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INCH-POUND

MIL-PRF-21038/28  
8 July 1998

## PERFORMANCE SPECIFICATION SHEET

### TRANSFORMERS, PULSE, LOW POWER, DUAL UNITS

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-21038.

#### REQUIREMENTS:

Dimensions and configuration: See figure 1 and table 1.

Operating temperature: -55°C to +130°C.

Case: The case shall be nonmetallic (e.g., epoxy).

Weight: 5 grams, maximum.

Terminal strength: Method 211 of MIL-STD-202, test condition A, 2 pounds applied force.

Terminals: Solderable printed circuit type terminals, see figure 1.

#### Electrical characteristics:

Turns ratio: See table I.

Common mode rejection (CMR): 45 dB minimum when tested as specified on figure 2.

Pulse width of output: 2 microseconds nominal. The transformers shall be tested as specified on figure 3.

Overshoot and ringing:  $\pm 1$  volt maximum. The transformers shall be tested as specified on figure 3 with the resulting waveform shown on figure 4.

Droop: Less than 20 percent when tested as specified on figure 3 with the resulting waveform shown on figure 4.

Rise time and fall time of output pulse: shall be less than 150 nanoseconds except dash numbers -25, -26, -27, -30, and -31 shall be less than 250 nanoseconds maximum and dash numbers -9, -10, -15, -20, -24 shall be less than 200 nanoseconds maximum. The transformers shall be tested as specified on figure 3 with the resulting output waveform shown on figure 4.

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Input impedance: The input impedance shall be as specified in table I when tested as specified on figure 5 at the frequencies of 75 kHz and at 1 MHz at  $-55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ;  $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ; and  $+130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ .

DC resistance: The maximum dc resistance shall be in accordance with table I.

Dielectric withstanding voltage: Method 301 of MIL-STD-202, 100 V rms.

Insulation resistance: Method 302 of MIL-STD-202, test condition B. Not less than 1,000 megohms at 250 V dc.

Shock (specified pulse): Method 213 of MIL-STD-202, test condition I.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B.

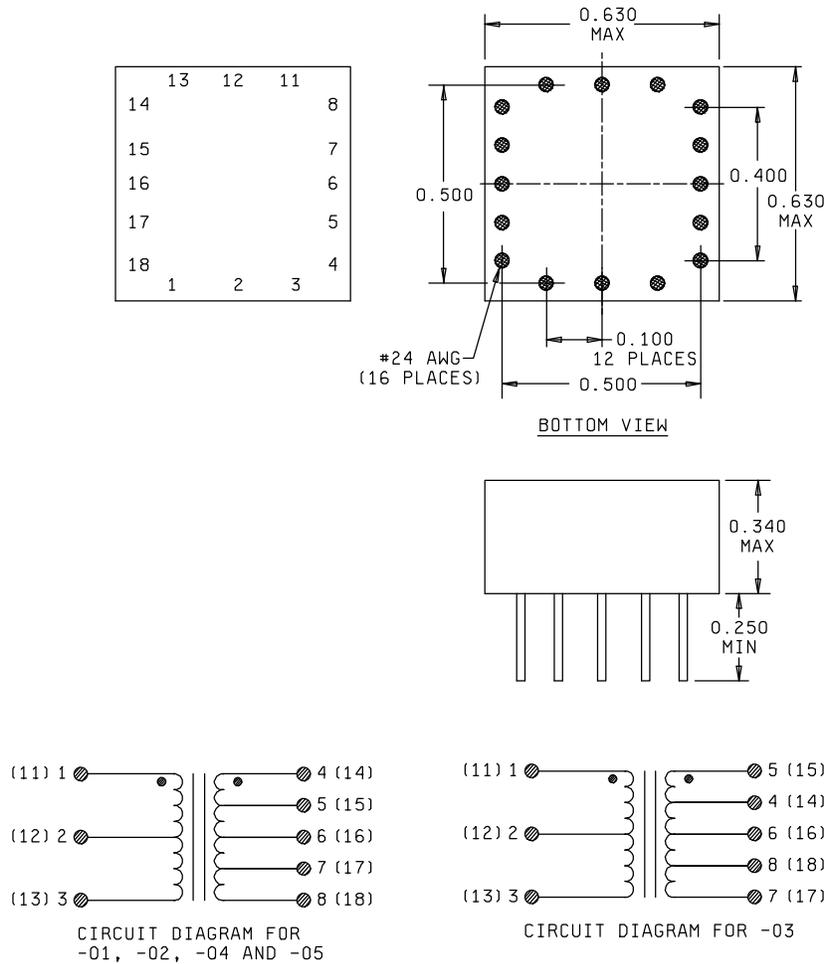
Part or Identifying Number (PIN): Three levels of product are available in accordance with MIL-PRF-21038, level C, level M, and level T. The PIN shall be coded as follows:

