

**MICROPROFILE LINE MATCHING  
TRANSFORMER****P370X**  
**(Family P3700-P3709)****Features**

- \* Low Distortion
- \* 4.4mm Height (PC Card)
- \* 4.7mm Height (SMD)
- \* Choice of Pinout
- \* Simple Matching
- \* Supplementary Insulation
- \* EN 60950 Certified
- \* Reflow Solderable
- \* Wide Operating Temperature Range
- \* Equivalent to KT Series

**Applications**

- \* V.90 Modems
- \* PC Card/PCMCIA on-card DAAs
- \* Laptop Computers

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**DESCRIPTION**

P370X family is intended for 56kbps modems and other high-speed applications where a very low height profile is required. Versions are available in a variety of pin-outs to suit PC Card/PCMCIA on-card DAAs, where typically the body of the device sits within a PCB cut-out, and for conventional surface-mount applications requiring sub-5mm seated height. The components are rated for use at elevated temperatures, as commonly encountered where semiconductors dissipate heat in restricted space.

The P370X family is designed for conventional production reflow processes and directly replaces alternative sources with possible added benefits of improved performance and reduced real estate.

The family is certified to EN 60950 and is suitable for worldwide use.

## SPECIFICATIONS

### Electrical

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

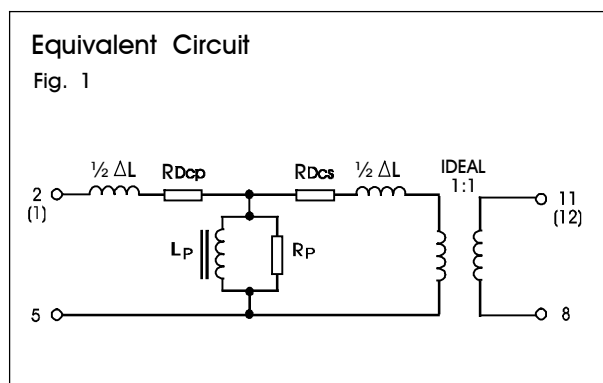
Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	Source/Load = 600Ω	2.8	-	3.5	dB
Frequency Response	300Hz - 3.4kHz	-	±0.05	-	dB
Return Loss	200Hz – 4kHz	-	24	-	dB
Third Harmonic Distortion <sup>(1)</sup>	600Hz - 10dBm in line 150Hz - 3dBm in line	-	-110 -67	-	dBm dBm
Voltage Isolation <sup>(2)</sup>	50Hz DC	2.5 3.5	- -	- -	kVrms kV
Operating Range: Functional Storage	Ambient temperature	-40 -40	- -	+155 +155	°C °C

Lumped equivalent circuit parameters as Fig. 1

DC resistance <sup>(3)</sup>					
R <sub>Dcp</sub>	Primary resistance	-	160	-	Ω
R <sub>Dcs</sub>	Secondary resistance	-	200	-	Ω
Leakage inductance, ΔL		-	1.7	-	mH
Shunt inductance, L <sub>p</sub> <sup>(4)</sup>	200Hz -43dBm	-	8	-	H
Shunt loss, R <sub>p</sub>	200Hz -43dBm	-	22	-	kΩ

#### Notes:

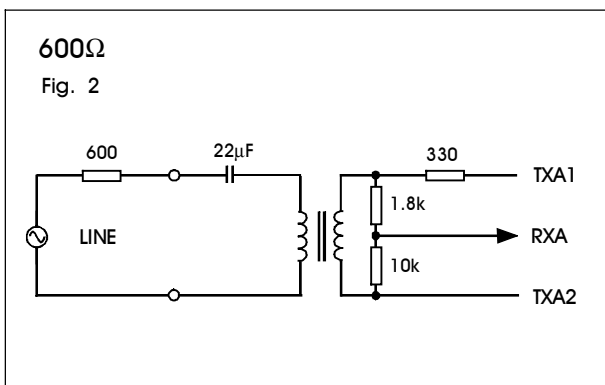
1. Third harmonic typically exceeds other harmonics by 10dB.
2. Components are 100% tested at 3kVrms minimum.
3. Caution: do not pass DC through windings. Telephone line current must be diverted using semiconductor line hold circuit or equivalent.
4. At signal levels greater than -20dBm, L<sub>p</sub> will increase and R<sub>p</sub> will decrease slightly but the effect is usually favourable to the return loss characteristic.



