Transistors (cont'd) (Maximum Ratings at $T_C = 25°C$ Unless Otherwise Noted)

ECG Type	Description and Application	Collector To Base Volts BV_{CBO}	Collector To Emitter Volts BV_{CEO}	Base to Emitter Volts BV_{EBO}	Max. Collector Current I_C Amps	Max. Device Diss. P_D Watts	Freq. in MHz f_t	Current Gain h_{FE}	Package Case	Package Fig. No.
ECG58	NPN-Si, Hi Power Audio Output (Compl to ECG59)	200	200	6	17	200	20	20 min	TB-35	T44-1
ECG59	PNP-Si, Hi Power Audio Output (Compl to ECG58)	200	200	6	17	200	20	20 min	TB-35	T44-1
ECG60 **ECG60MP***	NPN-Si, Power Amp, AF PO, Gen Purp (Compl to ECG61)	140	140	5	20	250	2	30 typ	TO-3	T28
ECG61 **ECG61MP*** **ECG61MCP**	PNP-Si, Power Amp, AF PO, Gen Purp (Compl to ECG60) Matched Compl Pair-Contains one each of ECG60 (NPN) and ECG61 (PNP)	140	140	5	20	250	2	30 typ	TO-3	T28
ECG63	NPN-Si, UHF/Microwave Amp/Mixer G_{PE} 7.5 dB @ 2 GHz NF 4 dB @ 2 GHz	20	12	3	40 mA	400 mW	5 GHz typ	40	RF-19A	T49-3
ECG64	NPN-Si, UHF/Microwave Amp/Hi Speed Sw G_{PE} 10 dB @ 1 GHz NF 2 dB typ @ 1 GHz	25	15	3	30 mA	350 mW	4.5 GHz typ	60	RF-19A	T49-3
ECG65	NPN-Si, UHF/Microwave Amp, CATV, MATV	20	15	2	25 mA	180 mW	5 GHz typ	30 typ	RF-19	T49-2
ECG66	See FET Selector Guide Page 1-58	---	---	---	---	---	---	---	---	---
ECG67	See FET Selector Guide Page 1-58	---	---	---	---	---	---	---	---	---
ECG68 **ECG68MCP**	PNP-Si, Gen Purp Hi Pwr Amp (Compl to ECG388) Matched Compl Pair-Contains one each of ECG388 (NPN) and ECG68 (PNP)	400	250	5	16	250	4 min	30 typ	TO-3	T28
ECG69	NPN-Si, UHF/VHF Amp, Osc, Mixer	35	35	4	50 mA	.25 ($T_A = 25°C$)	800 min	70 typ	TO-92	T16
ECG70	NPN-Si, HV Pwr Amp, Switch	180	150	6	50	250	30 min	30 min	TO-63	T35
ECG71	NPN-Si, Hi Current Amp, Fast Switch	150	90	7	20	200	20	20 min	TO-63	T35
ECG72	NPN-Si, Hi Current Amp, Fast Switch	120	100	6	10	115	30	30 min	TO-61 (Isolated)	T33
ECG73 DISCONTINUED	NPN-Si, HV Amp, Switch	220	200	8	10	85	40	15 min	TO-61	T34
ECG74	NPN-Si, Gen Purp Amp, Sw	100	100	6	7	60	30	60 min	TO-59	T32
ECG75	NPN-Si, Hi Pwr Amp, Sw	100	80	8	5	50	50 min	40 min	TO-111	T30
ECG76 **ECG76MP***	NPN-Si, CATV Broadband Amp	50	30	5	.4	5	1800	30 min	TO-117	T50
ECG77	NPN-Si, CATV Broadband Amp	50	30	5	.4	3.5	1800	30 min	TO-39	T6
ECG78	NPN-Si, RF PO, CB, 27 MHz, 3 W	36	18	4	.6	5	---	5 min	TO-202M	T39
ECG79	NPN-Si, RF PO, CB, 27 MHz	36	18	4	2	10	---	5 min	TO-202M	T39
ECG80 DISCONTINUED	NPN-Si, HV Sw, Horiz Driver	700	300	12	1	8 ($T_C = 25°C$) 1 ($T_A = 25°C$)	13	50 typ	TO-202J	T37
ECG81	**Dual** NPN-Si, Switch, DC to VHF Amp	75	40	6	.6	2 total ($T_C = 25°C$) .6 total ($T_A = 25°C$)	250 min	100 min	TO-78	T12
ECG82	**Dual** PNP-Si, Switch, DC to VHF	60	60	5	.6	2 total ($T_C = 25°C$) .6 total ($T_A = 25°C$)	200 min	100 min	TO-78	T12

Notes: * MP - Matched pair

Package Outline - See Page 1-76

Frequency at which common emitter current gain is 70.0% of low frequency gain

• When alternate packages are shown it indicates a change is in progress. Although only one package is available both packages will be shown as long as the obsolete package may be encountered in the field.

