78000 Series

2-10kΩ, 300-200kHz, 400mW Max. @ 1kHz+ Low Profile Audio Transformer

PICO Electronics, Inc.

PRODUCT OVERVIEW

The 78000 series are ultra-miniature transformers in an encapsulated package with design layout as surface mount gull-wing leads. They can operate over a wide temperature range of -55°C to +130°C. Our proprietary materials and methods allow extreme temperatures of vapor phase, IR or other reflow procedures without degrading the high reliability of their physical form and electrical performance.

Typical applications:

- Sensors
- Radars
- Avionic flight controls
- Airborne systems
- Naval electronics
- Military, aerospace, or commercial aircraft

FEATURES

- Extreme resistance to impact, shock, and vibration
- Manufactured to MIL-PRF-27, Class S, Grade 5
- High reliability for space and mission critical applications
- Ultra miniature in size and minimalistic design
- Design layout in surface mount
- Available with magnetic shielding and/or electrostatic shielding

Contact Pico for part number of available options:

- Screening and qualification criteria to flight standard
- Capability to thermal shock up to 300 cycles
- Extra layers of magnetic shielding
- Fully RoHS compliant or with exemption 7(a)
- Modifications to mechanical design and electrical characteristics
- Custom new design and parameters



SPECIFICATIONS

Part Number [2]	Primary Impedance [Ω]	Secondary Impedance with Split Windings		Power		Primary Unbalanced DC Current [mA]	Primary DCR [Ω]	Secondary DCR		Turns Ratio PRI:SEC	
		Series [Ω]	Parallel [Ω]	1kHz+ [W]	300Hz+ [W]			Series [Ω]	Parallel [Ω]	Series	Parallel
78003	10 CT	10 CT	2.5	.4	.050	31.6	.83	1.16	.29	1:1	2:1
78005	20 CT	8 CT	2	.4	.050	22.3	1.66	.93	.23	1.58:1	3.16:1
78010	20 CT	20 CT	5	.4	.050	22.3	1.66	2.33	.58	1:1	2:1
78015	32 CT	32 CT	8	.4	.050	17.6	2.66	3.73	.93	1:1	2:1
78020	40 CT	40 CT	10	.4	.050	15.8	3.33	4.66	1.16	1:1	2:1
78025	48 CT	16 CT	4	.4	.050	14.4	4	1.86	.46	1.73:1	3.46:1
78030	50 CT	50 CT	12.5	.4	.050	14.1	4.16	5.8	1.45	1:1	2:1
78035	80 CT	32 CT	8	.4	.050	11.1	6.66	3.73	.93	1.58:1	3.16:1
78040	100 CT	40 CT	10	.4	.050	10	8.33	4.66	1.16	1.58:1	3.16:1
78045	100 CT	100 CT	25	.4	.050	10	8.33	11.6	2.91	1:1	2:1
78050	120 CT	12.8 CT	3.2	.4	.050	9.1	10	1.49	.37	3.06:1	6.12:1
78055	120 CT	60 CT	15	.4	.050	9.1	10	7	1.75	1.41:1	2.83:1
78060	120 CT	120 CT	30	.4	.050	9.1	10	14	3.5	1:1	2:1
78065	150 CT	12 CT	3	.4	.050	8.2	12.5	1.4	.35	3.54:1	7.08:1
78070	150 CT	50 CT	12.5	.4	.050	8.2	12.5	5.8	1.45	1.73:1	3.46:1
78075	150 CT	100 CT	25	.4	.050	8.2	12.5	11.6	2.91	1.22:1	2.45:1
78080	150 CT	150 CT	37.5	.4	.050	8.2	12.5	17.5	4.37	1:1	2:1
78085	150 CT	600 CT	150	.4	.050	8.2	12.5	70	17.5	1:2	1:1
78090	200 CT	200 CT	50	.4	.050	7	16.6	23.3	5.83	1:1	2:1
78095	300 CT	12 CT	3	.4	.050	5.8	25	1.4	.35	5:1	10:1
78100	300 CT	50 CT	12.5	.4	.050	5.8	25	5.8	1.45	2.45:1	4.9:1
78105	300 CT	150 CT	37.5	.4	.050	5.8	25	17.5	4.37	1.41:1	2.83:1
78110	300 CT	300 CT	75	.4	.050	5.8	25	35	8.75	1:1	2:1
78115	300 CT	600 CT	150	.4	.050	5.8	25	70	17.5	1:1.41	1.41:1
78120	320 CT	12.8 CT	3.2	.4	.050	5.6	26.6	1.49	.37	5:1	10:1
78125	400 CT	40 CT	10	.4	.050	5	33.3	4.66	1.16	3.16:1	6.32:1
78130	400 CT	120 CT	30	.4	.050	5	33.3	14	3.5	1.83:1	3.65:1
78135	400 CT	200 CT	50	.4	.050	5	33.3	23.3	5.83	1.41:1	2.83:1
78140	400 CT	400 CT	100	.4	.050	5	33.3	46.6	11.66	1:1	2:1
78145	400 CT	1000 CT	250	.4	.050	5	33.3	116.6	29.16	1:1.58	1.26:1
78150	400 CT	2000 CT	500	.4	.050	5	33.3	233.3	58.3	1:2.24	1:1.12
78155	400 CT	4000 CT	1000	.4	.050	5	33.3	466.6	116.6	1:3.16	1:1.58
78160	500 CT	12.8 CT	3.2	.4	.050	4.5	41.6	1.49	.37	6.25:1	12.5:1
78165	500 CT	16 CT	4	.4	.050	4.5	41.6	1.86	.46	5.6:1	11.2:1
78170	500 CT	50 CT	12.5	.4	.050	4.5	41.6	5.83	1.45	3.16:1	6.32:1

