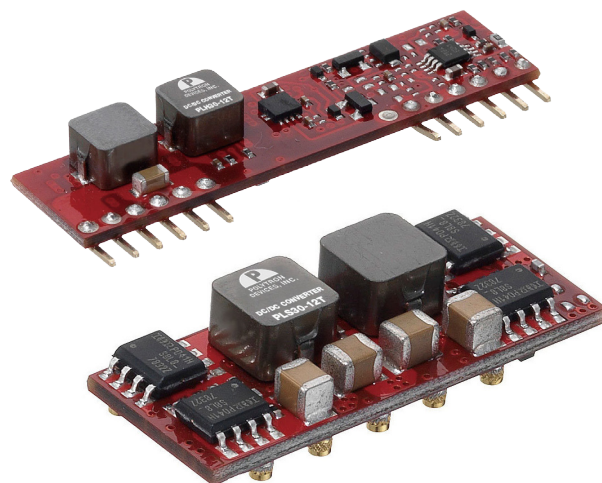


DC-DC CONVERTERS

NON-ISOLATED, POINT OF LOAD, 30 AMPS

SMD OR SIP PACKAGE

PLS(H)30 SERIES



FEATURES

- Output Current up to 30A
- Small Size and Low Profile:
 - PLS30-05T: 1.30" × 0.53" × 0.37" (SMD);
 - PLS30-12T: 1.30" × 0.53" × 0.31" (SMD);
 - PLH30-05T: 2.00" × 0.50" × 0.37" (SIP);
 - PLH30-12T: 2.00" × 0.50" × 0.31" (SIP)
- Input and Output Range:
 - PLS(H)30-05T: 4.5 - 5.5Vdc Input, 0.8 - 3.63Vdc Output;
 - PLS30-12T: 6.0 - 14.0Vdc Input, 0.8 - 3.63Vdc Output;
 - PLH30-12T: 6.0 - 14.0Vdc Input, 0.8 - 5.5Vdc Output
- High Efficiency up to 93% at 5V_{in}, 3.3V_{out} Full Load
- Fixed Switching Frequency (300kHz)
- SMD and SIP Packages
- Monotonic Start-up Into Pre-biased Output
- Output Voltage Sequencing
- Parallel Operation With Active Current Sharing
- Safety Meets UL60950-1, EN60950-1 and IEC60950-1
- Compliant to RoHS II & Reach
- CE Mark Meets 2006/95/EC, 2011/95/EC and 2004/108/EC

SELECTION GUIDE

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

Input Voltage Range Vdc	Output Voltage Vdc	Output Current Load A		No Load Current V _{in} (nom), 3.3Vdc mA	Efficiency % (5.0V _{in} , 3.3Vdc @ 6A)	Model Number	Package
		Min.	Max.				
4.5 - 5.5 V _{in} , Min. = V _{out} (set) + 1.5V	0.8 ~ 3.63	0	30	180	93	PLS30-05T	SMD
	0.8 ~ 3.63	0	30	180	93	PLH30-05T	SIP
6.0 - 14 V _{in} , Min. = V _{out} (set) + 2.4V	0.8 ≤ V _{out} ≤ 2.75	0	30	200	92	PLS30-12T	SMD
	2.75 < V _{out} ≤ 3.63	0	20				
	0.8 ≤ V _{out} ≤ 2.75	0	30	200	92	PLH30-12T	SIP
	2.75 < V _{out} ≤ 5.5		25				

PLS(H)30 SERIES

Input Specifications

Operating input voltage range, Vdc		$V_{in}, \text{Min.} = V_{out}(\text{set}) + 2.4\text{Vdc}$
	PLS(H)30-05T	4.5 - 5.5Vdc $V_{in}(\text{nom}) = 5\text{Vdc}$
	PLS(H)30-12T	6 - 14Vdc $V_{in}(\text{nom}) = 12\text{Vdc}$
Input filter ⁽⁵⁾		C filter
Input reflected ripple current, mA _{p-p}	100	5-20MHz, 1μH source impedance
Sequencing delay time ⁽⁶⁾ , ms	10, Min.	
Tracking accuracy, mV	$V_{in}(\text{min}) - V_{in}(\text{max}), I_{o}(\text{min}) - I_{o}(\text{max}), V_{SE0} < V_{out}$	
	100	Power-up (2V/ms)
	200	Power-down (1V/ms)
Start-up voltage, Vdc	4.4	
Shut-down voltage, Vdc	4.3	
Remote ON/OFF ⁽⁸⁾		Negative logic, Standard
	$I_{IN} = 200\mu\text{A}, \text{Max.}$	ON = Open or $-0.3\text{V} < V_r < 1.2\text{V}$
	$I_{IN} = 3.3\mu\text{A}, \text{Max.}$	OFF = $3\text{V} < V_r < V_{in}(\text{max})$
		Positive logic, option
	$I_{IN} = 200\mu\text{A}, \text{Max.}$	ON = Open or $3\text{V} < V_r < V_{in}(\text{max})$
	$I_{IN} = 3.3\mu\text{A}, \text{Max.}$	OFF = $-0.3\text{V} < V_r < 1.2\text{V}$
Rise time, ms	10 Max.	10% to 90% $V_{out}(\text{set})$
Remote sense range, V	0.5 Max.	
Active load share	10% I_o	Accuracy (option)
	5 pcs., Max.	Number of units in parallel ⁽⁷⁾
Turn-on delay time, ms	2.5	Case 1 ⁽⁹⁾
	2.5	Case 2 ⁽¹⁰⁾

