

ECP150 Series



- 100W Convection Cooled Rating
- 150W Force Cooled Rating
- 2.0”by 4.0” Footprint
- Low 1.26”Profile
- High Efficiency, up to 92%
- High Power Density
- Medical & ITE Approvals
- Less than 0.5W No Load Input Power
- Built–In Fan Supply
- 3 Year Warranty

GREEN XP POWER

The ECP150 series minimises the no load power consumption and maximises efficiency to facilitate equipment design to meet the latest environmental legislation.

Approved for medical and ITE applications, this range of single output AC/DC power supplies are packaged in a low profile 1.26” height with a foot print of just 2.0” by 4.0”.

The ECP150 provides up to 150W force-cooled or 100W convection-cooled leading to very high power densities of 14.9W/in^3 or 9.9W/in^3 respectively. A 12V, 500mA fan supply is included in the design.

The power supply contains two fuses and low leakage currents as required by medical applications and is safety approved to operate in a 70 °C ambient.

The low profile and safety approvals covering ITE and medical standards along with conducted emissions meeting EN55011/22 level B allow the versatile ECP150 series to be used in a vast range of applications.

Models and Ratings

Output Voltage	Output Current		Ripple and Noise pk-pk[2]	Fan Output	Efficiency[3]	Model Number[4]
	Convection-cooled	Forced-cooled[1]				
12.0 V	8.33 A	12.50 A	120 mV	12 V/0.5 A	91%	ECP150PS12
15.0 V	6.67 A	10.00 A	150 mV	12 V/0.5 A	91%	ECP150PS15
24.0 V	4.17 A	6.25 A	240 mV	12 V/0.5 A	91%	ECP150PS24
28.0 V	3.50 A	5.40 A	280 mV	12 V/0.5 A	92%	ECP150PS28
48.0 V	2.08 A	3.10 A	480 mV	12 V/0.5 A	92%	ECP150PS48

Notes:
1. Requires 10 CFM.
2. Measured with 20 MHz bandwidth and 10 µF electrolytic capacitor in parallel with 0.1 µF ceramic capacitor
3. Minimum average efficiencies measured at 25%, 50%, 75% & 100% of 150 W load and 230 VAC input.

Input Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage - Operating	90	115/230	264	VAC	Derate output from 100% at 100 VAC to 90% at 90 VAC
Input Frequency	47	50/60	63	Hz	Agency approval 47-63 Hz
Power Factor	0.95				230 VAC, 100% load EN61000-3-2 class A EN61000-3-2 class C > 60W
Input Current - Full Load		1.5/0.75		A	115/230 VAC
Inrush Current			60	A	230 VAC cold start, 25 °C
Earth Leakage Current		80/140	230	µA	115/230 VAC/50 Hz (Typ.), 264 VAC/60 Hz (Max.)
No Load Input Power			0.5	W	
Input Protection	F3.15 A/250 V Internal fuse fitted in line and neutral.				

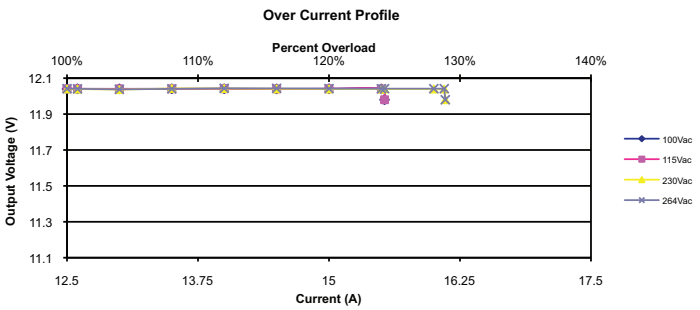
Output Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage - V1	12		48	VDC	See Models and Ratings table
Initial Set Accuracy			±1	%	V1 at 50% load, 115/230 VAC
Output Voltage Adjustment - V1	10			%	V1 only via potentiometer. See mech. details, Vfan will track
Minimum Load	0			A	
Start Up Delay		550		ms	115/230 VAC full load at 25° C. See fig. 3 & 4.
Rise Time		35		ms	
Hold Up Time	16	20		ms	At full load, 100 VAC, see fig. 5.
Drift			±0.02	%	After 20 min warm up
Line Regulation			±0.5	%	90-264 VAC
Load Regulation			±0.5	%	0-100% load
Transient Response			4	%	Recovery within 1% in less than 500 µs for a 50-75% and 75-50% load step
Over/Undershoot		4		%	Full Load
Ripple & Noise			1	% pk-pk	20 MHz bandwidth & 10 µF electrolytic capacitor in parallel with 0.1 µF ceramic capacitor, See fig. 6.
Overvoltage Protection	115		140	%	Vnom, recycle input to reset
Overload Protection	110		150	% I nom	See fig. 1.
Short Circuit Protection					Trip and Restart See fig. 2.
Temperature Coefficient			0.02	%/ ° C	

