DESCRIPTION:

Thermally conductive silicones are compounded with fillers such as Alumina and Boron Nitride, which readily allow the passage of heat, maintain flexibility through their service life, and create an electrical insulative barrier between the two mating surfaces.

APPLICATION:

Thermally conductive products are commonly used to isolate power sources from heat sinks. Ja-Bar offers a variety ranging from high performance insulators for demanding military applications, to moderately performing materials for less demanding commercial applications.

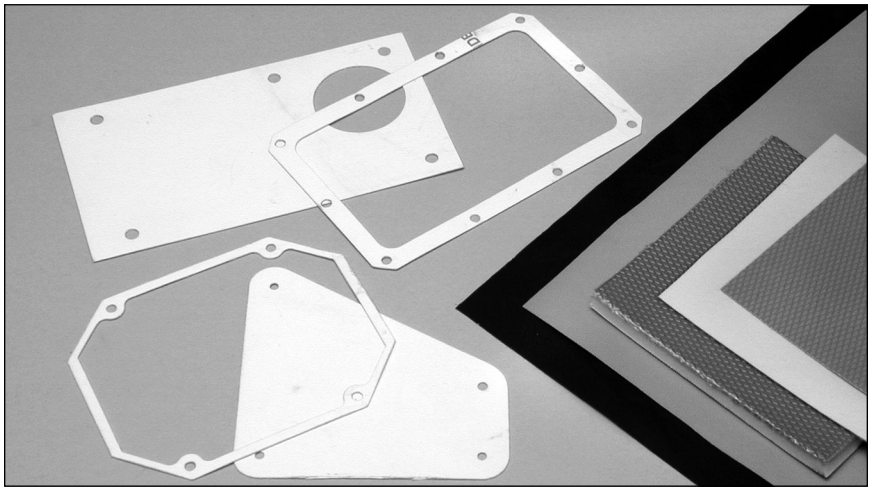
SPECIFICATION:

TABLE 7.1 gives specific information on thermally conductive materials.

Ja-Bar Series 701: Is our original thermally conductive material. Series 701 is a composite of silicone rubber fiberglass and alumina. It is flame retardant and is specially formulated for use as a thermally conductive insulator. Primary use is to electrically isolate power sources from heat sinks. Series 701 has an excellent mechanical and physical characteristic. Surfaces are pliable and allow complete surface contact with excellent heat dissipation. Series 701 actually improves its thermal resistance with age.The reinforcing fiberglass and alumina gives excellent cut-through resistance and Series 701 is non-toxic and resists damage from cleaning agents. Contact us for available thicknesses of Series 701. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 702: Is a composite of silicone rubber and fiberglass. It is boron nitride filled and offers low thermal resistance. Series 702 is non-toxic and resists damage from cleaning agents. It includes a flame retardant and is specially formulated for use as a thermally conductive insulator. Series 702 has the same excellent mechanical and physical characteristics of our Series 701 material while offering a 35% reduction in thermal resistance. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 703: Offers enhanced thermal performance thermal applications while meeting specific cost considerations. See Table 7.1 for specific properties and comparative information.



