





semitron hot line

discrete devices

TOLL FREE NUMBER 800-777-3960

germanium transistors cont'd

T-33-01

germanium power transistors — (cont'd)

Type	Polarity	Power Dissipation @ 25°C (watts)	T <sub>j</sub> (°C)	BV <sub>CBO</sub> (volts)	BV <sub>CES</sub> (volts)	h <sub>FE</sub> @ I <sub>C</sub>			V <sub>CE (SAT)</sub> @ I <sub>C</sub>		f <sub>T</sub> (MHz)	Case Style
						(Min.)	(Max.)	(Amps)	(volts)	(Amps)		
		NOTE 1	NOTE 2					NOTE 3		NOTE 4		
2N514A	PNP	80 (C)	95	60	60 (X)	—	—	—	1.25	25	—	TO-41
2N514B	PNP	80 (C)	95	80	80 (X)	—	—	—	1.25	25	—	TO-41
2N538	PNP	34 (J)	95	80	60 —	20	50	2.0	—	—	—	MT-36
2N538A	PNP	34 (J)	95	80	60 —	20	50	2.0	0.6	2.0	—	MT-36
2N539	PNP	34 (J)	95	80	55 —	30	75	2.0	0.6	2.0	—	MT-36
2N539A	PNP	11 (J)	95	80	55 —	30	75	2.0	0.6	2.0	—	MT-36
2N540	PNP	34 (J)	95	80	55 —	45	113	2.0	0.6	2.0	—	MT-36
2N540A	PNP	34 (J)	95	80	55 —	45	113	2.0	0.6	2.0	—	MT-36
2N553	PNP	35 (C)	95	80	—	40	80	0.5	0.9	3.0	—	TO-3
2N554	PNP	40 (J)	90	—	—	—	—	—	—	—	—	TO-3
2N555	PNP	10 (J)	90	40	—	—	—	—	—	—	5.0 (B)	TO-3
2N561	PNP	50 (A)	100	80	50 (O)	20	50	4.0	—	—	—	TO-3
2N574	PNP	180 (J)	100	60	55 (O)	9.0	22	10	0.2	10	—	MT-7
2N574A	PNP	180 (J)	100	80	60 (O)	9.0	22	10	0.2	10	—	MT-7
2N575	PNP	180 (J)	100	60	50 (O)	19	42	10	0.5	25	—	MT-7
2N618	PNP	90 (C)	95	80	60 (S)	60	140	1.0	0.8	2.0	—	TO-3
2N627	PNP	90 (C)	100	40	30 (S)	10	30	10	1.0	10	—	TO-3
2N628	PNP	90 (C)	100	60	45 (S)	10	30	10	1.0	10	—	TO-3
2N629	PNP	90 (C)	100	80	60 (S)	10	30	10	1.0	10	—	TO-3
2N630	PNP	90 (C)	100	100	75 (S)	10	30	10	1.0	10	—	TO-3
2N637	PNP	60 (C)	100	—	35 (R)	30	60	3.0	1.5	3.0	—	TO-3
2N637A	PNP	60 (C)	100	—	65 (R)	30	60	3.0	1.5	3.0	—	TO-3
2N637B	PNP	60 (C)	100	—	75 (R)	30	60	3.0	1.5	3.0	—	TO-3
2N638	PNP	60 (C)	100	—	35 (R)	20	40	3.0	2.0	3.0	—	TO-3
2N638A	PNP	60 (C)	100	—	65 (R)	20	40	3.0	2.0	3.0	—	TO-3
2N638B	PNP	60 (C)	100	—	75 (R)	20	40	3.0	2.0	3.0	—	TO-3
2N663	PNP	35 (C)	100	50	25 (O)	25	75	0.5	1.0	3.0	15 (E)	TO-3
2N665	PNP	35 (C)	95	80	40 (O)	40	80	0.5	0.9	3.0	20 (E)	TO-3
2N669	PNP	62.5 (C)	100	40	30 (S)	—	250	0.5	—	—	3.0 (E)	TO-3
2N677	PNP	90 (C)	100	50	30 (S)	20	60	10	1.0	10	—	TO-41
2N677A	PNP	90 (C)	100	60	40 (S)	20	60	10	1.0	10	—	TO-41
2N677B	PNP	90 (C)	100	90	70 (S)	20	60	10	1.0	10	—	TO-41
2N677C	PNP	90 (C)	100	100	80 (S)	20	60	10	1.0	10	—	TO-41
2N678	PNP	90 (C)	100	50	20 (O)	50	100	10	1.0	10	—	TO-41
2N678A	PNP	90 (C)	100	60	30 (O)	50	100	10	1.0	10	—	TO-41
2N678B	PNP	90 (C)	100	90	60 (O)	50	100	10	1.0	10	—	TO-41
