

# LED15 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 15Watts



## FEATURES

- NO MINIMUM LOAD REQUIRED
- 2250VDC INPUT TO OUTPUT ISOLATION
- SMALL SIZE AND LOW PROFILE : 1.10 x 0.94 x 0.34 INCH
- SURFACE-MOUNT OR THROUGH-HOLE
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

## APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

2250VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP
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## TECHNICAL SPECIFICATION

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

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA	%	µF
LED15-24S3P3	18 ~ 36	3.3	3500	20	86	10000
LED15-24S05	18 ~ 36	5	3000	20	87	6000
LED15-24S12	18 ~ 36	12	1250	15	87	1000
LED15-24S15	18 ~ 36	15	1000	15	88	660
LED15-48S3P3	36 ~ 75	3.3	3500	15	85	10000
LED15-48S05	36 ~ 75	5	3000	15	87	6000
LED15-48S12	36 ~ 75	12	1250	10	87	1000
LED15-48S15	36 ~ 75	15	1000	10	88	660

## PART NUMBER STRUCTURE

LED15 - 48 S 05 - A

Series Name      Input Voltage (VDC)      Output Quantity      Output Voltage (VDC)      Option

24: 18~36  
48: 36~75

S: Single

3P3: 3.3  
05: 5  
12: 12  
15: 15

- : Negative logic remote ON/OFF with DIP(Standard)
- A: Negative logic remote ON/OFF with SMT
- B: Positive logic remote ON/OFF with DIP
- C: Positive logic remote ON/OFF with SMT
- D: DIP type without Ctrl pin
- E: SMT type without Ctrl pin
- F: DIP type, negative logic remote ON/OFF without Trim pin
- G: SMT type, negative logic remote ON/OFF without Trim pin
- H: DIP type without Ctrl & Trim pin
- I: SMT type without Ctrl & Trim pin
- J: DIP type, positive logic remote ON/OFF without Trim pin
- K: SMT type, positive logic remote ON/OFF without Trim pin

## INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	24Vin(nom)		18	24	36	VDC
	48Vin(nom)		36	48	75	
Input reflected ripple current	Nominal input and Full load		30			mAp-p
Start-up voltage	24Vin(nom)					18
	48Vin(nom)					36
Shutdown voltage	24Vin(nom)					14.5
	48Vin(nom)					30.5
Start up time	Constant resistive load	Power up				30
		Remote ON/OFF				30
Input surge voltage	100ms, max.	24Vin(nom)				50
		48Vin(nom)				100
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON			Open or 3 ~ 15VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 15VDC
		(Option)	DC-DC OFF			
		Negative logic	DC-DC ON			
		(Standard)	DC-DC OFF			
		Input current of Ctrl pin	-0.5			1.0
		Remote off input current				20

## OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Voltage accuracy			-1.0			+1.0
Line regulation	Low Line to High Line at Full Load		-0.2			+0.2
Load regulation	No Load to Full Load		-0.2			+0.2
Voltage adjustability (2)			-10			+10
Ripple and noise	Measured by 20MHz bandwidth	3.3Vout, 5Vout				75
	With a 1μF M/C X7R and a 10μF T/C	12Vout, 15Vout				100
Temperature coefficient			-0.02			+0.02
Transient response recovery time	25% load step change, ΔIo/Δt=0.1A/us					300
Over voltage protection			3.3Vout			5.4
			5Vout			7.0
			12Vout			19.6
			15Vout			20.5
Over load protection	% of Iout rated; Hiccup mode					150
Output voltage overshoot						3
Short circuit protection						Continuous, automatic recovery

## GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	2250			VDC
Isolation resistance	500VDC		10			MΩ
Isolation capacitance			1000			pF
Switching frequency			3.3Vout, 5Vout	243	270	297
			12Vout, 15Vout	423	470	517
Safety approvals						UL60950-1 EN60950-1 IEC60950-1
Weight						10.5g (0.36oz)
MTBF	MIL-HDBK-217F, Full load					3.438 x 10 <sup>6</sup> hrs

## ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature (3)	With derating		-40			+105
Storage temperature range			-55			+125
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH
Lead-free reflow solder process						IPC J-STD-020D
Moisture sensitivity level(MSL)						IPC J-STD-033B level 2a

