PRODUCT DATA SHEET

ULTRA LOW DISTORTION LOW PROFILE LINE MATCHING TRANSFORMER

P3156

Features

* Ultra Low Distortion
* Low Profile (11mm)
* Extended Frequency Response
* IEC 950, UL 1950 and EN 60950 certified
* UL Recognized Component
* BABT Certificate of Recognition
* CSA NRTL/C Certificate of Compliance
* Flat TX and RX Responses
* High Thermal Stability

Applications

* V.90 and V.92 modems
* Line matching

DESCRIPTION

P3156 is intended for data communications to V.90 and V.92 (56kbps) data rates. P3156 is specifically designed to be matched to both 600 ohm and complex impedance telephone lines, using a minimum of external components, with very flat TX and RX frequency responses.

P3156 has extended flat frequency response from 30Hz to 4kHz with very low levels of signal distortion at signal frequencies as low as 150Hz.

P3156 also exhibits stable characteristics over its operating temperature range to maximize data throughput under varying environmental conditions without the need for modem retraining.

P3156 is certified to IEC 950, EN 60950, EN 41003 and UL1950. P3156 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. 2 unless otherwise stated.

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	f = 2kHz, R_L = 510Ω	-	4.8	-	dB
Frequency Response	LF -3dB cutoff	-	10	-	Hz
	HF -3dB cutoff	-	8	-	kHz
	100Hz - 4kHz	-	-	±0.2	dB
Return Loss	200Hz - 4kHz	14	-	-	dB
Distortion [1]	0dBm in line, 3rd Harmonic f = 600Hz	-	-	-90	dBm
	-3dBm in line, 3rd Harmonic f = 150Hz	-	-77	-	dBm
Balance	DC - 5kHz	80	-	-	dB
Saturation	Excitation 50Hz	-	-	10	Vrms
	250Vrms. Output voltage across line	-	-	65	Vpeak
Voltage isolation[2]	50Hz	3.88	-	-	kVrms
	DC	5.5	-	-	kV
Operating range: Functional	Ambient temperature	-10	-	+70	ºC
Storage		-40	-	+125	ºC
Humidity		-	-	95	%R.H.

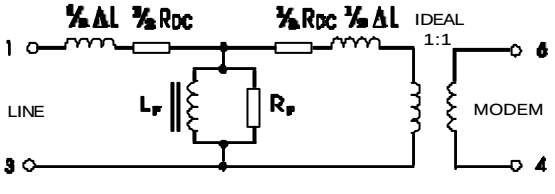
Lumped equivalent circuit parameters as Fig. 1

DC resistance, R_{DC}[3]	Sum of windings	-	280	-	Ω
Leakage inductance ΔL		-	20	-	mH
Shunt inductance Lp[4]	-43dBm 200Hz	-	14	-	H
Shunt loss Rp[4]	-43dBm 200Hz	12	-	-	kΩ

Notes

1. Third harmonic typically exceeds other harmonics by 10dB.
2. Components are 100% tested at 6.5kV DC.
3. Caution: do not pass DC through windings. Telephone line current, etc. must be diverted using 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.

Equivalent Circuit
Fig 1

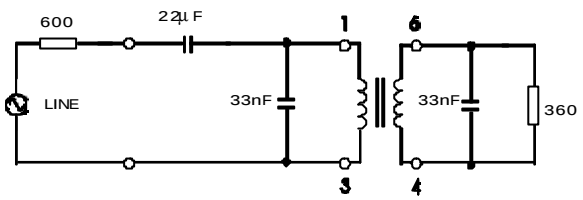


MATCHING RECOMMENDATIONS

600Ω MATCH

Recommended Circuit

Fig 2



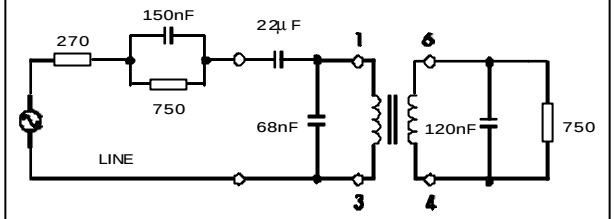
In practice the 360Ω load resistor in figure 2 will connect to a low output impedance TX driver. The 33nF capacitor on the load side should appear in parallel with the 360Ω resistor (rather than in parallel with the transformer winding) to obtain flat TX response to line.