Ja-Bar Series 704: Is a high performance, high reliability thermally conductive insulator, Series 704 is designed for demanding military/aerospace and commercial applications, in these applications, Series 704 complies with military standards. This boron nitride loaded silicone elastomer is formulated to maximize the thermal and dielectric performance of the filler/binder matrix. The result is a "grease free", conformable material capable of meeting or exceeding the thermal and electrical requirements of high reliability electronic packaging applications. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 705: Is designed and developed in conjunction with DuPont. Series 705 combines the thermal transfer properties of our well-known thermal rubber with high dielectric strength, and physically tough DuPont Kapton MT Film. Kapton MT is a specially developed film, which has high thermal conductivity. The result is a durable insulator that withstands high voltages, requires no thermal grease to transfer heat, is available in customized shapes and sizes and saves time and costs while increasing productivity. Expect immediate delivery of all standard configurations. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 706: Is a high performance insulator, which combines Kapton MT polyimide film with boron nitride filled silicone rubber. Series 706 is designed to replace ceramic insulators such as Beryllium Oxide, Boron Nitride and Alumina that are expensive and break easily. Series 706 eliminates breakage and costs much less than ceramics. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 707: Is a fiberglass-based insulator coated with a boron nitride filled polyester resin. Series 707 offers superior thermal resistance for high performance applications. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 708: Is a composite of a DuPont Kapton film coated with an alumina-filled polyester resin. Series 708 is an economical insulator and the Kapton carrier provides excellent dielectric and physical strength. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 709: Is a composite of DuPont Kapton film coated with a boron nitride-filled polyester resin; Series 709 offers superior thermal performance for your most critical applications with thermal resistance of 0.2 C/Watt as well as excellent dielectric strength. See Table 7.1 for specific properties and comparative information.

Ja-Bar Series 700-CTCS: Our new Conformable Thermally Conductive Silicone is specifically designed to provide excellent thermal interface between electronic devices and the mating Heat Sink. The very nature of the 700-CTCS, being highly conforming, yet resistance to compression set, substantially reduces the amount of insulating air between PCB's and their interface.

Ja-Bar Series 704-1905: Maintains the impression of the surfaces, unlike our other Conformable materials, which should be considered during design. Ideal for many electronic applications including PCB heat sinks where high thermal transfer is necessary.

Thermally Conductive Insulators
Series 700

Series	701	702	703	704	705	706	707	708	709	700ctcs
Color	Gray	Pink	Green	White	Gray	Beige	Yellow	Mauve	Yellow	Pink
Thickness Inches	.010	.010	.015	.015	.006	.006	.009	.006	.006	.020/.188
Filler	AL	BN	AL/BN	BN	AL	BN	AL	AL	BN	AL
Hardness Shore A	85	85	80	80	90	90	90	90	90	—
Breakdown Voltage (AC Volts)	4500	4500	4000	4000	6000	6000	2500	6000	6000	6000
Thermal Conductivity (W/m-k)	0.9	1.2	2.0	3.5	0.9	1.3	1.2	0.9	1.3	—
Thermal Resistance (C/watt)	0.50	0.30	0.23	0.20	0.40	0.20	0.30	0.30	0.20	0.20
Dielectric Constant (1000 Hz)	5.5	4.5	4.0	4.0	5.0	3.7	4.5	5.0	3.7	5.5
Breaking Strength (#/in)	100	100	65	65	30	30	100	30	30	—
Tensile Strength (KPSI)	11.1	11.1	6.5	4.3	5.0	5.0	14.1	5.0	5.0	—
Elongation Percent	4	4	4	4	40	40	4	40	40	—
Specific Gravity	2.1	1.5	—	1.5	—	—	1.5	—	—	2.0
Outgassing % TML	0.40	0.22	—	0.26	0.28	0.36	—	—	—	—
24 hr PC	0.25	—	—	0.07	—	—	—	—	—	—
% CVLM	0.11	0.08	—	0.10	0.07	0.09	—	—	—	—
24 hr PC	0.07	—	—	0.03	—	—	—	—	—	—
Continuous use Temp (°C)	-60/+180	-60/+200	-60/+200	-60/+200	-60/+180	-60/+180	-20/+150	-20/+150	-20/+150	-60/+200

Conformable Thermally Conductive Silicone
Series 700-CTCS

Ja-Bar Silicone's thermally conductive materials are produced to meet the most demanding of military and commercial applications. The following is a cross-reference between Ja-Bar series 700 materials and Mill-I-49456. Upon request, we will forward our complete cross-reference listing for Mill-I-49456 as well as Mil-M-38527/08, Mil-I-49466, and Mil-H-87111. To indicate the need for PSA change the second digit from a 0 to a 1 for PSA on one side. For PSA on both sides, change second digit from 0 to 2. Note that although the PSA is thermally conductive, the addition of PSA degrades the performance significantly.

