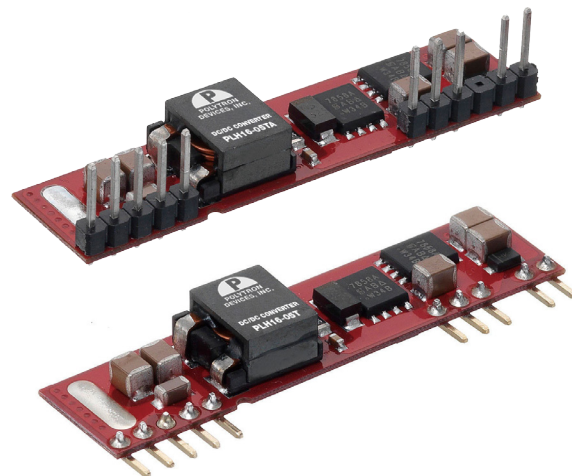


DC-DC CONVERTERS

NON-ISOLATED, POINT OF LOAD, 16 AMPS

SMD OR SIP PACKAGE

PLS(H)16 SERIES



FEATURES

- Output Current up to 16A
- Small Size and Low Profile:
1.30" × 0.53" × 0.30" (SMD);
2.00" × 0.50" × 0.28" (SIP)
- High Efficiency up to 95% at 3.3V Full Load
- Input Range From 2.4Vdc to 5.5Vdc
- Fixed Switching Frequency (300kHz)
- SMD and SIP Packages
- Input Under-Voltage Protection
- SMD Package Qualified for Leadfree Reflow Solder Process According to IPC J-STD-020D
- Output Voltage Programmable From 0.75Vdc to 3.3Vdc Via External Resistor
- Safety Meets UL60950-1, EN60950-1 and IEC60950-1
- Compliant to RoHS II & Reach
- CE Marked

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		ON/OFF Logic	Efficiency % (5.0V _{in} , 3.3Vdc @ 6A)	Model Number	Package
		Min.	Max.				
2.4 ~ 5.5 Vdc $V_{in(min)} = V_{out(set)} + 0.5V$	0.75 ~ 3.3Vdc	0	16	Negative	95	PLS16-05T	SMD
	0.75 ~ 3.3Vdc	0	16	Positive	95	PLS16-05TP	SMD
	0.75 ~ 3.3Vdc	0	16	Negative	95	PLH16-5T	Vertical Mounting SIP
	0.75 ~ 3.3Vdc	0	16	Positive	95	PLH16-5TP	Vertical Mounting SIP
	0.75 ~ 3.3Vdc	0	16	Negative	95	PLH16-5TA	Horizontal Mounting SIP
	0.75 ~ 3.3Vdc	0	16	Positive	95	PLH16-5TAP	Horizontal Mounting SIP

PLS(H)16 SERIES

Input Specifications		
Operating input voltage range, Vdc	2.4 - 5.5	$V_{out(set)} < V_{in} - 0.5V$
Input filter ⁽⁵⁾		C filter
Maximum input current, A	16	$V_{in} = 2.4$ to $5.5V$; $I_o = I_o(max)$
Input reflected ripple current, mA _{p-p}	100	5-20MHz, 1 μ H source impedance
Input current no load, mA	$V_{in} = 5V, I_o = 0$, module enabled	
	100	$V_{out(set)} = 0.75Vdc$
	130	$V_{out(set)} = 3.3Vdc$
Start-up voltage, Vdc	2.2	
Shut-down voltage, Vdc	2.0	
Remote ON/OFF ⁽⁶⁾		Negative logic, Standard
	$I_{IN} = 10\mu A$, Max.	ON = Open or $0V < V_r < 0.3V$
	$I_{IN} = 1\mu A$, Max.	OFF = $1.5V < V_r < V_{in(max)}$
		Positive logic, option
	$I_{IN} = 10\mu A$, Max.	ON = Open or $V_{in(max)}$
	$I_{IN} = 1\mu A$, Max.	OFF = $0V < V_r < 0.3V$
	10 μA - 1.0mA	Input current of Ctrl pin
	1.5mA (nominal)	Remote off input current
Rise time, mS	6 Max.	10% to 90% $V_{out(set)}$
Turn-on delay time, ms	1	Case 1 ⁽⁷⁾
	1	Case 2 ⁽⁸⁾
Remote sense range, V	0.5 Max.	

