PRODUCT DATA SHEET

MICROPROFILE LINE MATCHING TRANSFORMER

P2781

Features

* Surface Mount
* 7mm seated height
* Vacuum encapsulated
* IEC 950, UL 1950 and EN 60950 certified
* UL Recognized Component
* BABT Certificate of Recognition
* CSA NRTL/C Certificate of Compliance

Applications

* Telecommunications
* V.22bis and V.32bis modems
* Line matching
* Portable computers
* Instrumentation

DESCRIPTION

P2781 is a microprofile transformer for applications where high performance and safety isolation to international standards are required in an extremely small case size.

Designed specifically as a surface mount device, the P2781 features a 7mm seated height and is vacuum encapsulated and tested to 6500VDC.

Despite the subminiature size, the performance is the equal of that of much larger components. The P2781 offers reinforced insulation, is ideal for voice telecommunications and for data communications to medium speed, whilst capable of being matched to both 600Ω and complex impedance telephone lines.

At moderate transmit power levels (e.g. -10dBm) performance to V.32bis may be achieved.

In instrumentation applications, the P2781 offers a wideband frequency response from 50Hz to 40kHz.

P2781 is certified to IEC 950, EN 60950, EN 41003, and UL1950. P2781 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.

E203175

1998
to Electronic Techniques (Anglia) Limited

SPECIFICATIONS

Electrical

At T = 25ºC and as circuit Fig. 1 unless otherwise stated.

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	f = 2kHz, R_L = 600Ω f = 2kHz, R_L = 430Ω	- -	- -	2.0 4.0	dB dB
Frequency response	-3dB LF cutoff -3dB HF cutoff 200Hz - 4kHz	- - -	50 40 -	- - ±0.2	Hz kHz dB
Return Loss	200Hz - 4kHz	18	-	-	dB
Distortion (1)	f = 450Hz 0dBm in line 3rd Harmonic	-	-60	-54	dBm
Balance	DC - 5kHz Method TG25	80	-	-	dB
Saturation	Excitation 50Hz 250Vrms Output voltage across line	- -	- -	10 65	Vrms Vpeak
Voltage Isolation (2)	50Hz DC	3.88 5.5	-	-	kVrms kV
Operating range: Functional Storage Humidity	Ambient temperature	 -10 -40 -	 - - -	 +85 +125 95	 ºC ºC %R.H.

Lumped equivalent circuit parameters as Fig. 1

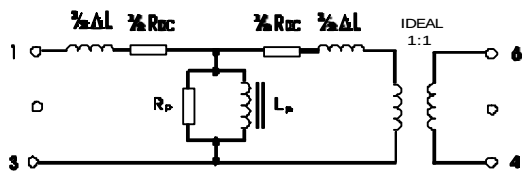
DC resistance, R_{DC} (3)	Sum of windings	205	-	245	Ω
Leakage inductance ΔL		4.2	-	4.9	mH
Shunt inductance Lp(4)	-43dBm 200Hz -43dBm 1kHz	1.4 -	- 1.8	3.5 -	H H
Shunt loss Rp(4)	-43dBm 200Hz -43dBm 1kHz	5 -	- 10	15 -	kΩ kΩ

Notes

1. Third harmonic typically exceeds other harmonics by 20dB.
2. Components 100% tested at 6.5 kVDC.
3. **Caution:** do not pass DC through windings. Telephone line current, etc. must be diverted using choke or semiconductor line hold circuit.
4. At signal levels greater than -20dBm, Lp will increase and Rp will decrease slightly but the effect is usually favourable to the return loss characteristic.
5. Excludes shipping materials. Components are dry-packed and sealed as shipped. Refer to Profec Technologies for appropriate storage conditions for sealed consignments.

Equivalent Circuit

Fig 1

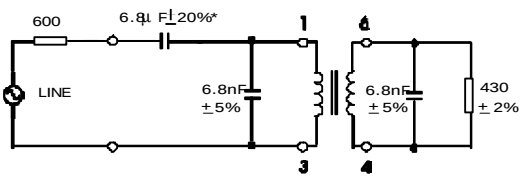


PERFORMANCE

600Ω MATCH

Recommended Circuit

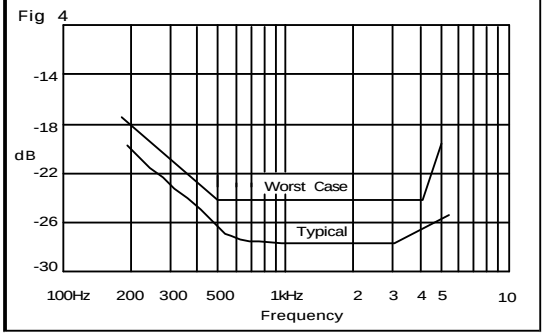
Fig 2



* If return loss >16dB, 300Hz - 4kHz is acceptable, blocking capacitor may be relaxed to 4.7µF +50% −20%

