

### APPLICATIONS

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

### 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 (BASIC INSULATION)
- INDUSTRY STANDARD PIN-OUT FEC15 SERIES COMPATIBLE
- SURFACE-MOUNT OR THROUGH-HOLE
- COST EFFICIENT OPEN FRAME DESIGN
- -40°C to +85°C WIDE OPERATING TEMPERATURE
- CE MARK MEETS 2006/95/EC, 93/68/EEC AND 2004/108/EC
- UL60950-1, EN60950-1 AND IEC60950-1 LICENSED
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2002/95/EC

### OPTIONS

Positive logic Remote On/Off, SMD type, Without trim, without On/Off 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 25°C otherwise noted

OUTPUT SPECIFICATIONS				INPUT SPECIFICATIONS			
Output power	15Watts max			Input voltage range	24V nominal input	18-36VDC	
Voltage accuracy	±1%				48V nominal input	36-75VDC	
Minimum load	0%			Input surge voltage	24V input	50VDC	
Voltage adjustability (Note 6)	±10%			100mS max	48V input	100VDC	
Line regulation	LL to HL at Full Load	±0.2%		Input reflected ripple current	12uH source impedance		30mAp-p,Typ.
Load regulation	No Load to Full Load	±0.2%			( $\pi$ filter with 220 $\mu$ F & 33 $\mu$ F)		
Ripple and noise	20MHz bandwidth (Measured with a 1 $\mu$ F M/C and a 10 $\mu$ F T/C)	5V,3.3V 15V,12V	See table	Start up time	Nominal Vin	Power up	30mS, max.
Temperature coefficient	±0.02%/°C				Constant resistive load	RemoteON/OFF	30mS, max.
Transient response recovery time	25% load step change $\Delta I_o / \Delta t = 0.1A/us$		300 $\mu$ S	Start-up voltage	24V input	17VDC	
Over voltage protection (Voltage clamped)	3.3V output	3.7VDC-5.4VDC			48V input	33VDC	
	5V output	5.6VDC-7.0VDC		Shutdown voltage	24V input	14.5VDC	
Output load protection	12V output	13.5VDC-19.6VDC			48V input	30.5VDC	
	15V output	16.8VDC-20.5VDC		Remote ON/OFF (Note 7)			
Output load protection	150%, max.			Positive logic(Optional)	DC-DC ON	Open or	3V < Vr < 15V
Short circuit protection	Hiccup & Automatics recovery				DC-DC OFF	Short or	- 0.7V < Vr < 1.2V
Output voltage overshoot	3%			Negative logic(Standard)	DC-DC ON	Short or	- 0.7V < Vr < 1.2V
					DC-DC OFF	Open or	3V < Vr < 15V
				Input current of remote control pin	Nominal Vin	-0.5mA ~ 1.0mA	
				Remote off state input current	Nominal Vin	20mA,Max	
GENERAL SPECIFICATIONS				ENVIRONMENTAL SPECIFICATIONS			
Efficiency	See table			Operating ambient temperature (Note 8)	-40°C to +85°C (with derating)		
Isolation voltage	Input to Output	2250Vdc, min.		Storage temperature range	-55°C to +125°C		
Isolation resistance	10M $\Omega$ , min.			Thermal shock	MIL-STD-810F		
Isolation capacitance	1000pF, Typ.			Vibration	MIL-STD-810F		
Switching frequency	5V,3.3V	270KHz, Typ.		Relative humidity	5% to 95% RH		
	15V,12V	470KHz, Typ.		EMC CHARACTERISTICS			
Approvals and standard	IEC60950-1,UL60950-1,EN60950-1			EMI (Note 9)	EN55022		Class A
Dimensions	1.10 X 0.94 X 0.34 Inch (27.9 X 23.9 X 8.5 mm)			Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Weight	10.5g(0.36oz)			Fast transient (Note 10)	EN61000-4-4	± 2KV	Perf. Criteria B
MTBF (Note 1)	BELLCORE TR-NWT-000332	2.200x10 <sup>6</sup> hrs		Surge (Note 10)	EN61000-4-5	± 1KV	Perf. Criteria A
	MIL-HDBK-217F	1.314x10 <sup>6</sup> hrs		Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

