

Industrial



### FEATURES AND BENEFITS

Meets Class B Conducted EMI with 6db Margin Class B Radiated EMI with 3db Margin	Compliant to High Levels of EMC Per EN61000-4 ■ 15kV ESD (Air), 8kV (Contact) ■ 4kV Surge
Up to 110W Output Power	>10,00,000 Hrs. MTBF (50°C)
Universal Input 90-264VAC Input Range	>15 Years E-Cap Life
Up to 90% Efficiency	3 Years Warranty
5V @1A Standby Output	DC OK Signal, Inhibit, Power Good Signals
Class I and II Input Models	Approved to EN/CSA/IEC/UL62368-1
2" x 4" x 1.4" Package	

### MODEL SELECTION

Model Number <sup>4</sup>	Output Voltage (Nom)	Output Current w/Air	Output Current Convection	Efficiency <sup>1</sup>	Ripple & Noise <sup>2</sup> (pk-pk)	Total Regulation	OVP Threshold	MTBF <sup>3</sup>
TB110S12K	12V	8.7A	6.7A	89%	120mV	±2%	15.0 ± 2.0V	5,00,000
TB110S24K	24V	4.3A	3.3A	89%	240mV	±2%	28.0 ± 2.5V	5,00,000
TB110S48K	48V	2.1A	1.6A	89%	480mV	±2%	55.0 ± 4.0V	5,00,000

- Notes : 1. Efficiency values listed are typical and are measured at 115Vac input, full load output current, at an ambient temperature of 25°C.  
 2. Measured at 25°C ambient with noise probe directly at end of 6" twisted pair terminated with 0.1µF ceramic and 10µF low ESR capacitors. Values will be higher at ambient temperatures below 0°C.  
 3. MTBF values are in hours, per Telcordia SR-332, Issue 3, 25°C, full rated load (w/airflow) at 110VAC input.  
 4. Change the "K" suffix to "C" for Input Class II (ungrounded) models.

### INPUT

AC Input	85-264VAC, Single phase (Safety approved to 90-264VAC)
Input Current	1.8A max at 110VAC, 0.9A max at 240VAC
Inrush Current	40Arms max within 1/2 line cycle, Cold start at 25°C. See application note
Input Fuses	3.15A, 250VAC, Line and neutral inputs
Earth Leakage Current	<500mA @ 264VAC, 60Hz input, NC
Efficiency	88% - 90% typical at 115/230VAC, 25°C
Rise Time	Main output: <70ms 5Vsb output: <70ms
Turn-On Input Voltage	70-85VAC, Full spec performance at 85VAC
Turn-Off Input Voltage	<75VAC ± 8VAC

### OUTPUT

Hold-Up Time	Main output: 20ms 5Vsb output: 100ms From loss of AC input at 115 VAC, Full load 25°C
Turn On Time	Main output: <1second at 115VAC 5Vsb output: <250ms at 115VAC
Output Power	110W with 200LFM airflow; 80W convection cooled, -20C to 50°C ambient. 85VAC to 264VAC See chart for de-rating above 50°C
Output Voltage	12V to 48V DC. See models chart for part numbering
Transient Response	500µS typ response time for return to within 0.5% of final value for a 50% load change Δi/Δt<0.2A/µs. Max voltage deviation is ±3.5%
Voltage Adjustability	+/- 10%
Minimum Load	Not required
Total Regulation	±2.0 % for all models



### PROTECTION

Over Temperature Protection (OTP)	Power shuts down at temperature of TBD (typical) at full load. Auto-recovery
Over Load Protection (OCP)	115% - 200% of rated output current value Hiccup mode, Auto-recovery
Short Circuit Protection (SCP)	Short across the output terminals will not cause damage to the unit. Hiccup mode, Auto-recovery
Overshoot	<2% overshoot at turn-on <1% overshoot at turn off, Under all conditions
Output Reverse Voltage Protection	Outputs protected against momentary reverse current less than 20A peak for less than 10ms with 0.5A average. Sustained reverse current at high levels may damage unit
Overshoot	<2% overshoot at turn-on <1% overshoot at turn off, Under all conditions

### RELIABILITY

MTBF	>1,000,000 hours @ 110/220VAC, 50°C GB Telcordia SR-332 issue 3
E-Cap Life	>15 years in use condition of 40°C ambient, at 12h/day, 261 days/year. Additional information on other use profiles available on request

### STANDARDS

IPC 610	Class 2
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### ENVIRONMENT