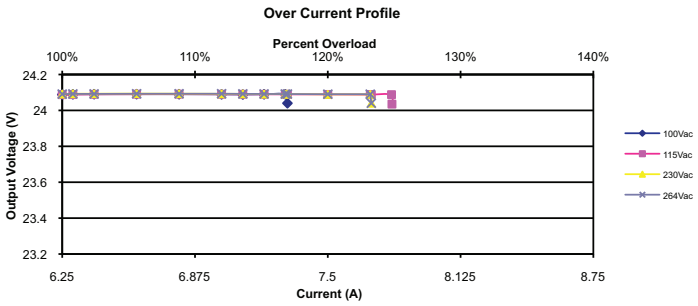
Output Overload Characteristic

Figure. 1

ECP150PS12



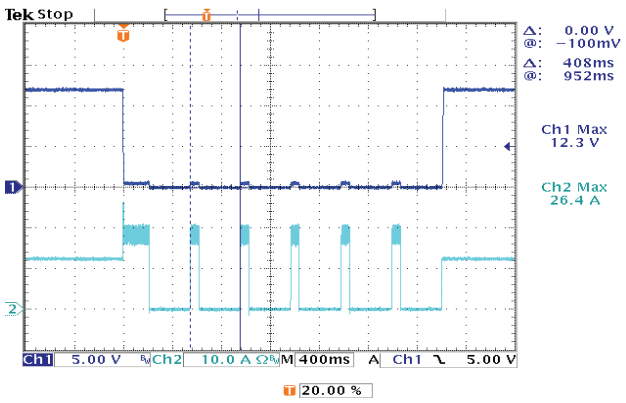
ECP150PS24



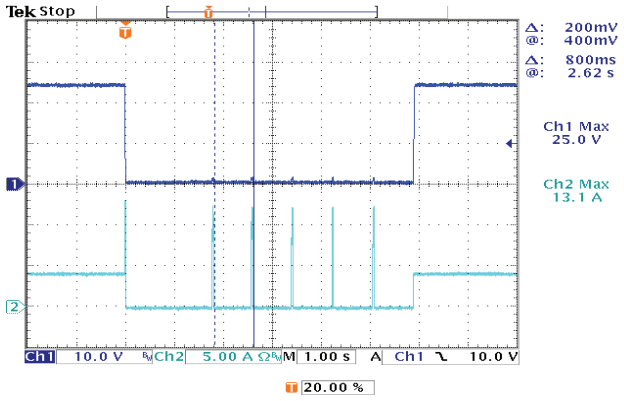
Output Short Circuit Profile

Figure 2

ECP150PS12



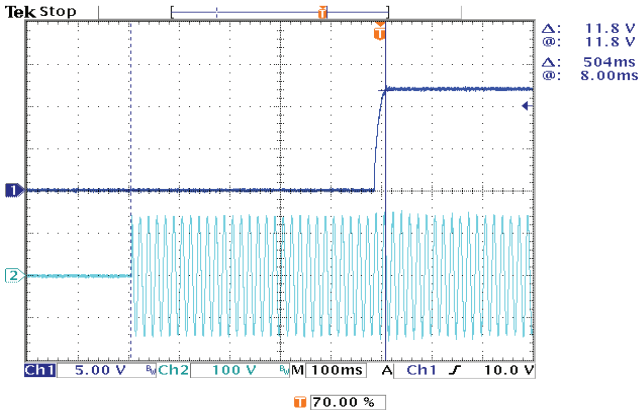
ECP150PS24



Output Start Up Time

Figure 3

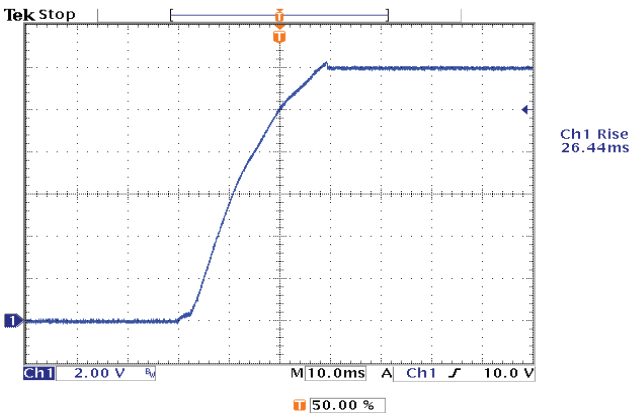
ECP150PS12 100VAC full load



Output Rise Time

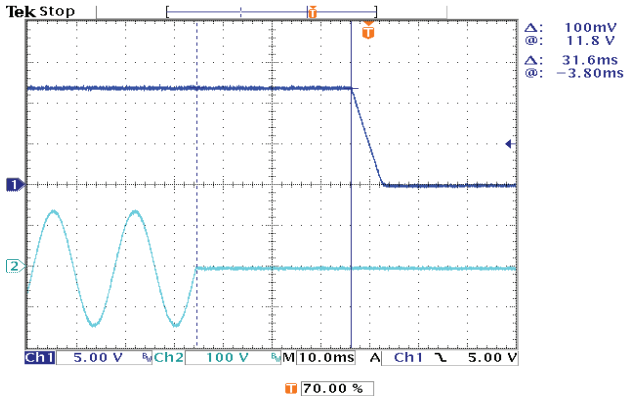
