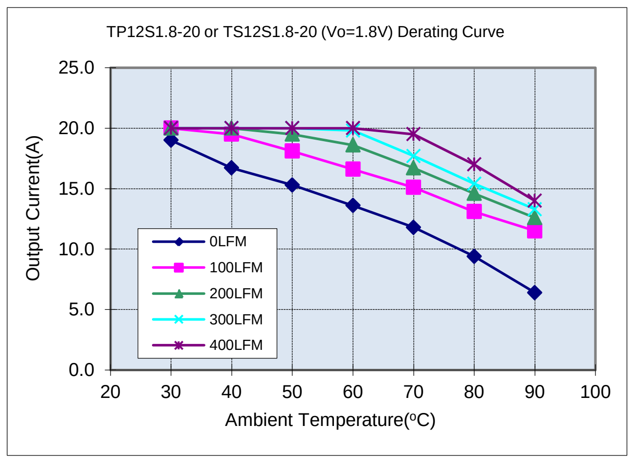
Typical Power De-rating for 12V IN 5.0Vout



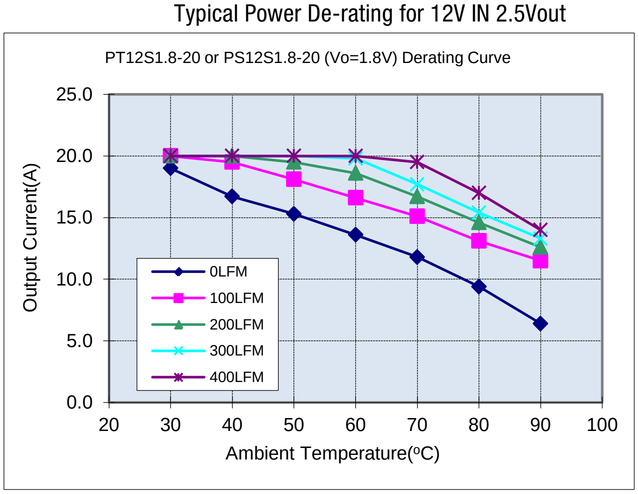
Typical Power De-rating for 12V IN 3.3Vout



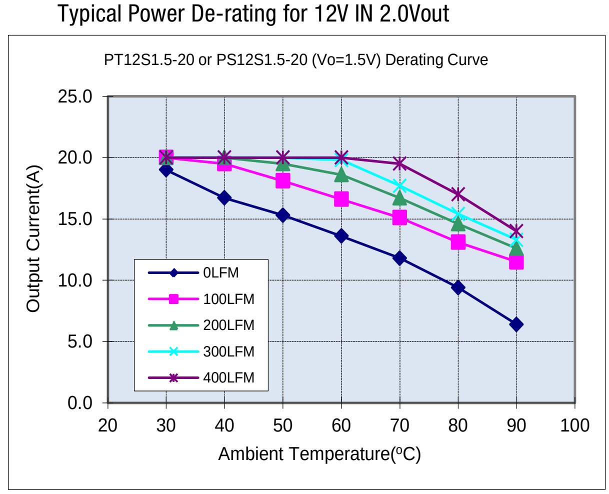
Typical Power De-rating for 12V IN 2.5Vout



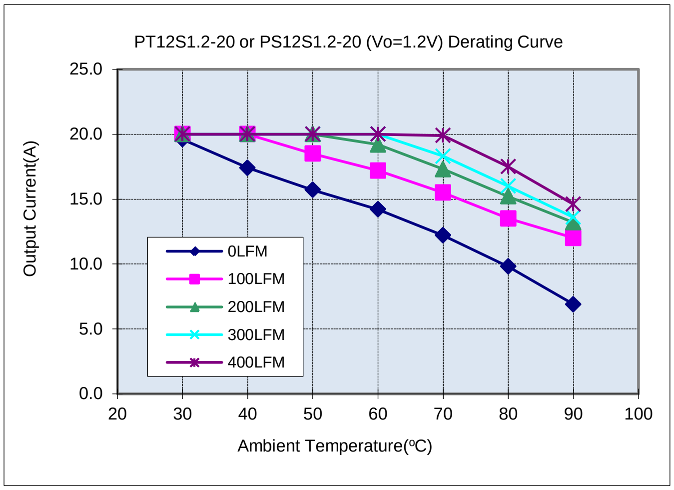
Typical Power De-rating for 12V IN 2.0Vout