SPECIFICATIONS

	Part Number [2]	Primary Impedance [Ω]	Secondary Impedance with Split Windings Series [Ω]	Secondary Impedance with Split Windings Parallel [Ω]	Power 1kHz+ [W]	Power 300Hz+ [W]	Primary Unbalanced DC Current [mA]	Primary DCR [Ω]	Secondary DCR Series [Ω]	Secondary DCR Parallel [Ω]	Turns Ratio PRI:SEC Series	Turns Ratio PRI:SEC Parallel
	78175	500 CT	150 CT	37.5	.4	.050	4.5	41.6	17.5	4.37	1.83:1	3.65:1
	78180	500 CT	500 CT	125	.4	.050	4.5	41.6	58.3	14.58	1:1	2:1
(1)	78185	500 CT	500 CT	-	.4	.050	4.5	41.6	58.3	14.58	1:1	-
	78190	500 CT	600 CT	150	.4	.050	4.5	41.6	70	17.5	1:1.1	1.83:1
	78195	600 CT	12.8 CT	3.2	.4	.050	4.1	50	1.49	.37	6.85:1	13.7:1
	78200	600 CT	30 CT	7.5	.4	.050	4.1	50	3.5	.875	4.47:1	8.94:1
	78205	600 CT	48 CT	12	.4	.050	4.1	50	5.6	1.4	3.54:1	7.07:1
	78210	600 CT	200 CT	50	.4	.050	4.1	50	23.3	5.83	1.73:1	3.46:1
	78215	600 CT	600 CT	150	.4	.050	4.1	50	70	17.5	1:1	2:1
(1)	78220	600 CT	600 CT	-	.4	.050	4.1	50	70	17.5	1:1	-
	78225	600 CT	1200 CT	300	.4	.050	4.1	50	140	35	1:1.41	1.41:1
	78230	640 CT	12.8 CT	3.2	.4	.050	3.9	53.3	1.49	.37	7.07:1	14.4:1
	78235	700 CT	100 CT	25	.4	.050	3.8	58.3	11.6	2.91	2.65:1	5.29:1
	78240	800 CT	12.8 CT	3.2	.4	.050	3.5	66.6	1.49	.37	7.9:1	15.8:1
	78245	800 CT	48 CT	12	.4	.050	3.5	66.6	5.6	1.4	4.08:1	8.16:1
	78250	800 CT	800 CT	200	.4	.050	3.5	66.6	93.3	23.3	1:1	2:1
	78255	900 CT	600 CT	150	.4	.050	3.3	75	70	17.5	1.22:1	2.45:1
	78260	1000 CT	12 CT	3	.4	.050	3.2	83.3	1.4	.35	9.13:1	18.3:1
	78265	1000 CT	50 CT	12.5	.4	.050	3.2	83.3	5.83	1.45	4.47:1	8.94:1
	78270	1000 CT	1000 CT	250	.4	.050	3.2	83.3	116.6	29.15	1:1	2:1
	78275	1060 CT	12.8 CT	3.2	.4	.050	3.1	88.3	1.49	.37	9.1:1	18.2:1
	78280	1200 CT	12.8 CT	3.2	.4	.050	2.9	100	1.49	.37	9.68:1	19.4:1
	78285	1200 CT	500 CT	125	.4	.050	2.9	100	58.3	14.58	1.55:1	3.1:1
	78290	1200 CT	1200 CT	300	.4	.050	2.9	100	140	35	1:1	2:1
(1)	78295	1200 CT	1200 CT	-	.4	.050	2.9	100	140	35	1:1	-
	78300	1500 CT	12 CT	3	.4	.050	2.6	125	1.4	.35	11.2:1	22.4:1
	78305	1500 CT	500 CT	125	.4	.050	2.6	125	58.3	14.58	1.73:1	3.46:1
(1)	78310	1500 CT	600 CT	-	.4	.050	2.6	125	70	17.5	1.58:1	-
(1)	78315	1500 CT	1500 CT	-	.4	.050	2.6	125	175	43.75	1:1	-
	78320	1600 CT	12.8 CT	3.2	.4	.050	2.5	133.3	1.49	.37	11.2:1	22.4:1
	78325	2000 CT	8 CT	2	.4	.050	2.2	166.6	.93	.23	15.8:1	31.6:1
	78330	2000 CT	2000 CT	500	.4	.050	2.2	166.6	233.3	58.33	1:1	2:1
(1)	78335	2000 CT	2000 CT	-	.4	.050	2.2	166.6	233.3	58.33	1:1	-
	78340	2000 CT	8000 CT	2000	.4	.050	2.0	166.6	933.3	233.3	1:2	1:1
	78345	2000 CT	2500 CT	625	.4	.050	1.8	166.6	291.6	72.4	1:1	2:1

