



# 60 WATT Single & Dual Output

Regulated, 4:1 Extra Wide Input Range



## DC/DC Converters

### FEATURES

- **Extra Wide Input Voltage Range (4:1)**
- **Single and Dual Output**
- **No Minimum Load required**
- **Input/Output Isolation (1600 Vdc Minimum)**
- **Six-sided Continuous Metal Shielding**
- **Operating Temperature Range: -40 to +85°C**
- **Low Profile Package: 1.00" X 2.00" X 0.40"**
- **Safety Approved UL60950-1, EN60950-1, IEC60950-1**
- **CE Mark meets 2006/95/EC, 2011/95/EC, and 2004/108/EC**
- **RoHS Compliant to EU Directive 2011/65/EU**

LWB60 Series

### Specifications - All specifications are typical at nominal input, full load and 25° C.

#### INPUT

Voltage Range.....	24VDC nominal input .....	9 -36VDC
	48VDC nominal input .....	18 -75VDC
Input filter.....		Pi Filter
Input Surge Voltage.....	24VDC input.....	50VDC 100ms, max.
	48VDC input.....	100VDC 100ms, max.
Input Reflected Ripple Current .....		20mA <sub>p-p</sub>
Start up Time. ....	Constant resistive load.....	Power up.....60ms
		Remote ON/OFF.....60ms
Startup Voltage.....	24VDC input.....	9VDC, max.
	48VDC input.....	18VDC, max.
Shutdown Voltage.....	24VDC input.....	8VDC
	48VDC input.....	16VDC

#### Remote ON/OFF

#### Referenced to - INPUT pin

Positive logic (Standard)	DC-DC ON .....	Open or 3 - 12VDC
	DC-DC OFF .....	Short or 0 - 1.2VDC
Negative logic (Option)	DC-DC ON .....	Short or 0 - 1.2VDC
	DC-DC OFF .....	Open or 3 - 12VDC
Input Current of Remote Control Pin.....		-0.5 - 0.5mA
Remote off state input current.....		3mA

#### OUTPUT

Output Power.....		60 Watts max.
Voltage Accuracy.....		±1.0%
Line Regulation.....	LL to HL at Full Load.....	Single.....±0.2%
		Dual.....±0.5%
Load Regulation.....	No Load to Full Load.....	Single.....±0.2%
		Dual.....±1.0%
Cross Regulation.....	Asymmetrical Load 25% / 100% FL.....	Dual.....±5.0%
Voltage Adjustability.....	Single Output.....	3.3 Vout, 5 Vout, 12 Vout.....10%
		15 Vout, 24 Vout.....-10% - 20%
Ripple and Noise.....	Measured by 20MHz band width	
	With a 10µF/25V X7R MLCC.....	3.3Vout, 5Vout... 100mV <sub>p-p</sub>
		12Vout, 15Vout .....125mV <sub>p-p</sub>
	With a 4.7µF/50V X7R MLCC.....	24Vout.....200mV <sub>p-p</sub>
Temperature Coefficient.....		±0.2% / °C, max.
Transient Response recovery Time .....	25% load step change.....	250µS
	3.3 Vout.....	3.9VDC
	5Vout.....	6.2VDC
Over voltage protection.....	Zener Diode clamp .....	12Vout.....15VDC
		15Vout.....20VDC
		24Vout.....30VDC
Overload Protection.....		% of lout rated; Hiccup mode.....150%
Short Circuit Protection.....		Continuous, automatic recovery

Additional specifications on next page.



**GENERAL**

Efficiency.....	See table
Isolation Voltage .....	Input to Output .....1600VDC, min. 1 minute
Isolation Resistance .....	500VDC 1GΩ
Isolation Capacitance .....	2200pF
Switching Frequency..	275kHz Typ.
Approvals and Standard .....	IEC60950-1, UL60950-1, EN60950-1
Case Material .....	Copper
Base Material .....	FR4 PCB
Potting Material .....	Silicon (UL94-V0)
Dimensions	2.00 x 1.00 x 0.40 inches (50.8 x 25.4 x 10.2 mm)
Weight .....	33g (1.16 oz.)
MTBF.....	MIL-HDBK-217F Tc70°C, Full load.....8.582 x 10 <sup>5</sup> hrs

**ENVIRONMENTAL**

Operating Ambient Temperature .....	-40°C - +85°C
Maximum Case Temperature.....	+105°C
Over Temperature Protection.....	+115°C
Storage Temperature Range.....	-55°C - +125°C
Thermal Impedance <sup>(1)</sup> .....	Natural Convection (20LFM)..... Without Heat-sink.....10.8°C/Watt With Heat-sink.....10.3°C/Watt
Thermal Shock.....	MIL-STD-810F
Vibration.....	MIL-STD-810F
Relative Humidity.....	5% to 95% RH

