

82505-ICL

PFC BOOST CONVERTER MODULE (47 - 440Hz)

The **82505-ICL** PFC boost converter module contains all the necessary circuitry for complete power line compliance with aeronautics specification RTCA/DO-160D and Boeing's D6-44588. Housed in an all aluminum silicon-based encapsulated enclosure, the PFC module is compact and rugged. Providing line rectification, minimized input current harmonic distortion, active inrush current limiting and near unity power factor; these chassis mount devices are ideal for avionics applications where power demands are in the 125W-250W range.



A tightly regulated 325Vdc output provides necessary input to a variety of off-the-shelf DC/DC converter modules. Utilizing a modular approach, system power supplies are easily configured with a few individual components required. Tedious design and development cycles normally associated with custom power solutions are no longer necessary with this approach. Reliable, compliant power supplies can be configured in weeks, not months, without the need for specialized Power Supply Engineers.

FEATURES

✘	EXCEEDS D6-44588 (AA) FOR POWER FACTOR AND INPUT CURRENT HARMONIC DISTORTION LEVELS AT 360- 440Hz
✘	EFFICIENCY: 88% TYPICAL
✘	WIDE INPUT RANGE: 97 - 134Vrms, 47 - 440Hz
✘	STANDARD 325Vdc OUTPUT COMPATIBLE WITH BROAD RANGE OF <i>OFF-THE-SHELF</i> DC/DC CONVERTER MODULES
✘	COMPLIES WITH RTCA/DO-160D EMI & SUSCEPTIBILITY
✘	VL94V-0 FLAMMABILITY CLASSIFICATION (ENCAPSULANT)
✘	RUGGEDIZED SILICON BASED ENCAPSULANT AND INTEGRAL HEATSINK PROVIDES IMMUNITY FROM HARSH ENVIRONMENTS
✘	INPUT TRANSIENT SUPPRESSION - 30J/2mSecs
✘	FINNED VERSION DIMENSIONS: 5.50" X 3.0" X 1.75", WEIGHT = 29oz.
✘	ACTIVE INRUSH CURRENT LIMITING

SERIES OPTIONS

82505 - ■ - ICL - ■

INTERCONNECTION SCHEME	TERMINAL BLOCK	SPADE TERMINALS
INSERT	T	S

MECHANICAL CONFIGURATION	HORIZONTAL FINS	FLAT PLATE (w/o FINS)
INSERT	nil	01

TEMPERATURE CHARACTERISTICS

AIRFLOW (LFM)	THERMAL IMPEDANCE (Θ_{s-a}) (°C/W)	
	HORIZONTAL FINS	FLAT TOP (W/O FINS)
Air velocity through cross-sectional area of fins or across flat top		
0 LFM	1.09	4.34
250 LFM	0.68	2.28
500 LFM	0.60	1.59
750 LFM	0.42	1.07

Notes:

