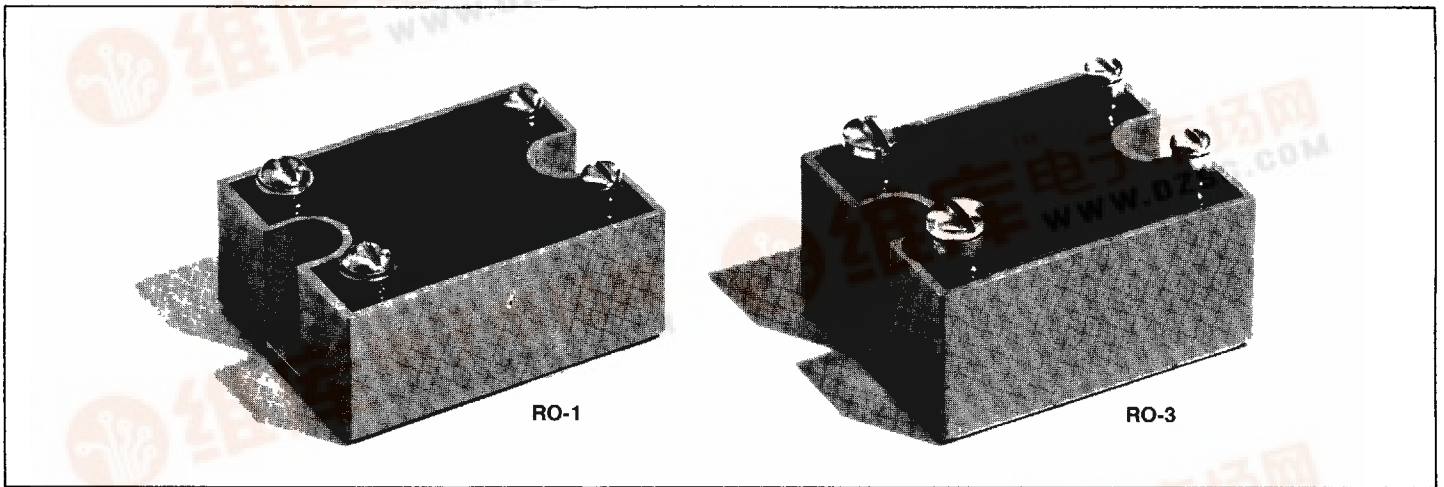
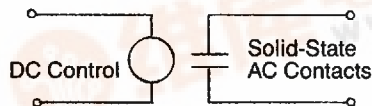


SOLID-STATE RELAYS



NATIONAL PART NO.	D2410Z D2410R	D4810Z	D2425Z D2425R	D4825Z	D2440Z D2440R	D4840Z	D2475Z D2475R	D4875Z	D24110Z D24110R	D48110Z
Zero Cross switching										
Random switching										
I_{RMS} Current rating (RMS Amps)	10		25		40		75		110	
Voltage range (RMS volts)	48-280	180-530	48-280	180-530	48-280	180-530	48-280	180-530	48-280	180-530
Transient voltage (PK volts)	500	1200	500	1200	500	1200	500	1200	500	1200
I_{TSM} Peak one cycle surge current (PK Amps)	150		300		650		1000		2000	
I_{pt} For fusing at 8.3 msec (A ² sec)	95		375		1750		4150		16000	
V_{TM} Max peak on-state volts @ peak amps, T _J = 25°C	1.5		1.6		1.6		1.7		1.5	
dv/dt Min. rate of voltage rise (V/μsec)	200		200		200		200		200	
Control voltage range (DC volts)	3-32		3-32		3-32		3-32		3-32	
Control input impedance (OHMS)	1000-1800		1000-1800		1000-1800		1000-1800		1000-1800	
Turn-On Min. control (volts)	3.0		3.0		3.0		3.0		3.0	
Turn-Off Max control (volts)	1.0		1.0		1.0		1.0		1.0	
Isolation voltage (RMS)	2500		2500		2500		2500		2500	
R_{θjc} Thermal impedance Junction-to-case (°C/W)	.9		.7		.5		.2		.18	
T_J Max junction operating temperature °C	125		125		125		125		125	
Ambient temperature range °C	-30 to +80		-30 to +80		-30 to +80		-30 to +80		-30 to +80	
Package Outline Number	RO-1		RO-1		RO-1		RO-3		RO-3	

Circuit



OUTLINE DRAWINGS

T-91-20

DO-4

NOTE 1: .422 MAX. / .453 MAX. / .163 / .189
 NOTE 2: .075 / .060 MIN. / .060 MIN. / .250 MAX.
 TERM. 2
 SEATING PLANE
 .405 MAX.
 TERM. 1
 .800 MAX.
 .424 MAX.
 .437

NOTES:

1. COMPLETE THREADS TO EXTEND TO WITHIN 2-1/2 THREADS OF SEATING PLANE.
2. ANGULAR ORIENTATION OF THIS TERMINAL IS UNDEFINED.
3. 10-32 UNF-2A MAXIMUM PITCH DIAMETER OF PLATED THREADS SHALL BE BASIC PITCH DIAMETER (.1697", 4.29 MM) REF. (SCREW THREAD STANDARDS FOR FEDERAL SERVICES 1957) HANDBOOK H28 P1.