M21038/28-(dash no. from table I) C	denotes C level part (e.g., M21038/28-01C)
M21038/28-(dash no. from table I) M	denotes M level part (e.g., M21038/28-01M)
M21038/28-(dash no. from table I) T	denotes T level part (e.g., M21038/28-01T)

Extension of qualification: Extension of qualification shall be in accordance with MIL-PRF-21038. Manufacturers may submit additional proposals for extension of qualification for review and approval by the qualifying activity. One way to obtain family approval of products in this specification is outlined below:

Qualify any dash number in this specification sheet and receive extension of qualification to all other dash numbers for that configuration (e.g. configuration A). To further extend qualification to other configurations, submit two additional samples for that configuration to table I (of MIL-PRF-21038), group I tests and then the group IV tests. One or more failures may be cause to refuse qualification. (For example, submit eight samples of M21038/028-01 to qualification testing of MIL-PRF-21038 and receive qualification for all configuration A dash numbers; then submit two samples of M21039/28-09 (for configuration B) and two samples of M21038/28-17 (configuration C) and receive qualification for all configuration B and configuration C dash numbers.)

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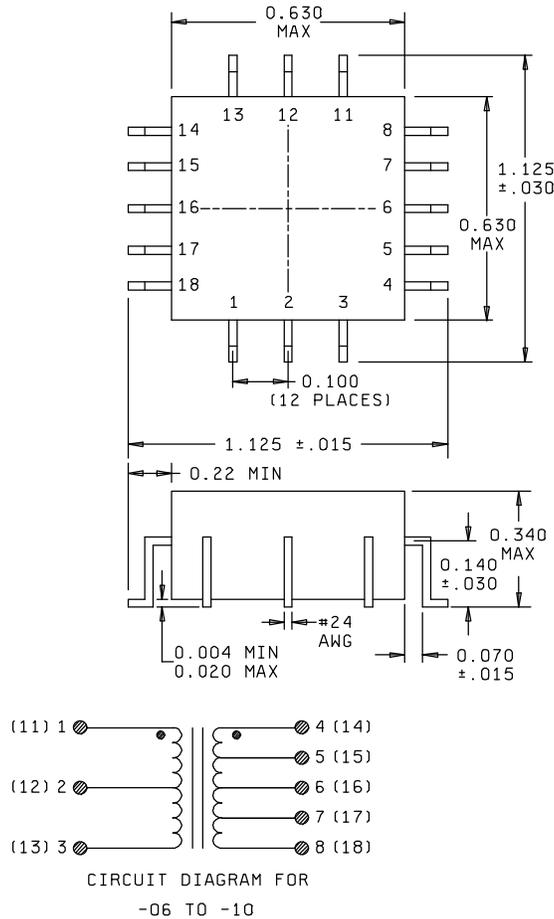
CONFIGURATION A

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.010$  inch (0.255 mm).
4. Marking shall be on top of the case unless space is insufficient, then marking can appear on the sides.
5. Terminal identification shall be marked on the transformer as shown or, as a minimum, pin 1, pin 4, pin 11, and pin 14 shall be marked.

FIGURE 1. Dimensions, configurations, and circuit diagrams

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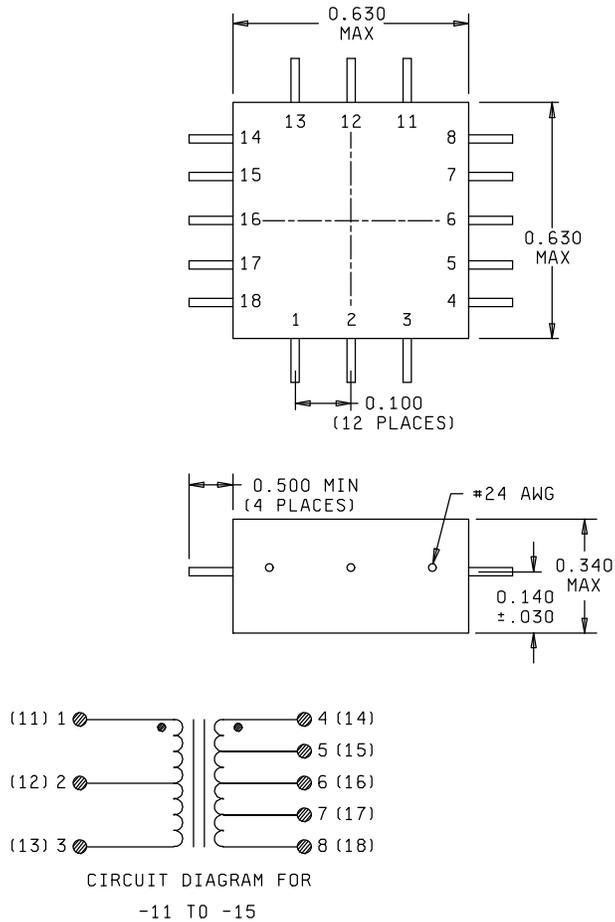
CONFIGURATION B