Figure 4

ECP150PS12 100 VAC full load

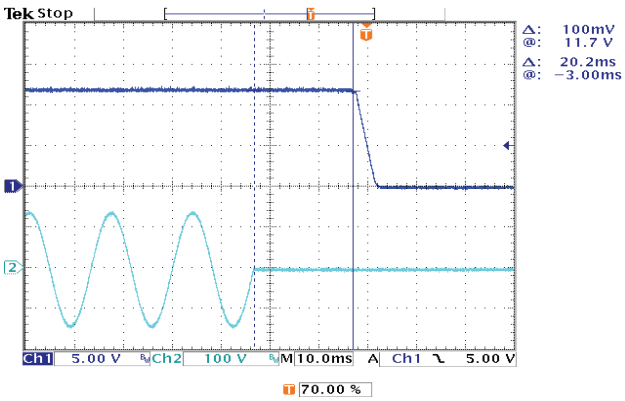


Output Hold Up Time

Figure 5
ECP150PS12 100VAC 100W load



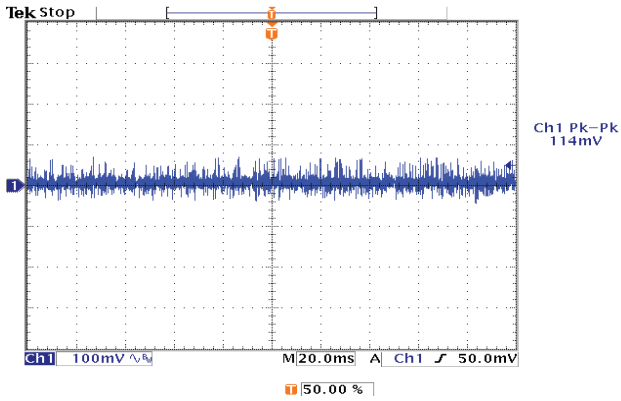
ECP150PS12 100VAC 150W load



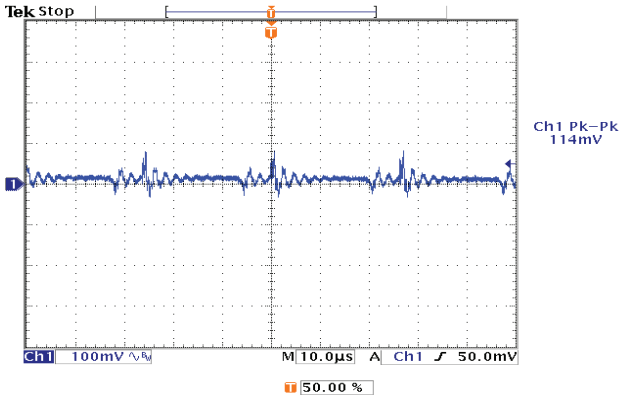
Output Noise & Ripple

Figure 6
ECP150PS12 at 100VAC & 150W load

Low Frequency



High Frequecy



General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		91		%	230 VAC Full load (see fig. 7 & 8)