DO-8

.210 DIA.
 .310
 3.875
 4.625
 1.675 MAX.
 .605
 .645
 3/8-24UNF-2A

DO-5

NOTE 1, 3: .422 MAX. / .453 MAX. / .115 / .200
 NOTE 1: .220 / .249
 NOTE 2: .156 MIN. / .375 MAX. / .140 / .175
 TERM. 1
 SEATING PLANE
 .060 MIN.
 .450 MAX.
 1.00 MAX.
 .667 MAX.
 .667
 .080 MAX.

NOTES:

1. COMPLETE THREADS TO EXTEND TO WITHIN 2-1/2 THREADS OF SEATING PLANE.
2. ANGULAR ORIENTATION OF THIS TERMINAL IS UNDEFINED.
3. 1/4-28 UNF-2A. MAXIMUM PITCH DIAMETER OF PLATED THREADS SHALL BE BASIC PITCH DIAMETER (.2268", 5.74 MM) REF. (SCREW THREAD STANDARDS FOR FEDERAL SERVICES 1957) HANDBOOK H28 1957 P1.
4. MINIMUM FLAT.

DO-9

① ⑦
 3.250 MAX. / .793 / .828 / 1.443 MAX.
 ② ③ ④
 250 / 630 / 660 / 749 / 1.212 / 1.250
 ⑤ ⑥
 375 MIN. / 265 / 350 / 530 / 756
 1.218 MAX. / 2.250 MAX. / 7028 / 7094
 ⑧
 5.00 / 6.00
 SEATING PLANE
 TERM 2

1. The device with exception of the hexagon, thread, and flexible lead extension lies within the cylinder defined by 1.218 and length 3.25.
2. Angular orientation of terminal with respect to hexagonal portion is undefined. Square or radius on end of terminal is optional.
3. Length of incomplete or undercut threads.
4. Pitch diameter of 3/4-16 UNF-2A (coated) threads (SAS B1.1-1960).
5. A chamfer (or undercut) on one or both ends of the hexagonal portion is optional.

DO-30

SEATING PLANE
 TERM 1
 TERM 2
 ϕD
 ϕW
 ϕD₁
 ϕT
 Z
 M
 N
 J
 F
 N₁

NOTES:

1. CONTOUR AND ORIENTATION OF TERMINAL LUG IS UNDEFINED.
2. THE BODY OF THE DEVICE, WITH THE EXCEPTION OF THE HEXAGON, THREAD, AND FLEXIBLE LEAD EXTENSION, LIES WITHIN THE CYLINDER DEFINED BY ϕD₁ AND LENGTH J.
3. A CHAMFER (OR UNDERCUT) ON ONE OR BOTH ENDS OF THE HEXAGONAL PORTION IS OPTIONAL.
4. SEATED HEIGHT WITH THE LEAD BENT AT RIGHT ANGLE.
5. LENGTH OF INCOMPLETE OR UNDERCUT THREADS OF ϕM.
6. PITCH DIA. OF 1/2-20 UNF-2A (COATED) THREADS (ASA B1.1-1960).
7. MINIMUM FLAT.

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
B	.035	.100	.89	2.54	1
ϕD	-	1.227	-	31.16	-
ϕD ₁	-	1.031	-	26.18	2
E	1.031	1.063	28.19	27.00	-
F	.187	.500	4.8	12.7	3
J	-	2.500	-	63.50	2, 4
M	.437	.650	11.1	16.5	1
ϕM	.425	.499	10.80	12.67	5
N	.605	.645	15.37	26.38	-
N ₁	-	.125	-	3.17	5
ϕ	4.250	4.750	108.0	120.6	-
ϕT	.260	.296	6.61	7.51	-
ϕW	.4619	.4675	11.73	11.874	6
Z	.312	-	7.93	-	7

A-24-11
T-91-20

OUTLINE DRAWINGS

HS69

Top view dimensions: 8.500, 6.500, 3.490, 3.250, 6.875.

Side view dimensions: 1.750, 500, 2.000, 4.500 MAX, 1.000, 1.500.