1. Air velocity measured using a digital anemometer positioned within an airflow duct 1.0" X 2.3" above top of module.

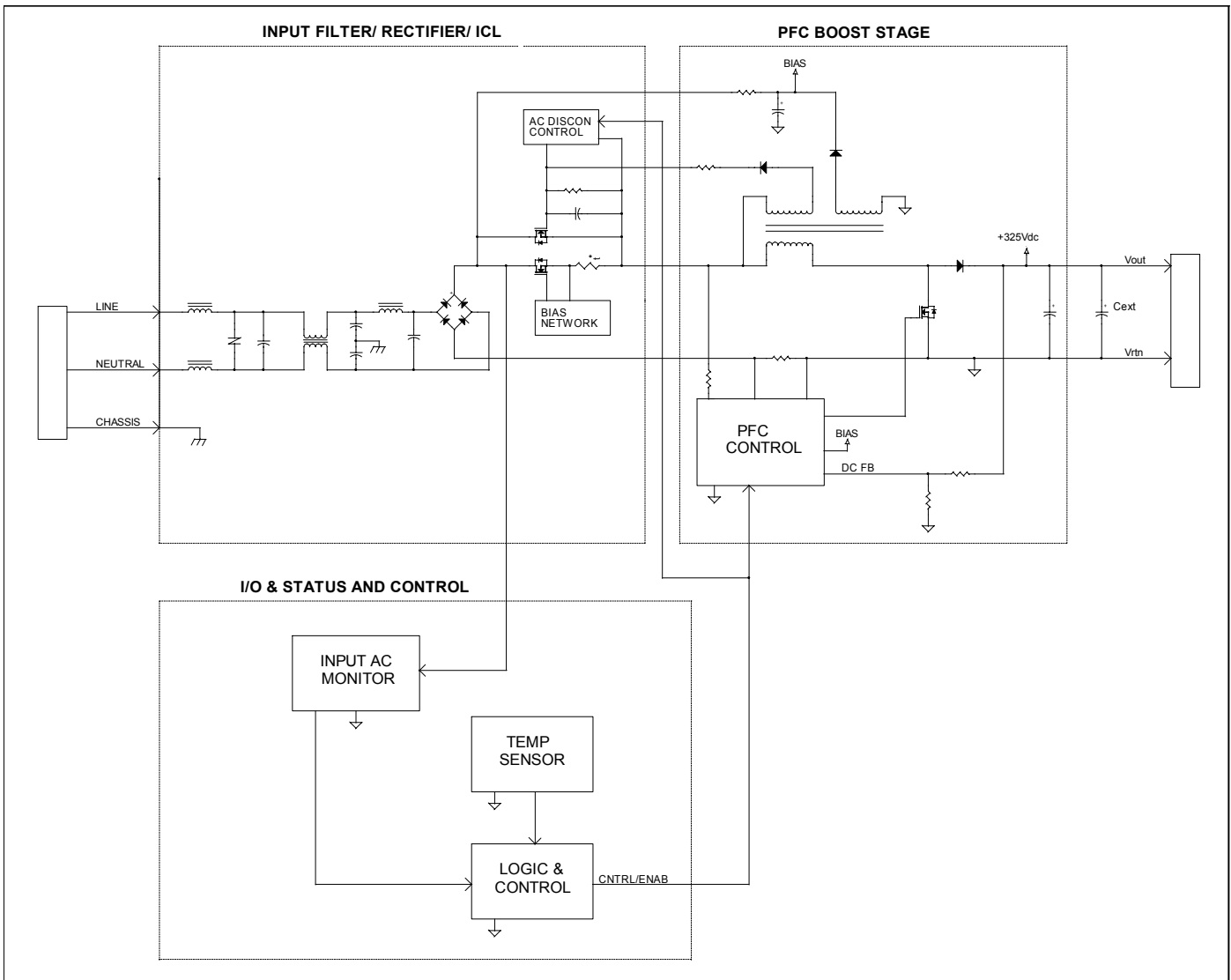
PERFORMANCE SUMMARY

PARAMETER	SPECIFICATIONS
OUTPUT POWER RANGE (1,2)	125 - 250W
OUTPUT VOLTAGE (3)	325Vdc
EFFICIENCY (4)	86%
SWITCHING FREQUENCY	100kHz
MINIMUM OUTPUT CAPACITANCE (5)	100uF
INPUT LINE TO NEUTRAL CAPACITANCE (6)	1.0uF
TOTAL LINE/NEUTRAL TO CHASSIS CAPACITANCE (6)	11.4nF
ISOLATION VOLTAGE, INPUT/ OUTPUT TO CHASSIS (7)	1500Vdc
MTBF (Aic, 30°C case)	49,000 Hours

NOTES:

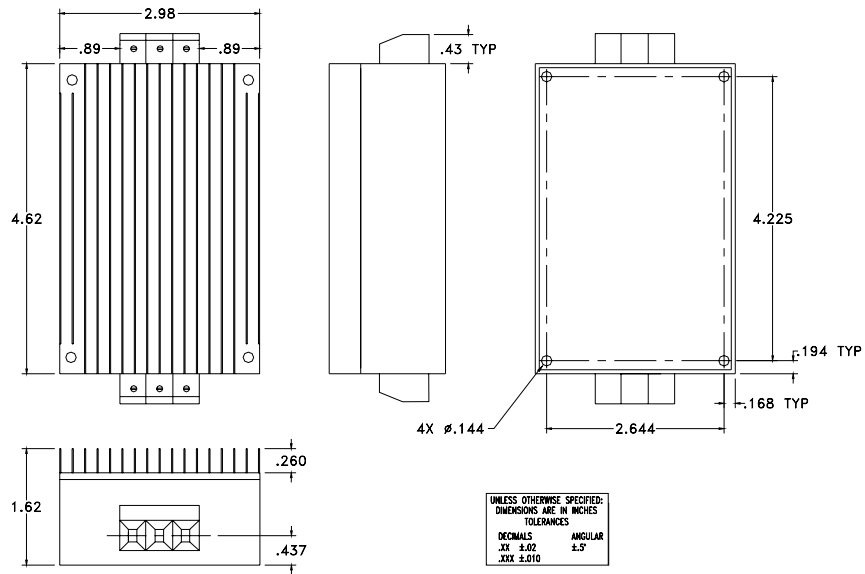
1. Output power range in which module complies with D6-44588(AA) for harmonic distortion and PF.
2. Module is power limited at ~375W output power.
3. DC output voltage \pm 3% when operating from no load through 250Wout.
4. Minimum efficiency at Pmax. Efficiency is 88% typical.
5. Minimum output capacitance for proper boost module operation. Typical values will be larger to meet hold-up time requirements. Use polarized aluminum electrolytic type.
6. Capacitance tolerances are \pm 20%.
7. 1500Vdc for 60 seconds without arc or damage; 200uAdc maximum leakage current (internal line-to-earth capacitors installed)