## MATCHING RECOMMENDATIONS

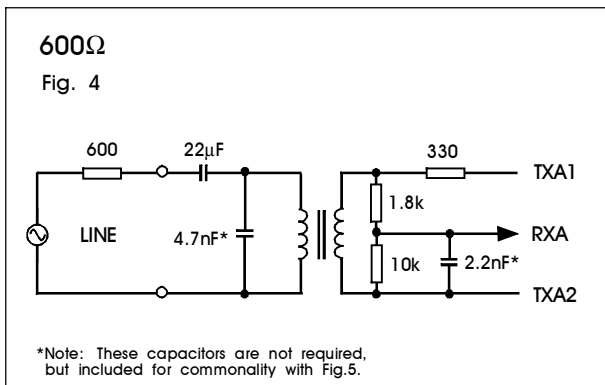
The following implementations assume a low impedance balanced TX drive and a relatively high impedance RX input, as is commonly available, though use with other TX/RX arrangements is straightforward. Note that there need be no changes to components on the line side, or in the hybrid, whether 600Ω or complex reference impedance selected, thus assisting country configuration. For complex impedance, the matching circuits derived are suitable for reference impedances of the type 270 + 750//150nF e.g. European CTR21 and 220 + 820//120nF (or 115nF) e.g. Australia, South Africa, etc., and yield similar performance characteristics. For other impedances, please contact Profec Technologies.

### Minimum Cost Implementations

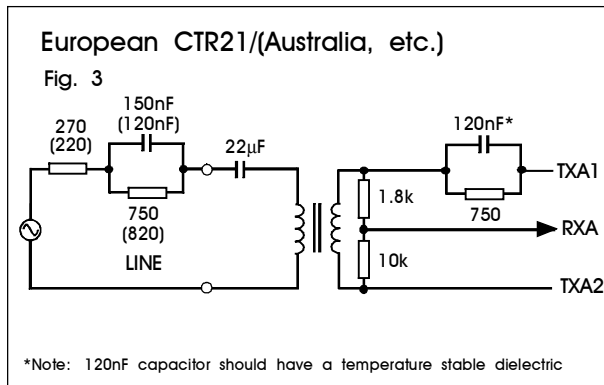


Frequency Response : ±0.2dB 30Hz – 10kHz  
Return Loss: 24dB 200Hz – 4kHz  
Transhybrid Loss: 18dB 200Hz – 4kHz

### Effect of extra capacitors on 600Ω circuit

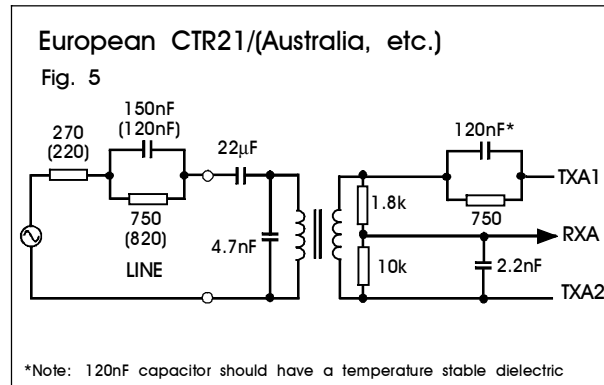


Frequency Response : ±0.1dB 30Hz – 4kHz  
Return Loss: 24dB 200Hz – 4kHz  
Transhybrid Loss: 18dB 50Hz – 4kHz



