

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Page 1-11 – added dash numbers 02 thru 10 Page 8 – removed 50Ω resistor from test circuit	7 Feb 84	Randy Larson
B	Page 2 – added paragraphs 3.2.1 through 3.2.6 Page 6 – revised paragraph 3.3.7 Page 6 – deleted paragraph 3.4 and subparagraphs and added them to page 2 Page 7 – revised paragraph 4.3.4 Page 8 – removed 1/ from table I Page 8 – table I, changed values of R _{DC} for part numbers -02, -03, -04, -06, -07, and -08 Page 9 – added N:1 to figure 2 added note to figure 2 added 1:N to figure 3 revised note to figure 3 Page 11 – added N:1 to figure 5 and revised note Page 12 – added additional supplier	8 Aug 85	Ivan R. Jones
C	Page 1 – added, inactive for new design note Page 2 and 12 – editorial changes	2 Feb 87	Ivan R. Jones
D	Page 1 – Changed CAGE Code to 037Z3. Page 12 – Inserted new paragraph 6.4 <u>Supersession Data</u> .	18 July 2002	Kendall Cottongim
E	Addition of pure tin prohibition requirements	5 September 2013	Michael A. Radecki

INACTIVE FOR
 NEW DESIGN USE
 MIL-PRF-21038/27

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
 HAS CHANGED NAMES TO:
 DLA LAND AND MARITIME
 COLUMBUS, OHIO 43218-3990

REV STATUS OF PAGES	REV	E	E	E	E	E	E	E	E	E	E	E	E						
	PAGES	1	2	3	4	5	6	7	8	9	10	11	12						
PMIC N/A	PREPARED BY Dan McGrath							DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO											
Original date of drawing 18 November 1982	CHECKED BY Randy Larson							TITLE TRANSFORMER, PULSE, LOW POWER											
	APPROVED BY Ivan R. Jones																		
	SIZE A	CODE IDENT. NO. 14933						DWG NO. 82030											
	SCALE N/A			REV E				PAGE 1 OF 12											

1. SCOPE

1.1 Scope. This drawing describes the requirements for a low power pulse transformer. This drawing provides for a level of transformer quality and reliability assurance for acquisition of type TP7SXNNNNKZ low power pulse transformer in accordance with MIL-PRF-21038.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as follows:



2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-21038 - Transformers, Pulse, Low Power, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Interface and physical dimensions.

3.1.1 Item Requirements. The individual item requirements shall be in accordance with MIL-PRF-21038, grade 7, and as specified herein.

3.2 Design and construction.

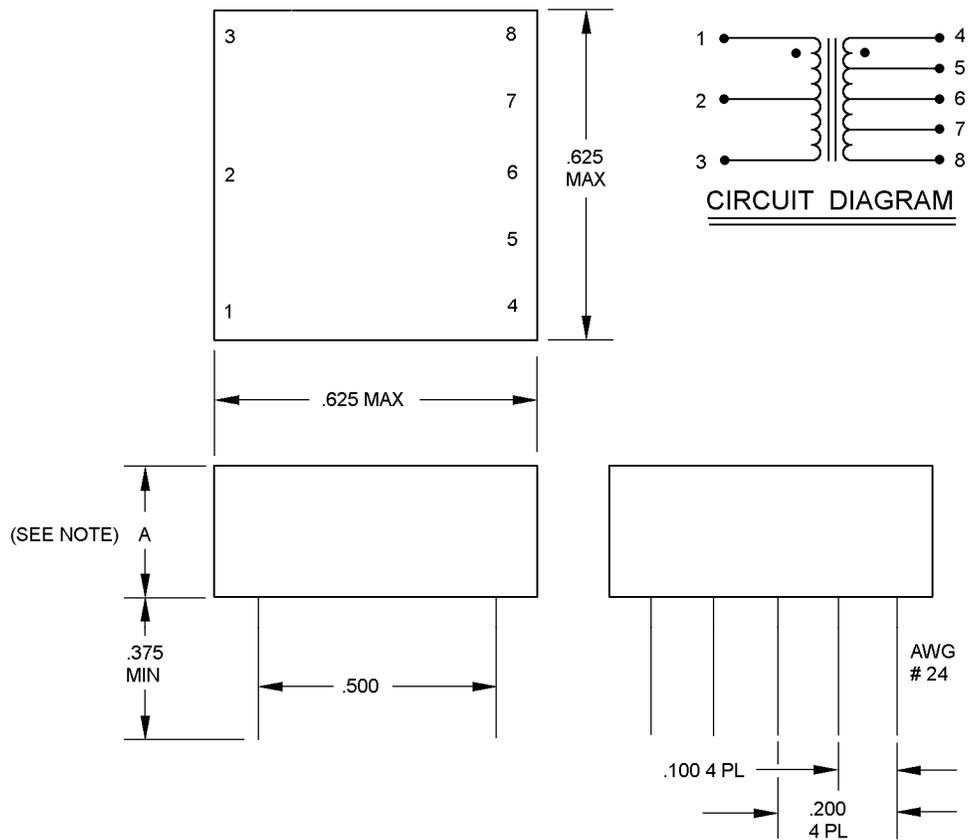
3.2.1 Dimensions and configurations. Dimensions and configurations shall be as specified on figure 1 and in table I.