**EMC CHARACTERISTICS**

EMI (Note 2).....	EN55022.....	Class A
ESD.....	EN61000-4-2	Air ±8KV Contact ±6KV .....Perf. Criteria A
Radiated Immunity.....	EN61000-4-3.....	20 V/m .....Perf. Criteria A
Fast Transient (Note 3).....	EN61000-4-4.....	±2KV .....Perf. Criteria A
Surge (Note 3).....	EN61000-4-5.....	±2KV .....Perf. Criteria A
Conducted Immunity.....	EN61000-4-6.....	10Vr.m.s. ....Perf. Criteria A

**SELECTION GUIDE**

	Input Voltage Nominal (Range) (Vdc)	Output Voltage (Vdc)	Output Current (mA)	Output Ripple & Noise	Input Current	Efficiency (%)	Model Number*	Capacitor Load max.
					No load (mA)			
<b>SINGLE OUTPUT VOLTAGE</b>	24(9-36)	3.3	12000	75m Vp-p	10	90	LWB60-24S33	32000µF
	24(9-36)	5	12000	75m Vp-p	10	92	LWB60-24S5	30000µF
	24(9-36)	12	5000	100m Vp-p	10	92	LWB60-24S12	5850µF
	24(9-36)	15	4000	100m Vp-p	10	92	LWB60-24S15	3900µF
	24(9-36)	24	2500	150m Vp-p	10	92	LWB60-24S24	2000µF
	48(18-75)	3.3	12000	75m Vp-p	10	90	LWB60-48S33	3200µF
	48(18-75)	5	12000	75m Vp-p	10	92	LWB60-48S5	3000µF
	48(18-75)	12	5000	100m Vp-p	10	92	LWB60-48S12	5850µF
	48(18-75)	15	4000	100m Vp-p	10	92	LWB60-48S15	3900µF
	48(18-75)	24	2500	150m Vp-p	10	91	LWB60-48S24	2000µF
<b>DUAL OUTPUT VOLTAGE</b>	24(9-36)	±12	±2500	100m Vp-p	10	91	LWB60-24-12	+/-3900µF
	24(9-36)	±15	±2000	100m Vp-p	10	91	LWB60-24-15	+/-2400µF
	24(9-36)	±24	±1250	150m Vp-p	10	91	LWB60-24-24	+/-1000µF
	48(18-75)	±12	±2500	100m Vp-p	10	91	LWB60-48-12	+/-3900µF
	48(18-75)	±15	±2000	100m Vp-p	10	91	LWB60-48-15	+/-2400µF
	48(18-75)	±24	±1250	150m Vp-p	10	91	LWB60-48-24	+/-1000µF

**Notes**

- The heat-sink is optional and P/N: 7G-0020C-F.
- The LWB60 series standard module meets EMI Class A or Class B with external components. For more detailed information, please contact Polytron Devices, Inc.
- An external filter capacitor is required if the module is to meet EN61000-4-4, EN61000-4-5.  
The LWB60-24 recommended an aluminum electrolytic capacitor (Nippon cheni-con KY series, 220µF/100V) and a TVS (SMDJ120A, 120V, 3000 Watt peak pulse power) to connect in parallel.

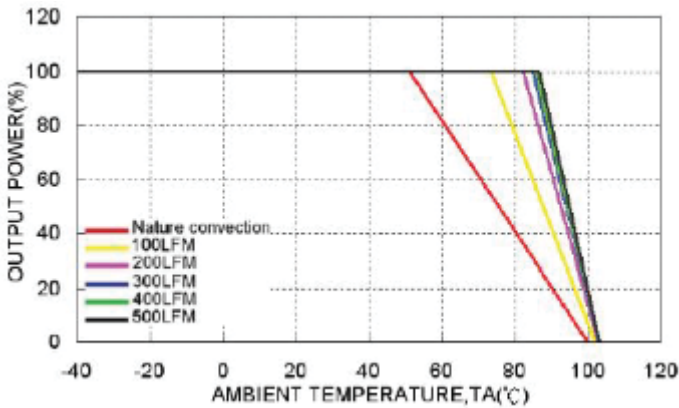
**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