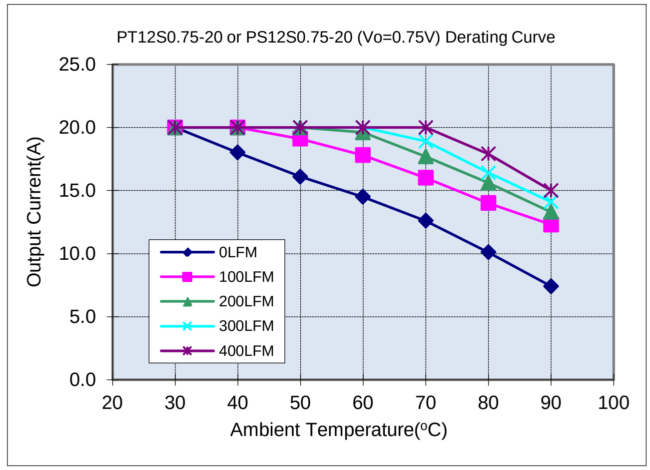
Typical Power De-rating for 12V IN 1.8Vout



Typical Power De-rating for 12V IN 1.5Vout

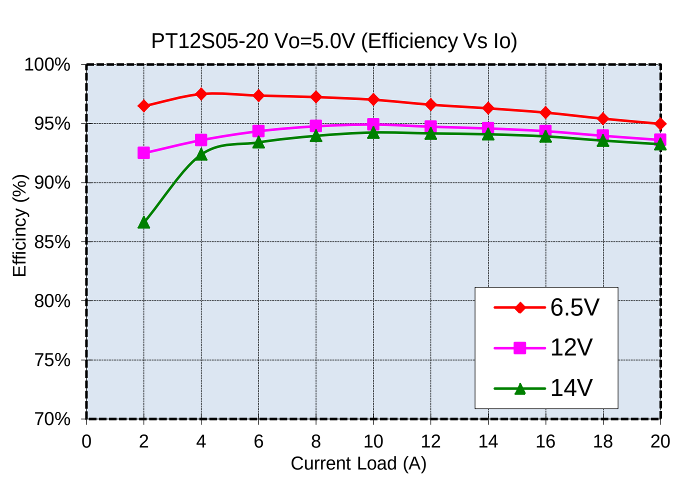


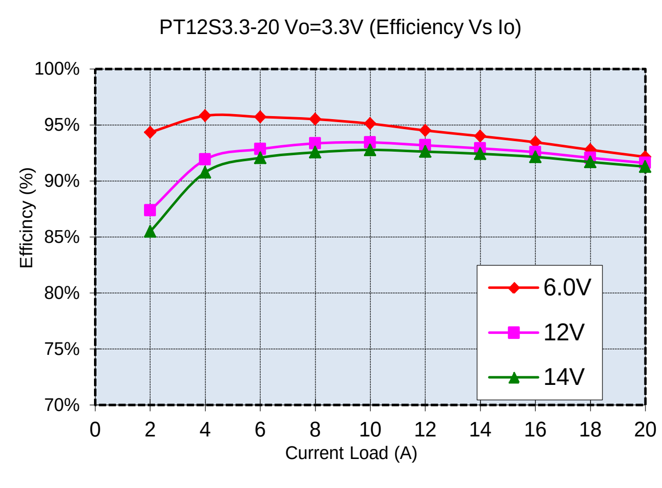
Typical Power De-rating for 12V IN 1.2Vout

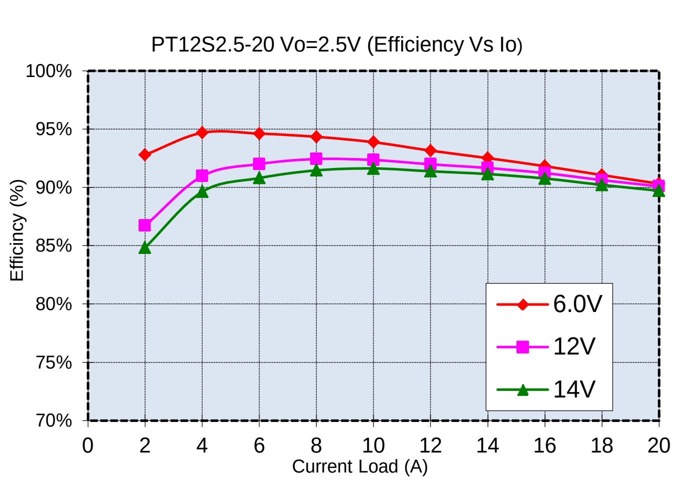


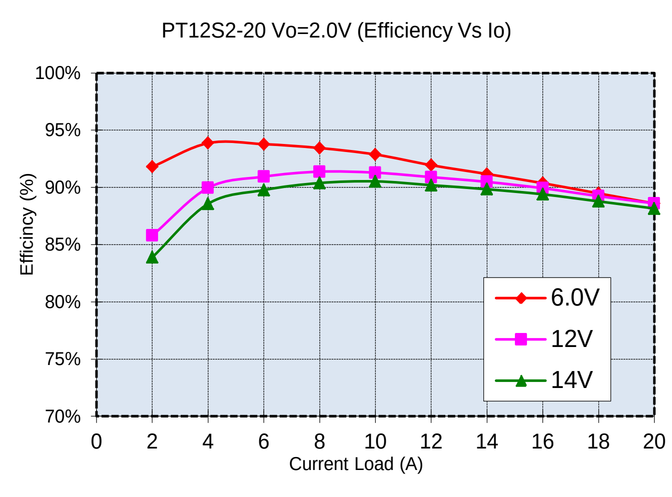
Typical Power De-rating for 12V IN 0.75Vout