Transistor Outlines

Fig. T1
TO-1
ECG
102A
103A
158

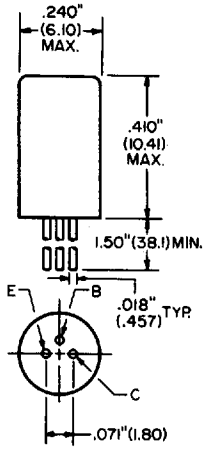


Fig. T2
TO-18

ECG	1	2	3
106	E	B	C
123A*	E	B	C
126A	E	B	C
462	S	G	D
466	S	D	G

*Collector to Case

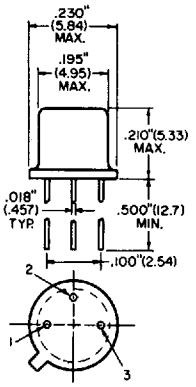
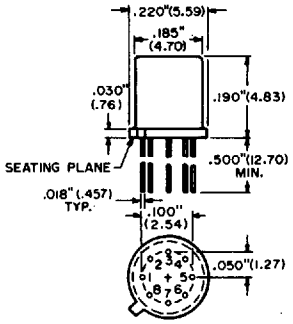


Fig. T3
TO-71
ECG
461



1. S1
2. D1
3. G1
4. Blank
5. S2
6. D2
7. G2
8. Blank

Fig. T4
TO-72

ECG	1	2	3	4
160	E	B	C	CASE
161	E	B	C	CASE
220	D	S	G	CASE
221	D	G2	G1	S, CASE
222	D	G2	G1	S, CASE
316	E	B	C	CASE
395	E	B	C	CASE
452	S	D	G	CASE
454	D	G2	G1	S, CASE
456*	D	S	G	CASE
459*	S	D	G	CASE
460*	S	G	D	CASE
464	S	G	D	S, CASE
465	S	G	D	CASE

* D & S Interchangeable

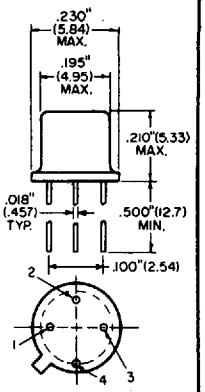


Fig. T5
TO-5
ECG
100
101
102
103

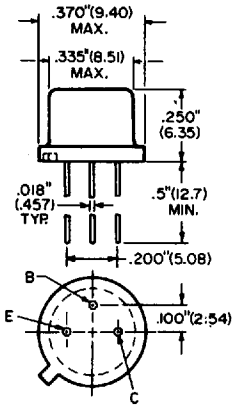


Fig. T6
TO-39
ECG
77 **324**
123 **329**
128 **346**
129 **396**
154 **397**
176 **472**
195A **473**
278 **479**
311 **486**
323

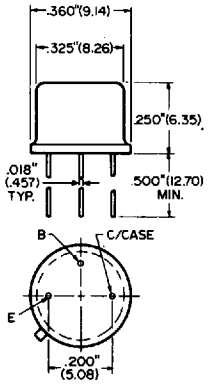


Fig. T7
TO-39EC
ECG
341
361

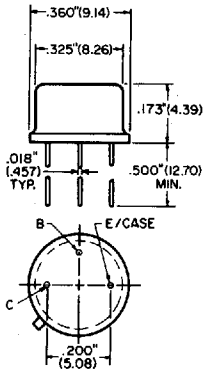
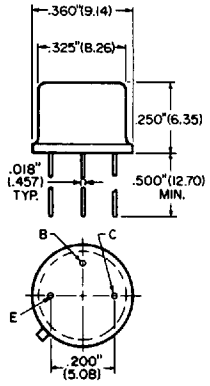


Fig. T8
TO-39A
ECG
487



Note: All leads electrically isolated from case.