3.2.2 Weight. The weight shall be 5 grams maximum.

3.2.3 Case. The case shall be epoxy.

3.2.4 Terminals. The terminals shall be solderable, printed circuit pins.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 2

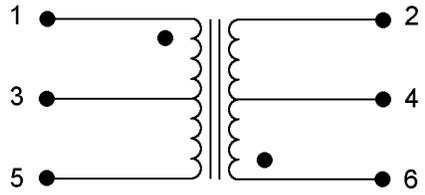


CONFIGURATION A

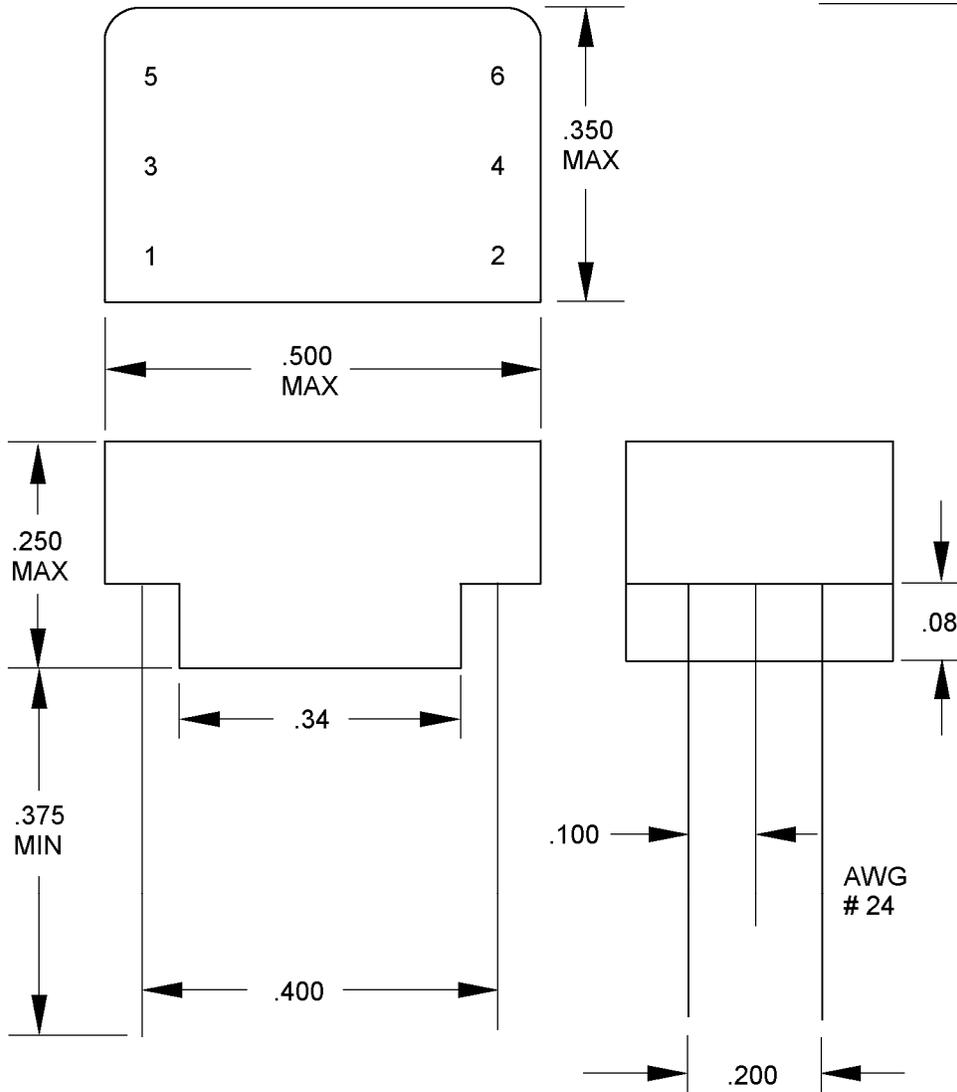
NOTE: See table I.