2N678C	PNP	90 (C)	100	100	70 (O)	50	100	10	1.0	10	—	TO-41
2N1011	PNP	35 (C)	95	80	80 (S)	30	75	3.0	1.5	3.0	20 (E)	TO-3
2N1021	PNP	50 (C)	95	100	100 (X)	23	70	1.0	1.0	5.0	—	TO-3
2N1021A	PNP	150 (C)	100	100	50 (O)	30	90	5.0	0.5	5.0	200 (T)	TO-3
2N1022	PNP	50 (C)	95	120	120 (X)	23	70	5.0	1.0	5.0	—	TO-3
2N1022A	PNP	150 (C)	100	120	55 (O)	30	90	5.0	0.5	5.0	200 (T)	TO-3
2N1031	PNP	90 (C)	100	50	30 (S)	20	60	10	1.0	10	10 (E)	TO-41
2N1031A	PNP	90 (C)	100	60	40 (S)	20	60	10	1.0	10	10 (E)	TO-41
2N1031B	PNP	90 (C)	100	90	70 (S)	20	60	10	1.0	10	10 (E)	TO-41
2N1031C	PNP	90 (C)	100	100	80 (S)	20	60	10	1.0	10	10 (E)	TO-41
2N1032	PNP	90 (C)	100	50	30 (S)	50	10	10	1.0	10	25 (E)	TO-41
2N1032A	PNP	90 (C)	100	60	40 (S)	50	100	10	1.0	10	25 (E)	TO-41
2N1032B	PNP	90 (C)	100	90	70 (S)	50	100	10	1.0	10	25 (E)	TO-41
2N1032C	PNP	90 (C)	100	100	80 (S)	50	100	10	1.0	10	25 (E)	TO-41
2N1038	PNP	20 (C)	95	40	40 (V)	20	60	1.0	0.25	1.0	18 (E)	TO-5
2N1099	PNP	50 (C)	95	80	70 (S)	35	70	5.0	0.7	12	—	TO-36
2N1100	PNP	50 (C)	95	100	65 (O)	25	50	5.0	0.7	12	—	TO-36
2N1120	PNP	45 (C)	95	80	70 (S)	20	50	10	1.0	10	30 (E)	TO-41
2N1136	PNP	—	100	60	35 (R)	50	100	3.0	1.0	3.0	—	TO-3
2N1136A	PNP	—	100	90	35 (R)	50	100	3.0	1.0	3.0	4.0 (E)	TO-3
2N1136B	PNP	—	100	100	75 (R)	50	100	3.0	1.0	3.0	4.0 (E)	TO-3
2N1137	PNP	—	100	60	25 (O)	75	150	3.0	1.0	3.0	—	TO-3
2N1137A	PNP	—	100	90	55 (O)	75	150	3.0	1.0	3.0	—	TO-3
2N1137B	PNP	—	100	100	65 (O)	75	150	3.0	1.0	3.0	—	TO-3
2N1138	PNP	—	100	60	25 (O)	100	200	3.0	1.0	3.0	—	TO-3
2N1138A	PNP	—	100	90	55 (O)	100	200	3.0	1.0	3.0	—	TO-3
2N1138B	PNP	—	100	100	65 (O)	100	200	3.0	1.0	3.0	—	TO-3
2N1146	PNP	87 (C)	95	40	20 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-3
2N1146A	PNP	87 (C)	95	60	30 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-3
2N1146B	PNP	87 (C)	95	80	40 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-3
2N1146C	PNP	87 (C)	95	100	50 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-3
2N1147	PNP	87 (C)	95	40	20 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-41
2N1147A	PNP	87 (C)	95	60	30 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-41
2N1147B	PNP	87 (C)	95	80	40 (O)	60	150	5.0	1.0	15	0.15*(E)	TO-41
2N1147C	PNP	87 (C)	95	100	50 (O)	60	150	5.0	1.0	15	0.15 (E)	TO-41
2N1157	PNP	187 (J)	100	60	45 (O)	38	84	10	0.8	40	75 (T)	MT-7
2N1157A	PNP	187 (J)	100	80	50 (O)	38	84	10	0.8	40	75 (T)	MT-7
2N1159	PNP	35 (C)	95	80	60 (O)	30	75	3.0	1.0	3.0	—	TO-3
2N1160	PNP	35 (C)	95	80	60 (O)	20	50	5.0	1.0	5.0	—	TO-3

