

**MICROPROFILE LINE ISOLATING  
HYBRID****P3000****Features**

- \* Surface mount
- \* 7mm seated height
- \* Low loss
- \* Low Distortion
- \* 2-4 wire conversion
- \* IEC 950, UL 1950 and EN 60950 certified
- \* UL Recognized Component
- \* BABT Certificate of Recognition
- \* CSA NRTL/C Certificate of Compliance

**Applications**

- \* V.34, V.90 and V.92 Modems
- \* Miniature DAA applications
- \* Universal DAA applications
- \* Notebook PC Fax/Modems
- \* CODEC interface

**DESCRIPTION**

P3000 is a microprofile passive hybrid module for applications where reinforced insulation is required. It features fully vacuum encapsulated construction using materials conforming to UL94V-0 flammability requirements.

P3000 performs the functions of reinforced safety barrier (3750Vrms), telephone line matching and 2-4 wire conversion. This component is designed specifically for high speed full-duplex data transmission where very low levels of distortion are required and where the transmission spectral density is mainly confined to the band 600Hz - 3kHz, (e.g. V.32bis and faster). Operation at 56kbits/second has been confirmed. The high performance is achieved by realizing a very low noise floor at the receive port even when the power sourced at the transmit port is high. Circuit simplification is readily achieved as the transmit, receive and line ports are fully floating and galvanically isolated from each other.

P3000 is readily matched to complex reference impedances and with the major benefit that the impedance matching components are all on the line side of the safety barrier. Furthermore, the transmit and receive frequency responses are very flat (i.e. negligible 'twist') when matched to complex impedances.

For best operation the module requires a transmit drive from a high-quality low-impedance source ( $\ll 10\Omega$ ), and a high impedance receive load (47k $\Omega$  nominal). These impedances may be directly provided by data pumps and CODECs.

P3000 is also useful for voice applications requiring 2-4 wire conversion as its port impedances are particularly suitable for CODECs.

P3000 is certified to IEC 950, EN 60950, EN 41003, and UL1950. P3000 is a UL Recognized Component, and is supported by a BABT Certificate of Recognition, a CSA Certificate of Compliance and an IEC CB Test Certificate.

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to Electronic Techniques  
(Anglia) Limited

## SPECIFICATIONS

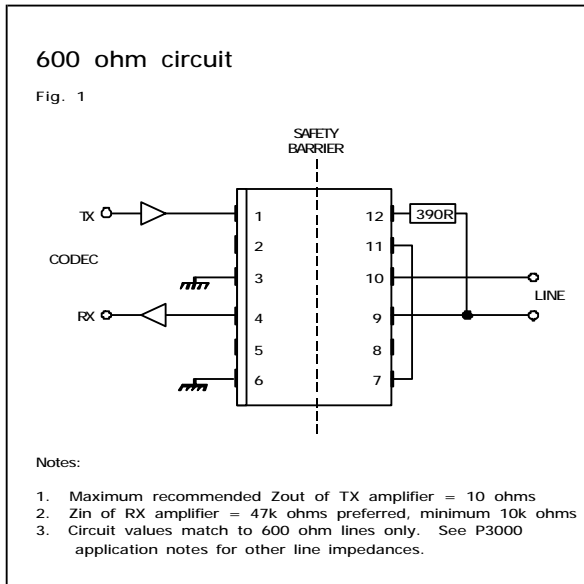
### Electrical

At T = 25°C and as reference circuit Fig. 2 unless otherwise stated.