SPECIFICATIONS

	Part Number [2]	Primary Impedance [Ω]	Secondary Impedance with Split Windings Series [Ω]	Secondary Impedance with Split Windings Parallel [Ω]	Power 1kHz+ [W]	Power 300Hz+ [W]	Primary Unbalanced DC Current [mA]	Primary DCR [Ω]	Secondary DCR Series [Ω]	Secondary DCR Parallel [Ω]	Turns Ratio PRI:SEC Series	Turns Ratio PRI:SEC Parallel
	78350	3000 CT	3000 CT	725	.4	.050	1.8	250	350	87.5	1:1	2:1
(1)	78355	3000 CT	3000 CT	-	.4	.050	1.7	250	350	87.5	1:1	-
	78360	3600 CT	3600 CT	900	.4	.050	1.6	300	420	105	1:1	2:1
	78365	4000 CT	16 CT	4	.4	.050	1.6	333.3	1.86	.46	15.8:1	31.6:1
	78370	4000 CT	600 CT	150	.4	.050	1.6	333.3	70	17.5	2.58:1	5.16:1
	78375	4000 CT	1000 CT	250	.4	.050	1.6	333.3	116.6	29.16	2:1	4:1
(1)	78380	4000 CT	8000 CT	-	.4	.050	1.4	333.3	933.3	233.3	1:1.41	-
	78385	5000 CT	500 CT	125	.4	.050	1.4	416.6	58.3	14.58	3.16:1	6.32:1
	78390	5000 CT	5000 CT	1250	.4	.050	1.2	416.6	583.3	145.8	1:1	2:1
	78395	7500 CT	50 CT	12.5	.4	.050	1.2	625	5.83	1.45	12.2:1	24.5:1
	78400	7500 CT	100 CT	25	.4	.050	1.2	625	11.66	2.91	8.66:1	17.3:1
	78405	7500 CT	600 CT	150	.4	.050	1.2	625	70	17.5	3.54:1	7.07:1
	78410	7500 CT	2500 CT	625	.4	.050	1.2	625	291.6	72.9	1.73:1	3.46:1
(1)	78415	7500 CT	7500 CT	-	.4	.050	1.1	625	875	218.75	1:1	-
	78420	8000 CT	12.8 CT	3.2	.4	.050	1.1	666.6	1.49	.37	25:1	50:1
	78425	8000 CT	1000 CT	250	.4	.050	1.1	666.6	116.6	29.16	2.83:1	5.66:1
(1)	78430	8000 CT	1200 CT	-	.4	.050	1.1	666.6	140	35	2.58:1	-
(1)	78435	9000 CT	9000 CT	-	.4	.050	1.0	750	1.050	262.5	1:1	-
	78440	10,000 CT	12.8 CT	3.2	.4	.050	1.0	833	1.49	.37	28:1	56:1
	78445	10,000 CT	16 CT	4	.4	.050	1.0	833	1.86	.46	25:1	50:1
	78450	10,000 CT	100 CT	25	.4	.050	1.0	833	11.66	2.91	10:1	20:1
	78455	10,000 CT	200 CT	50	.4	.050	1.0	833	23.3	5.83	7.07:1	14.14:1
	78460	10,000 CT	500 CT	125	.4	.050	1.0	833	58.3	14.58	4.47:1	8.94:1
	78465	10,000 CT	600 CT	150	.4	.050	1.0	833	70	17.5	4.08:1	8.16:1
	78470	10,000 CT	1000 CT	250	.4	.050	1.0	833	116.6	29.16	3.16.1	6.32:1
	78475	10,000 CT	1200 CT	300	.4	.050	1.0	833	140	35	2.89:1	5.77:1
	78480	10,000 CT	1500 CT	375	.4	.050	1.0	833	175	43.75	2.58:1	5.16:1
	78485	10,000 CT	2000 CT	500	.4	.050	1.0	833	233.33	58.33	2.24:1	4.47:1
	78490	10,000 CT	5000 CT	1250	.4	.050	1.0	833	583.3	145.83	1.41:1	2.83:1
	78495	10,000 CT	7500 CT	1875	.4	.050	1.0	833	875	218.75	1.15:1	2.3:1
	78500	10,000 CT	10,000 CT	2500	.4	.050	1.0	833	1166.6	291.6	1:1	2:1
(1)	78505	10,000 CT	10,000 CT	-	.4	.050	1.0	833	1166.6	291.6	1:1	-