Output Specifications			
Output current, A	16 Max.		
Voltage accuracy, %	-2 Min., 2 Max	$V_{out(set)}$	
Line regulation, %	$V_{in} = V_{out(set)} + 0.5V$ to $V_{in(max)}$ at Full Load		
	-0.3 Min., 0.3 Max.	$V_{out(set)}$	
Load regulation, %	No Load to Full Load		
	-0.4 Min., 0.4 Max.	$V_{out(set)}$	
Minimum load, %	0 Min.		
Output current limit, %	180		
Voltage adjustability ⁽⁴⁾ , V (see fig.1)	0.7525-3.63		
Ripple and noise ⁽²⁾	Measured by 20MHz bandwidth		
	15mVrms, Max.		
	50mVp-p, Max.		
Temperature coefficient, %/°C	-0.4 Min., -0.4 Max.		
Output voltage overshoot-startup	1% $V_{out(set)}$	$V_{in} = 2.4 - 5.5V$, F.L.	
Dynamic load response	Note2	300mV	$\Delta I_o / \Delta t = 2.5A / \mu s, V_{in(nom)}$, Peak deviation
		25 μs	Load change step (50% to 100% or 100% to 50% of $I_o(max)$), Setting time ($V_{out} < 10\%$ peak deviation)
	Note3	150mV	$\Delta I_o / \Delta t = 2.5A / \mu s, V_{in(nom)}$, Peak deviation
		100 μs	Load change step (50% to 100% or 100% to 50% of $I_o(max)$), Setting time ($V_{out} < 10\%$ peak deviation)
External load capacitance, μF	1000 Max.	ESR $\geq 1m\Omega$	
	5000 Max.	ESR $\geq 10m\Omega$	
Short circuit protection	Continuous, automatics recovery		

General Specifications	
Isolation voltage	None
Switching frequency, kHz	300 \pm 10%
Design meet safety standard	UL60950-1, EN60950-1, IEC60950-1

PLS(H)16 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	SMD	1.30 × 0.53 × 0.30 (33.0 × 13.5 × 7.7 mm)
	SIP	2.00 × 0.50 × 0.28 (50.8 × 12.7 × 7.2 mm)
Weight	6.0g (0.22oz)	
MTBF ⁽¹⁾	3.239 × 10 ⁶ hrs, MIL-HDBK-217F	

Note:

- MIL-HDBK-217F @Ta=25 °C, Full load.
- External with C_{out} = 1µF ceramic//10µF tantalum capacitors.
- External with C_{out} = 2pcs of 150uF polymer capacitors.
- Output voltage programmable from 0.75V to 3.3V 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:

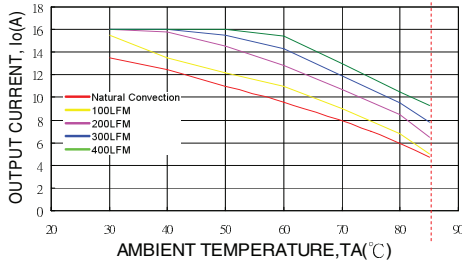
$$R_{trim} = \left[\frac{21070}{V_{out} - 0.7525} - 5110 \right] \Omega$$

- It's necessary to equip the external input capacitors at the input of the module. The capacitors should connect as close as possible to the input terminals that ensuring module stability. The external C_{in} is 4pcs of 150µF low-ESR polymer capacitors // 4pcs of 47µF ceramic capacitors at least.
- Device code with suffix “-P” – Positive logic (ON/OFF is open collector/drain logic input; Signal referenced to GND) Device code with no suffix – Negative logic (ON/OFF pin is open collector/drain logic input with external pull-up resistor; signal referenced to GND)
- 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))

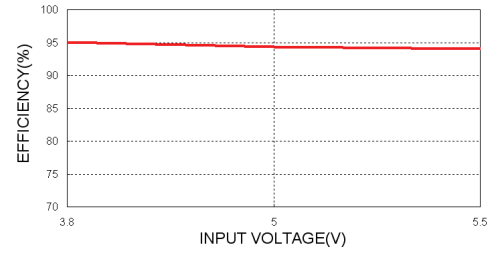
CAUTION: This power module is not internally fused. An input line fuse must always be used.