FIGURE 1. Dimensions and configurations.

<p>DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 14933</p>	<p>DWG NO. 82030</p>
		<p>REV E</p>	<p>PAGE 3</p>

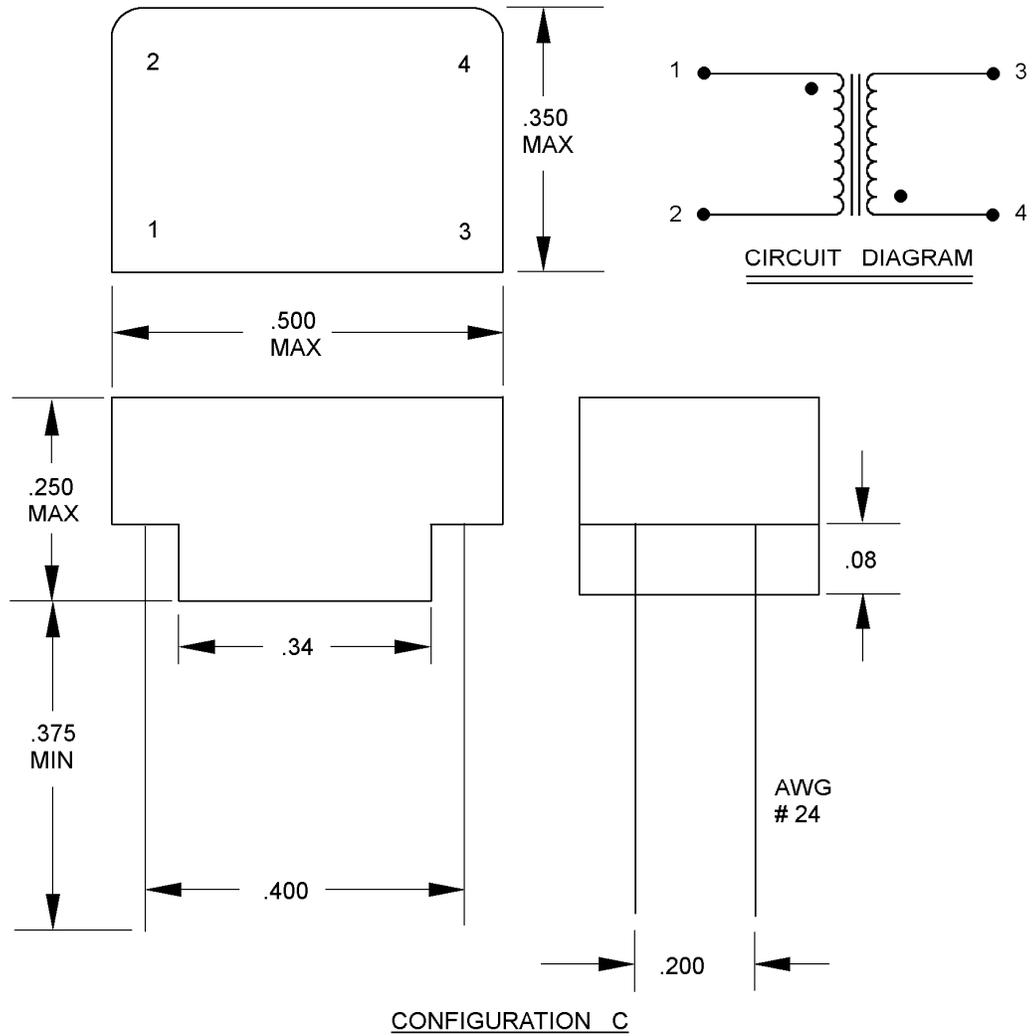


CIRCUIT DIAGRAM



CONFIGURATION B

<p>DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 14933</p>	<p>DWG NO. 82030</p>
		<p>REV E</p>	<p>PAGE 4</p>