HS82

Top view dimensions: 8.500 ± .000, 6.500 ± .000, 1.000 ± .000, 3.000 ± .000, 6.875 ± .005, 2.50 ± .005, 1.620 ± .000, 3.250, 2.50 ± .010, 3.250 REF., 2.490 REF., 3.490 REF.

Side view dimensions: 2.000 ± .000, 4.375 MAX, 1.500 ± .000, 1/2 x 14 SLOT.

HS86

Front view dimensions: 4.90, 6.00, 3.500, 4.694.

Side view dimensions: 4.000, 5.93.

MO-11, MO-12

Top view dimensions: E, B, A.

Side view dimensions: C, D.

DIM.	INCHES		MILLIMETERS	
	MAX.	MIN.	MAX.	MIN.
A	2.910	2.490	63.90	63.20
B	1.255	1.245	31.90	31.60
C	1.010	0.990	25.90	25.00
D	0.590	0.560	14.99	14.22
E	1.970	1.940	50.00	49.30

MO-13, MO-14

Top view dimensions: B.

Side view dimensions: D, C, A.

DIM.	INCHES		MILLIMETERS	
	MAX.	MIN.	MAX.	MIN.
A	2.900	2.240	58.4	56.9
B	1.800	1.740	45.7	44.2
C	1.140	1.100	29.0	27.9
D	1.015	0.985	25.8	25.0
E	1.690	1.670	43.0	42.5

P-4

Top view dimensions: J-DIA, K-DEPTH, 20° ± 5°, AUXILIARY CATHODE (SEE NOTE 1).

Side view dimensions: D, A, E, ANODE, CATHODE, GATE (SEE NOTE 2), H, B, C.

DIM.	DECIMAL (INCHES)		METRIC (MM)	
	MIN.	MAX.	MIN.	MAX.
A	1.000	1.070	25.400	27.178
B	1.695	1.900	43.053	48.260
C	—	2.640	—	67.058
D	0.30	—	.762	—
E	0.05	0.70	.127	1.778
F	—	2.900	—	73.660
G	1.680	1.690	42.672	42.926
H	1.65	1.99	4.191	5.054
J	135	145	3.429	3.683
			540	

P-7

Dimensions: 2.9" MAX., 1.85" MAX., 1.162" MAX., 1.85" MAX., ANODE, CATHODE.

Weight 530g

P-9

Top view dimensions: G DIA, H DEPTH.

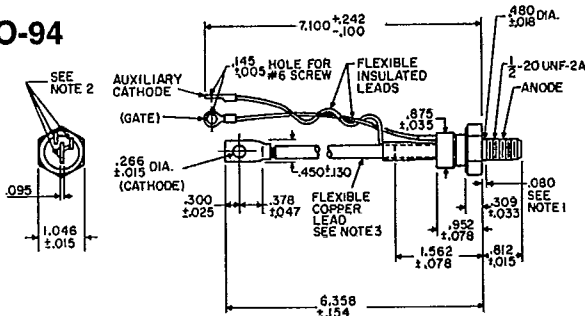
Side view dimensions: D, F, E, ANODE, B, C, A.

UNLESS SPECIFIED ALL DEVICES SHIPPED WITH 12" LEAD TERMINALS

DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	—	2.900	—	73.660
B	—	2.640	—	67.056
C	1.695	1.900	43.053	48.260
D	0.30	—	.762	—
E	.005	.070	.127	1.778
F	1.000	1.070	25.400	27.178
G	.135	.145	3.429	3.683
H	.070	.100	1.778	2.540

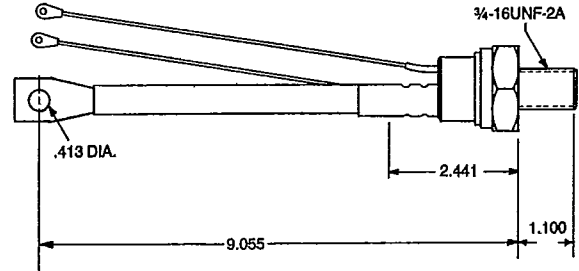
OUTLINE DRAWINGS

TO-94

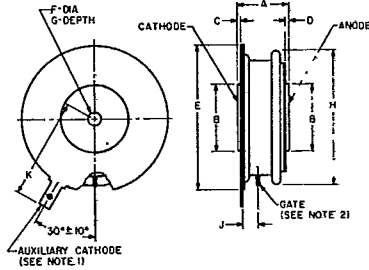


- NOTES:
 1. MAXIMUM LENGTH OF UNTHREADED PORTION.
 2. ORIENTATION OF THESE TERMINALS IS UNDEFINED.
 3. LEAD COVERED WITH SILICONE RUBBER INSULATION (CLASS H) 600 VOLT ASTM STANDARD WALL.
 4. CONFORMS TO JEDEC TO-94 OUTLINE.
 5. DIMENSIONS IN INCHES.
 6. APPROX. WEIGHT: 3.5 OZS. / 100 GRAMS