Fig. T9
TO-39EG
ECG
488

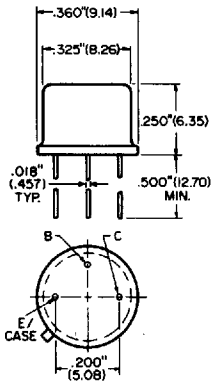
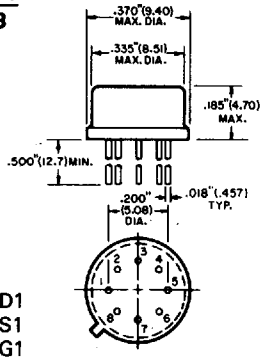
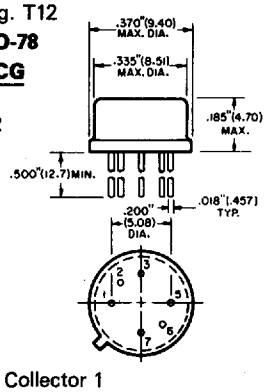


Fig. T10
TO-99
ECG
463



1. D1
2. S1
3. G1
4. Base, Case
5. G2
6. S2
7. D2
8. NC

Fig. T12
TO-78
ECG
81
82



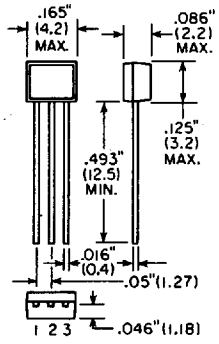
1. Collector 1
2. Base 1
3. Emitter 1
4. Emitter 2
5. Base 2
6. Collector 2
7. Collector 2

Note: All leads electrically isolated from case

Fig. T13-1
SP-92
ECG
26
453•*
2361
2362

•Alternate Fig. T16

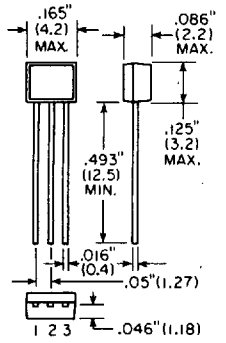
1. Emitter
2. Collector
3. Base



*1. D
2. S
3. G

Transistor Outlines (cont'd)

Fig. T13-2
SP-92
ECG
2355
2356
2357
2358
2359
2360



1. GND
2. OUT
3. IN

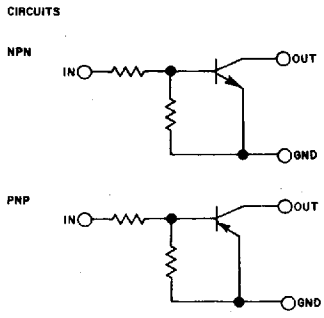


Fig. T15 • Alternate Fig. T16
TO-98
ECG
172A•
199•

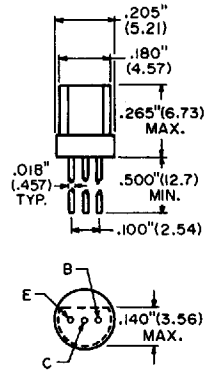
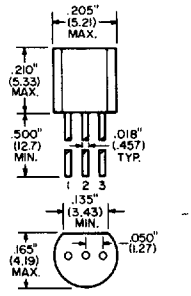


Fig. T16
TO-92

ECG	1	2	3
10	B	E	C
11	E	C	B
12	E	C	B
23	B	E	C
46	E	B	C
47	E	B	C
69	B	E	C
85	E	C	B
107	E	C	B
108	E	B	C
123AP	E	B	C
159	E	B	C

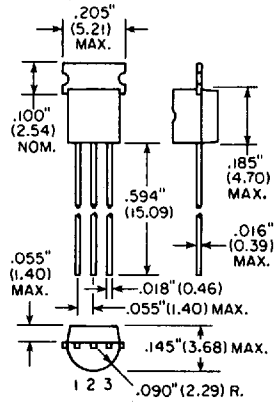
ECG	1	2	3
172A■	E	C	B
194	E	B	C
199■	E	C	B
229	B	E	C
232	E	B	C
233	E	B	C
234	E	C	B
287	E	B	C
288	E	B	C
289A	E	C	B
290A	E	C	B
312*	G	S	D