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ± 0.010 inches (0.25 mm).
4. Marking shall be on the top of the case.
5. Terminal identification shall be marked on the transformer as shown above.

INCHES	MM
.08	2.0
.100	2.54
.200	5.08
.250	6.35
.34	8.6
.350	8.89
.375	9.53
.500	12.70
.625	15.88

FIGURE 1. Dimensions and configurations – Continued.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 5

3.2.5 Operating temperature range. The operating temperature range shall be -55°C to +110°C for dash number 01, and -55°C to +130°C for all other dash numbers.

3.2.6 Design documentation. The design documentation shall be in accordance with MIL-PRF-21038. Unless otherwise specified in the contract or purchase order, documentation shall be retained by the manufacturer and available for review by the acquiring activity or contractor upon request.

3.3 Electrical ratings.

3.3.1 Rise time of output pulse. The rise time of output pulse shall be less than 100 nanoseconds for dash number 01 and less than 150 nanoseconds for dash numbers 02 through 10.

3.3.2 Pulse width of output pulse. The pulse width of output pulse shall be 2 microseconds.

3.3.3 Overshoot. The overshoot shall be less than 1 volt when tested in accordance with 4.3.2.

3.3.4 Droop. See table I and 4.3.3.

3.3.5 Turns ratio. See table I.

3.3.6 Common mode rejection (CMR). See table I.

3.3.7 Input impedance. The input impedance shall be greater than 3,000 ohms when tested in accordance with 4.3.4 over the frequency range of 75 kilohertz to 1 megahertz with a temperature range of -55°C to +110°C for dash number 01 and -55°C to +130°C for all other dash numbers.

3.3.8 DC resistance. See table I.

3.3.9 Polarity. Polarity shall be in accordance with the circuit diagram of figure 1.

3.4 Terminal strength. The terminal strength shall be in accordance with MIL-STD-202, method 211, test condition A, 2 pounds applied force.

3.5 Dielectric withstanding voltage. The dielectric withstanding voltage shall be tested in accordance with MIL-STD-202, method 301, test voltage 100 V rms.

3.6 Insulation resistance. The insulation resistance shall be 10,000 megohms minimum at 250 V dc.

3.7 Life expectancy. The life expectancy shall be 10,000 hours minimum (X), in accordance with MIL-PRF-21038.

3.8 Vibration, high frequency. The vibration high frequency shall be tested in accordance with MIL-STD-202, method 204, test condition B.

3.9 Shock (specified pulse). The shock shall be tested in accordance with MIL-STD-202, method 213, test condition I.

3.10 Marking. Marking shall be in accordance with MIL-PRF-21038, except the part number shall be in accordance with 1.2 herein. The similar vendor part number may also be marked in accordance with 6.4 herein.

3.11 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.12 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.

3.13 Pure tin. The use of pure tin, as an underplate or final finish is prohibited both internally and externally. Tin content of transformer components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.4).

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 6

3.14 Manufacturer Eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the MIL-PRF-21038 Qualified Products List for at least one part.

3.15 Workmanship. The transformer shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection for this part is not required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and group B inspections of MIL-PRF-21038.

4.2.2 Group A inspection. Group A inspection shall be in accordance with MIL-PRF-21038.

4.2.3 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-21038.

4.2.4 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group A and group B requirements in lieu of performing group A and group B tests (see 6.2c).

4.3 Methods of inspection. Methods of inspection shall be in accordance with MIL-PRF-21038 and as specified herein.

4.3.1 Common mode rejection (CMR) (see table I). The transformers shall be tested as specified on figure 2.

4.3.2 Rise time, pulse width, and overshoot (see 3.3.1 through 3.3.3). The transformers shall be tested as specified on figure 3 with the resulting output waveform shown on figure 4.