Property :	700-CTCS	704-1905	
Thickness Available	0.020" - 0.160"	0.020" - 0.160"	+- .010
Color	Pink	Pink	—
Hardness	55	65	Type 00
Specific Gravity	2.0	2.2	gms/cc
Heat Capacity	1	1.0	J/g-K
Continuous Use Temp	-60 - +200	-60 - +200	C
Dielectric Constant	5.5	5.5	1000 Hz
Dielectric Breakdown	6	>6	kV-AC
Thermal Conductivity	0.8	3.0	W/m-K
Thermal Impedance			
.020 thick	1.0	1.0	C-in _ /W
.040 thick	2.0	2.0	C-in _ /W
.080 thick	4.0	4.0	C-in _ /W
.120 thick	6.2	6.2	C-in _ /W
Standard Sheet Size	8.0" X 16.0"	12.0" X 15.0"	—

TABLE 7.2 - CONFORMABLE SPECIFICATIONS

Thermally Conductive Insulators
Series 700

Mil-I-49456 Dash #	Ja-Bar Series	Maximum Thickness (Inches)
-11-XX	704	.020
-12-XX	704	.030
-12-XX	702	.009
-12-XX	701	.007
-13-XX	704	.040
-13-XX	702	.015
-13-XX	701	.009
-14-XX	704	.090
-14-XX	702	.030
-14-XX	701	.020
-21-XX	703	.010
-21-XX	704	.020
-22-XX	704	.030
-22-XX	702	.009
-22-XX	701	.007
-23-XX	704	.040
-23-XX	702	.015
-23-XX	701	.009
-24-XX	704	.090
-24-XX	702	.030
-24-XX	701	.020
-31-XX	714	.010
-32-XX	714	.020
-32-XX	713	.010
-33-XX	714	.030
-33-XX	712	.012
-33-XX	711	.009
-34-XX	714	.080
-34-XX	712	.020
-34-XX	711	.020
-41-XX	724	.010
-42-XX	724	.015
-43-XX	724	.020
-43-XX	723	.010
-43-XX	722	.009
-44-XX	724	.070
-44-XX	722	.020
-44-XX	721	.015

Part No.	Thickness	Sheet Size
0101	.006	8 X 8
0102	.007	8 X 8
0103	.009	8 X 8
0104	.011	8 X 8
0105	.012	8 X 8
0106	.015	8 X 8
0107	.020	8 X 8
0108	.030	8 X 8
0109	.040	8 X 8
0110	.045	8 X 8
0111	.050	8 X 8
0112	.060	8 X 8
0113	.125	8 X 8
0114	.006	10 X 10
0115	.007	10 X 10
0116	.009	10 X 10
0117	.011	10 X 10
0118	.012	10 X 10
0119	.015	10 X 10
0120	.020	10 X 10
0121	.030	10 X 10
0122	.040	10 X 10
0123	.045	10 X 10
0124	.050	10 X 10
0125	.060	10 X 10
0126	.125	10 X 10
0127	.006	12 X 12
0128	.007	12 X 12
0129	.009	12 X 12
0130	.011	12 X 12
0131	.012	12 X 12
0132	.015	12 X 12
0133	.020	12 X 12
0134	.030	12 X 12
0135	.040	12 X 12
0136	.045	12 X 12
0137	.050	12 X 12
0138	.060	12 X 12
0139	.125	12 X 12
0140	.006	16 X 16
0141	.007	16 X 16
0142	.009	16 X 16
0143	.011	16 X 16
0144	.012	16 X 16
0145	.015	16 X 16
0146	.020	16 X 16
0147	.030	16 X 16
0148	.040	16 X 16
0149	.045	16 X 16
0150	.050	16 X 16
0151	.060	8 X 8
0152	.125	8 X 8
0153	.020	8 X 8
0154	.040	8 X 8
0155	.060	8 X 8
0156	.080	8 X 8
0157	.125	8 X 8
0158	.156	8 X 8
0159	.188	8 X 8

TABLE 7.1 - STANDARD SPECIFICATIONS

Ja-Bar can also supply a wide variety of finished die cut insulators.