## EMC SPECIFICATIONS

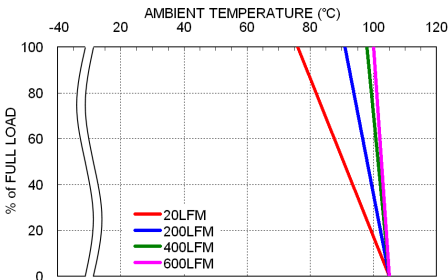
Parameter	Conditions		Level		
EMI (4)	EN55022		Class A, Class B		
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A		
Fast transient (5)	EN61000-4-4	± 2kV	Perf. Criteria B		
Surge (5)	EN61000-4-5	± 1kV	Perf. Criteria A		
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A		

**Note:**

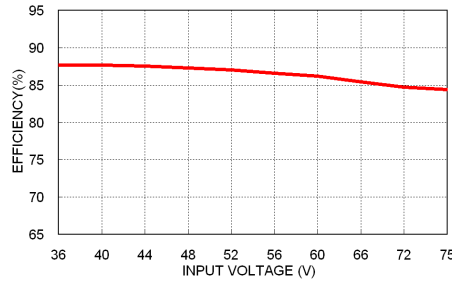
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The power module operates in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation.
4. The standard modules meet EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
5. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220µF/100V.

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

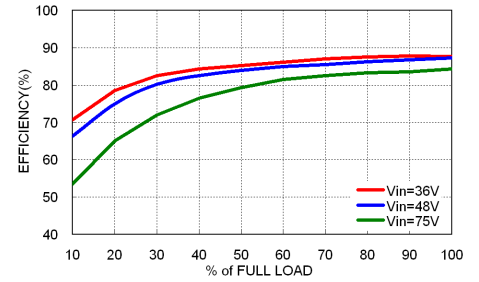
**CHARACTERISTIC CURVE**



LED15-48S05 Derating Curve



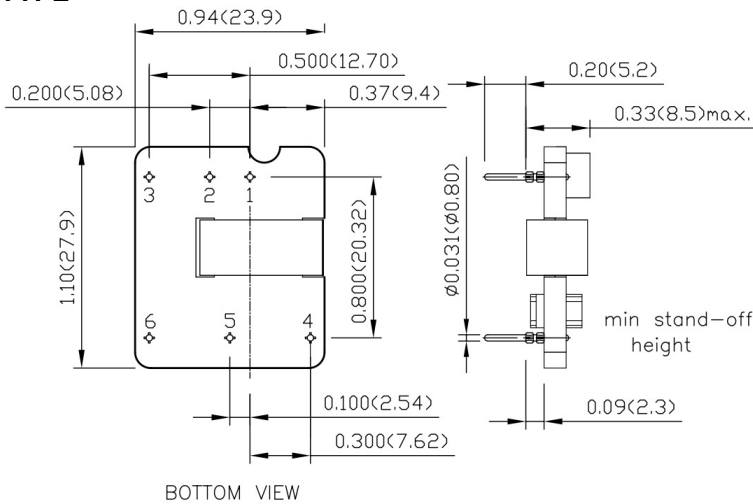
LED15-48S05 Efficiency vs. Input Voltage



LED15-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**

**DIP TYPE**



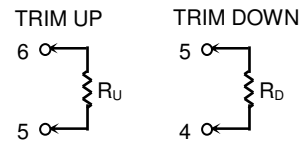
BOTTOM VIEW

**PIN CONNECTION**

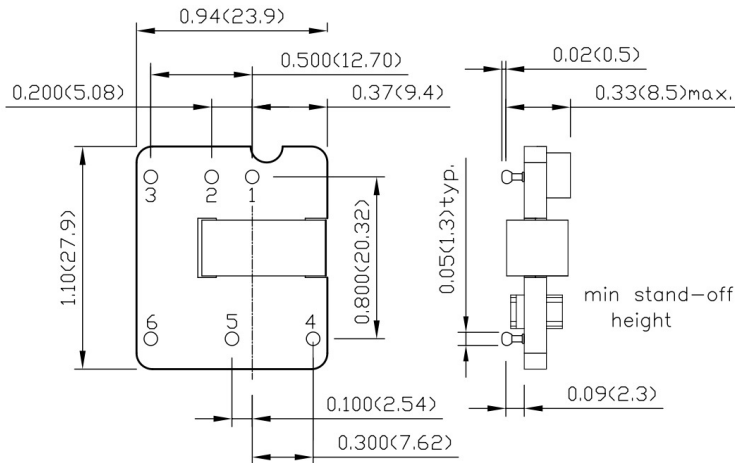
PIN	DEFINE
1	+Vin
2	-Vin
3	Ctrl
4	+Vout
5	Trim
6	-Vout

**EXTERNAL OUTPUT TRIMMING**

Output can be externally trimmed by using the method shown below.



**SMT TYPE**



BOTTOM VIEW

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)