ECG	1	2	3
319P	B	E	C
326*	S	D	G
451	D	S	G
453•	D	S	G
457*	D	S	G
458	D	G	S
467	D	S	G
468	D	S	G
469	D	S	G
489	D	G	S
2341	E	C	B
2342	E	C	B



• Alternate Fig. T13-1
■ Alternate Fig. T15
* D & S Interchangeable

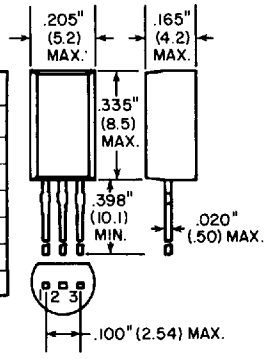
Fig. T17
TO-237
ECG
24*
25*
128P
129P
216
217
227
255



1. EMITTER
2. BASE
3. COLLECTOR

*1. EMITTER
2. COLLECTOR
3. BASE

Fig. T18
TO-92M



ECG	1	2	3
31	E	C	B
32	E	C	B
48	E	B	C
90	E	C	B
91	E	C	B
382	E	C	B
383	E	C	B

Fig. T19
SC-51
ECG
315

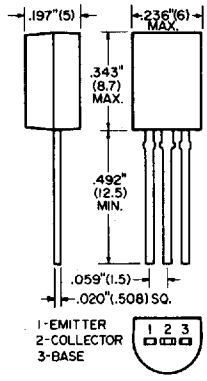


Fig. T20
T-16
ECG
293
294
297
298
340
399

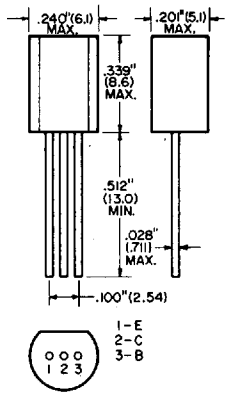


Fig. T20-1
SIP-5

ECG	1	2	3	4	5
40	B	C	E	C	B
41	B	C	E	C	B
42	B	C	E	C	B
43	B	C	E	C	B
44	E	C	B	C	E
45	E	C	B	C	E

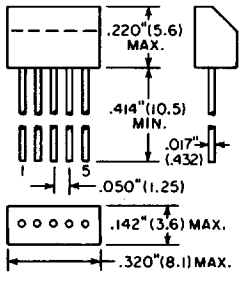


Fig. T20-2
M-68
ECG
14
15

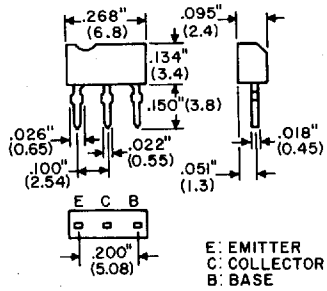
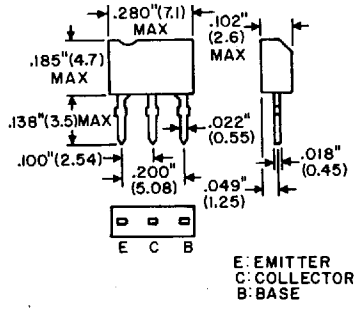


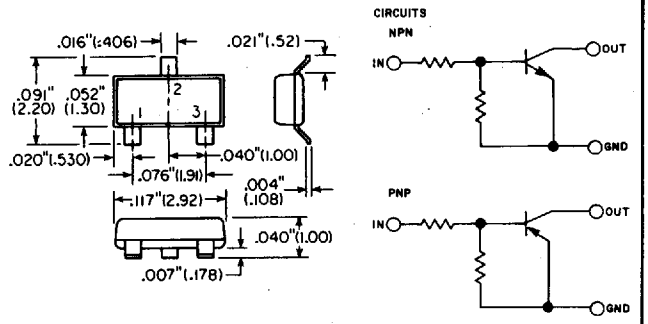
Fig. T20-3
M-71
ECG
13
16
17
18
19
20
21
22



Transistor Outlines (cont'd)

Fig. T20-4
SOT-23
ECG

2401	2411
2402	2412
2403	2413
2404	2414*
2405	2415*
2406	2416*
2407	2417*
2408	2418*
2409	2419*
2410	