Isolation: Input to Output	4000			VAC	2 MOPP
Input to Ground	1500			VAC	1 MOPP
Output to Ground	500			VDC	
Switching Frequency			60	kHz	PFC ±10kHz
			60	kHz	Main Converters ±10kHz
Power Density			14.9/9.9	W/in³	Forced / Convection-cooled
Mean Time Between Failure		300		kHrs	MIL-HDBK-217F, Notice 2 +25 °C GB
Weight		0.51(230)		lb(g)	

Efficiency Versus Load

Figure 7
ECP150PS12

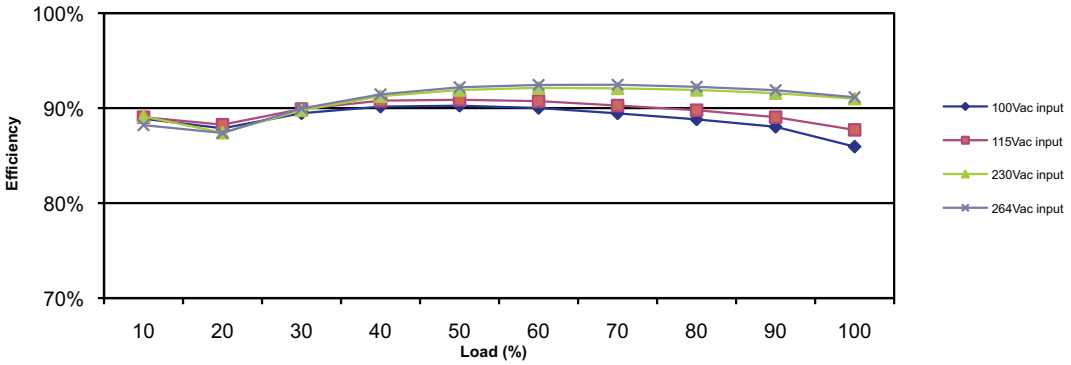
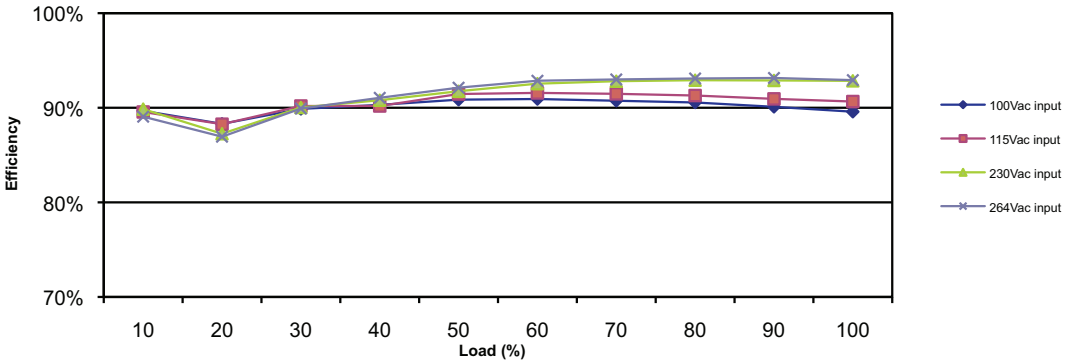