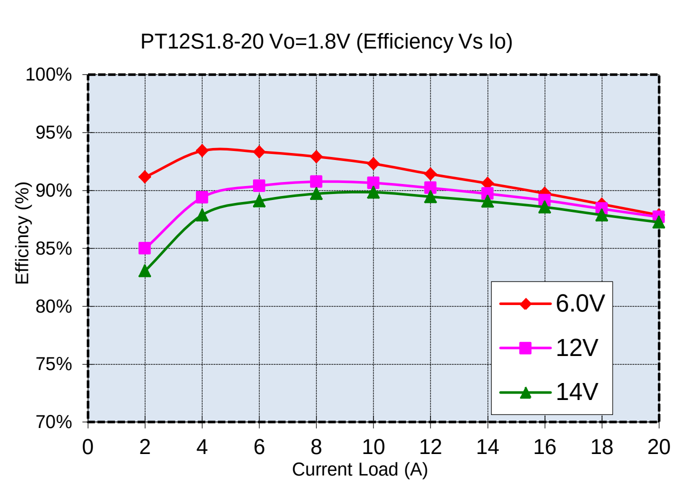
Efficiency vs Load Curves

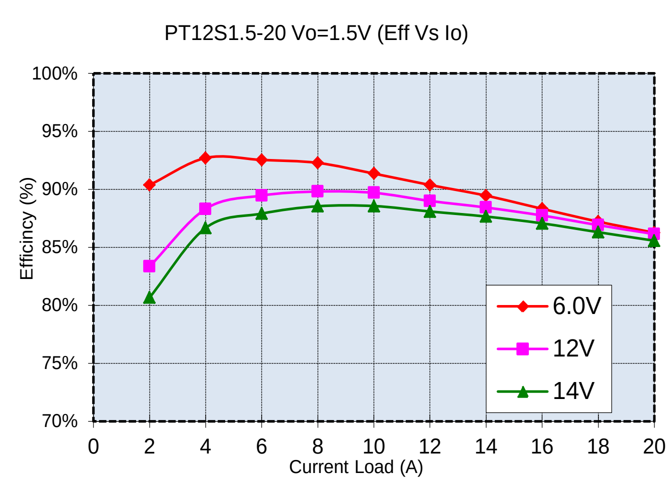


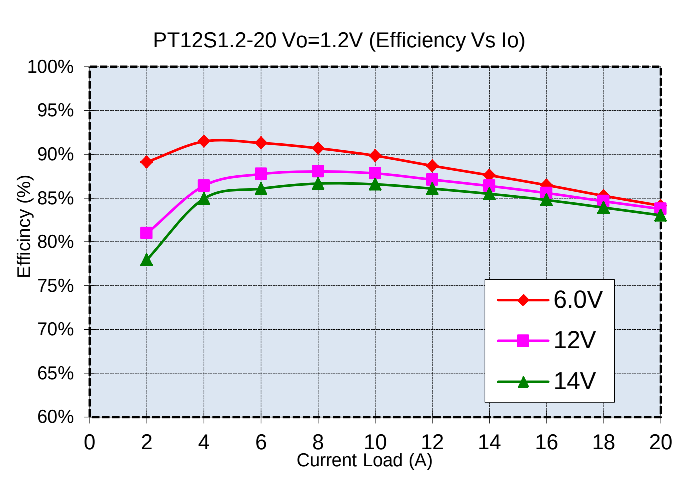


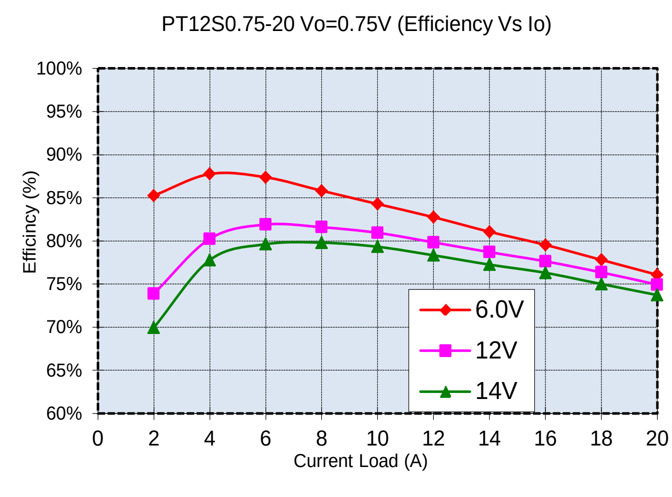


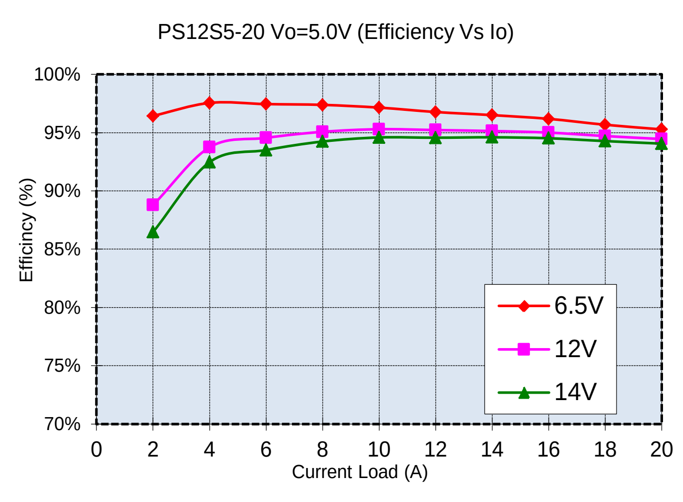