Operating Temperature	-20°C to +70°C. Turn on @ -40°C at >=120VAC
Vibration (IEC 60068-2-6) (IEC 60068-2-64)	Operating: Sinusoidal Frequency: 10-500Hz, Impact Acceleration: 1g, Sweep rate: 1 octave/min Cycles: 10 times per axis in X, Y, Z direction Random Vibration: Operating: 0.003g <sup>2</sup> /Hz, 1.224grms overall, 3 axes, 10 min per axis, 1-500Hz Non-operating: 0.02g <sup>2</sup> /Hz, 3.1grms overall, 3 axes, 1 hour per axis, 20-500 Hz
Altitude	Operating: -500m to 5,000m Non-operating: -500 to 40,000ft
Relative Humidity	5% to 95%, Non-condensing
Storage Temperature	-40°C to +85°C
Weight	180g, Typical
Dimensions	W: 2.0" x L: 4.0" x H: 1.4"

### SAFETY

Safety Standards	EN/CSA/IEC/UL62368-1
Shock (IEC 60068-2-27)	Operating: Half-sine shock waveform. Impact Acceleration: 20g, Pulse duration: 11ms Cycles: 3 times per axis in X,Y, Z direction Non-operating: Half-sine shock waveform Impact Acceleration: 50g, Pulse duration: 6ms Cycles: 3 times per direction on 3 axes (X,Y, Z)

### ISOLATION SPECIFICATIONS

Isolation	Input-Output: 3,000VAC Input-Ground: 1,800VAC Output-Ground: 500VAC
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### AUXILIARY SIGNALS

5V Standby Output	5VDC @ 1A, +/-5% regulation over all changes in main output load current
Power Good/Power Fail	Signal is high after the main output is within regulation band upon AC turn on. Goes low with 4ms min. Before the main DC output drops below 90% of nominal value when AC turns off
	Logic HIGH or open = ON Logic LOW or short to ground = OFF



### EMI/EMC COMPLIANCE

Conducted Emissions	EN55022/CISPR22 Class B, FCC Part 15.107, Class B, 6db margin, Typical
Radiated Emissions	EN55022/CISPR22 Class B, FCC Part 15.109, Class B, 3db margin, Typical
Common Mode Noise: High Frequency (100Khz -20 Mhz)	<90mA pk-pk, 10mArms, <800mV pk-pk. (Class I input units)
Common Mode Noise: Low Frequency (50-120 Hz)	<40mA pk-pk, 5mArms (Class I input models)
Static Discharge Immunity	EN55024/IEC61000-4-2, Level 4, 8kV contact discharge, 15kV air discharge, Criteria A
Radiated RF Immunity	EN55022/IEC61000-4-3, Level 3, 10V/m, Criteria A
EFT/Burst Immunity	EN55024/IEC61000-4-4, Level 3, 4kV (PS outputs), Criteria A; 2kV (signal outputs), Criteria B
Line Surge Immunity	EN55024/IEC61000-4-5, Level 4, 2kV diff., 4kV common-mode, Criteria A
Power Frequency Magnetic Field Immunity	EN55024/IEC61000-4-8, Level 4, 30A/m, Criteria A
Conducted RF Immunity	EN55022/IEC61000-4-6, Level 4, 10V/m, Criteria A
Voltage Dip Immunity	EN55024/IEC61000-4-11, Dips: 100%, 10ms; 30%, 500ms; 60%, 100ms Interruptions: 100%, 5000ms; Performance Criteria A, A, B & B
Line Harmonic Emissions	EN55024/IEC61000-3-2, Class A
Flicker Test	EN55024/IEC61000-3-3

Notes : Performance criteria are based on EN55024. According to the standards, performance criteria are defined as following:

- A – Normal performance during and after the test
- B – Temporary degradation, self-recoverable
- C – Temporary degradation, operator intervention required to recover the operation
- D – Permanent damage