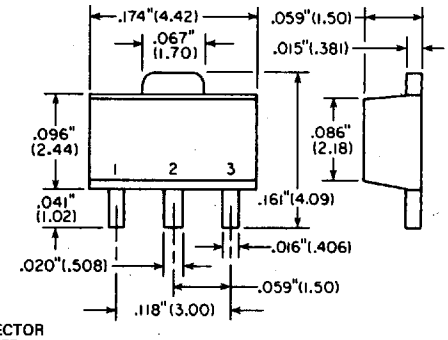


1. BASE
2. COLLECTOR
3. EMITTER

* DIGITAL TRANSISTORS
1. IN
2. OUT
3. GND

Fig. T20-5
SOT-89
ECG

2426
2427
2428
2429
2430
2431



1. BASE
2. COLLECTOR
3. EMITTER

Fig. T21
TO-92HS
ECG

192
193

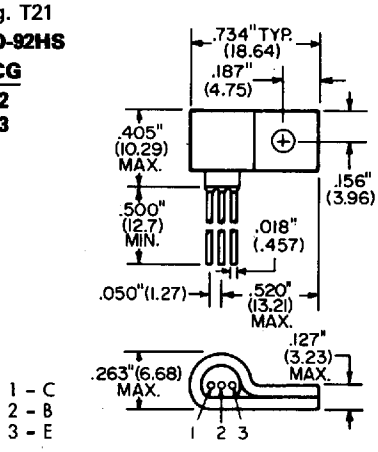


Fig. T22
T-16HS
ECG

192A
193A

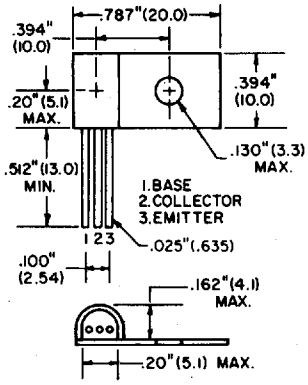


Fig. T23
TO-39F
ECG

224
225

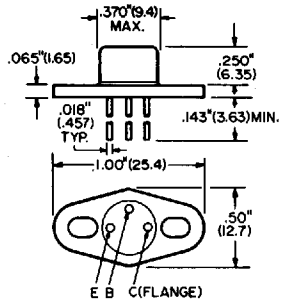


Fig. T24
TO-39HS
ECG

237

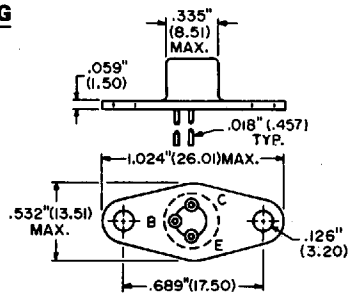


Fig. T25
TO-66
ECG

38	124	218
57	175	274

275	321	384
286	369	

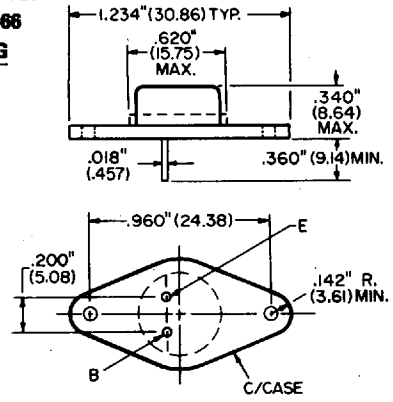


Fig. T26
TC-9A
ECG

226

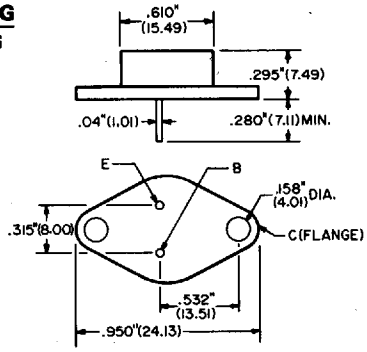


Fig. T27
TC-9
ECG

131	
155	

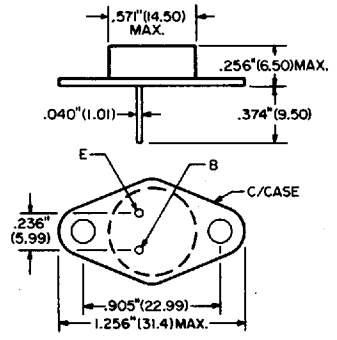
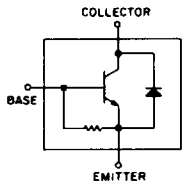
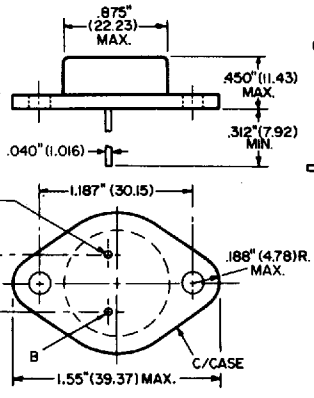