The diagrams, their dimensions, and the Ja-Bar part number equivalent follows:

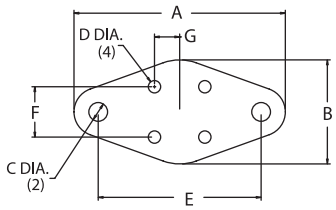


FIGURE 7.1 - LEAD TO 66

Part No. Suffix	"A'	"B"	"C"	"D"	"E"	"F"	"G"
0406	1.312	.762	.140	.062	.960	.200	.100

TABLE 7.5 - 4 LEAD TO 66 SPECIFICATIONS

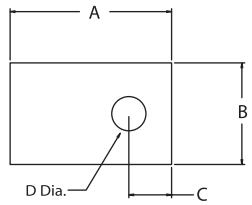


FIGURE 7.2 - PLASTIC POWER

Descriptions	Part No. Suffix	"A"	"B"	"C"	"D"
TO-126	0501	.437	.312	.140	.093
TO-126	0502	.437	.312	.140	.122
Various	0503	.500	.385	.170	.120
TO 220	0504	.610	.560	.245	.125
Various	0505	.687	.562	.218	.125
Various	0506	.710	.500	.160	.141
Various TO-220	0507	.750	.410	.225	.156
(Clip Mount)	0508	.750	.500	—	—
TO-220	0509	.750	.500	.187	.147
TO-220	0510	.750	.500	.187	.125
Various	0511	.750	.600	.240	.150
Various	0512	.750	.600	.240	.115
Various	0513	.855	.562	.218	.125
Various	0514	.855	.630	.230	.093
TO-218	0515	.860	.740	.200	.160
Various	0516	1.125	.625	.200	.145
Various	0517	1.140	.810	.355	.147
Various	0521	.866	.650	.217	.142
Various	0522	.750	.800	.150	.160
TO-3P	0523	1.000	.750	.300	.140

TABLE 7.6 - PLASTIC POWER SPECIFICATIONS

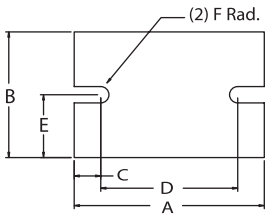


FIGURE 7.3 - POWER MODULE

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"
-0524	1.500	.900	.150	1.200	.450	.075
-0525	2.500	2.000	.344	1.812	1.000	.156

TABLE 7.7 - POWER MODULE SPECIFICATIONS

Thermally Conductive Insulators
Series 700

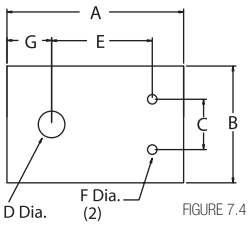


FIGURE 7.4 - PLASTIC POWER

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0518	.910	.500	.200	.125	.580	.046	.265
0519	.983	.750	.432	.156	.665	.101	.217

TABLE 7.8 - PLASTIC POWER SPECIFICATIONS

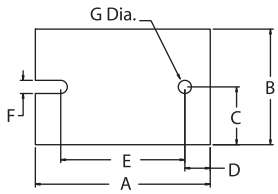


FIGURE 7.5 - PLASTIC POWER

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
0520	1.000	.500	.200	.141	.626	.046	.219	.032