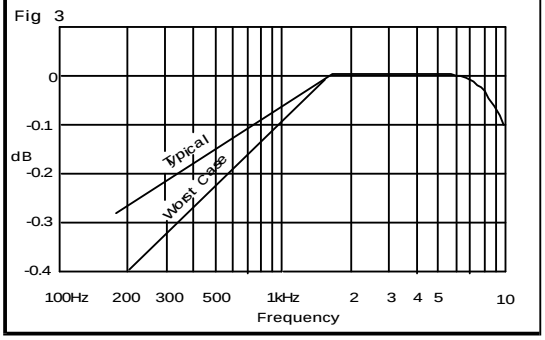
Return Loss

Fig 4



Frequency Response

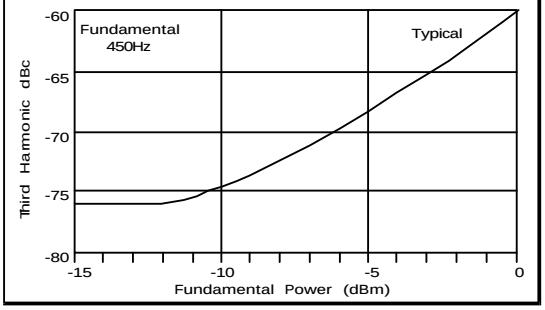
Fig 3



Frequency response driven by terminal equipment (voltage scource with 430Ω series resistance) measured across 600Ω is within ±0.2dB 200Hz to 4kHz

Third Harmonic Distortion vs. Signal Level

Fig 5

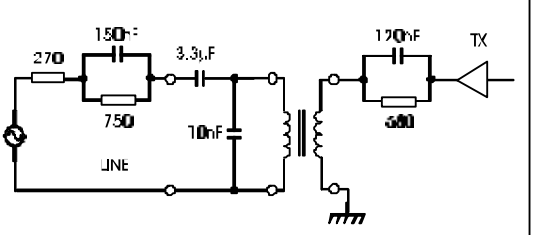


Note:
To obtain harmonic distortion power in dBm, add fundamental power in dBm to third harmonic in dBc e.g. at -10dBm power in line at 450Hz, third harmonic power is -10 + (-74) = -84dBm typical.

EUROPEAN CTR21 COMPLEX MATCH

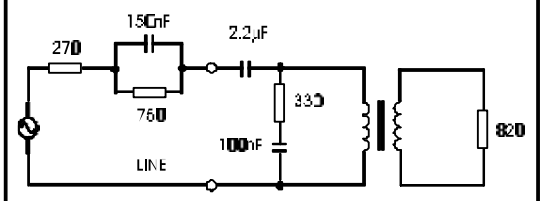
Recommended Circuit

Fig 6



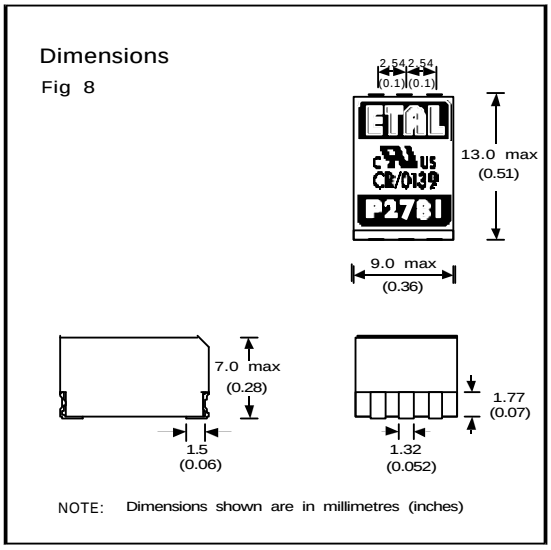
Recommended Circuit

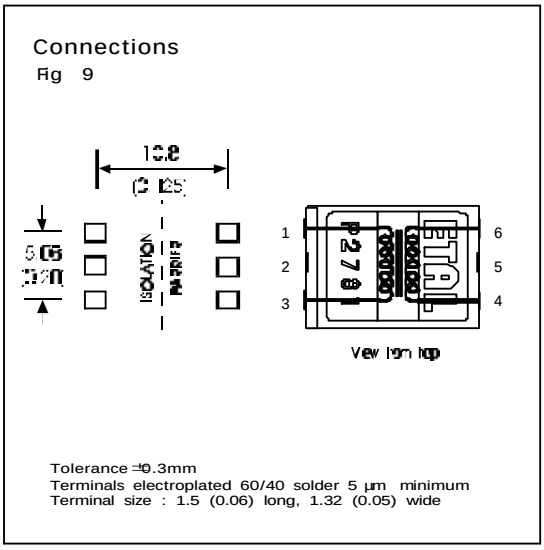
Fig 7



The circuit of Fig. 6 gives good TX and RX flatness (±0.3dBm 200Hz - 4kHz). An alternative arrangement, using existing PCB sites, is shown in Fig. 7. Note, however, that TX flatness will be degraded with the topology.

CONSTRUCTION





Dimensions shown are in millimetres (inches).
Geometric centres of outline and pad grid coincide within a tolerance circle of 0.3mmØ.
Observe correct orientation in circuit.

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 +85ºC 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 (2s)		4.6 kVrms, 6.5kVDC	
DC current		100µA	
Storage temperature		-40ºC to +125ºC	
Soldering temperature			
Profile peak -	either	260ºC	10s
	or	250ºC	30s
	or	240ºC	60s

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ISO 9001
FM 25326

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