Fig. T28
TO-3
ECG

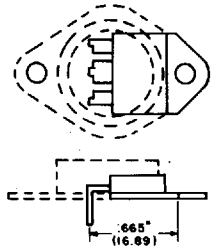
52	162	251
53	163A	252
60	164	280
61	165	281
68	179	283
86	180	284
87	181	285
88	219	327
89*	238	328
94	243	385
97	244	386
98	245	388
99	246	389
104	247	2319
121	248	2384•
127	249	2386•
130	250	2392•

* Internal Circuit for ECG89





Mechanical Interchangeability of Plastic Package with TO-3 Case.



• Basing - SGD

Transistor Outlines (cont'd)

Fig. T28A
TO-3
ECG
27
29
30
387
2349
2350

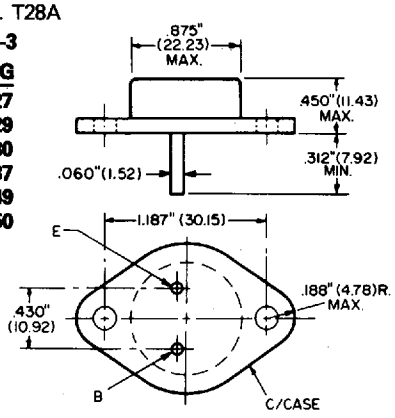
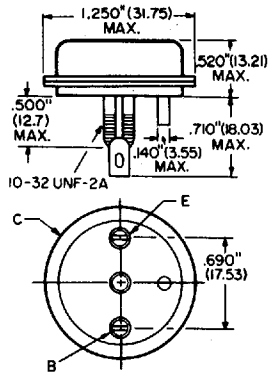


Fig. T29
TO-36
ECG
105
213
330
330W*



* Supplied with Welded-On Wire Leads

Fig. T29A
TO-66
ECG
28

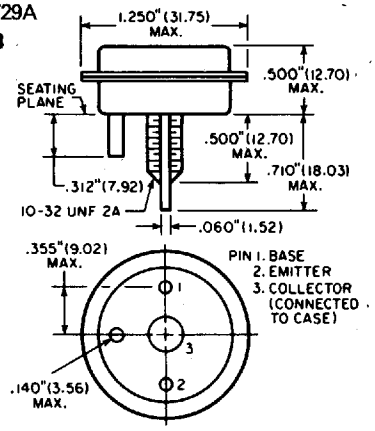
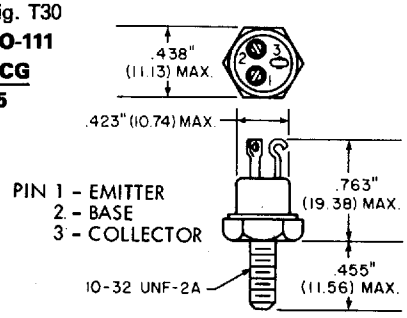