\* MHz





TOLL FREE NUMBER 800-777-3960

T-33-01

germanium transistors cont'd

germanium power transistors — (cont'd)

Type	Polarity	Power Dissipation (watts) @ 25°C	T <sub>J</sub> (°C)	BV <sub>ceo</sub> (volts)	BV <sub>ce(sat)</sub> (volts)	h <sub>FE</sub> @ I <sub>c</sub>			V <sub>CE (SAT)</sub> @ I <sub>c</sub>		hf <sub>M</sub>	f <sub>T</sub> (MHz)		Case Style
						(Min.)	(Max.)	(Amps)	(volts)	(Amps)		NOTE 3	NOTE 4	
						NOTE 1		NOTE 2		NOTE 3		NOTE 4		
2N1554	PNP	90 (C)	100	60	45 (S)	30	60	10	0.5	10	—	1.0 (E)	TO-3	
2N1554A	PNP	90 (C)	100	60	30 (O)	30	60	10	0.5	10	—	3.0 (E)	TO-3	
2N1565	PNP	90 (C)	100	80	60 (S)	30	60	10	0.5	10	—	1.0 (E)	TO-3	
2N1565A	PNP	90 (C)	100	80	40 (O)	30	60	10	0.5	10	—	3.0 (E)	TO-3	
2N1568	PNP	90 (C)	100	100	75 (S)	30	60	10	0.5	10	—	1.0 (E)	TO-3	
2N1558A	PNP	90 (C)	100	100	50 (O)	30	60	10	0.5	10	—	3.0 (E)	TO-3	
2N1557	PNP	90 (C)	100	40	30 (S)	50	100	10	0.4	10	—	1.0 (E)	TO-3	
2N1557A	PNP	90 (C)	100	40	20 (O)	50	100	10	0.5	10	—	3.0 (E)	TO-3	
2N1558	PNP	90 (C)	100	60	45 (S)	50	100	10	0.4	10	—	1.0 (E)	TO-3	
2N1558A	PNP	90 (C)	100	60	30 (O)	20	100	10	0.5	10	—	3.0 (E)	TO-3	
2N1559	PNP	90 (C)	100	80	60 (S)	50	100	10	0.4	10	—	1.0 (E)	TO-3	
2N1559A	PNP	90 (C)	100	80	40 (O)	50	100	10	0.4	10	—	3.0 (E)	TO-3	
2N1560	PNP	90 (C)	100	100	75 (S)	50	100	10	0.5	10	—	1.0 (E)	TO-3	
2N1560A	PNP	90 (C)	100	100	50 (O)	50	100	10	0.5	10	—	3.0 (E)	TO-3	
2N1970	PNP	150 (C)	100	100	50 (B)	17	40	5	1	12	—	5.0 (E)	TO-36	
2N1971	PNP	170 (C)	100	80	40 (O)	25	60	5	0.9	3.0	—	15 (E)	TO-3	
2N1980	PNP	170 (C)	100	50	30 (O)	50	100	5.0	0.5	5.0	—	3.0 (E)	TO-36	
2N1981	PNP	170 (C)	100	70	40 (O)	50	100	5.0	0.5	5.0	—	3.0 (E)	TO-36	
2N1982	PNP	170 (C)	100	90	50 (O)	50	100	5.0	0.5	5.0	—	3.0 (E)	TO-36	
2N2075	PNP	170 (C)	110	80	80 (S)	20	40	5.0	0.7	12	—	5.0 (E)	TO-36	
2N2076	PNP	170 (C)	110	70	70 (S)	20	40	5.0	0.7	12	—	5.0 (E)	TO-36	