TABLE 7.9 - PLASTIC POWER SPECIFICATIONS

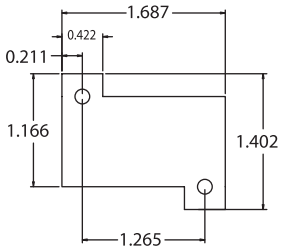
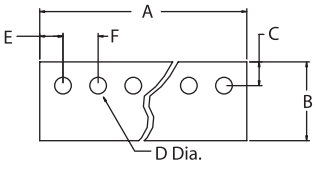


FIGURE 7.6 - POWER RESISTORS

Description	Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
RH-25	-0821	1.187	1.205	.234	.469	.212	.156	.719	.781	.140
RH-50	-0822	2.093	1.265	.265	.530	.210	.255	1.563	.845	.140
RH-5	-0803	.725	.771	.140	.280	.140	.156	.445	.491	.093
RH-10	-0804	.805	.890	.127	.250	.130	.190	.551	.630	.121
RH-25	-0801	1.150	1.180	.231	.425	.190	.270	.688	.800	.147
RH-50	-0802	1.965	1.236	.198	.404	.132	.263	1.569	.972	.130

TABLE 7.10 - POWER RESISTORS SPECIFICATIONS



G=# Of Holes

FIGURE 7.7 - MULTIPLES TO 220

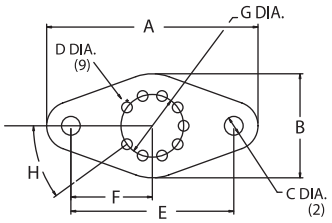


FIGURE 7.8 - 9 LEAD TO 66

	Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	# of Holes
2 Parts	0601	1.000	.750	.187	.125	.250	.500	2
3 Parts	0602	1.500	.750	.187	.125	.250	.500	3
	0603	2.000	.750	.187	.125	.250	.500	4
	0604	2.500	.750	.187	.125	.250	.500	5
	0605	3.000	.750	.187	.125	.250	.500	6
	0606	3.500	.750	.187	.125	.250	.500	7
	0607	4.000	.750	.187	.125	.250	.500	8

TABLE 7.11 - MULTIPLES TO 220 SPECIFICATIONS

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
0618	1.440	1.000	.140	.055	.960	.480	.325	36DEG

TABLE 7.12 - 9 LEAD TO 66 SPECIFICATIONS

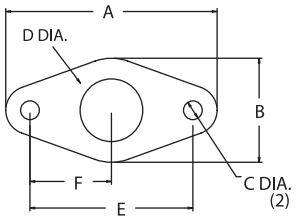


FIGURE 7.9 - MULTI-LEAD TO 66

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"
0408	1.350	.800	.140	.400	.960	.480

TABLE 7.13 - 9 LEAD TO 66 SPECIFICATIONS

Thermally Conductive Insulators
Series 700

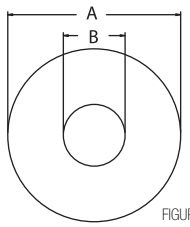


FIGURE 7.10 - DIODE WASHER

Diode Washer	Part No. Suffix	"A"	"B"
Various	0701	.360	.260
Various	0702	.510	.140
DO-4	0703	.510	.200
Various DO-4	0704	.512	.161
(Oversized)	0705	.625	.200
Various	0706	.750	.125
Various	0707	.800	.190
DO-5	0708	.800	.260
Various	0709	.812	.115
Various	0710	.812	.145
DO-8	0711	.875	.313
Various DO-5	0712	1.000	.140
(Oversized)	0713	1.000	.260
Various	0714	1.180	.515
Various	0715	1.250	.380
Various	0716	1.500	.200
Various	0717	1.500	.500