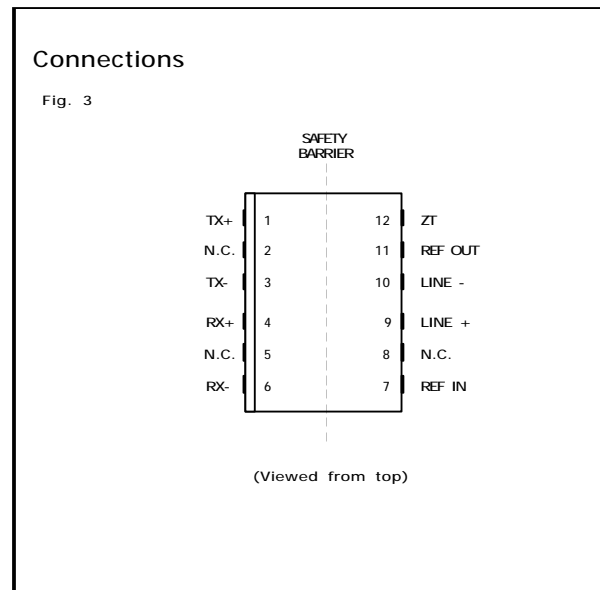
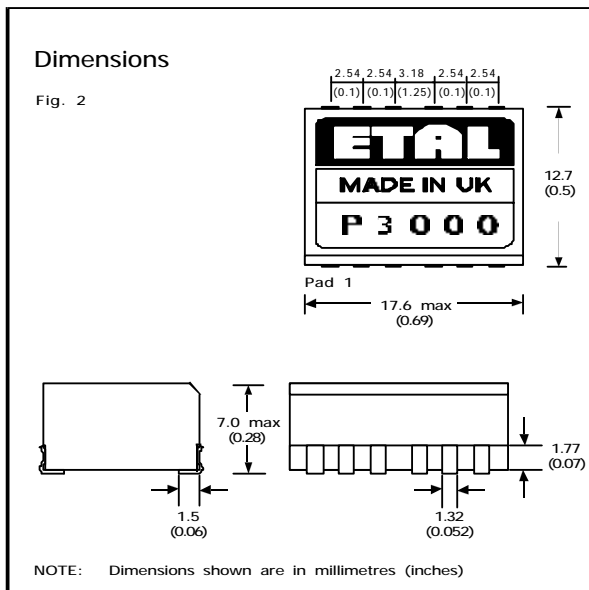
Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	TX port (1,3) to line port (9,10)	-	1.8	-	dB
	TX port (1,3) to line terminals (matching loss included)	-	6.2	-	dB
	Line terminals to RX port (4,6)	-	2.8	-	dB
Frequency Response	TX port to line port 200Hz – 4kHz	-	±0.05	-	dB
	TX port to line terminals 300Hz – 3.4kHz	-	±0.1	-	dB
	Line terminals to RX port 300Hz – 3.4kHz	-	±0.1	-	dB
Transhybrid loss	300Hz – 3.4kHz	-	>30	-	dB
Return Loss	300Hz – 3.4kHz	-	>17	-	dB
Distortion <sup>(1)(2)</sup>					
TX signal splashback distortion at RX port					
Harmonic	Fundamental ≥600Hz @ 0dBm in line	-	≤-90	-	dBm
Intermodulation	Tones 1.5kHz, 2.1Hz total 0dBm in line	-	<-90	-	dBm
RX signal distortion at RX port					
Harmonic	Fundamental ≥600Hz @ 0dBm in line	-	≤-90	-	dBm
Intermodulation	Tones 1.5kHz, 2.1Hz total 0dBm in line	-	≤-90	-	dBm
TX signal distortion at line terminals					
Harmonic	Fundamental ≥600Hz @ 0dBm in line	-	≤-65	-	dBm
	Fundamental ≥600Hz @ -6dBm in line	-	≤-80	-	dBm
Intermodulation	Tones 1.5kHz, 2.1Hz total 0dBm in line	-	-70	-	dBm
Voltage Isolation <sup>(3)</sup>	50Hz	3.88	-	-	kVrms
	DC	5.5	-	-	kV
Operating Range:	Ambient				
Functional		-25	-	+85	°C
Storage		-40	-	+125	°C

### Notes:

- For optimum distortion performance DC currents through pins 1 and 3 should not exceed 50µA, and currents through pins 4 and 6 should not exceed 3µA. DC resistance between pins 1-3, 115Ω nominal. DC resistance between pins 4-6, 1.6kΩ nominal.
- Caution: do not pass DC through P3000. Telephone line current etc. must be diverted using semiconductor line hold circuit.
- Components are 100% tested at 6.5kVDC.



## CONSTRUCTION



Geometric centres of outline and pin grid coincide within a tolerance circle of 0.6mm $\varnothing$ .

**SAFETY**

Manufactured from materials conforming to flammability requirements of UL94V-0 and EN 60950:1992 (BS 7002:1992) sub-clause 1.2.13.2 (V-0).

Distance through reinforced insulation 0.4mm minimum.

Creepage and clearances in circuit are 7mm minimum where PCB pads do not exceed 3mmØ.

Constructed and fully encapsulated in accordance with EN 60950:1992 (BS 7002:1992) IEC950:1991 and BS EN 41003:1997 (reinforced), 250Vrms maximum working voltage.

**CERTIFICATION**

Certified by BSI to IEC 950:1991/A4:1996 (IEC CB Test Certificate No. GB441W) sub-clauses 1.5, 1.5.1, 1.5.3, 2.2, 2.2.2, 2.2.3, 2.2.4, 2.9.2, 2.9.3, 2.9.4, 2.9.6, 2.9.7, 4.4, 4.4.3.2 (class V-0) and 5.3 for a maximum working voltage of 250Vrms, nominal mains supply voltage not exceeding 250Vrms and a maximum operating temperature of +85°C in Pollution Degree 2 environment, reinforced insulation.

CAN/CSA C22.2 No. 950-95/UL1950, certified by CSA, Third Edition, including revisions through to revision date March 1, 1998, based on Fourth Amendment of IEC 950, Second Edition, maximum working voltage 250Vrms, Pollution Degree 2, reinforced insulation.

UL File number E203175.

CSA Certificate of Compliance 1107696 (Master Contract 1188107).

Certified by BABT to EN 60950.

BABT Certificate CR/0139.

Additionally, Profec Technologies certifies all transformers as providing voltage isolation of 3.88kVrms, 5.5kV DC minimum. All shipments are supported by a Certificate of Conformity to current applicable safety standards.

**ABSOLUTE MAXIMUM RATINGS**

(Ratings of components independent of circuit).

Short term isolation voltage (15s)	4.6 kVrms, 6.5kVDC
Storage temperature	-40°C to +125°C
Soldering temperature profile peak -	either            240°C    60s or                250°C    30s or                260°C    10s

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The Trade Mark ETAL is registered at the UK Trade Marks Registry.

The concept, design and circuit embodiment of components such as P3000 are patented. No patent rights or licences to any circuits or products described herein are implied or granted to any third party.

British Patent No. 2270241

France Patent No. 2696063

US Patent No. 5426697

Germany Patent No. DE 4329519

Hong Kong Patent No. HK 1004044

Singapore Patent No. 9791629-0

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