

DESCRIPTION

The TM110 series of compact, open PCB constructed, AC-DC switching power supplies are specially designed for medical applications. They are capable of delivering 72 to 110 watts of continuous power at 25 CFM forced air cooling or 80 watts at convection cooling. They operate at 85 to 264VAC input voltage without the need of changing jumper. All models meet the safety requirements of UL, CSA and IEC for medical applications.

FEATURES

- Low safety ground leakage current
- Meet EN55011 and FCC Class B
- Small size, light weight
- 100% burn-in
- Wide input range 85 to 264VAC
- Input surge current protection
- Overvoltage protections
- Overcurrent protections
- Compliant with RoHS requirements

INPUT SPECIFICATIONS

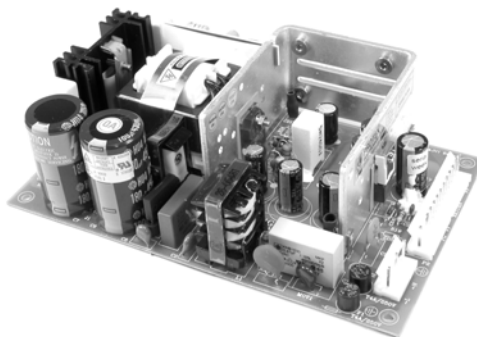
Input voltage : 85 to 264VAC
Input frequency : 47 to 63 Hz
Input current : 3.20A (rms) for 115VAC
1.80A (rms) for 230VAC
Earth leakage current : 90µA max. @ 115VAC, 60Hz
150µA max. @ 230VAC, 50Hz

OUTPUT SPECIFICATIONS

Output voltage/current: See rating chart
Total output power: 110 watts maximum at 25 CFM forced air cooling or 80 watts maximum at convection cooling
Ripple and noise: 1% peak to peak maximum
Overvoltage protection: Provided on output #1 only; set at 112-132% of its nominal output voltage
Overcurrent protection: All outputs protected to short circuit conditions
Temperature coefficient: All outputs $\pm 0.04\%/^{\circ}\text{C}$ max.
Transient response: Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500µs after a 25% step load change
PFD signal: TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1ms prior to +5V output dropping 5% below its nominal value. This signal also provides a minimum delay of 100ms after +5V is within regulation

TM110 SERIES

CE (LVD)
RoHS



Safety Standard Approvals :



UL 2601-1



CSA C22.2 No. 601.1



TÜV EN60601-1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature: 0°C to +70°C
Storage temperature: -40°C to +85°C
Relative humidity : 5% to 95% non-condensing
Derating: Derate from 100% at +50°C linearly to 50% at +70°C
Cooling : 110 watts continuous output power at 25 CFM forced air cooling or 80 watts at convection cooling

GENERAL SPECIFICATIONS

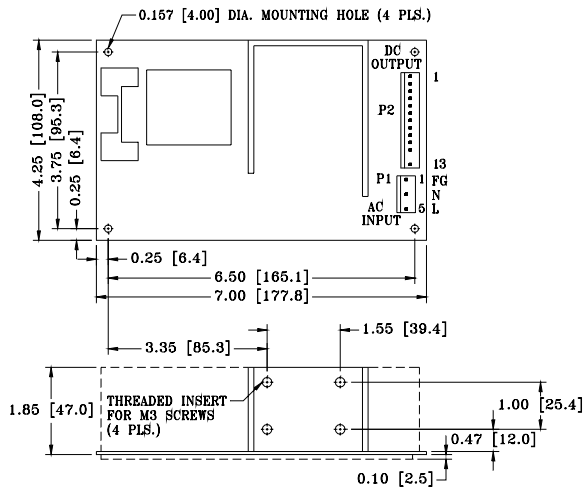
Switching frequency: 20KHz to 250KHz, varies with load and line
Efficiency: 70% minimum on single output models with $V_o \geq 12\text{V}$, 65% minimum on the others
Hold-up time: 12 msec minimum at 110VAC
Line regulation: $\pm 0.5\%$ maximum at full load
Inrush current: 15 amps @ 115VAC or 30 amps @ 230VAC at 25°C cold start
Withstand voltage: 4000VAC from input to output
1500VAC from input to ground
500VAC from output to ground
MTBF: 400,000 hours minimum at full load at 25°C ambient, calculated per MIL-HDBK-217F, excluding DC fan.
EMC Performance (EN60601-1-2: 2001)
EN55011: Class B conducted, Class B radiated
FCC: Class B conducted, Class B radiated
VCCI: Class B conducted, Class B radiated
EN61000-3-2: Harmonic distortion, Class A
EN61000-3-3: Line flicker
EN61000-4-2: ESD, $\pm 8\text{KV}$ air and $\pm 6\text{KV}$ contact
EN61000-4-3: Radiated immunity, 3V/m for 80-2500MHz
EN61000-4-4: Fast transient/burst, $\pm 2\text{KV}$
EN61000-4-5: Surge, $\pm 1\text{KV}$ diff, $\pm 2\text{KV}$ com.
EN61000-4-6: Conducted immunity, 3Vrms
EN61000-4-8: Magnetic field immunity, 3A/m
EN61000-4-11: Voltage dips, 30% reduction for 500ms, 60% reduction for 100ms and >95% reduction for 10ms