Output Specifications

Output current, A	PLS(H)30-05T	30 Max.	
	PLS30-12T	30 Max.	$0.8 \leq V_{out} \leq 2.75\text{Vdc}$
		20 Max.	$2.75 < V_{out} \leq 3.63\text{Vdc}$
PLH30-12T	30 Max.	$0.8 \leq V_{out} \leq 2.75\text{Vdc}$	
	25 Max.	$2.75 < V_{out} \leq 5.5\text{Vdc}$	
Voltage accuracy, %	1.5	$V_{out}(\text{set})$	$V_{in} = V_{in}(\text{min}) - V_{in}(\text{max})$ at Full Load
Line regulation, %	0.1 Min., -0.1 Max.	$V_{out}(\text{set})$	No Load to Full Load
Load regulation, %	-0.4 Min., 0.4 Max.	$V_{out}(\text{set})$	
Minimum load, %	0 Min.		
Output current limit, %	150		
Voltage adjustability ⁽⁴⁾ , Vdc (see fig.1)	0.8 - 3.63	PLS30-05T	
	0.8 - 3.63	PLH30-05T	
	0.8 - 3.63	PLS30-12T	
	0.8 - 5.5	PLH30-12T	
Ripple and noise ⁽²⁾	75mV _{p-p} , Max.	Measured by 20MHz bandwidth	
Temperature coefficient, %	-0.5 Min., -0.5 Max.		
Output voltage overshoot-startup, %	$3 V_{out}(\text{set})$, Max.	$V_{in} = V_{in}(\text{min}) - V_{in}(\text{max}); \text{F.L.}$	
Dynamic load response	Note2	350mV	$\Delta I_o / \Delta t = 5\text{A} / \mu\text{s}, V_{in}(\text{nom}), \text{Peak deviation}$
		25μs	Load change step (50% to 100% or 100% to 50% of $I_o(\text{max})$), Setting time ($V_{out} < 10\%$ peak deviation)
	Note3	250mV	$\Delta I_o / \Delta t = 5\text{A} / \mu\text{s}, V_{in}(\text{nom}), \text{Peak deviation}$
		40μs	Load change step (50% to 100% or 100% to 50% of $I_o(\text{max})$), Setting time ($V_{out} < 10\%$ peak deviation)
External load capacitance, μF	2000 Max.	ESR $\geq 1\text{m}\Omega$	
	10000 Max.	ESR $\geq 10\text{m}\Omega$	
Short circuit protection	Hiccup, automatic recovery		

General Specifications

Isolation voltage	None
Switching frequency, kHz	$300 \pm 13\%$
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1

PLS(H)30 SERIES

Environmental Specifications

Operating ambient temperature, °C	With derating	-40 Min.	85 Max.
Storage temperature range, °C		-55 Min.	125 Max.
Over temperature protection, °C		125	
Thermal shock		MIL-STD-810F	
Vibration		MIL-STD-810F	
Relative humidity	Non-condensing	5% to 95% RH	
Lead-free reflow solder process		IPC J STD-020D	
Moisture sensitivity level (MSL)	Level 2a	IPC J STD-033B	

Physical Specifications

Dimensions, inches	PLS30-05T	1.30 × 0.53 × 0.37 (33.0 × 13.5 × 9.4 mm)
	PLS30-12T	1.30 × 0.53 × 0.31 (33.0 × 13.5 × 7.8 mm)
	PLH30-05T	2.00 × 0.50 × 0.37 (50.8 × 12.7 × 9.4 mm)
	PLH30-12T	2.00 × 0.50 × 0.31 (50.8 × 12.7 × 7.8 mm)
Weight	SMD	6.0g (0.21oz)
	SIP	7.0g (0.25oz)
MTBF ⁽¹⁾	1.258 × 10 ⁶ hrs, MIL-HDBK-217F	

Note:

- MIL-HDBK-217F @Tc=70 °C, Full load.
- External with C_{out} = 1µF ceramic//10µF tantalum capacitors.
- External with C_{out} = 2 × 150uF polymer capacitors.
- Output voltage programmable from 0.8V to 5V by connecting a single resistor (shown as R_{trim} in Table 1) between the TRIM and GND pins of the module. To calculate the value of the resistor **R_{trim}** for a particular output voltage **V_{out}**, use the following equation:

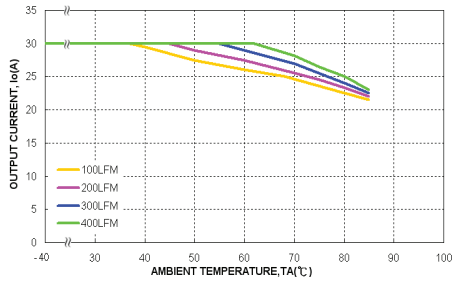
$$R_{trim} = \left[\frac{1200}{V_{out} - 0.80} - 100 \right] \Omega$$