TABLE 7.14 - DIODE WASHER SPECIFICATIONS

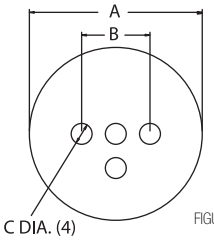


FIGURE 7.11 - TO 36

Part No. Suffix	"A"	"B"	"C"
0805	1.063	.690	.190

TABLE 7.15 - TO 36 SPECIFICATIONS

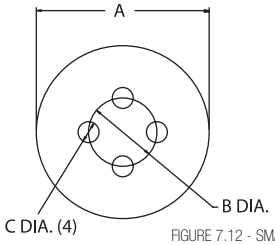


FIGURE 7.12 - SMALL POWER DEVICE

SMALL POWER	Part No. Suffix	"A"	"B"	"C"
TO-18, 3Holes	0806	.250	.100	.036
TO-18, 4Holes	0807	.250	.100	.036
TO-5, 3 Holes	0808	.360	.200	.040
TO-5, 4 Holes	0809	.360	.200	.040
TO-5, 3 Holes	0810	.390	.200	.040
TO-5, 4 Holes	0811	.390	.200	.040

TABLE 7.16 - SMALL POWER DEVICE SPECIFICATIONS

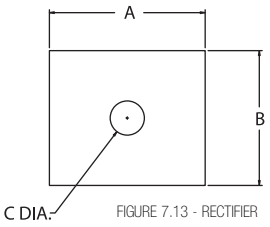


FIGURE 7.13 - RECTIFIER

Part No. Suffix	"A"	"B"	"C"
0812	1.000	1.000	.187
0813	1.125	1.125	.140
0814	1.250	1.250	.200

TABLE 7.17 - RECTIFIER SPECIFICATIONS

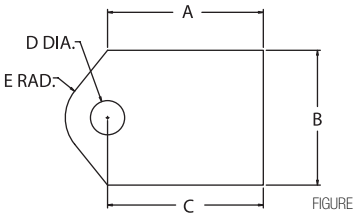


FIGURE 7.14 - TIP PACKAGES

	Part No. Suffix	"A'	"B"	"C"	"D"	"E"
TIP-36 Plastic Tip	0815	.865	.650	.650	.140	.205
Clip Mount	0816	.984	.787	—	—	.205
Plastic Clip	0817	.984	.787	.708	.142	.205
TO-3P	0818	1.260	.787	.984	.142	.205

TABLE 7.18 - TIP PACKAGES SPECIFICATIONS

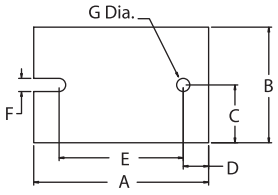


FIGURE 7.15 - POWER MODULE

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0819	2.510	1.260	.630	.305	1.900	.205	.205

TABLE 7.19 - POWER MODULE SPECIFICATIONS

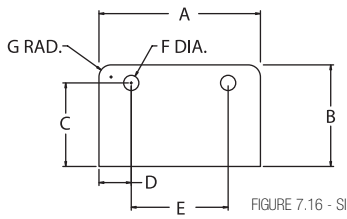


FIGURE 7.16 - SIP PACKAGE

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0820	1.450	.838	.612	.245	.960	.170	.120

TABLE 7.20 - SIP PACKAGE SPECIFICATIONS

Thermally Conductive Insulators
Series 700

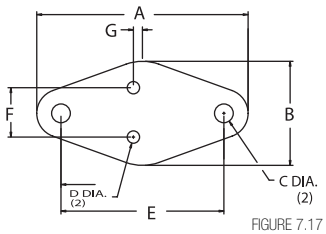


FIGURE 7.17 - TO 3 STYLE

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0301	1.563	1.050	.140	.080	1.187	.430	.072
0302	1.563	1.100	.140	.140	1.187	.430	.072
0303	1.593	1.050	.156	.062	1.187	.430	.072
0304	1.650	1.065	.140	.046	1.187	.430	.072
0305	1.650	1.140	.122	.062	1.187	.430	.072
0306	1.650	1.140	.140	.093	1.187	.430	.072
0307	1.650	1.140	.165	.062	1.187	.430	.072
0308	1.650	1.140	.140	.046	1.187	.430	.072
0309	1.650	1.140	.165	—	1.187	—	
0310	1.700	1.187	.156	.062	1.187	.430	.072
0311	1.780	1.250	.140	.093	1.187	.430	.072
0312	1.780	1.250	.165	.094	1.187	.430	.072
0313	1.780	1.250	.140	.046	1.187	.430	.072
0314	2.070	1.560	.122	.062	1.187	.430	.072

