60W Single Output Medical Grade



CE Mons



MB60 Family

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FEATURES AND BENEFITS

Ultra Small Size of 2" x 3" x 1.063"	Less than 0.5W no-load Power Consumption
For 1U Applications	3 Year Warranty
60W Convection Cooled	Optional LED Indicator for power-on
Universal Input 90-264Vac	RoHS Compliant
Approved to IEC60601-1, 3 ^d Edition with 2 MOPP	Level V Efficiency Compliant Models
Class II Input Versions Available	

MODEL SELECTION

Model Number***	Volts	Output Current Convection Cooled	Output Power Convection Cooled	Ripple & Noise*	Total Regulation	OVP Threshold
MB60S12K	12V	4.58A	55W	120mV pk-pk	±2%	14.4-18Vdc
MB60S15K	15V	4.00A	60W	150mV pk-pk	±2%	18-22.5Vdc
MB60S18K	18V	3.33A	60W	180mV pk-pk	±2%	21-25.5Vdc
MB60S24K	24V	2.50A	60W	240mV pk-pk	±2%	28.8-36Vdc
MB60S36K**	36V	1.67A	60W	360mV pk-pk	±2%	42-47Vdc
MB60S48K	48V	1.25A	60W	480mV pk-pk	±2%	57.6-72Vdc

Notes:

 \star At -20 $^{\circ}$ C, the noise and ripple is 2% of the output. 1

** For product availability, please contact the factory. 2.

***Replace "K" in model number with "C" for class II input versions 3.

INPUT

Input Voltage	90-264Vac, single phase
Input Current	120Vac: 1.4A, 240Vac: 0.75A
Inrush Current	40A maximum @ 0°C
Input Fuses	F1, F2: 2.5A, 250Vac
Earth Leakage Current	<275µA@264Vac, 60 Hz input, NC / <90µA@264Vac, 60 Hz input, NC
Efficiency	83% to 88%
Input Frequency	47-63Hz
No Load Input Power	<0.5W
Turn-on Input Voltage	70V
Turn-off Input Voltage	65V





Output Power	60W continuous for operation form -10°C to 50°C 55 Watts for 12V output.
Turn On Time	<2 Seconds at 120\ac
Hold Up Time	16mS minimum fom loss of ac input at 120 \(c, full load)
Ripple and Noise	0.5% RMS, 1% pk-pk for all models
Total Regulation	±2% for all models
Transient Response	500 μ s typ. response time for eturn to within 0.5% of final alue for a 50% load change, $\Delta i/\Delta <$ 0.2A/ μ s. Max. voltage deviation is 3.5%
Minimum Load	No minimum load is equired



RELIABILITY

MTBF	700,000 hours, 25°C ambient, full load
Warranty	3 Years
HALT Data	Per SL Power Halt procedure

ISOLATION



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Isolation Safety Rating	Input to Ground: 1 MOPP, Class I input models Input to Output: 2 MOPP Output to Ground: Functional, Class I input models	
Electric Strength Test Voltage	Input to Ground: 1800Vac, Class I input models Input to Output: 4000Vac Output to Ground: 500Vac, Class I input models	

SAFETY

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Safety Standards	UL - ANSI/AAMI ES60101:2005, 9 Edition CSA - CAN/CSA-C22.2 No. 60601-1 (2008)	
	Demko - EN 60601-1:2006	
	CB Report - IEC 60601-1 (3d Edition)	
	Isolation Type - B rated	

ENVIRONMENT



Operating Temperature	-10°C to +80°C
Relative Humidity	5% to 95%, non-condensing
Shock	Non-Operating: Half-sine, 40 gpk, 10mS, 3 æs, 6 shocks total
Temperature Derating	For 24V output and up, derate output power to 50 Watts@ 60C, 40 Watt @ 70C, and 20 Watts for 80C
Altitude	Operating: -500 b 3,000 meter Non-operating: -500 b 40,000 ft.
Storage Temperature	-40°C to +85°C
Vibration	Random vibration per MIL-STD-810E, Method 514.4, Cat. 1, Figure 514.4-1, 1 hr in each of thee axes
Cooling	Convection

Notes:

