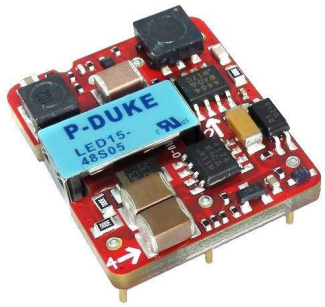
POWER MATE TECHNOLOGY CO., LTD.

LED15 SERIES

15 WATTS DC-DC CONVERTER



FEATURES

- 15 WATTS MAXIMUM OUTPUT POWER
- SINGLE OUTPUT UP TO 3.5A
- SMALL SIZE AND LOW PROFILE：1.10 x 0.94 x 0.34 INCH
- HIGH EFFICIENCY UP TO 88%
- 2:1 WIDE INPUT VOLTAGE RANGE
- FIXED SWITCHING FREQUENCY
- INPUT TO OUTPUT ISOLATION: 2250VDC
- INDUSTRY STANDARD PIN-OUT FEC15 SERIES COMPATIBLE
- SURFACE-MOUNT OR THROUGH-HOLE
- SMD PACKAGE QUALIFIED FOR LEADFREE REFLOW SOLDER PROCESS ACCORDING IPC J-STD-020D
- COST EFFICIENT OPEN FRAME DESIGN
- -40℃to +85℃ WIDE OPERATING TEMPERATURE
- CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC
- SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

Positive logic Remote On/Off, SMD type, Without TRIM pin, Without CTRL pin

DESCRIPTION

LED15 single output DC/DC converters provide up to 15 watts of output power in an industry standard package and footprint. All models feature a wide input range, comprehensively protected against over-current, over-voltage and input under-voltage protection conditions, and trimmable output voltage.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power		15Watts max
Voltage accuracy		±1%
Minimum load		0%
Voltage adjustability (Note 6)		±10%
Line regulation	LL to HL at Full Load	±0.2%
Load regulation	No Load to Full Load	±0.2%
Ripple and noise	20MHz bandwidth (Measured with a 1μF M/C and a 10μF T/C)	See table
Temperature coefficient		±0.02%/ºC, max.
Transient response recovery time	25% load step change △Io/△t=0.1A/us	300μs
Over voltage protection (Voltage clamped)	3.3VDC output 5VDC output 12VDC output 15VDC output	3.7VDC~5.4VDC 5.6VDC~7.0VDC 13.5VDC~19.6VDC 16.8VDC~20.5VDC
Output load protection		150%, max.
Short circuit protection		Continuous, automatics recovery
Output voltage overshoot		3%

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output	2250 VDC, min. 1minute
Isolation resistance	500VDC	10MΩ, min.
Isolation capacitance		1000pF
Switching frequency	5VDC,3.3VDC 15VDC,12VDC	270kHz±10% 470kHz±10%
Design meets safety standard		IEC60950-1,UL60950-1,EN60950-1
Dimensions		1.10 X 0.94 X 0.34 Inch (27.9 X 23.9 X 8.5 mm)
Weight		10.5g(0.36oz)
MTBF (Note 1)	BELLCORE TR-NWT-000332 MIL-HDBK-217F	2.200x10^{6}hrs 1.314x10^{6}hrs

INPUT SPECIFICATIONS

Input voltage range	24VDC nominal input 48VDC nominal input	18 ~ 36VDC 36 ~ 75VDC
Input surge voltage	24VDC input 48VDC input	50VDC 100ms, max. 100VDC 100ms, max.
Input reflected ripple current	12uH source impedance (π filter with 220μF & 33μF)	30mAp-p
Start up time	Nominal input and Constant resistive load Power up Remote ON/OFF	30ms, max. 30ms, max.
Start-up voltage	24VDC input 48VDC input	18VDC, max. 36VDC, max.
Shutdown voltage	24VDC input 48VDC input	14.5VDC 30.5VDC
Remote ON/OFF (Note 7)		
Positive logic(Option)	DC-DC ON DC-DC OFF	Open or 3V < Vr < 15V Short or 0V < Vr < 1.2V
Negative logic(Standard)	DC-DC ON DC-DC OFF	Short or 0V < Vr < 1.2V Open or 3V < Vr < 15V
Input current of remote control pin	Nominal input	-0.5mA ~ 1.0mA
Remote off state input current	Nominal input	20mA,Max

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature (Note 8)	-40ºC ~ +85ºC (with derating)
Storage temperature range	-55 ºC ~ +125 ºC
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 CHARACTERISTICS

EMI (Note 9)	EN55022		Class A, Class B
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (Note 10)	EN61000-4-4	± 2kV	Perf. Criteria B
Surge (Note 10)	EN61000-4-5	± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