TABLE 7.21 - TO 3 STYLE SPECIFICATIONS

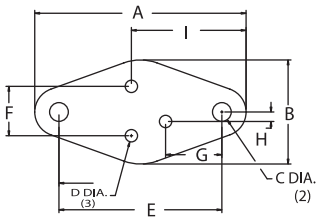


FIGURE 7.18 - 3 LEAD TO 3

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"
0315	1.650	1.140	.140	.093	1.187	.430	.400	.155	.718

TABLE 7.22 - 3 LEAD TO 3 SPECIFICATIONS

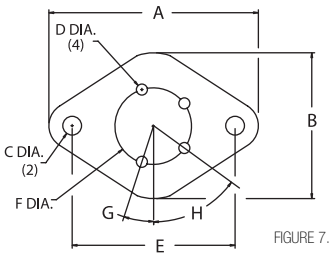


FIGURE 7.19 - 4 LEAD TO 3

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
0316	1.560	1.050	.156	.080	1.170	.470	18 DEG	59 DEG
0317	1.563	1.050	.156	.063	1.187	.470	18 DEG	59 DEG

TABLE 7.22 - 3 LEAD TO 3 SPECIFICATIONS

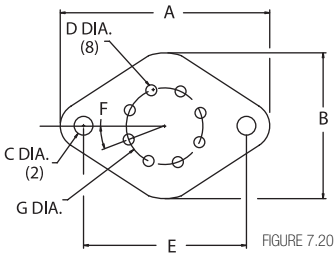


FIGURE 7.20 - 8 LEAD TO 3

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0318	1.655	1.187	.156	.060	1.187	40 DEG	.500

TABLE 7.23 - 8 LEAD TO 3 SPECIFICATIONS

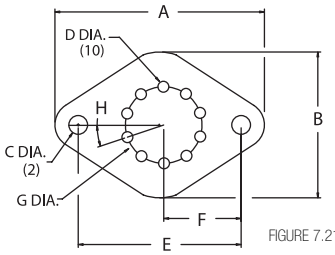


FIGURE 7.21 - 10 LEAD TO 3

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0319	1.650	1.140	.165	.040	1.187	.593	32.7 DEG

TABLE 7.24 - 10 LEAD TO 3 SPECIFICATIONS

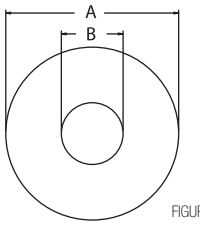


FIGURE 7.22 - TO 66 STYLE

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"
0401	1.250	.700	.140	.062	.960	.200	.100
0402	1.312	.762	.140	.062	.960	.200	.100
0402	1.375	.825	.140	.062	.960	.200	.100
0402	1.440	1.000	.140	.075	.960	.200	.100

TABLE 7.25 - TO 66 STYLE SPECIFICATIONS

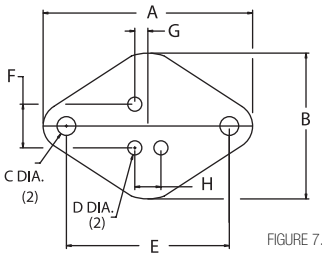


FIGURE 7.23 - 3 LEAD TO 66

Part No. Suffix	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
0405	1.275	.750	.156	.100	.960	.200	.100	.200

TABLE 7.26 - 3 LEAD TO 66 SPECIFICATIONS