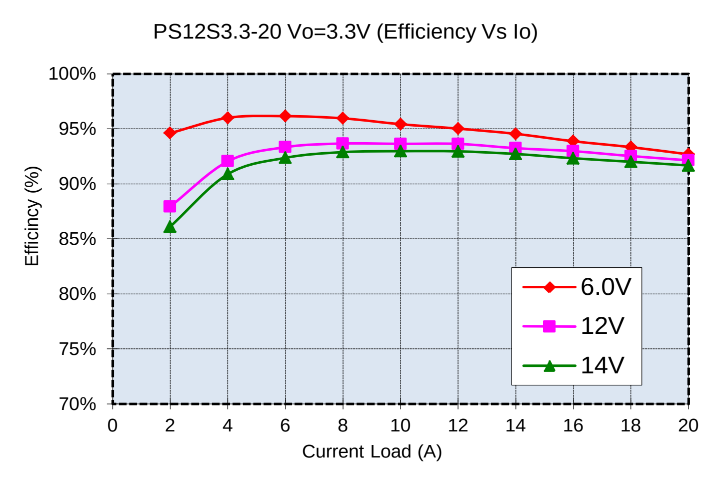


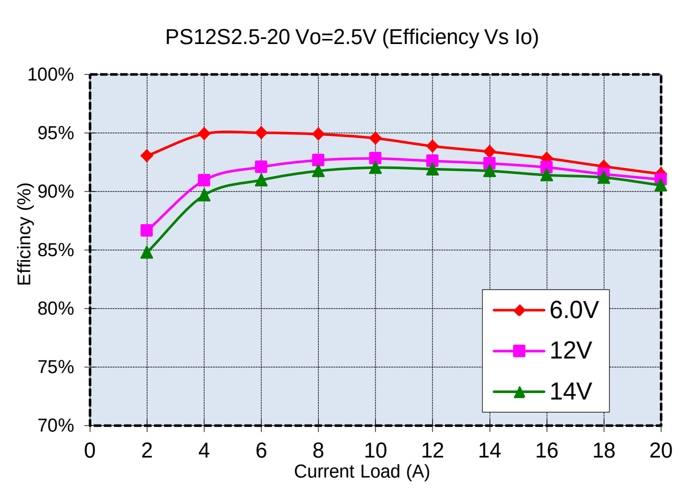


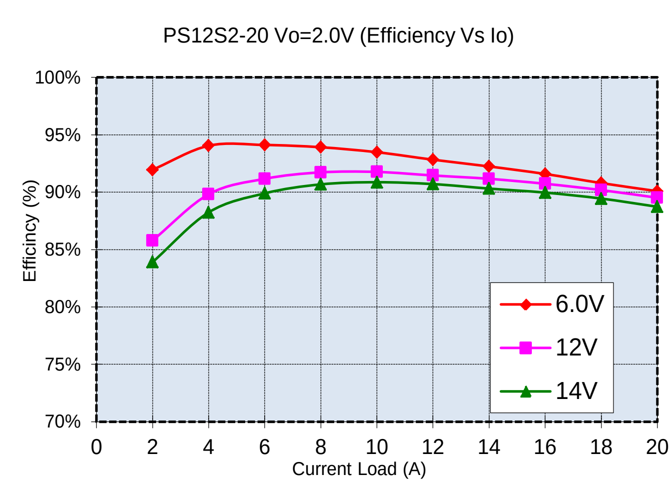

PT12S1.2-20 Vo=1.2V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V