Figure 3 gives flat RX and TX responses against the complex reference impedance (typically ±0.5dB 30Hz - 4kHz) with return loss better than 15dB.

EUROPEAN CTR21 COMPLEX MATCH

Recommended Circuit

Fig 3



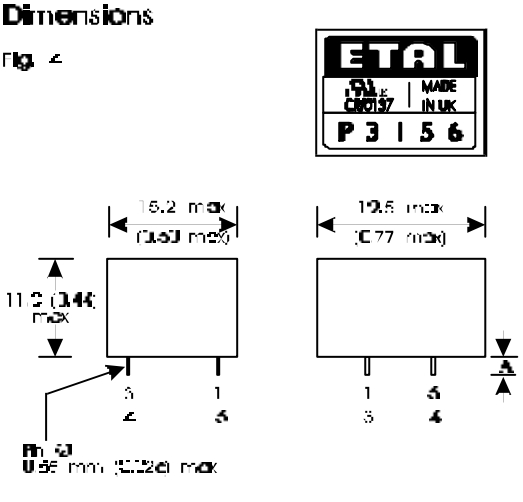
In practice, the 750Ω load resistor will connect to a low output impedance TX driver. The 120nF capacitor, which should have a temperature stable dielectric, should appear in parallel with the 750Ω resistor (rather than in parallel with the transformer winding) to obtain flat TX response to line.

For recommended matching to other reference impedances please contact Profec Technologies.

CONSTRUCTION

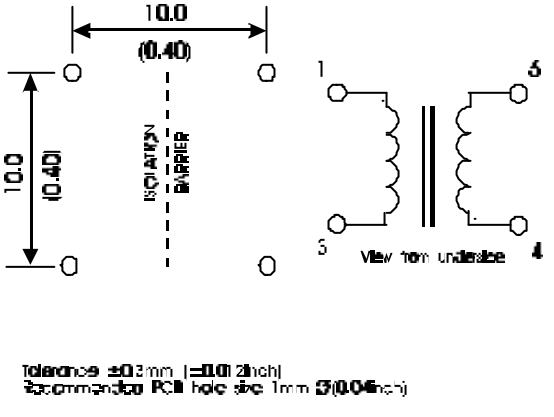
Dimensions

Fig 4



Connections

Fig 5



Dimensions shown are in millimetres (inches).
Geometric centres of outline and pin grid coincide within a tolerance circle of 0.6mmØ.
Windings may be used interchangeably as primary or secondary.

SAFETY

Constructed in accordance with IEC 950:1991, EN60950:1992 (BS7002:1992) to amendment 5, supplementary insulation, and UL 1950 3rd Edition, reinforced insulation, 250Vrms maximum working voltage, flammability class V-0.
Distances through solid insulation 0.4mm minimum.

CERTIFICATION

Certified under the IEC CB scheme (Certificate GB443W) to IEC 950:1991, up to amendment 4, sub-clauses 2.2.2, 2.9.1, 2.9.6, 2.9.7, 4.4.3 (class V-0) and 5.3 for a maximum working voltage of 250Vrms, nominal mains supply voltage not exceeding 300Vrms and a maximum operating temperature of 70ºC in Pollution Degree 2 environments, supplementary insulation.
Recognized under the Component Recognition Program of Underwriters Laboratories Inc. to US and Canadian requirements CAN/CSA C22.2 No. 950-95/UL1950, 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 188107).
Approved and certified by BABT to EN 60950 and EN 41003.
BABT Certificate of Recognition CR/0137.

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, 6.5 kVDC
DC current	100µA
Storage temperature	-40ºC to +125ºC
Lead temperature, 10s	260ºC

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TRANSFORMING THE FUTURE

ISO 9001
FM 25326

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