1. <24V will derate to 40W at 60C, 30W at 70C, and 20 W at 80C

EMI/EMC COMPLIANCE

Conducted Emissions	EN55011/22 Class B; FCC @rt 15	
Radiated Emissions	EN55011/22 Class A; FCC Art 15	
Voltage Fluctuations & Flicker	EN61000-3-3	
Static Discharge Immunity	EN61000-4-2 6kV contact, 8kV airCriteria A	
RF Field Susceptibility	EN61000-4-3 (3V/m), Criteria A	
Fast Transients/Bursts	EN61000-4-4 (PS: 2kV40A, other lines 1kV20A), Criteria B	
Surge Susceptability	EN61000-4-5, Installation Class 3 (1kV diff. mode, 2kV common mode), Criteria A	
Conducted RF Susceptability	EN61000-4-6 (3Vrms), Criteria A	
Power Frequency Magnetic Field Immunity	EN61000-4-8 (3A/m), Criteria A	
Voltage Sags and Surges	EN61000-4-11, 95% dip/0.5 cycle (Criteria A), 60%/5cycles (Criteria B), 30%/25 c y cles (Criteria A)	
Harmonic Current Emissions	EN61000-3-2, Class A	

Notes:

1. Specifications subject o change without notice.

 Specifications ae for convection rating at facbry settings with 115Vac input and 25 °C ambient unless othewise stated.

PROTECTION

Overvoltage Protection	OVP firing educes output voltage to <50% of nominal in <50mS. See chat for trip range	
Short Circuit Protection	Short across the output terminals will not cause damage to the unit. Hiccup Mode	
Overtemperature Protection	Automatic Power Shutdown at Tc = 155°C	
Overload Protection	120% - 180% of rated output curent value, Hiccup Mode	
Overshoot	5% overshoot at turn-on, 5% œershoot at turn- off, under all conditions	



MECHANICAL DRAWING



Notes:

- 1. For class I model, the unit shall be mountedct a metal plate with metal stand offs and serves to ensure proper emissions attenuation.
- 2. For class II model, the unit should be mounted using platic or other non-conductive havare.

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CONNECTOR INFORMATION

Input Connector J100	DC Output Connector J2	Ground (FG)
PIN 1) AC LINE PIN 2) EMPTY PIN 3) AC NEUTRAL	PIN 1) +Vout PIN 3) -Vout PIN 2) +Vout PIN 4) -Vout	19-30258-0187 (Keystone 1285) (Zierick 895)(.187*0.020)
Mating Connector: Tyco/AMP 640250-3 Pins = 770461-1	Mating Connector: AMP 640250-4 Pins = 770461-1	Mating Connector Molex 19002-0005

Notes:

1. Mounting holes should be connected dgether for EMI purpose.

2. FG is safety ground connection (class I version).

3. This power supply equires mounting on metal standoffs 0.20" (5mm) in height.



CHARACTERISTIC CURVES

Output vs. Temperature

- 1. -40°C start up: At -20°C, the supply meet its full spec except ripple & noise might be increased from 1% to 2% of the output voltage.
- 2. See chart below for output power available at higher ambient.



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Output Voltage				
Temp °C	12V	15V	24V	48V
50	55	55	60	60
60	35	41	45	40
70	22	27	30	30
80	12	15	15	15

Efficiency vs. Loading





Ripple & Noise

To verify that the output ripple and noise does not exceed the level specified in the product specification, measured using a scope probe socket with 0.1uF ceramic and a 10uF electrolytic capacitor connected in parallel across it, 20MHz BW.

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MB60 Family







24V OUT, FULL LOAD, 264VAC, 50HZ



Output Transient Response

50% load step within the regulation limits of minimum and maximum load, dl/dt< 0.2A/µSec. Recovery time not specified as there is no laps in regulation with a 50% Load Step. Maximum voltage deviation is 3.5%



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Overvoltage Protection

OVP firing reduces output voltage to <50% of nominal in <50ms. See models chart for trip ranges.

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Ch1 Pk-Pk 71.6mV Ch1 RMS 11.8mV Ch1 RMS 11.8mV Ch1 RMS 11.8mV Ch1 RMS 11.8mV

II→▼ -200.000µs



Tek Stop