2N2077	PNP	170 (C)	110	50	50 (S)	20	40	5.0	0.9	12	—	5.0 (E)	TO-36	
2N2078	PNP	170 (C)	110	40	40 (S)	20	40	5.0	0.9	12	—	5.0 (E)	TO-36	
2N2079	PNP	170 (C)	110	80	80 (S)	35	70	5.0	0.7	12	—	5.0 (E)	TO-36	
2N2080	PNP	170 (C)	110	70	70 (S)	35	70	5.0	0.7	12	—	5.0 (E)	TO-36	
2N2081	PNP	170 (C)	110	50	50 (S)	35	70	5.0	0.9	12	—	5.0 (E)	TO-36	
2N2082	PNP	170 (C)	110	40	40 (S)	35	70	5.0	0.9	12	—	5.0 (E)	TO-36	
2N2138	PNP	62.5 (C)	100	45	45 (S)	30	60	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2139	PNP	62.5 (C)	100	60	60 (S)	30	60	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2140	PNP	62.5 (C)	100	75	75 (S)	30	60	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2141	PNP	62.5 (C)	100	90	90 (S)	30	60	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2142	PNP	62.5 (C)	100	30	30 (S)	50	100	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2143	PNP	62.5 (C)	100	45	45 (S)	50	100	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2144	PNP	62.5 (C)	100	60	60 (S)	50	100	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2145	PNP	62.5 (C)	100	75	75 (S)	50	100	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2146	PNP	62.5 (C)	100	90	90 (S)	50	100	0.5	0.5	2.0	—	12 (E)	TO-3	
2N2158	PNP	170 (C)	110	75	75 (S)	80	160	5.0	0.1	5.0	—	2.0 (E)	TO-36	
2N2266	PNP	50 (J)	125	100	55 —	40	120	0.5	0.75	5.0	—	200 (T)	MT-36	
2N2267	PNP	50 (J)	125	120	55 —	40	120	0.5	0.75	5.0	—	200 (T)	MT-36	
2N2268	PNP	50 (J)	125	100	55 —	40	120	0.5	0.75	5.0	—	200 (T)	MT-36	
2N2269	PNP	50 (J)	125	120	55 —	40	120	0.5	0.75	5.0	—	200 (T)	MT-36	
2N2289	PNP	50 (J)	125	100	50 (O)	30	60	10	1.0	10	—	200 (T)	MT-36	
2N2445	PNP	90 (C)	100	80	60 (O)	30	120	25	0.25	25	30 (E)	0.1* (T)	TO-41	
2N2730	PNP	140 (C)	110	60	45 (O)	30	120	25	0.25	25	—	200 (T)	TO-36	
2N2731	PNP	140 (C)	110	60	45 (O)	30	120	25	0.25	25	—	200 (T)	TO-36	