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm .010$  inch (0.255 mm).
4. Marking shall be on top of the case unless space is insufficient, then marking can appear on the sides.
5. Terminal identification shall be marked on the transformer as shown or, as a minimum, pin 1, pin 4, pin 11, and pin 14 shall be marked.

FIGURE 1. Dimensions, configurations, and circuit diagrams Continued.

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CONFIGURATION C

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.010$  inch (0.255 mm).
4. Marking shall be on top of the case unless space is insufficient, then marking can appear on the sides.
5. Terminal identification shall be marked on the transformer as shown or, as a minimum, pin 1, pin 4, pin 11, and pin 14 shall be marked.

FIGURE 1. Dimensions, configurations, and circuit diagrams Continued.

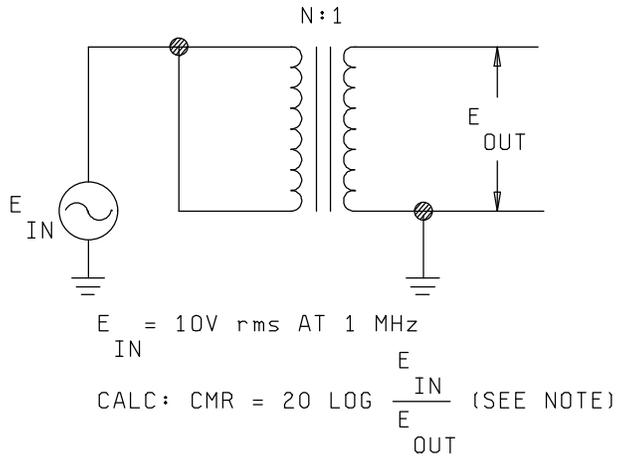
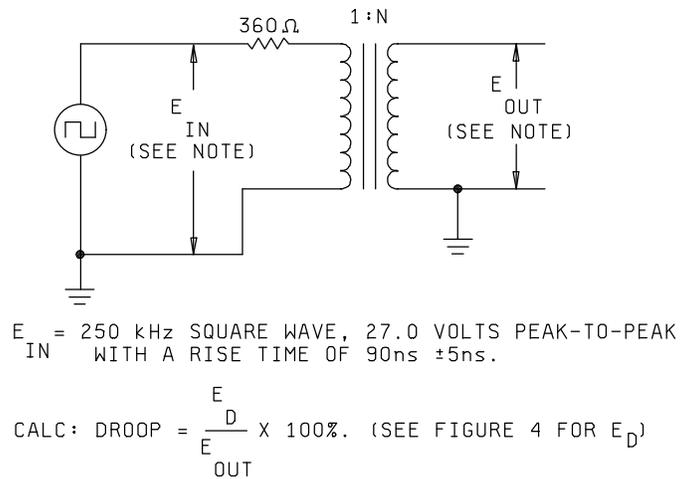


FIGURE 2. Test circuit for common mode rejection



NOTE: Input to be applied and output to be measured for all dash numbers as shown on figure 2 and figure 3. N represents highest turn winding in each test.