PLS(H)16 SERIES

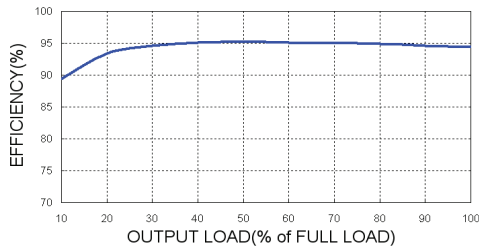
Characteristic Curve All specifications are $V_0 = 3.3V$



PLS16-5T Derating Curve



PLS16-5T Efficiency vs. Output Load



PLS16-5T Efficiency vs. Input Voltage

Trim

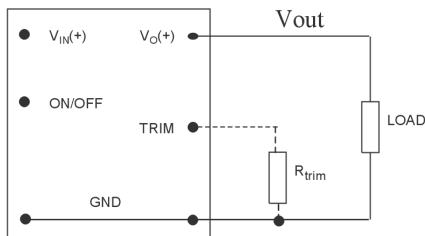


Figure 1

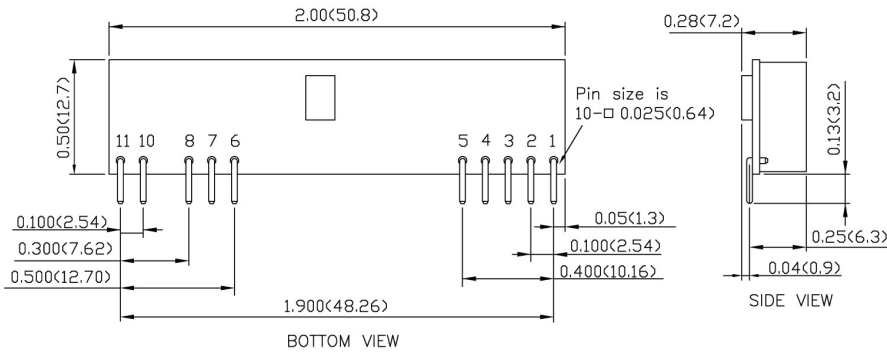
TABLE 1

$V_{out}(\text{set}) (V)$	RTRIM (K Ω)
0.7525	Open
1.2	41.973
1.5	23.077
1.8	15.004
2.5	6.974
3.3	3.160

PLS(H)10 SERIES

Mechanical Drawing

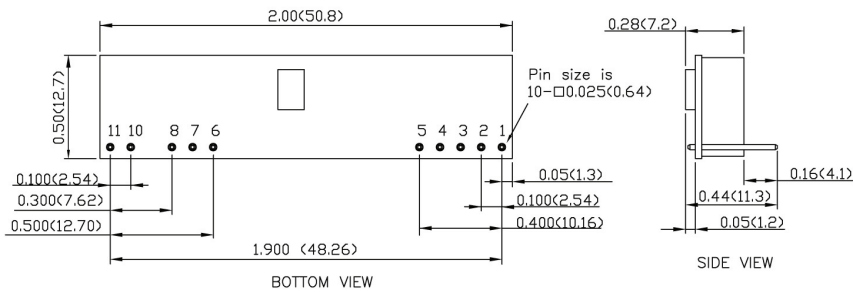
PLH16-5T Type



PIN CONNECTION

PIN	DEFINE
1	+Output
2	+Output
3	+Sense
4	+Output
5	GND
6	GND
7	+Input
8	+Input
10	Trim
11	Ctrl

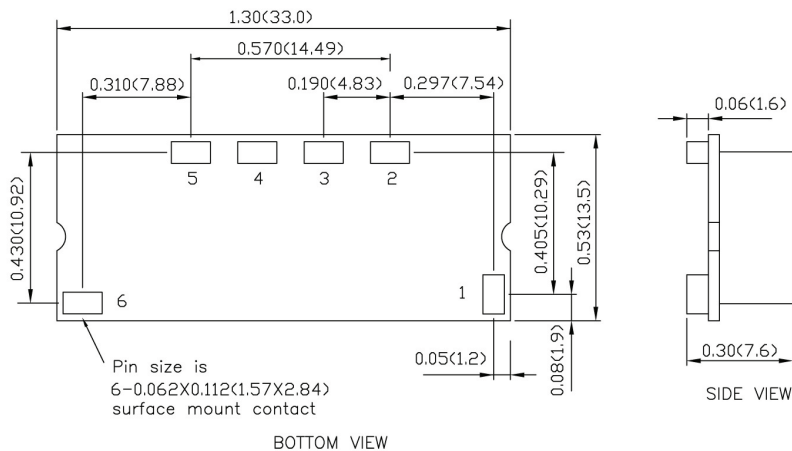
PLH16-05T Type



PIN CONNECTION

PIN	DEFINE
1	+Output
2	+Output
3	+Sense
4	+Output
5	GND
6	GND
7	+Input
8	+Input
10	Trim
11	Ctrl

PLS16-5T Type



PIN CONNECTION

PIN	DEFINE
1	Ctrl
2	+Sense
3	Trim
4	+Output
5	GND
6	+Input

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