2N2732	PNP	140 (C)	110	40	30 (O)	30	120	25	0.25	25	—	200 (T)	TO-36	
2N2733	PNP	140 (C)	110	80	60 (O)	30	120	25	0.25	25	—	200 (T)	MT-23	
2N2734	PNP	140 (C)	110	60	45 (O)	30	120	25	0.25	25	—	200 (T)	MT-23	
2N2735	PNP	140 (C)	110	40	30 (O)	30	120	25	0.25	25	—	200 (T)	MT-23	
2N2736	PNP	140 (C)	110	80	60 (O)	30	120	25	0.25	25	—	200 (T)	MT-22	
2N2737	PNP	140 (C)	110	60	45 (O)	30	120	25	0.25	25	—	200 (T)	MT-22	
2N2738	PNP	140 (C)	110	40	30 (O)	30	120	25	0.25	25	—	200 (T)	MT-22	
2N2869	PNP	30 (C)	100	60	50 (O)	50	165	1.0	0.75	10	—	200 (T)	MT-22	
2N3311	PNP	170 (C)	110	30	30 (S)	60	120	3.0	0.1	3.0	30 (E)	1.0 (E)	TO-36	
2N3312	PNP	170 (C)	110	45	45 (S)	60	120	3.0	0.1	3.0	30 (E)	1.0 (E)	TO-36	
2N3313	PNP	170 (C)	110	60	60 (S)	60	120	3.0	0.1	3.0	30 (E)	1.0 (E)	TO-36	
2N3314	PNP	170 (C)	110	30	30 (S)	100	200	3.0	0.1	3.0	40 (E)	1.0 (E)	TO-36	
2N3315	PNP	170 (C)	110	45	45 (S)	100	200	3.0	0.1	3.0	40 (E)	1.0 (E)	TO-36	
2N3316	PNP	170 (C)	110	60	60 (S)	100	200	3.0	0.1	3.0	40 (E)	1.0 (E)	TO-36	
2N3611	PNP	85 (C)	110	40	30 (S)	35	70	3.0	0.25	3.0	40 (E)	0.3* (T)	TO-3	
2N3612	PNP	85 (C)	110	60	45 (S)	35	70	3.0	0.25	3.0	40 (E)	0.3* (T)	TO-3	
2N3613	PNP	85 (C)	110	40	30 (S)	60	120	3.0	0.25	3.0	60 (E)	0.3* (T)	TO-3	
2N3614	PNP	85 (C)	110	60	45 (S)	60	120	3.0	0.25	3.0	60 (E)	0.3* (T)	TO-3	
2N3615	PNP	85 (C)	110	80	60 (S)	30	60	3.0	0.25	3.0	40 (E)	0.3* (T)	TO-3	
2N3616	PNP	85 (C)	110	100	75 (S)	30	60	3.0	0.25	3.0	40 (E)	0.3* (T)	TO-3	
2N3617	PNP	85 (C)	110	80	60 (S)	45	90	3.0	0.25	3.0	60 (E)	0.3* (T)	TO-3	
2N3618	PNP	85 (C)	110	100	75 (S)	45	90	3.0	0.25	3.0	60 (E)	0.3* (T)	TO-3	
3N49	PNP	94 (C)	100	60	35 —	30	120	5.0	0.4	5.0	30 (E)	600 —	MT-70	
3N50	PNP	94 (C)	100	80	50 —	20	80	5.0	0.4	5.0	—	300 —	MT-70	
3N51	PNP	94 (C)	100	40	25 —	30	120	5.0	0.4	5.0	—	500 —	MT-70	
3N52	PNP	94 (C)	100	60	40 —	20	80	5.0	0.4	5.0	—	300 —	MT-70	