4.3.3 Droop (see table I). The transformers shall be tested as specified on figure 3 with the resulting output waveform shown on figure 4.

4.3.4 Input impedance. The transformers shall be tested as specified on figure 5 over the frequency range of 75 kHz to 1 MHz at -35°C, +25°C, and +110°C for dash number 01, and at -55°C, -35°C, +25°C +110°C, and +130°C for all other dash numbers.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. Transformers conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL 21038, this drawing becomes obsolete and will not be used for new design. The QPL 21038 product shall be the preferred item for all applications.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 7

6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the quality conformance inspection data with each shipment of parts by the manufacturer.
- c. Whether the manufacturer performs the group A and group B tests or provides certification of compliance with group A and group B requirements.
- d. Requirements for notification of change of product to the contracting activity, if applicable.

6.3 Replaceability. Transformers covered by this drawing will replace the same commercial device covered by contractor prepared specification or drawing.

6.4 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers

6.5 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at <mailto:transformercoil@dla.mil> or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0557 or DSN 850-0557.

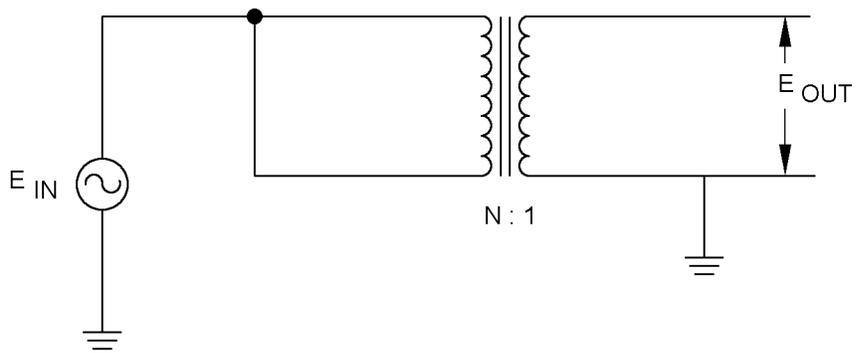
TABLE I. Electrical characteristics and dimensions.

Part number	<u>1/</u> Turns ratio	Primary	Secondary	% (max) droop	CMR (min)	"A" (max)	R _{DC} Ω (max)	<u>2/</u> Config-uration
82030-01	1:1 ±3% 1:.707 ±3%	1-3 1-3	4-8 5-7	20	45 dB	.325	1-3 1.9 4-8 2.1	A
82030-02	1:1 ±3% 1:.707 ±3%	1-3 1-3	4-8 5-7	20	45 dB	.300	1-3 3.0 4-8 3.0	A
82030-03	1.4:1 ±3% 2:1 ±3%	1-3 1-3	4-8 5-7	20	45 dB	.250	1-3 3.5 4-8 3.0	A
82030-04	1.25:1 ±3% 1.66:1 ±3%	1-3 1-3	4-8 5-7	20	45 dB	.250	1-3 3.2 4-8 3.0	A
82030-05	2.3:1 ±3% 3.2:1 ±3%	4-8 5-7	1-3 1-3	20	45 dB	.300	1-3 1.2 4-8 3.0	A
82030-06	1:1.41 ±3%	1-2	3-4	20	45 dB	---	1-2 2.2 3-4 2.7	C
82030-07	1:1 ±3%	1-5	2-6	20	45 dB	---	1-5 2.5 2-6 2.8	B
82030-08	1:1.41 ±3%	1-5	2-6	20	45 dB	---	1-5 2.2 2-6 2.7	B
82030-09	1:1.66 ±3%	1-5	2-6	20	45 dB	---	1-5 1.5 2-6 2.4	B
82030-10	1:2 ±3%	1-5	2-6	20	45 dB	---	1-5 1.3 2-6 2.6	B

1/ Primary, secondary on all parts except -06 shall have center tap balance to ±5 percent.