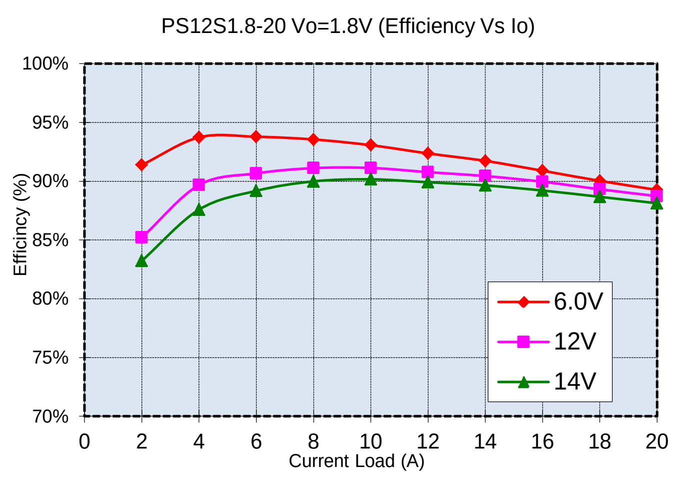

PT12S0.75-20 Vo=0.75V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V

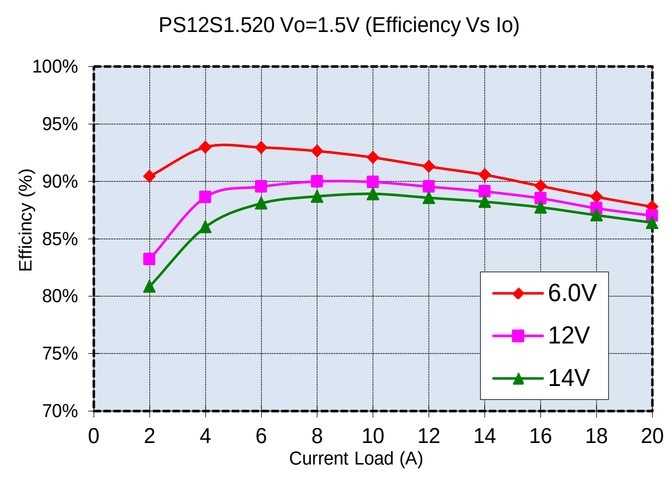

PS12S5-20 Vo=5.0V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.5V
12V
14V