OUTPUT VOLTAGE/ CURRENT RATING CHART

Product No.	Output #1				Output #2				Output #3				Output #4				Maximum Output Power	
	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Ipeak	Tol.	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.		Tol.
TM110-S3.3	3.3V	0A	22A	3%			(N/A)					(N/A)				(N/A)		72W
TM110-S5.0	5.0V	0A	22A	3%			(N/A)					(N/A)				(N/A)		110W
TM110-S12	12V	0A	9.0A	2%			(N/A)					(N/A)				(N/A)		110W
TM110-S15	15V	0A	7.5A	2%			(N/A)					(N/A)				(N/A)		110W
TM110-S24	24V	0A	4.5A	2%			(N/A)					(N/A)				(N/A)		110W
TM110-S30	30V	0A	3.6A	2%			(N/A)					(N/A)				(N/A)		110W
TM110-D23	+5.1V	0A	10A	3%	+12V	0A	5A	9.0A	3%			(N/A)				(N/A)		110W
TM110-T31	+5.1V	0A	10A	3%	+12V	0A	5A	9.0A	3%	-12V	0A	1A	4%			(N/A)		110W
TM110-T32	+5.1V	0A	10A	3%	+15V	0A	4A	7.5A	3%	-15V	0A	1A	4%			(N/A)		110W
TM110-Q40	+5.1V	0A	10A	3%	+12V	0A	5A	9.0A	3%	-12V	0A	1A	4%	-5V	0A	1A	4%	110W
TM110-Q41	+5.1V	0A	10A	3%	+15V	0A	4A	7.5A	3%	-15V	0A	1A	4%	+24V	0A	1A	4%	110W
TM110-Q42	+5.1V	0A	10A	3%	+12V	0A	5A	9.0A	3%	-12V	0A	1A	4%	+12V	0A	1A	4%	110W
TM110-Q45	+5.1V	0A	10A	3%	+12V	0A	5A	9.0A	3%	-12V	0A	1A	4%	+24V	0A	1A	4%	110W
TM110-Q45-1	+5.1V	2A	10A	3%	+12V	0A	5A	9.0A	3%	-12V	0A	1A	4%	+24V	1.5A	3A	10%	110W
TM110-Q45-2	+5.1V	0A	10A	3%	+24V	0A	3A	5.0A	3%	-12V	0A	1A	4%	+12V	0A	1A	4%	110W
TM110-Q46	+5.1V	0A	10A	3%	+15V	0A	4A	7.5A	3%	-15V	0A	1A	4%	-5V	0A	1A	4%	110W

- NOTES:
1. Peak output current with 10% maximum duty cycle for less than 60 seconds. Total peak power must not exceed 130 watts.
 2. 110 watts maximum at 25 CFM forced air cooling or 80 watts maximum at convection cooling, except model TM110-S3.3 which is rated maximum 60 watts at convection cooling or 72 watts at 25 CFM forced air cooling.
 3. Safety agency approvals are for the above listed models in PCB format. To order models with metallic L-bracket or box, add suffix "B" for L-bracket format, or "C" for enclosed format, e.g. TM110-S24C.
 4. The output #1 of model TM110-Q45-1 needs a minimum current of 2A to support the other outputs at their maximum rated loads.

MECHANICAL SPECIFICATIONS



NOTES:

1. Dimensions shown in inch [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector mates with Molex housing 09-50-3051 and Molex 2878 series crimp terminal.
4. Output connector mates with Molex housing 09-50-3131 and Molex 2878 series crimp terminal.
5. Weight: 640 grams (PCB format)
6. The copper pad of the mounting hole near P1 is for system grounding through a metallic stand-off to system chassis.

PIN CHART

Product No.	PIN	1, 2, 3	4, 5	6, 7	8, 9	10	11	12	13
TM110-S3.3	TM110-S5.0	OUTPUT #1	RETURN	RETURN	OUTPUT #1	P.F.D	N.C.	KEY	N.C.
TM110-S12	TM110-S15	OUTPUT #1	RETURN	RETURN	OUTPUT #1	P.F.D	N.C.	KEY	N.C.
TM110-S24	TM110-S30	OUTPUT #1	RETURN	RETURN	OUTPUT #1	P.F.D	N.C.	KEY	N.C.
TM110-D23		OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	N.C.	KEY	N.C.
TM110-T31	TM110-T32	OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	OUTPUT #3	KEY	N.C.
TM110-Q40	TM110-Q41	OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	OUTPUT #3	KEY	OUTPUT #4
TM110-Q42	TM110-Q45	OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	OUTPUT #3	KEY	OUTPUT #4
TM110-Q45-1	TM110-Q45-2	OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	OUTPUT #3	KEY	OUTPUT #4
TM110-Q46		OUTPUT #1	COMMON RETURN	COMMON RETURN	OUTPUT #2	P.F.D	OUTPUT #3	KEY	OUTPUT #4