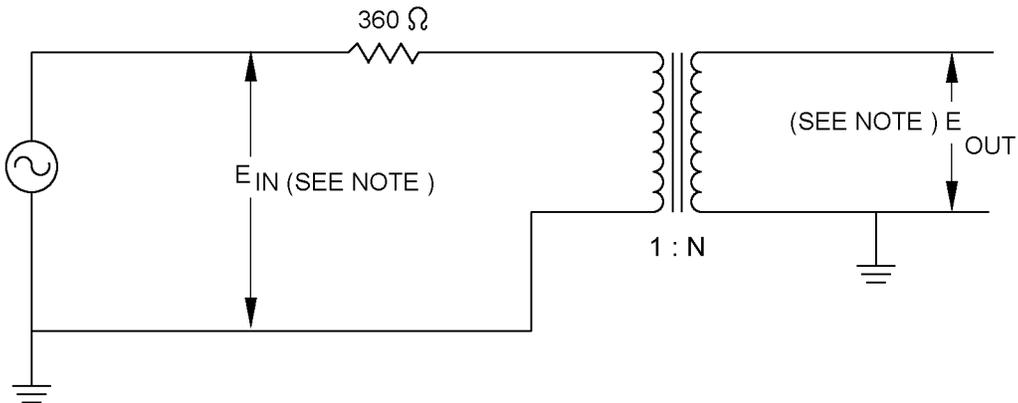
2/ See figure 1.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 8



NOTE: input to be applied and output to be measured as shown for all dash numbers.

Figure 2. Test circuit for common mode rejection.



$$\text{Calc: Droop} = \frac{E_D}{E_{OUT}} \times 100\%. \quad (\text{See figure 4 for } E_D.)$$

NOTE: Input to be applied and output to be measured as shown for all dash numbers.

FIGURE 3. Test circuit for droop, rise time, pulse width and overshoot.

<p>DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 14933</p>	<p>DWG NO. 82030</p>
		<p>REV E</p>	<p>PAGE 9</p>

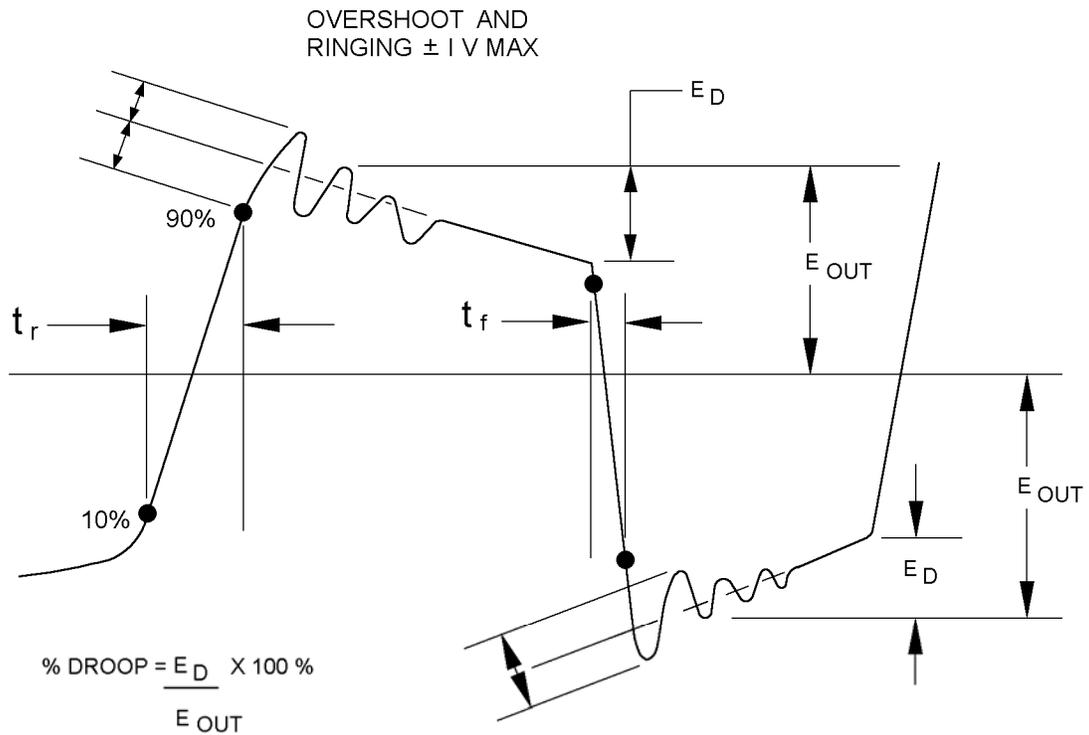


FIGURE 4. Output waveform for test circuit on figure 3.