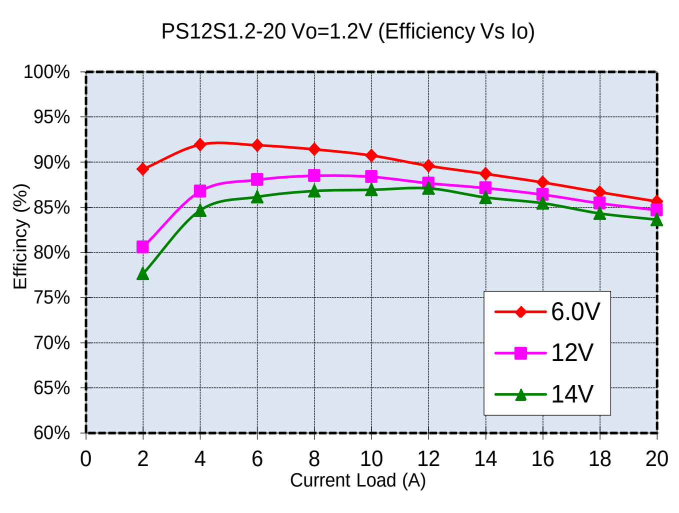

PS12S3.3-20 Vo=3.3V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V

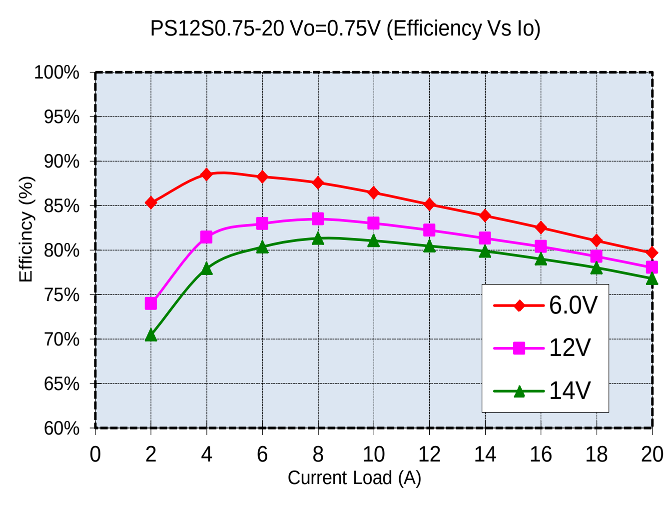

PS12S2.5-20 Vo=2.5V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V


PS12S2-20 Vo=2.0V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V


PS12S1.8-20 Vo=1.8V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V

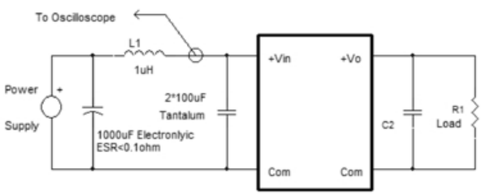

PS12S1.520 Vo=1.5V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V


PS12S1.2-20 Vo=1.2V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V


PS12S0.75-20 Vo=0.75V (Efficiency Vs Io)
Efficincy (%)
100%
95%
90%
85%
80%
75%
70%
65%
60%
0 2 4 6 8 10 12 14 16 18 20
Current Load (A)
6.0V
12V
14V

Input Capacitance at the Power Module

The PT/PS converters must be connected to a low AC source impedance. To avoid problems with loop stability source inductance should be low. Also, the input capacitors should be placed close to the converter input pins to de-couple distribution inductance. However, the external input capacitors are chosen for suitable ripple handling capability. Low ESR polymers are a good choice. They have high capacitance, high ripple rating and low ESR (typical <100mohm). Electrolytic capacitors should be avoided. Circuit as shown in Figure 15 represents typical measurement methods for ripple current. Input reflected-ripple current is measured with a simulated source Inductance of 1uH. Current is measured at the input of the module.



Input Reflected-Ripple Test Setup

Test Set-Up

The basic test set-up to measure parameters such as efficiency and load regulation is shown in Figure 16. Things to note are that this converter is non-isolated, as such the input and output share a common ground. These grounds should be connected together via low impedance ground plane in the application circuit. When testing a converter on a bench set-up, ensure that -Vin and -Vo are connected together via a low impedance short to ensure proper efficiency and load regulation measurements are being made. When testing the DATEL's PT/PS series under any transient conditions please ensure that the transient response of the source is sufficient to power the equipment under test. We can calculate the

- Efficiency
- Load regulation and line regulation.

The value of efficiency is defined as:

$$\eta = \frac{Vo \times Io}{Vin \times Iin} \times 100\%$$

Where: Vo is output voltage,
Io is output current,
Vin is input voltage,
Iin is input current.

The value of load regulation is defined as:

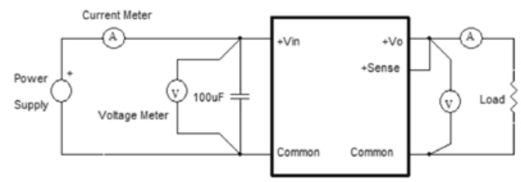
$$Load.reg = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where: V_{FL} is the output voltage at full load
V_{NL} is the output voltage at no load

The value of line regulation is defined as:

$$Line.reg = \frac{V_{HL} - V_{LL}}{V_{LL}} \times 100\%$$

Where: V_{HL} is the output voltage of maximum input voltage at full load.
V_{LL} is the output voltage of minimum input voltage at full load.



PT/PS Series Test Setup

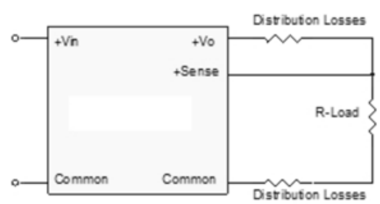
Remote Sense Compensation

Remote Sense regulates the output voltage at the point of load. It minimizes the effects of distribution losses such as drops across the connecting pin and PCB tracks (see Figure 17). Please note however, the maximum drop from the output pin to the point of load should not exceed 500mV for remote compensation to work.

The amount of power delivered by the module is defined as the output voltage multiplied by the output current (VO x IO).

When using TRIM UP, the output voltage of the module will increase which, if the same output current is maintained, increases the power output by the module. Make sure that the maximum output power of the module remains at or below the maximum rated power.

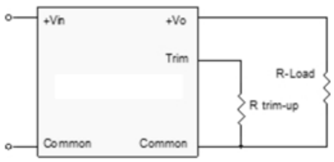
When the Remote Sense feature is not being used, leave sense pin disconnected.