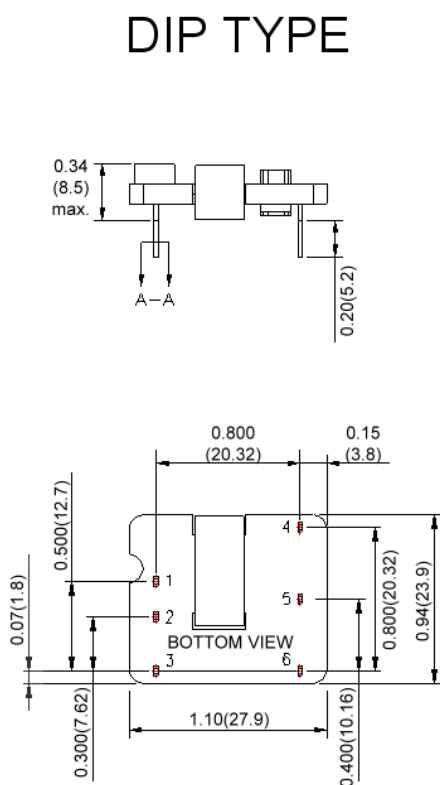


# 15WATTS SINGLE OUTPUT DC-DC CONVERTER

Model Number	Input Range	Output Voltage	Output Current		Output <sup>(4)</sup> Ripple & Noise	Input Current		Eff <sup>(4)</sup> (%)	Capacitor <sup>(5)</sup> Load max
			Min. load	Full Load		No load <sup>(3)</sup>	Full load <sup>(2)</sup>		
LED15-24S3P3	18 - 36 VDC	3.3 VDC	0mA	3500mA	75mVp-p	20mA	587mA	86	1000μF
LED15-24S05	18 - 36 VDC	5 VDC	0mA	3000mA	75mVp-p	20mA	753mA	87	1000μF
LED15-24S12	18 - 36 VDC	12 VDC	0mA	1250mA	100mVp-p	15mA	753mA	87	330μF
LED15-24S15	18 - 36 VDC	15 VDC	0mA	1000mA	100mVp-p	15mA	744mA	88	220μF
LED15-48S3P3	36 - 75 VDC	3.3 VDC	0mA	3500mA	75mVp-p	15mA	297mA	85	1000μF
LED15-48S05	36 - 75 VDC	5 VDC	0mA	3000mA	75mVp-p	15mA	377mA	87	1000μF
LED15-48S12	36 - 75 VDC	12 VDC	0mA	1250mA	100mVp-p	10mA	377mA	87	330μF
LED15-48S15	36 - 75 VDC	15 VDC	0mA	1000mA	100mVp-p	10mA	372mA	88	220μF

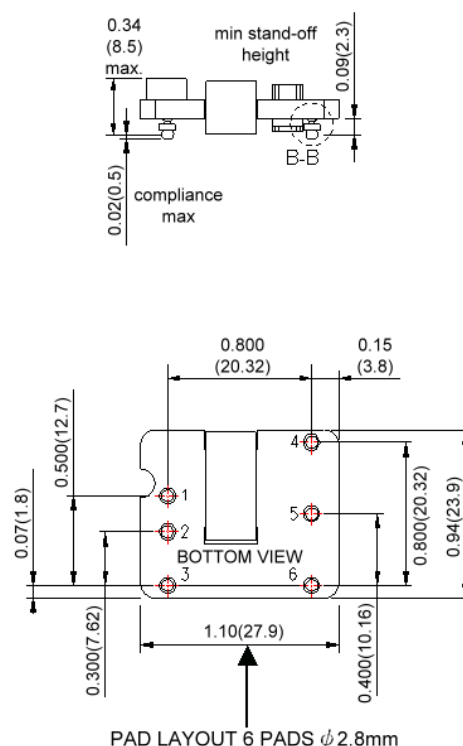
- Note**
- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.  
MIL-HDBK-217F Notice2 @Ta=25 °C, Full load(Ground, Benign, controlled environment)
  - Maximum value at nominal input voltage and full load.
  - Typical value at nominal input voltage and no load.
  - Typical value at nominal input voltage and full load.
  - Test by minimum Vin and constant resistive load.
  - 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 +VOUT pin or the -VOUT pin.
  - The ON/OFF control pin voltage is reference to -Vin. The order number please see product standard table.
  - The power module operate in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation.
  - The LED15 meets EN55022 class A and class B only with external components connected before the input pin to the converter.
  - 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, ESR 48mΩ.