BLOCK DIAGRAM

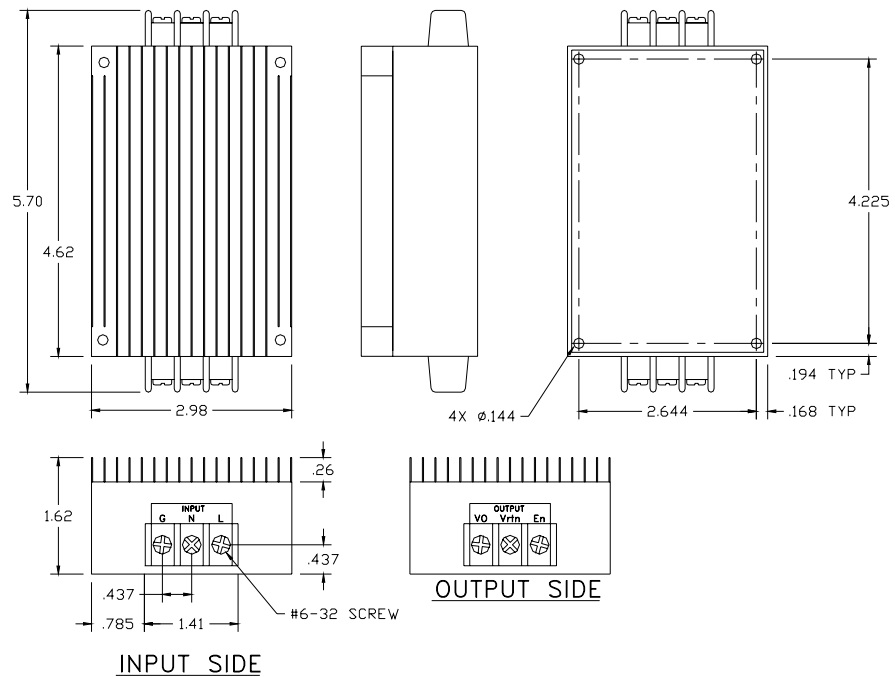


MECHANICAL DIAGRAM

TERMINAL BLOCK VERSION



SPADE TERMINAL VERSION



A DETAILED OUTLINE DRAWING CAN BE FURNISHED UPON REQUEST.

ELECTRICAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TEST CONDITIONS APPLY: $T_a=25^{\circ}\text{C}$, CONSTANT ACTIVE LOAD APPLIED TO OUTPUT & 470uF CAPACITOR ACROSS OUTPUT, $V_{IN}=115\text{Vrms}$, 400Hz, < 1% THD SINUSOID, OUTPUT POWER = 250W.