Circuit Configuration for Remote Sense Operation

PT/PS Series Output Voltage Adjustment

The output Voltage of the PT/PS can be adjusted in the range 0.7525V to 5.0V by connecting a single resistor on the motherboard (shown as R_{trim}) in Figure 18. When Trim resistor is not connected the output voltage defaults to 0.7525V



Trim-up Voltage Setup

The value of R_{trim} -up defined as:

$$Rtrim = (\frac{10500}{Vo - 0.7525} - 1000)$$

Where: R_{trim} -up is the external resistor in ohm,
Vo is the desired output voltage

To give an example of the above calculation, to set a voltage of 3.3Vdc, Rtrim is given by:

$$Rtrim = (\frac{10500}{3.3 - 0.7525} - 1000)$$

Rtrim = 3.122K ohm

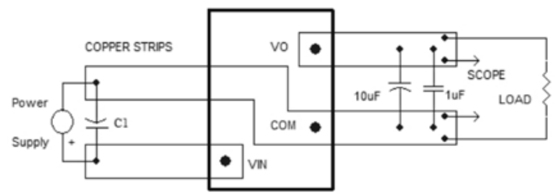
For various output values various resistors are calculated and provided in Table 3 for convenience.

Vo,set (V)	R_{trim} (Kohm)
0.7525	Open
1.2	22.46
1.5	13.05
1.8	9.024
2.0	7.417
2.5	5.009
3.3	3.122
5.0	1.472

Table 3 – Trim Resistor Values

Output Ripple and Noise Measurement

The test set-up for noise and ripple measurements is shown in Figure 19. a coaxial cable with a 50ohm termination was used to prevent impedance mismatch reflections disturbing the noise readings at higher frequencies. The Output Ripple & Noise is measured with 1uf ceramic and 10uf tantalum. The measured position are 50mm to 75mm (2” to 3”) from the module. The “C1” is 200uF Tantalum capacitor ESR< 25mΩ



Output Voltage Ripple and Noise Measurement Set-Up

Output Capacitance

DATEL’s PT/PS series converters provide unconditional stability with or without external capacitors. For good transient response low ESR output capacitors should be located close to the point of load. For high current applications point has already been made in layout considerations for low resistance and low inductance tracks.
Output capacitors with its associated ESR values have an impact on loop stability and bandwidth. DATEL’s converters are designed to work with load capacitance up-to 8,000uF. It is recommended that any additional capacitance, typically 1,000uF and low ESR (<20mohm), be connected close to the point of load and outside the remote compensation point.

SMT Reflow Profile

An example of the SMT reflow profile is given in Figure 20.
Equipment used: SMD HOT AIR REFLOW HD-350SAR
Alloy: AMQ-M293TA or NC-SMQ92 IND-82088 SN63

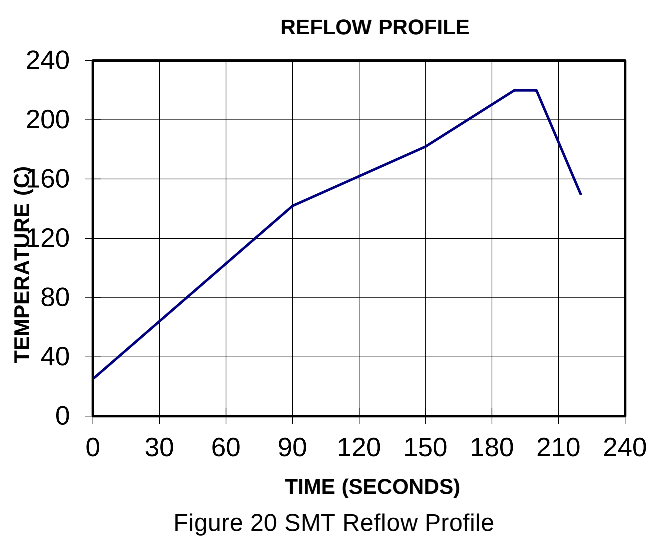
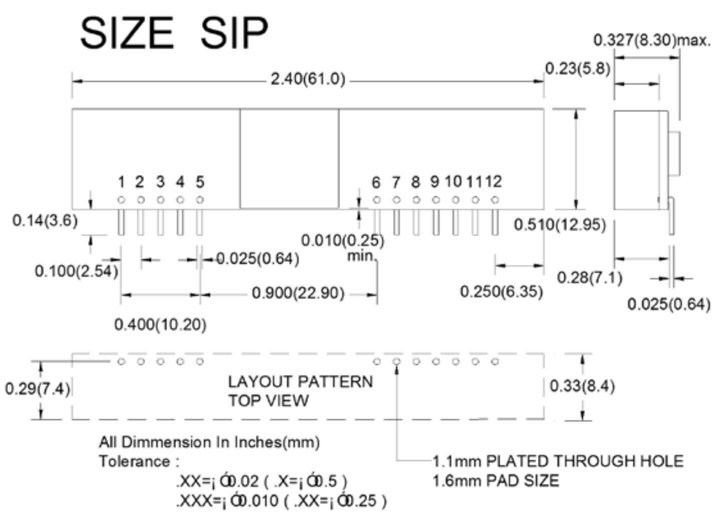