## DIP TYPE

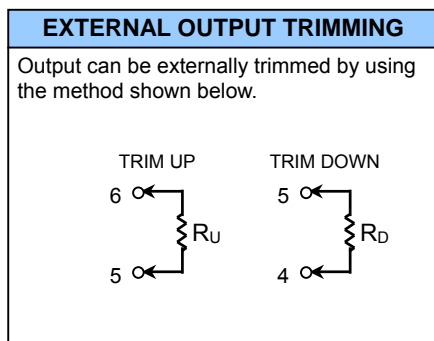


- All dimensions in Inches (mm)  
Tolerance: X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
- Pin pitch tolerance ±0.01(0.25)
- Pin dimension tolerance ±0.004 (0.1)

## SMD TYPE



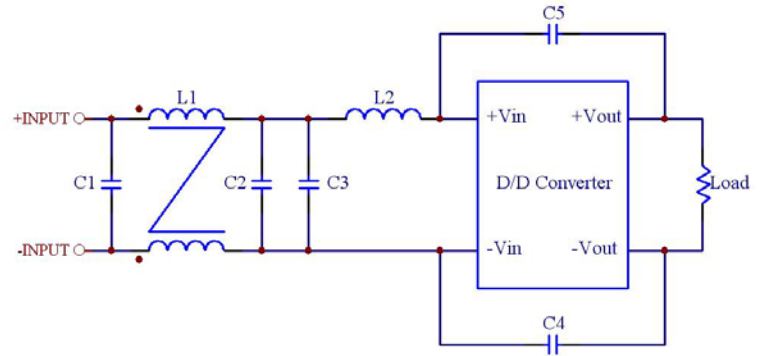
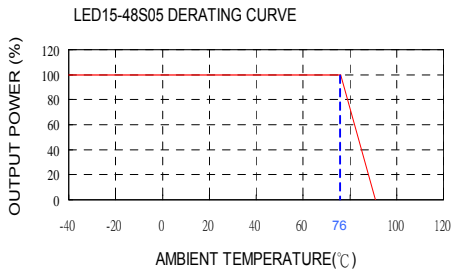
PIN CONNECTION	
PIN	LED15 SERIES
1	+ INPUT
2	- INPUT
3	ON/OFF
4	+VOUT
5	TRIM
6	-VOUT



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 ON/OFF pin	-D
SMT type without ON/OFF 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 ON/OFF&TRIM pin	-H
SMT type without ON/OFF&TRIM pin	-I
DIP type,positive remote ON/OFF without TRIM pin	-J
SMT type,positive remote ON/OFF without TRIM pin	-K

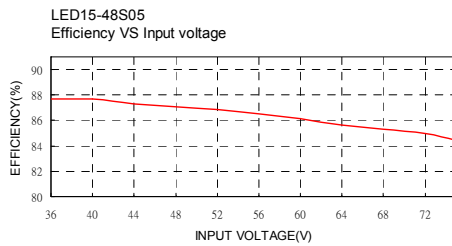


**15WATTS SINGLE OUTPUT  
DC-DC CONVERTER**

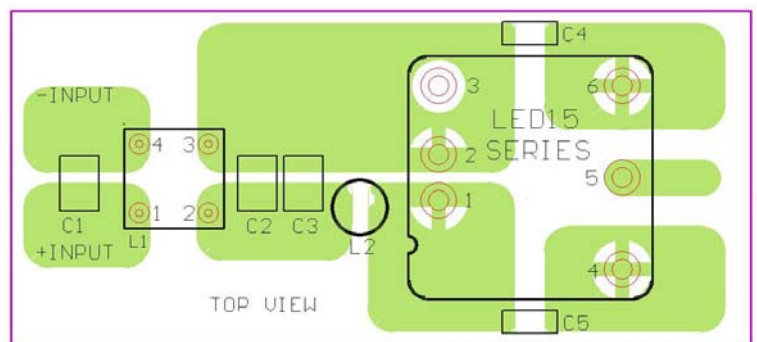
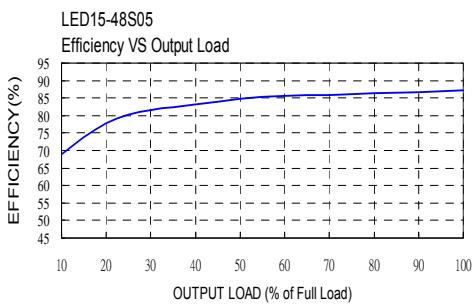


**Recommended Filter for EN55022 Class B Compliance**

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:



	C1 & C2	C3	C4 & C5	L1	L2
LED15-24xxx	6.8μF/50V 1812 MLCC	6.8μF/50V 1812 MLCC	470pF/3KV 1808 MLCC	145μH Common Choke PMT-051	10μH SMD Inductor PMT-047
LED15-48xxx	2.2μF/100V 1812 MLCC	2.2μF/100V 1812 MLCC	470pF/3KV 1808 MLCC	145μH Common Choke PMT-051	18μH SMD Inductor PMT-046



**Recommended EN55022 Class B Filter Circuit Layout**