DEFENSE ELECTRONIC SUPPLY CENTER
DAYTON, OHIO

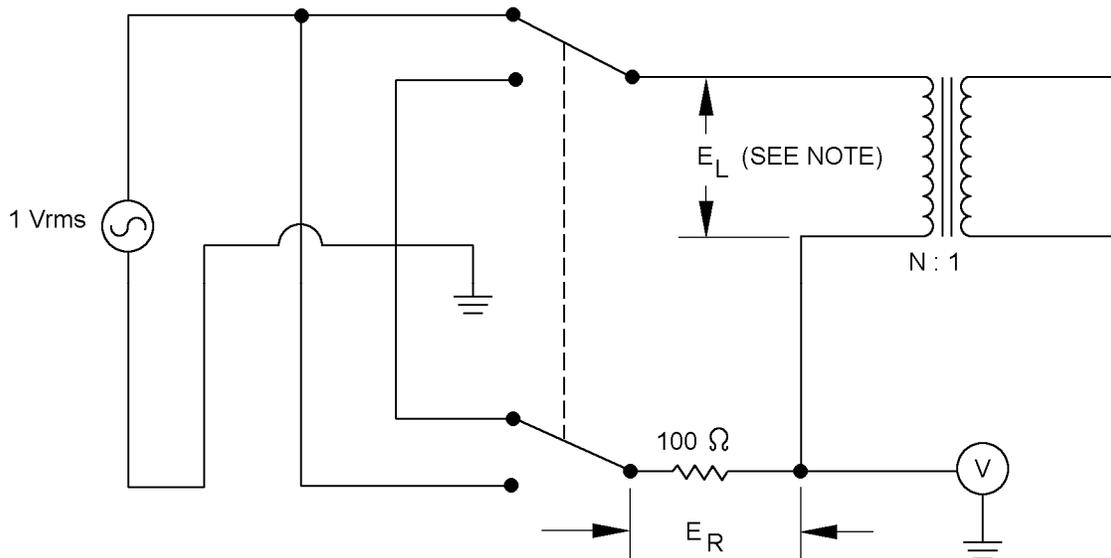
SIZE
A

CODE IDENT NO.
14933

DWG NO.
82030

REV E

PAGE 10



$$\text{Input Impedance } Z = \frac{E_L \times 100\Omega}{E_R}$$

NOTE: Input to be applied to the high turn side for all dash numbers. Self-impedance may also be measured using a HP4277A LCZ meter.

FIGURE 5. Test circuit for input impedance.

<p>DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 14933</p>	<p>DWG NO. 82030</p>
		<p>REV E</p>	<p>PAGE 11</p>

6.6 Supersession data. Device covered by this drawing are replaced by Military Specification stated in table II.

Table II. Supersession data.

MILITARY PIN	Superseded by PIN	MILITARY PIN	Superseded by PIN
82030-01	N/A	82030-06	M21038/27-05
82030-02	M21038/27-01	82030-07	M21038/27-06
82030-03	M21038/27-02	82030-08	M21038/27-07
82030-04	M21038/27-03	82030-09	M21038/27-08
82030-05	M21038/27-04	82030-10	M21038/27-09

6.7 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at <mailto:transformercoil@dla.mil>, or by contacting DLA Land and Maritime, Columbus, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0557 or DSN 850-0557.

DLA Land and Maritime drawing PIN <u>1/</u>	Vendor similar designation or type number	Vendor CAGE	Vendor name and address
82030-01 82030-02 82030-03 82030-04 82030-05 82030-06 82030-07 82030-08 82030-09 82030-10	B-2201 B-2202 B-2203 B-2204 B-2205 B-2206 B-2207 B-2208 B-2209 B-2210	64948	Beta Transformer Technology Corporation 40 Orville Dive Bohemia, NY 11716

1/ Parts must be purchased to this DLA Land and Maritime PIN to assure that all performance requirements and tests are met.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 82030
		REV E	PAGE 12