- To make sure the module is stable, input external capacitors is necessary that minimizes input ripple voltage of the module.
- Delay from V_{in}, min. to application of voltage on SEQ pin.
- Selecting current shar function that the regulations may not meet listed specification.
- The On/Off signal is referenced to ground. The standard remote On/Off logic of the device is negative logic. Adding a device code with suffix “-P” is option for positive logic of remote On/Off
- Case 1: On/Off input is set to logic low (module on) and then input power is applied (delay from instant at which V_{in}=V_{in}(min) until V_{out}=10% of V_{out}(set))
- Case 2: Input power is applied for at least one second and then the ON/OFF input is set to logic low (delay form instant at which Von/off=0.3V until V_{out}=10% of V_{out}(set))

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

PLS(H)30 SERIES

Characteristic Curve All specifications are $V_0 = 3.3V$



PLS30-5T Derating Curve

Trim

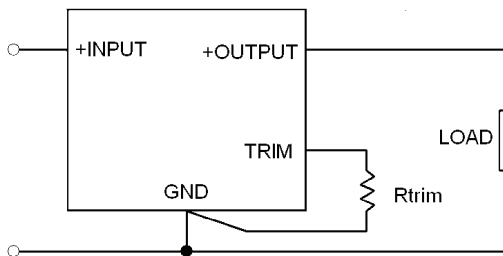


Figure 1

TABLE 1

$V_{out}(\text{set})$ (V)	RTRIM (Ω)
0.8	Open
1.2	2900
1.5	1614
1.8	1100
2.5	605
3.3	380
5	185

Device Option

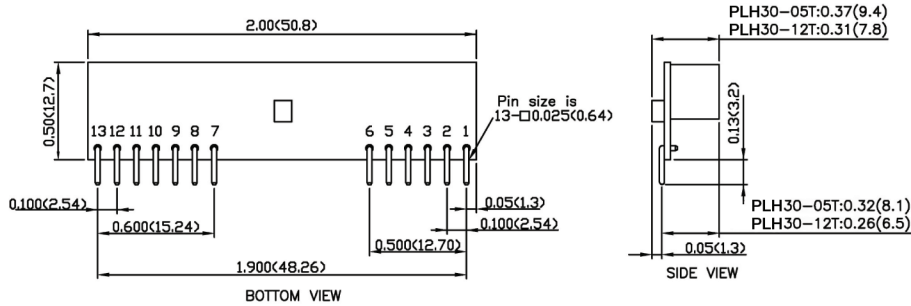
TABLE 2

Option	Suffix
Remote ON/OFF Positive Logic	-P
Current Share	-S
Extra GND pin 2 extra GND pins only for SMD Type	-E
Long Pins 5.08 ± 0.25mm only for SIP Type	-L

PLS(H)30 SERIES

Mechanical Drawing

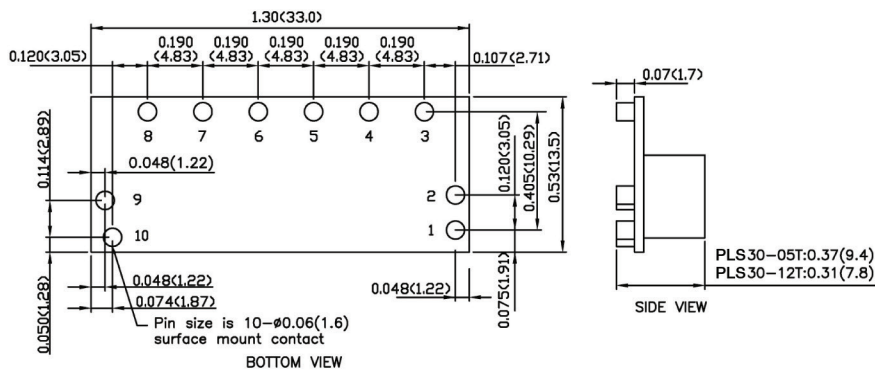
SIP Type



PIN CONNECTION

PIN	DEFINE
1	+Output
2	+Output
3	+Sense
4	+Output
5	GND
6	GND
7	SHARE(option)
8	GND
9	+Input
10	+Input
11	SEQ
12	Trim
13	Ctrl

SMD Type



PIN CONNECTION

PIN	DEFINE
1	Ctrl
2	GND(option)
3	SHARE(option)
4	+Sense
5	Trim
6	+Output
7	GND
8	SEQ
9	GND(option)
10	+Input

1. All dimensions in inch (mm)
2. Tolerance: $x.xx \pm 0.02$ ($x.x \pm 0.5$)
 $x.xxx \pm 0.01$ ($x.xx \pm 0.25$)
3. Pin pitch tolerance ± 0.01 (0.25)
4. Pin dimension tolerance ± 0.004 (0.1)