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

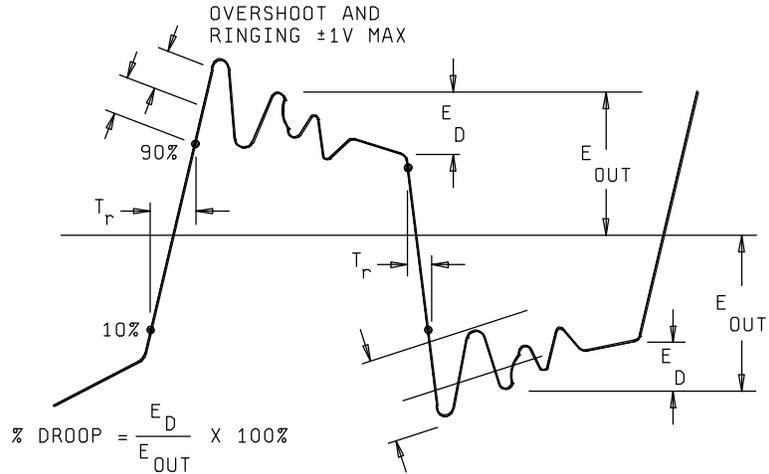
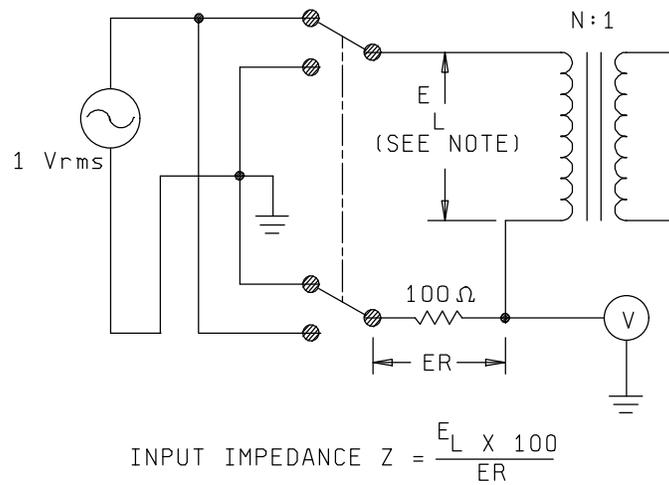


FIGURE 4. Output waveform for test circuit on figure 3



NOTE: Input to be applied to high-turn side for all dash numbers. Self impedance may also be measured using HP4277A LCZ meter or equivalent. N represents the highest turn winding.

FIGURE 5. Test circuit for input impedance

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TABLE I. Electrical characteristics and configurations

Dash no.	Turns Ratio ( $\pm 3\%$ )	Primary	Secondary	DC resistance (ohms) max	Impedance (ohms) min	Configuration
-01	1.4: 1 2:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.5 4-8 (14-18): 3.0	1-3 (11-13): 7,200	A
-02	1:1 1:0.707	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.0 4-8 (14-18): 3.0	1-3 (11-13): 4,000	A
-03	1.25:1 1.66:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.2 4-8 (14-18): 3.0	1-3 (11-13): 4,000	A
-04	1:2.12 1:1.5	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7 (15-17)	1-3 (11-13): 1.0 4-8 (14-18): 3.5	4-8 (14-18) 4,000	A
-05	1:2.5 1:1.79	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.5 4-8 (14-18): 4.0	4-8 (14-18): 4,000	A
-06	1.25:1 1.66:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.2 4-8 (14-18): 3.0	1-3 (11-13): 4,000	B
-07	1.4:1 2:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.5 4-8 (14-18): 3.0	1-3 (11-13): 7,200	B
-08	1:1 1:0.707	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.0 4-8 (14-18): 3.0	1-3 (11-13): 4,000	B
-09	1:2.12 1:1.5	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7 (15-17)	1-3 (11-13): 1.0 4-8 (14-18): 3.5	4-8 (14-18) 4,000	B
-10	1:2.5 1:1.79	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.5 4-8 (14-18): 4.0	4-8 (14-18): 3,000	B
-11	1.4:1 2:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.5 4-8 (14-18): 3.0	1-3 (11-13): 7,200	C
-12	1:1 1:0.707	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.0 4-8 (14-18): 3.0	1-3 (11-13): 4,000	C
-13	1.25:1 1.66:1	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7(15-17)	1-3 (11-13): 3.2 4-8 (14-18): 3.0	1-3 (11-13): 4,000	C
-14	1:2.12 1:1.5	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7 (15-17)	1-3 (11-13): 1.0 4-8 (14-18): 3.5	4-8 (14-18) 4,000	C
-15	1:2.5 1:1.79	1-3 (11-13) 1-3 (11-13)	4-8 (14-18) 5-7 (15-17)	1-3 (11-13): 3.5 4-8 (14-18): 4.0	4-8 (14-18): 3,000	C

Custodians:

Army - CR  
Navy - EC  
Air Force - 85  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5950-0908)

Review activities:

Army - AM, CR4, MI  
Navy - AS, MC, OS, SH  
Air Force - 17, 19, 99