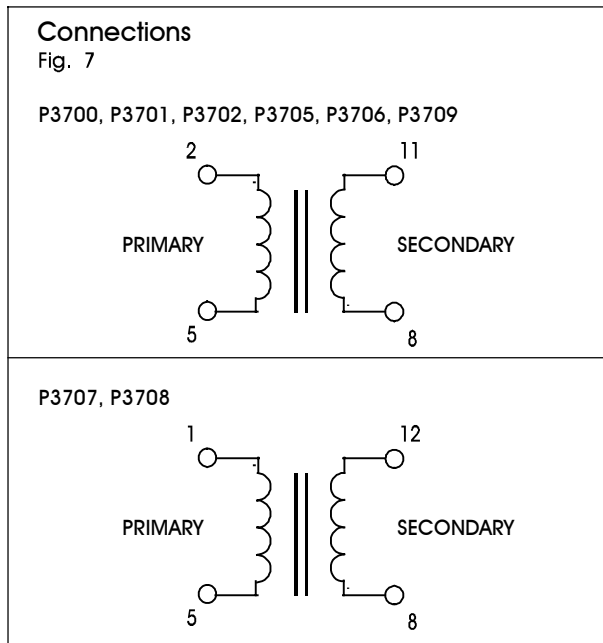
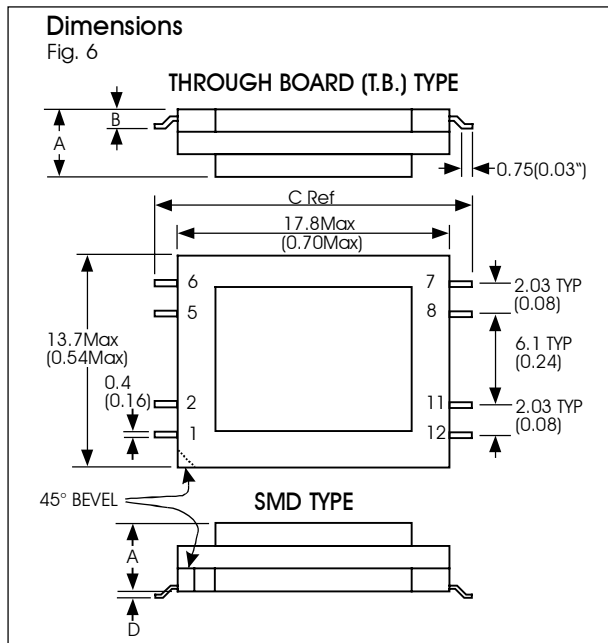
Frequency Response : ±0.3dB 50Hz – 4kHz  
Return Loss: 15dB 200Hz – 4kHz  
Transhybrid Loss: 14dB 200Hz – 4kHz

### Improved complex matching and hybrid



Frequency Response : ±0.5dB 50Hz – 4kHz  
Return Loss: 17dB 200Hz – 4kHz  
Transhybrid Loss: 16dB 200Hz – 4kHz

## CONSTRUCTION



Dimensions shown are in millimetres (inches).

Windings may be used interchangeably as primary or secondary.

Recommended PCB pad sizes 1.2 x 0.8mm (0.047" x 0.031") on centres dimension C-0.7mm (C-0.028")

Note: to prolong solderability, circuit terminals are shipped with a very fine solderable surface protection. This surface coating assists soldering and is completely depleted during the soldering process. However, this coating is not removed by other means of attachment e.g. conductive epoxy. Parts suitable for use with conductive epoxy can be supplied on special order.

Identity	Type	A max	B*	C ref	D*	Other
P3700	T.B.	4.40 (0.173")	1.27 (0.050")	19.8 (0.78")	--	--
P3701	T.B.	4.40 (0.173")	2.44 (0.096")	21.8 (0.86")	--	--
P3702	SMD	4.50 (0.177")	--	19.8 (0.78")	0.13 (0.005")	Vacuum varnish impregnated
P3705	SMD	4.70 (0.185")	--	19.8 (0.78")	0.13 (0.005")	--
P3706	SMD	4.50 (0.177")	--	19.8 (0.78")	0.13 (0.005")	--
P3707	T.B.	4.27 (0.168")	2.44 (0.096")	20.6 (0.81")	--	4 Pin versions. Only pins 1, 5, 8, 12 present
P3708	T.B.	4.40 (0.173")	2.44 (0.096")	20.1 (0.79")	--	
P3709	T.B.	4.40 (0.173")	2.29 (0.090")	21.8 (0.86")	--	

\*Tolerance on dimensions B and D  $\pm 0.076\text{mm}$  ( $\pm 0.003$ ").

For other custom configurations please contact Profec Technologies.

**SAFETY**

Constructed in accordance with IEC 950:1991, EN 60950:1992 (BS7002:1992), supplementary insulation, 250Vrms rated voltage.

Components should be installed in such a way that the core is separated from accessible conductive parts by a creepage of 2.5mm, clearance of 2.0mm, or by solid insulation of minimum thickness 0.4mm, or appropriate thin film.

**CERTIFICATION**

Certified (BABT PS Certificate C900865/02S) to EN 60950:1992 (BS 7002:1992) up to and including amendment 5 sub-clauses 2.2.2, 2.9.1 and 5.3.2, for a maximum working voltage of 250Vrms, and a maximum operating temperature of +155°C in Pollution Degree 2 environments.

**ABSOLUTE MAXIMUM RATINGS**

(Ratings of components independent of circuit).

Short term isolation voltage (1s)	2.5kVrms, 3.5 kVDC
DC current	100µA
Storage temperature	-40°C to +155°C
Reflow/terminal temperature.	250°C

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