**Mechanical specifications on next page.**

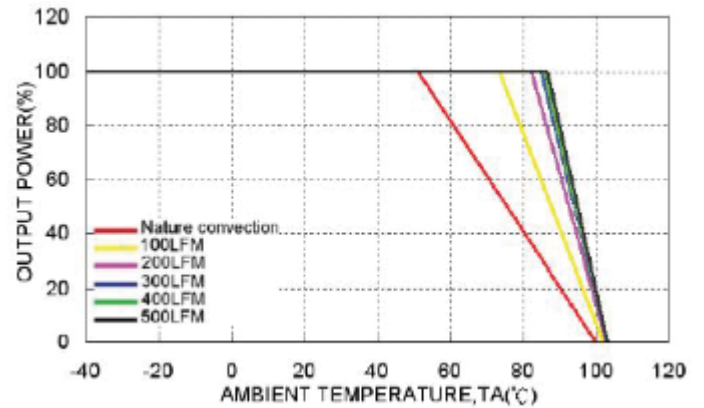


**POLYTRON DEVICES, Inc.**

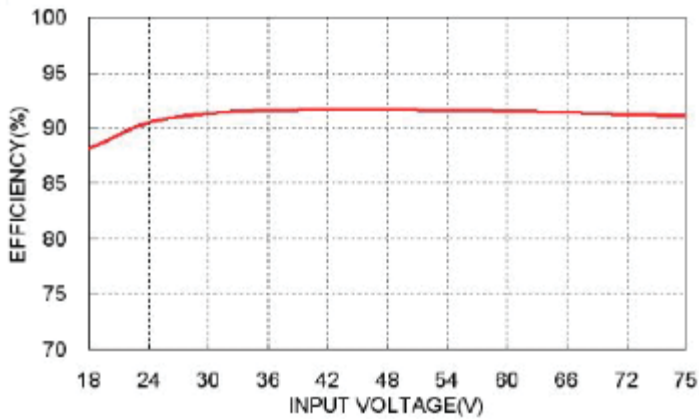
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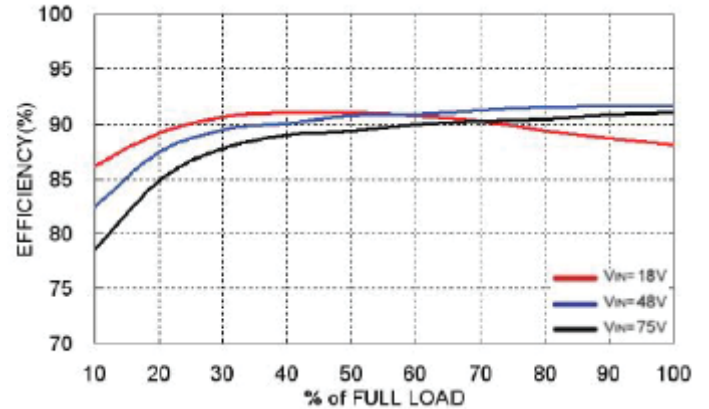
LWB60-48S12 Derating Curve



LWB60-48S12 Derating Curve with Heat-sink

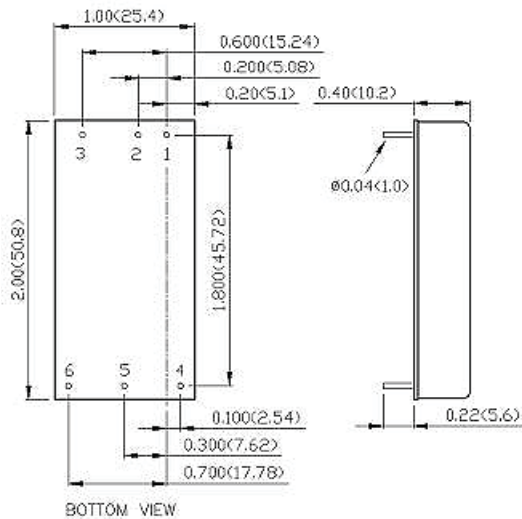


LWB60-48S12 Efficiency VS Input Voltage



LWB60-48S12 Efficiency VS Output Load

Mechanical Drawing



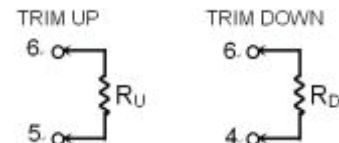
1. All dimensions in inches (mm)
2. Tolerance: X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
3. Pin pitch tolerance: ±0.01 (0.25)
4. Pin dimension tolerance: ±0.004 (0.1)

PIN CONNECTION

PIN	SINGLE	DUAL
1	+INPUT	+INPUT
2	-INPUT	-INPUT
3	CTRL	CTRL
4	+OUTPUT	+OUTPUT
5	-OUTPUT	COMMON
6	TRIM	-OUTPUT

EXTERNAL OUTPUT TRIMMING

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



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