\* MHz

## case outline drawings

**TO1**

**TO3**

**TO5**

**TO18**

**TO33**

**TO36**

**TO39**

**TO46**

**TO59**

**TO61**

**TO63**

**TO66**

**TO72**

**TO92**

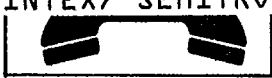
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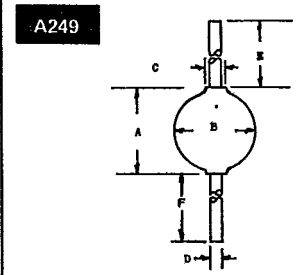
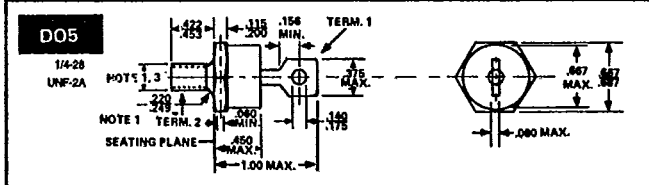
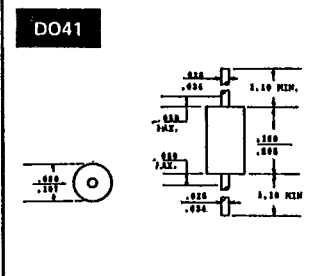
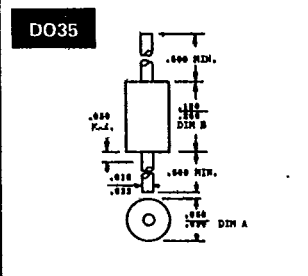
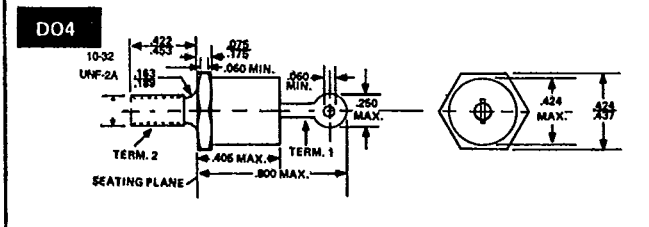
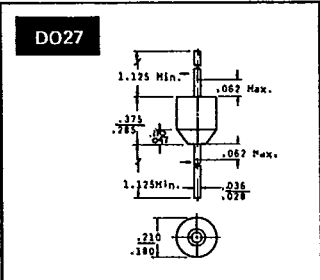
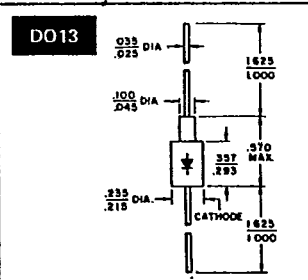
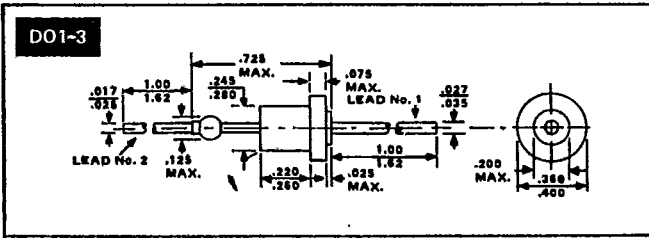
**NOTES:**

1. Refer to rules for dimensioning semiconductor product outlines included in Publication No. 76.
2. Figure "A", Axial Terminal Configuration, applicable.
3. Figure "B", Peripheral Terminal Configuration, applicable.
4. Alternate lead configurations allowed within C and D.
5. Tab contour optional within M and P.
6. Chamfer optional.
7. Position of lead to be measured .050 - .055 below seating plane.
8. Position of lead to be measured .250 - .325 from bottom of dimension E.