Figure 8
ECP150PS24

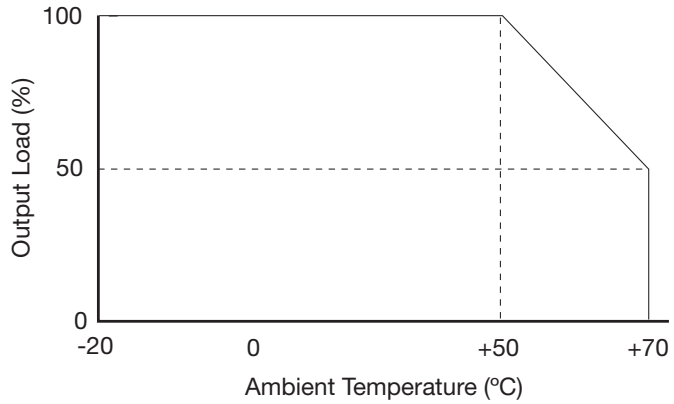


Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-20		+70	°C	See derating curve, fig.9
Storage Temperature	-40		+85	°C	
Cooling	10			CFM	Forced Cooled > 100W
Humidity	5		95	%RH	Non-condensing
Operating Altitude			3000	m	
Shock					±3 x 30g shocks in each plane, total 18 shocks. 30g = 11ms (+/- 0.5msecs), half sine. Conforms to EN60068-2-27
Vibration					Single axis 10 - 500 Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6

Thermal Derating Curve

Figure 9



Electromagnetic Compatibility - Emissions

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Conducted	EN55011/22	Class B		
Radiated	EN55011/22	Class A		
Harmonic Current	EN61000-3-2	Class A		Class C for loads above 60W
Voltage Fluctuations	EN61000-3-3			

Electromagnetic Compatibility - Immunity

- Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
Low Voltage PSU EMC	EN61204-3	High severity level	as below	
Radiated	EN61000-4-3	3	A	
EFT	EN61000-4-4	3	A	
Surges	EN61000-4-5	Installation class 3	A	
Conducted	EN61000-4-6	3	A	
Dips and Interruptions	EN55024 (100 VAC)	Dip > 95% (0 VAC), 8.3ms	A	
		Dip 30% (70 VAC), 416ms	A	
		Dip > 95% (0 VAC), 4160ms	B	
	EN55024 (240 VAC)	Dip > 95% (0 VAC), 10.0ms	A	
		Dip 30% (168 VAC), 500ms	A	
		Dip > 95% (0 VAC), 5000ms	B	
	EN60601-1-2 (100 VAC)	Dip > 95% (0 VAC), 10.0ms	A	
		Dip 60% (40 VAC), 100ms	B	
		Dip 30% (70 VAC), 500ms	A	
		Dip > 95% (0 VAC), 5000ms	B	
	EN60601-1-2 (240 VAC)	Dip > 95% (0 VAC), 10.0ms	A	
		Dip 60% (96 VAC), 100ms	A	
		Dip 30% (168 VAC), 500ms	A	
		Dip > 95% (0 VAC), 5000ms	B	