INPUT CHARACTERISTICS

PARAMETER	82505-ICL	REMARKS	NOTES
INPUT VOLTAGE RANGE	97-134Vrms	COMPLIES WITH NORMAL/ABNORMAL INPUT VOLTAGES PER RTCA/DO-160D, SECTION 16	2
INPUT FREQUENCY RANGE	47-440Hz	COMPLIES WITH D6-44588 (AA) FOR POWER FACTOR AND HARMONIC DISTORTION. OPERATES AT 47-360Hz WITH REDUCED DISTORTION PERFORMANCE	2
CONTINUOUS OUTPUT POWER	250W	OBSERVE MAXIMUM BASEPLATE TEMPERATURE	2
PEAK POWER RATING	375W	<5 SECOND DURATION	1
LEAKAGE CURRENT	< 5mArms	AC LINE/NEUTRAL TO CHASSIS, $V_{in}=115\text{Vrms}/400\text{Hz}$	1
INRUSH CURRENT	5A _{pk}	COLD START, V_{out} initial = 0Vdc	2
TOTAL HARMONIC DISTORTION (INPUT CURRENT)	< 5.5%	$P_{out} > 125\text{W}$, $V_{in} = 115\text{Vrms} / 360 - 440\text{Hz}$	2
INDIVIDUAL HARMONICS-AC CLEAN	EVEN: < 1% I_f / n , ($n < 10$) EVEN: < 0.1% I_f ($n \geq 10$) ODD: < 30% I_f / n ODD TRIPLENS: < 15% I_f / n	$V_{in} = 115\text{Vrms}$, 360 - 440Hz $V_{thd} \leq 1.25\%$ $n = \text{ORDER OF HARMONIC, 1 THRU 99}$ $I_f = \text{FUNDAMENTAL CURRENT}$ $P_{out} \geq 125\text{W}$ FOR ALL HARMONICS GREATER THAN 5mArms	1
INDIVIDUAL HARMONICS-DISTORTED INPUT	EVEN: < 1% $I_f / n + V_n$ ($n < 10$) EVEN: < 0.1% $I_f + V_n$ ($n \geq 10$) ODD: < 30% $I_f / n + V_n$ ODD TRIPLENS: < 15% $I_f / n + V_n$	$V_{in} = 115\text{Vrms}$, 360 - 440Hz $V_{thd} \geq 5\%$ $V_n = \text{CORRESPONDING INPUT VOLTAGE HARMONIC}$ $n = \text{ORDER OF HARMONIC, 1 THRU 99}$ $I_f = \text{FUNDAMENTAL CURRENT}$ $P_{out} \geq 125\text{W}$ FOR ALL HARMONICS GREATER THAN 5mArms	1
POWER FACTOR	0.90 min	$P_{out} > 50\text{W}$	2
TRANSIENT SURGE WITHSTAND	30J / 2mSec	NORMAL MODE	1
CREST FACTOR (CURRENT)	1.314 - 1.514	RATIO OF PEAK/RMS	1
START-UP TIME	< 1 Second	$V_{out} > 200\text{Vdc}$	2
START-UP THRESHOLD	104Vrms	MUST START VOLTAGE = 104Vrms. OPERATES DOWNTO 97Vrms (REMAINS ENABLED).	2
CONDUCTED EMISSIONS	RTCA/DO-160D	CATEGORY Z	1
OPERATING TEMPERATURE RANGE	-25°C TO 85°C	BASEPLATE (HEATSINK)	1
STORAGE TEMPERATURE RANGE	-55°C TO 100°C	NON-OPERATIONAL	1
MODULE ENABLE SIGNAL	PULL "EN" PIN TO V_{rtn} TO DISABLE OUTPUT (2.5V _{max})	FLOAT "EN" PIN TO ENABLE OUTPUT	2
OVER-TEMPERATURE PROTECTION	100°C ± 10°C	MODULE OUTPUT IS DISABLED IF OVER TEMPERATURE CONDITION IS DETECTED. THE MODULE WILL AUTO-RESTART WITH ~15°C HYSTERESIS	1

OUTPUT CHARACTERISTICS

PARAMETER	82505-ICL	REMARKS	NOTES
RATED OUTPUT VOLTAGE	325Vdc \pm 3%	0W < Pout \leq 250W	2
MINIMUM OUTPUT CURRENT	0Adc	NO LOAD REQUIRED FOR PROPER OUTPUT REGULATION	2
MAXIMUM BASEPLATE TEMPERATURE	85°C		1
TEMPERATURE STABILITY COEF.	0.02% / °C	OUTPUT VOLTAGE	1
OUTPUT RIPPLE + NOISE (pk-Pk)	<0.5%	20MHz BANDWIDTH, Cout = 220uF	1
LINE REGULATION	< 1%	OUTPUT DEVIATION FOR \pm 20% STEP CHANGE IN LINE VOLTAGE	1
HOLD-UP TIME	10mSec (Vout > 100V)	REQUIRES EXTERNAL HOLD-UP CAPACITOR TO EXPAND HOLD-UP TIME (SEE APPLICATION NOTES FOR DETAILS)	1
MINIMUM OUTPUT CAPACITANCE	100uF	OBSERVE RIPPLE CURRENT REQUIREMENTS AT 2 X LINE FREQUENCY & 100kHz FOR EXTERNAL OUTPUT CAPACITORS (SEE APPLICATION NOTES FOR DETAILS)	1
MAXIMUM OUTPUT CAPACITANCE	10,000uF	SPECIFIED IN ORDER NOT TO OVERSTRESS THE INTERNAL ACTIVE INRUSH CURRENT LIMITING CIRCUIT	1
ISOLATION VOLTAGE: INPUT TO OUTPUT	NONE		--
ISOLATION VOLTAGE: INPUT/OUTPUT TO CHASSIS	1500Vdc	NO ARCING OR DAMAGE FOR 60 SECOND DURATION. MAX LEAKAGE CURRENT = 200uAdc	2
SHORT-CIRCUIT PROTECTION	NONE	FUSE INPUT WITH SUITABLE FAST-BLOW FUSE	--
OUTPUT VOLTAGE ADJUSTMENT	NONE		--

Notes:

- 1) Ensured by design, not 100% tested in production.
- 2) 100% tested for specification compliance in production.