### CONNECTOR INFORMATION

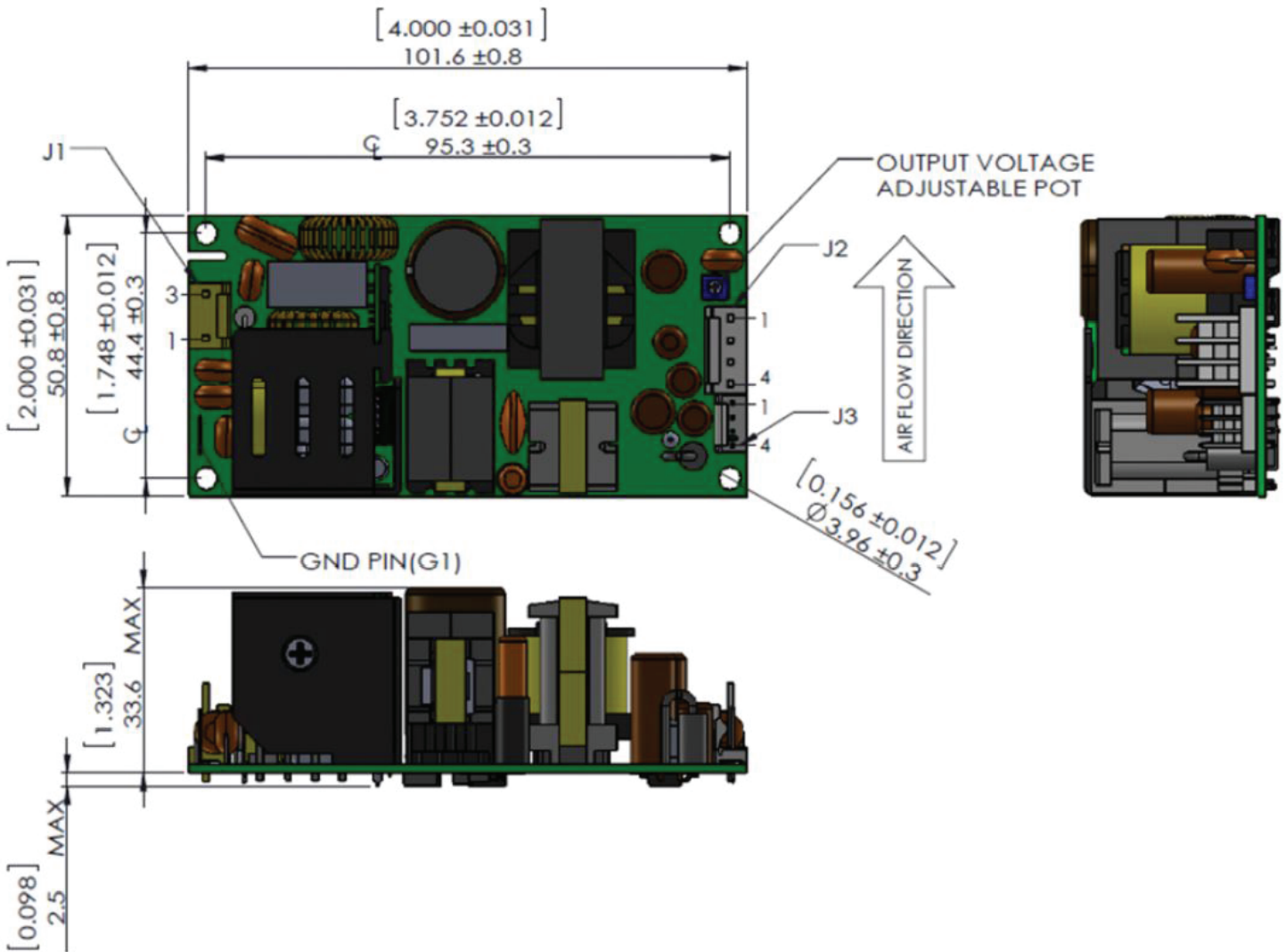
Input Connector J1	DC Output Connector J2	Ground Connector G1	Signal Connector J3
PIN 1) AC Line PIN 2) Empty (removed) PIN 3) AC Neutral	Pin 1) (+V) Pin 2) (+V) Pin 3) (-V) Pin 4) (-V)	FG 0.187" Quick-connect tab	PIN 1) RTN PIN 2) 5Vsb Output Pin 3) Power Good/Power Fail Pin 4) Inhibit
Mating Connector: Tyco/AMP 640250-3 Pins: 640252-2	Mating Connector: Tyco/AMP 640250-4 Pins: 640252-2	Mating Connector: Molex 01-90020005	Mating Connector: Tyco/AMP 1375820-4 Pins: 1375819



## ISOLATION SPECIFICATIONS

Parameter	Conditions/Description	Min	Nom	Max	Units
Insulation Safety Rating	Input/Ground		1,800VAC		
	Input/Output		3,000VAC		
	Output/Ground		500VAC		
Electric Strength Test Voltage	Input/Ground	1800			VAC
	Input/Output	3000	-	-	VAC
	Output/Ground	500			VAC

## MECHANICAL DRAWING



- Notes :
1. Overall Dimensions are 2.0"W x 4.0"L x 1.4"H.
  2. Height is measured from top of highest component to longest lead protrusion on bottom of PCB.
  3. Mounting holes isolated from ground for Class II designs.
  4. Mounting standoff height to be >= 5mm. A non-conductive insulator should be placed between the bottom of the unit and any conductive surface.





## OUTPUT DERATING

110W w/air, 80W convection cooled at -20°C to 50°C operating ambient temperature and across the entire operating AC input range of 85 to 264Vac. Derate as indicated below for temperatures above 50°C.