TO-118



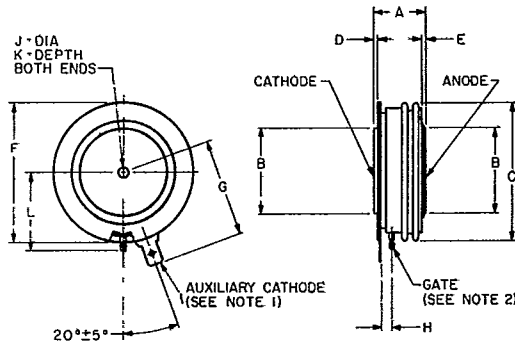
TO-200AB



DIM	DECIMAL (INCHES)		METRIC (MM)	
	MIN	MAX	MIN	MAX
A	.525	.575	13.335	14.605
B	.746	.754	18.948	19.152
C	.030	.060	.762	1.524
D	.030	.060	.762	1.524
E	1.580	1.655	40.132	42.037
F	.135	.145	3.420	3.680
G	.068	.082	1.727	2.083
H	1.380	1.460	35.052	37.084
J	.155	.175	3.937	4.445
K	---	1.150	---	29.210

- NOTES:
 1. USES AMP #42801-2 FAST-ON OR EQUIVALENT
 2. USES AMP #60354-2 CONNECTOR OR EQUIVALENT
 3. APPROX WEIGHT 1.8 OZ / 50 GRAMS

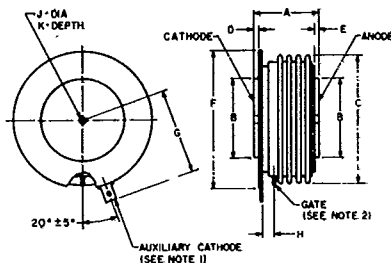
TO-200AB-2



DIM	DECIMAL (INCHES)		METRIC (MM)	
	MIN	MAX	MIN	MAX
A	.560	.605	14.224	15.367
B	.985	.995	25.019	25.273
C	---	1.585	---	40.259
D	.040	---	.1016	---
E	.030	---	.762	---
F	1.600	1.650	40.640	41.910
G	---	1.120	---	28.448
H	.130	.170	3.302	4.318
J	.135	.145	3.429	3.683
K	.070	.100	1.778	2.540
L	---	.875	---	22.225

- NOTES:
 1. USES AMP #42801-2 FAST-ON OR EQUIVALENT
 2. USES AMP #60598-1 CONNECTOR OR EQUIVALENT
 3. UNLESS SPECIFIED ALL DEVICES WILL BE SHIPPED WITH 12" LEADS WITH RING TERMINALS

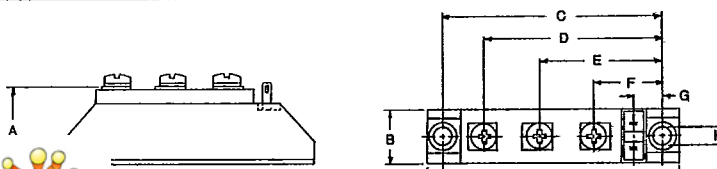
TO-200AC



DIM	DECIMAL (INCHES)		METRIC (MM)	
	MIN	MAX	MIN	MAX
A	1.000	1.065	25.400	27.051
B	1.336	1.350	33.934	34.290
C	---	2.100	---	53.340
D	.020	.105	.508	2.667
E	.030	.080	.762	2.032
F	2.246	2.251	57.040	57.170
G	1.399	1.409	35.530	35.780
H	.165	.185	4.190	4.690
J	.135	.145	3.420	3.680
K	.062	.072	1.570	1.820

- NOTES:
 1. USES AMP #42801-2 FAST-ON OR EQUIVALENT
 2. USES AMP #60598-1 CONNECTOR OR EQUIVALENT
 3. UNLESS SPECIFIED ALL DEVICES WILL BE SHIPPED WITH 12" LEADS WITH RING TERMINALS
 4. APPROX WEIGHT 8 OZ / 230 GRAMS

TO-240AA



DIM	DEC	MM	DIM	DEC	MM
A	1.181	30	F	.364	25
B	.787	20	G	.433	11
C	3.150	80	H	.252	6.4
D	2.559	65	I	3.622	92
E	1.772	45			