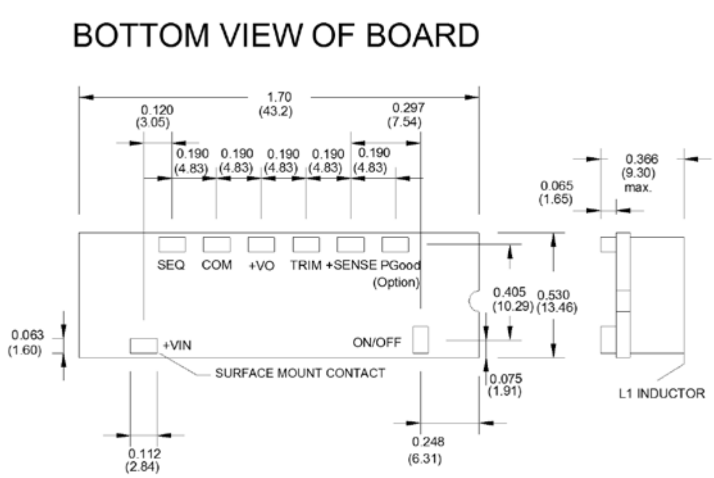
Figure 20 SMT Reflow Profile

SIP/SMT mechanical Outline Diagrams

Dimensions are in inches (millimeters)
Tolerance: x.xx ±0.02 in. (0.5mm), x.xxx ±0.010 in. (0.25 mm) unless otherwise noted



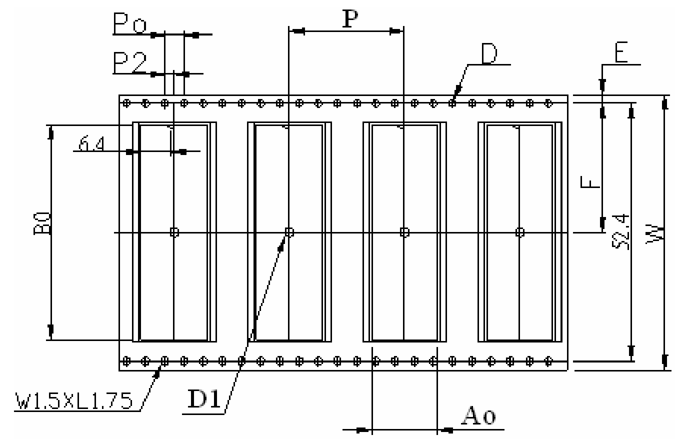
PT12 series mechanical outline diagram

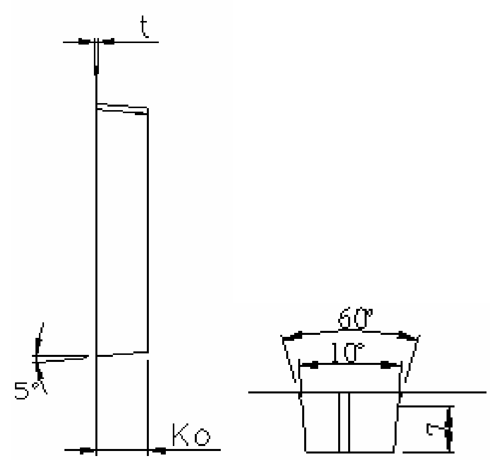


PS12 series mechanical outline diagram

SMT Tape and Reel Dimensions

The Tape and Reel dimensions for the SMT module are shown in the figure below.





ITEM	SPEC
W	56.00 +0.30 −0.30
Ao	13.80 +0.10 −0.10
Bo	43.7 +0.10 −0.10
Ko	9.50 +0.10 −0.10
P	24.00 +0.10 −0.10
F	26.20 +0.10 −0.10
E	1.75 +0.10 −0.10
D	1.50 +0.10 −0.00
D1	2.00 +0.25 −0.00
Po	4.00 +0.10 −0.10
P2	2.00 +0.10 −0.10
t	0.40 +0.05 −0.05

PS12 series SMT Tape and Reel Dimensions

PIN CONNECTIONS

PIN CONNECTION	
PIN	**FUNCTION**
1	+ Output
2	+ Output
3	+ Sense
4	+ Output
5	Common
6	No Pin/ P Good
7	Common
8	+ V Input
9	+ V Input
10	Sequence
11	Trim
12	ON/OFF Control

PART NUMBER ORDERING INFORMATION

Family, Form Factor Package	Nominal Input Voltage	Current Output	Options
PT/PS	12	20	N, P, G

PT/PS:
PT- Through Hole
PS- SMT

12: (6-14) 12 Volts

N, P, G:
N - Negative On/Off control
P - Positive On/Off control
G - Power Good

1. For proper part ordering, enter option suffixes in order listed in table above