Safety Agency Approvals

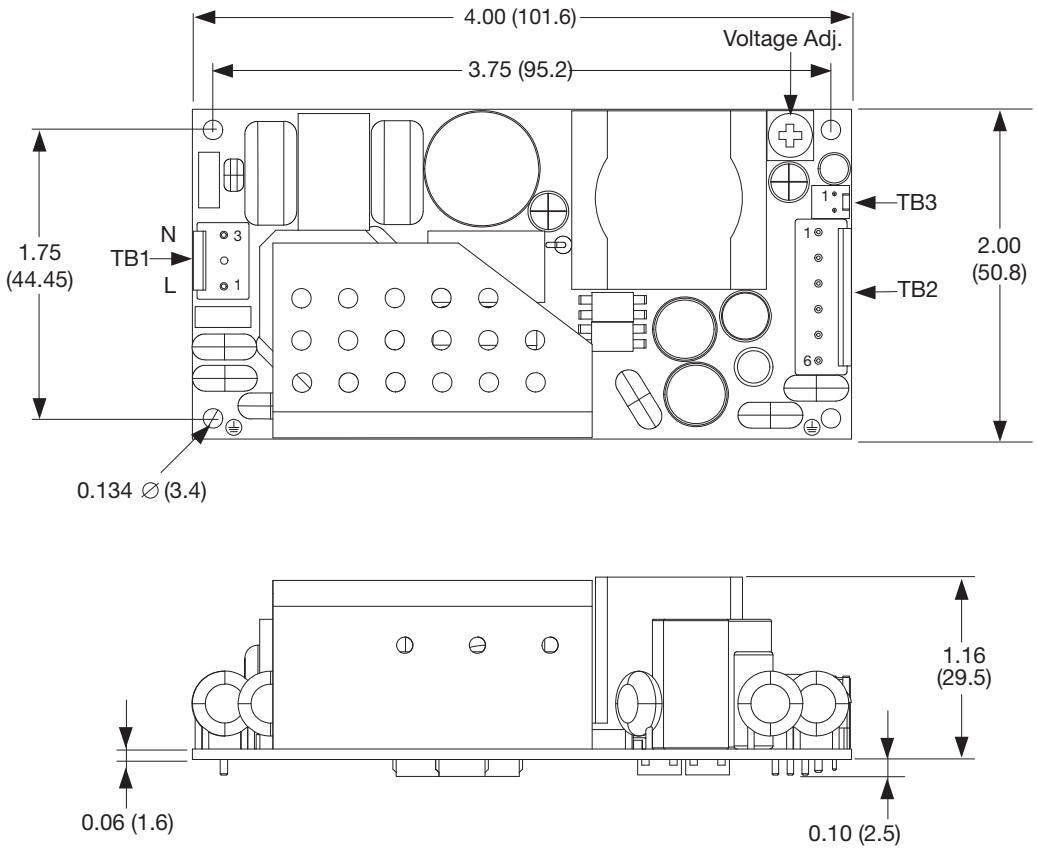
Safety Agency	Safety Standard	Category
CB Report	IEC60950-1:2005 + A1:2009	Information Technology
UL	UL60950-1 (2011), CSA 22.2 No.60950-1-07 Ed, 2011-12	Information Technology
TUV	EN60950-1:2006 + A11:2009 + A1:2010 + A12:2012	Information Technology
CE	LVD	

Safety Agency	Safety Standard	Category
CB Report	IEC60601-1 Ed 3 Including Risk Management	Medical
UL	ANSI/AAMI ES60601-1:2005 & CSA C22.2, No.60601-1:08	Medical
TUV	EN60601-1:2006	Medical

Means of Protection		Catergory
Primary to Secondary	2 x MOPP (Means of Patient Protection)	IEC60601-1 Ed3
Primary to Earth	1 x MOPP (Means of Patient Protection)	

Mechanical Details

Figure 10



TB2 - Output Connector	
Pin 1	+Vout
Pin 2	+Vout
Pin 3	+Vout
Pin 4	-Vout
Pin 5	-Vout
Pin 6	-Vout

Mates with JST housing
VHR-6N and JST Series
SVH-21T-P1.1 crimp terminals

TB1 - Input Connector	
Pin 1	Line
Pin 2	Not Fitted
Pin 3	Neutral

Mates with JST housing
VHR-3N and JST Series
SVH-21T-P1.1 crimp terminals

Mounting holes marked with
⏚ must be connected to safety earth

TB3 - Fan Connector	
Pin 1	Fan +
Pin 2	Fan -

Mates with Molex housing
22-01-1022 and 2759 crimp
terminals

Notes

1. All dimensions shown in inches (mm).
   Tolerance: ±0.02 (0.5)
2. Weight: 0.42 lbs (230 g) approx.

Thermal Considerations

In Order to ensure safe operation of the PSU in the end-use equipment, the temperature of the components listed in the table below must not be exceeded. Temperature should be monitored using K type thermocouples placed on the hottest part of the component (out of direct air flow). See Mechanical Details for component locations.

Temperature Measurements (At Maximum Ambient)	
Component	**Max Temperature °C**
TR1 Coil	110°C
L4 Coil	120°C
Q1 Body	120°C
Q2 Body	120°C
C1	105°C
C20	105°C

Service Life

The estimated service life of the ECP150 is determined by the cooling arrangements and load conditions experienced in the end application. Due to the uncertain nature of the end application this estimated service life is based on the actual measured temperature of key capacitors within the product when installed in the end application.

The graph below expresses the estimated lifetime given component temperature and assumes continuous operation at this temperature.

Estimated Service Life vs Component Temperature

Figure 11