Note 1: Includes electrostatic shield.
Note 2: Parts are available with Pb-free dipped terminals that is compliant to RoHS exemption 7 by requesting part number + '-RoHS-7'

SPECIFICATIONS

GENERAL

Parameter	Condition	Min.	Typ.	Max.	Units
Dielectric Strength	60Hz	-	200	-	V_{RMS}
Insulation Resistance	300VDC	10	-	-	GΩ
Distortion	1kHz @ Rated Power	-	-	5	%
Frequency Response	300 - 200kHz @ 1mW	-3	-	3	dB
Operating Temperature Range	Ambient with temperature rise	-55	-	+130	°C
Storage Temperature Range	Ambient	-55	-	+105	°C
Size	Width x Length x Height	0.55 x 0.55 x 0.24 (13.97 x 13.97 x 6.096)			inches (mm)
Weight		-	3	-	grams
Case	Glass Reinforced Polymer				
Potting	Vacuum Impregnated Epoxy				
Tube Packaging	Width x Height x Length	0.93 x 0.40 x 20.0 (23.734 x 10.16 x 508)			inches (mm)
Tape & Reel Packaging	Upon request				
Moisture Sensitivity Level	Surface mount only	Level 3			

OPTIONAL DESIGN CRITERIA

Test	Standard	Description
Vibration	MIL-STD-202	Method 204, Vibration, High Frequency
Shock	MIL-STD-202	Method 213, Shock (Specified Pulse)
Immersion	MIL-STD-202	Method 104, Immersion
Moisture Resistance	MIL-STD-202	Method 106, Moisture Resistance
Flammability	MIL-STD-202	Method 111, Flammability (External Flame)
Thermal Shock	MIL-STD-202	Method 107, Thermal Shock

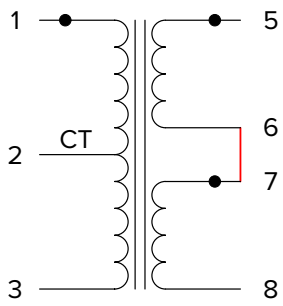
OPTIONAL SCREENING AND QUALIFICATION

Standard	Screening & Qualification	Test [3]
MIL-PRF-27	a.) Group A inspection Level-T - Table VII b.) Qualification inspection, Grade 5 - Table V	I. Thermal Shock II. Vibration III. Burn-in IV. Induced Voltage V. Shock VI. Dielectric Withstanding Voltage (at reduced pressure) VII. Insulation Resistance VIII. Electrical Characteristics IX. Visual and Mechanical Examination (External) X. Life XI. Radiographic Inspection
MIL-STD-981	a.) Group A screening tests – Table VI b.) Group B tests – Table XII, Class S	
EEE-INST-002, Section M1	a.) Magnetics Screening Req. – Table 2 b.) Magnetics Part Qual. – Table 3	