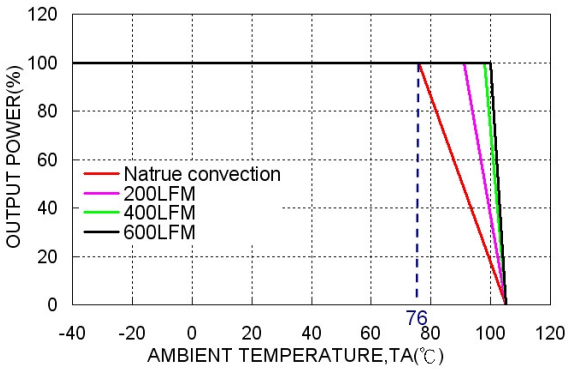
Model Number	Input Range	Output Voltage	Output Current		Output [2] Ripple & Noise	No load [3] Input Current	Eff [4] (%)	Capacitor[5] Load max
			Min. load	Full Load				
LED15-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	3500mA	75mVp-p	20mA	86	10000μF
LED15-24S05	18 ~ 36 VDC	5 VDC	0mA	3000mA	75mVp-p	20mA	87	6000μF
LED15-24S12	18 ~ 36 VDC	12 VDC	0mA	1250mA	100mVp-p	15mA	87	1000μF
LED15-24S15	18 ~ 36 VDC	15 VDC	0mA	1000mA	100mVp-p	15mA	88	660μF
LED15-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	3500mA	75mVp-p	15mA	85	10000μF
LED15-48S05	36 ~ 75 VDC	5 VDC	0mA	3000mA	75mVp-p	15mA	87	6000μF
LED15-48S12	36 ~ 75 VDC	12 VDC	0mA	1250mA	100mVp-p	10mA	87	1000μF
LED15-48S15	36 ~ 75 VDC	15 VDC	0mA	1000mA	100mVp-p	10mA	88	660μF

Note

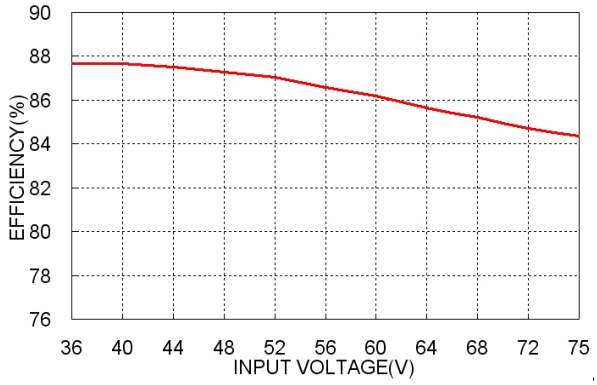
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment)
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. 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 the + OUTPUT pin or the - OUTPUT pin.
7. The CTRL pin voltage is reference to -INPUT. The order number please see product standard table.
8. The power module operate in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation.
9. The LED15 series standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.
10. 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.

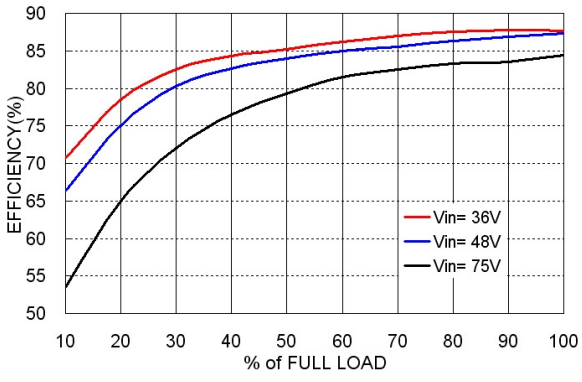
LED15-48S05 Derating Curve



LED15-48S05 Efficiency VS Input Voltage

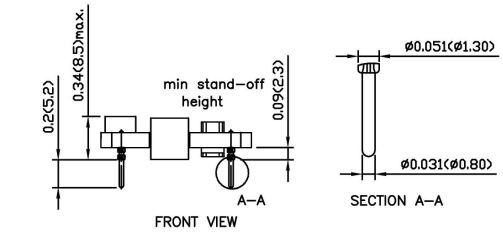


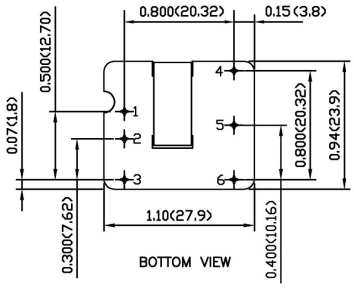
LED15-48S05 Efficiency VS Output Current

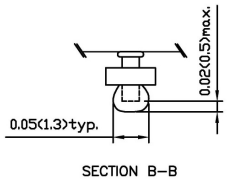


MECHANICAL DRAWING

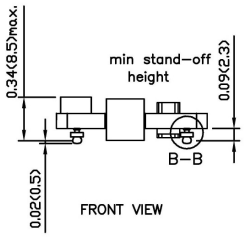
DIP TYPE

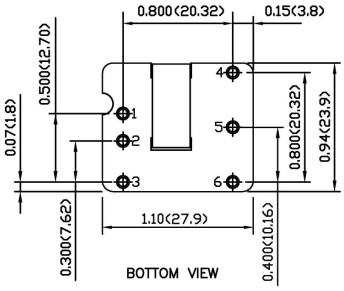






SMD TYPE



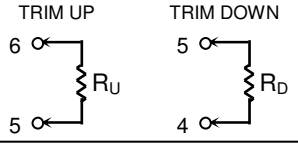


1. All dimensions in Inch (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION	
PIN	LED15W SERIES
1	+ INPUT
2	- INPUT
3	CTRL
4	+OUTPUT
5	TRIM
6	-OUTPUT

EXTERNAL OUTPUT TRIMMING

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



PRODUCT STANDARD TABLE	
Option	Suffix
Negative remote ON/OFF with DIP(Standard)	
Negative remote ON/OFF with SMT	-A
Positive remote ON/OFF with DIP	-B
Positive remote ON/OFF with SMT	-C
DIP type without CTRL pin	-D
SMT type without CTRL pin	-E
DIP type, negative remote ON/OFF without TRIM pin	-F
SMT type, negative remote ON/OFF without TRIM pin	-G
DIP type without CTRL&TRIM pin	-H
SMT type without CTRL&TRIM pin	-I
DIP type, positive remote ON/OFF without TRIM pin	-J
SMT type, positive remote ON/OFF without TRIM pin	-K