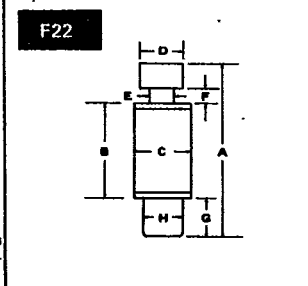
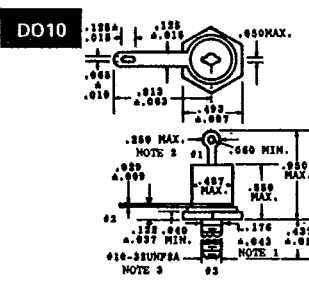
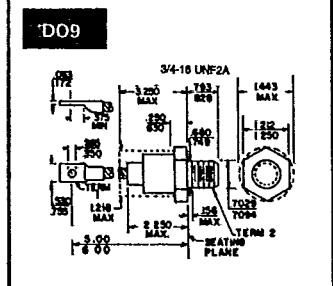
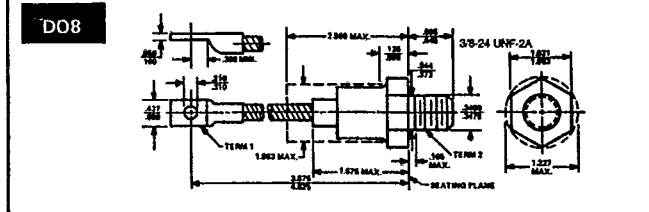
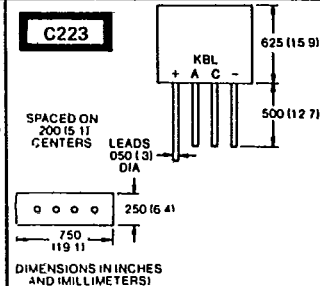
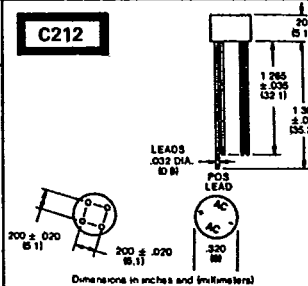
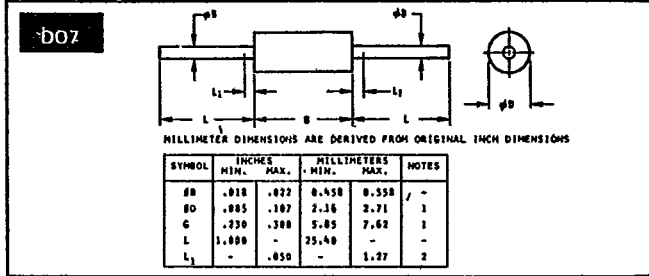
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	NOTES
Y220n/	.140	.045	.020	.012	.840	.340				.180	.040	.530	.040				.050	.340	.127	.100	.580	2
TO220AA	.180	.075	.045	.045	.885	.420				.210	.055	.370	.115				MAX	.422	.147	.130	.610	2
Y220D	.140	.045	.020	.012	.840	.340				.180	.040	.530	.040									
TO220AB	.180	.075	.045	.045	.885	.420				.210	.055	.370	.115									3
TO220B	.180	.075	.045	.045	.885	.420				.210	.055	.370	.115									



case outline drawings cont'd



	A	B	C	D	E	F
AR48	1.10	1.50	0.25	0.55	1.00	1.00
AR48	MAX	MAX	MAX	MAX	MIN	MIN
AR48B	1.10	1.50	0.25	0.55	1.00	1.00
AR48B	MAX	MAX	MAX	MAX	MIN	MIN
AR48C	1.10	1.50	0.25	0.55	1.00	1.00
AR48C	MAX	MAX	MAX	MAX	MIN	MIN



	A	B	C	D	E	F	G	H
F22	0.75	1.00	0.40	0.40	1.00	0.50	0.50	1.00
F22A	MAX	MAX	MAX	MAX	MAX	MAX	MAX	MAX
F22B	1.75	1.43	0.40	0.50	1.00	0.63	0.50	0.50
F22C	0.40	1.00	0.40	0.50	1.00	0.63	0.50	0.50
F22D	0.87	0.37	0.40	0.50	1.00	0.63	0.50	0.50
F22E	0.34	0.44	0.40	0.50	1.00	0.63	0.50	0.50
F22F	0.81	0.31	0.40	0.50	1.00	0.63	0.50	0.50
F22G	1.13	0.80	0.40	0.50	1.00	0.63	0.50	0.50