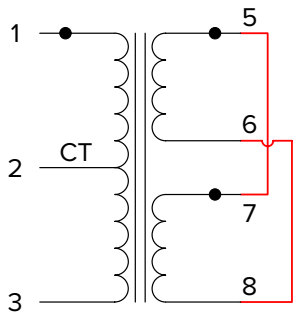
Note 3: Screening and qualification tests are not limited to the options in the chart above. Each standard may also be stringent or exclude certain tests from one another. Please contact Pico for specific application needs and for Pico part number.

ELECTRICAL SCHEMATIC

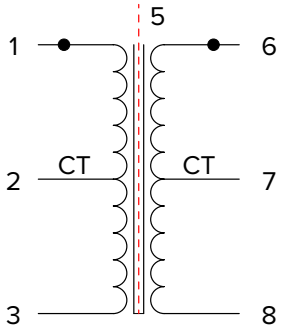
SPLIT SECONDARIES
SERIES CONNECTION



SPLIT SECONDARIES
PARALLEL CONNECTION

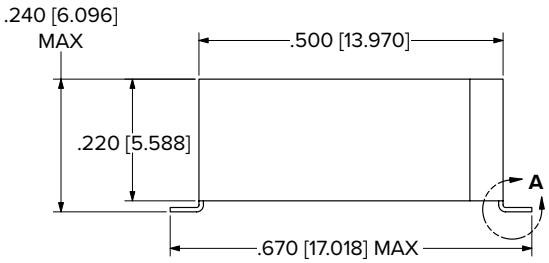


ELECTROSTATIC SHIELD

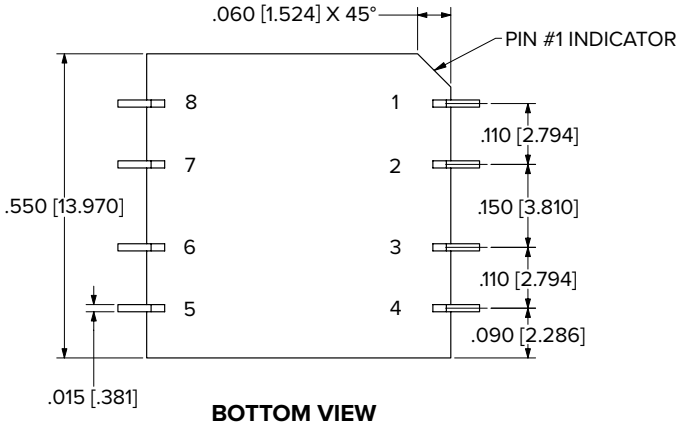


NOTES
a. TERMINAL 4 HAS NO CONNECTION. MECHANICAL STABILITY ONLY.
b. CT STANDS FOR "CENTER-TAP", WHERE THE TOTAL NUMBER OF TURNS IS EVENLY SPLIT BETWEEN THE TOP HALF AND BOTTOM HALF OF A COMPLETE WINDING.

MECHANICAL DRAWINGS

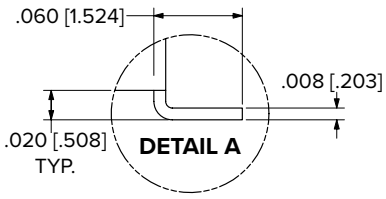


ELEVATION VIEW



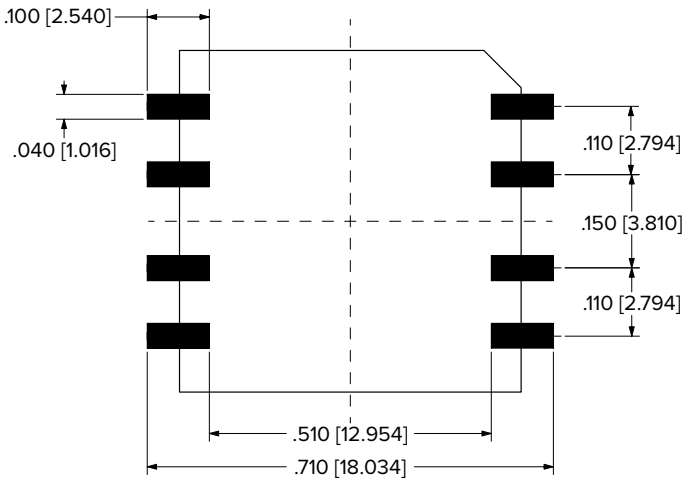
BOTTOM VIEW

LEAD DETAILS



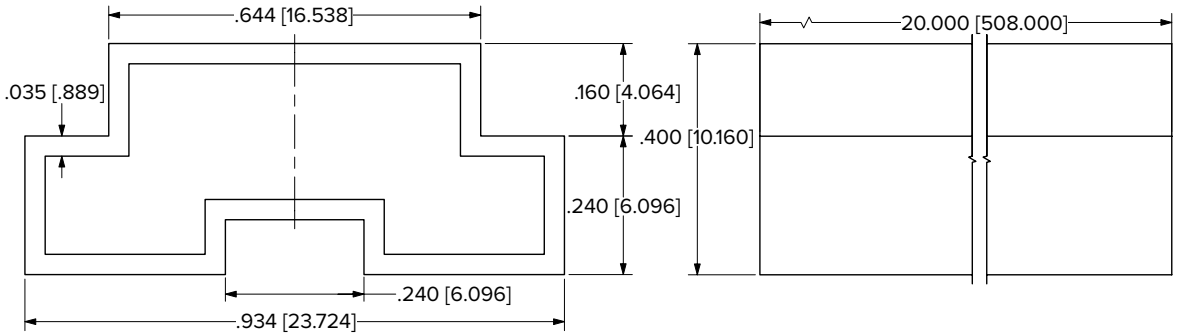
NOTES
a. ALL DIMENSIONS ARE IN INCHES, [ ] = MM
b. TERMINALS ARE CLOCKWISE FROM PIN #1
c. PIN #4 HAS NO CONNECTION

RECOMMENDED LAND PATTERN DIMENSIONS



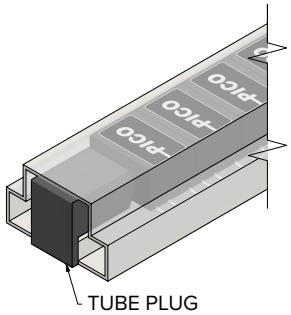
BOTTOM VIEW

TUBE PACKAGING

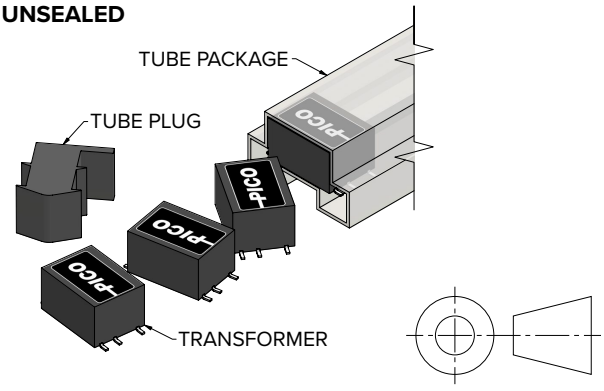


PLAN VIEW **ELEVATION VIEW**

SEALED



UNSEALED



Pico warrants each product manufactured by us and sold by us or an authorized representative, to be free from defects in material and workmanship. If properly used, it will perform within its applicable specifications for a period of one year after original shipment. Pico's obligation under this guarantee is limited to repairing or replacing our product to the original purchaser. This warranty is in lieu of all other warranties, express or implied and constitutes fulfillment of our obligations to the purchaser. We do not guarantee that the products can be used for a particular purpose other than those solely covered by the product's specifications. Pico must be notified if the product must meet particular certifications and/or standards. We assume no liability, in any event, for consequential damages, for anticipated or lost profits, incidental damages or loss of time or other losses incurred by the purchaser or any third party in connection with products covered by this warranty or otherwise. The purchaser will indemnify and hold Pico harmless for any damages, losses, costs, etc. from usage not within the product's specifications. Pico must be consulted before usage of its products in a nuclear, radioactive or space environment.

We reserve the right to discontinue products without notice, We reserve the right to make modifications to any existing catalog products without notice, at any time, without the obligation to modify units previously sold.