Fig. T30
TO-111
ECG
75



COLLECTOR TO STUD

Fig. T31
TO-59
Isolated Stud
ECG
95
96

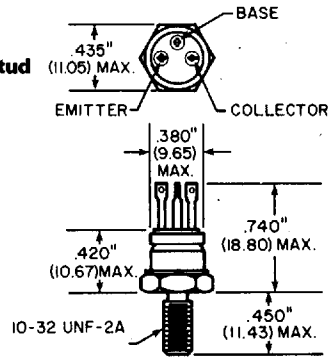


Fig. T32
TO-59
ECG
74

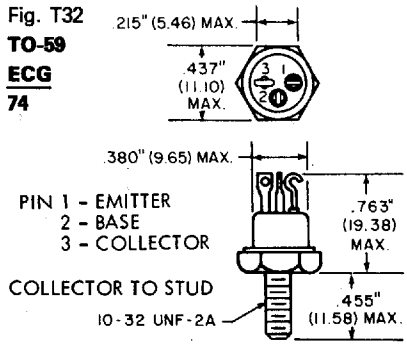


Fig. T33
TO-61
Isolated Stud
ECG
72

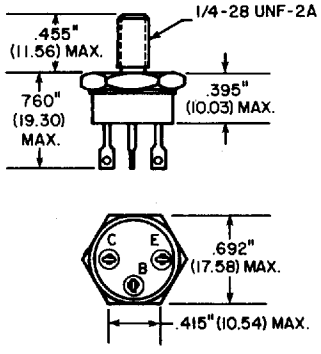
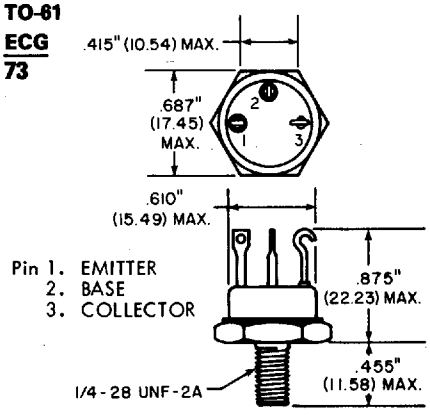


Fig. T34
TO-61
ECG
73



COLLECTOR TO STUD

Fig. T35
TO-63
ECG
70
71

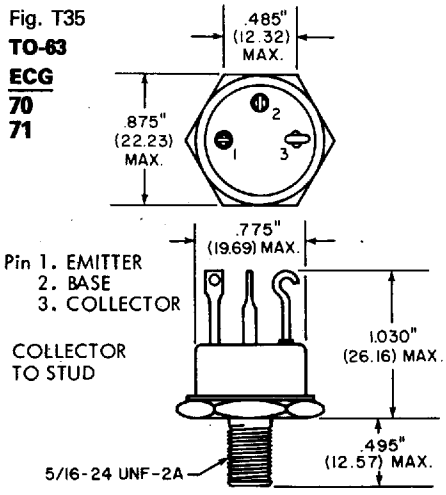


Fig. T36
TO-202N
ECG
188
189
190
191
240
272
273

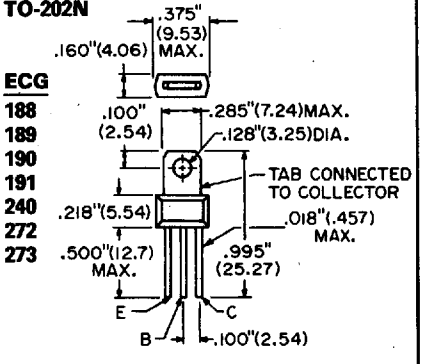


Fig. T37
TO-202J

ECG	1	2	3
80	B	C	E
302	E	B	C
306	B	C	E

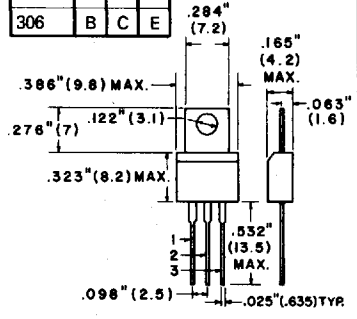
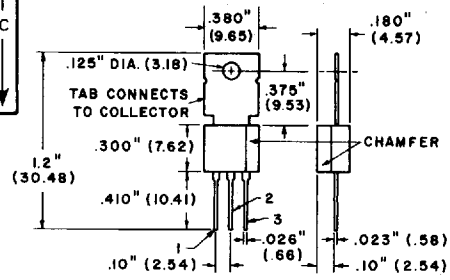


Fig. T38
TO-202

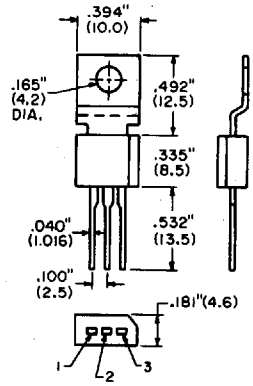
ECG	1	2	3
49 50 171 210 211 265 266 267 268 269	E	B	C

ECG	1	2	3
186 187	B	C	E
300 307	C	B	E



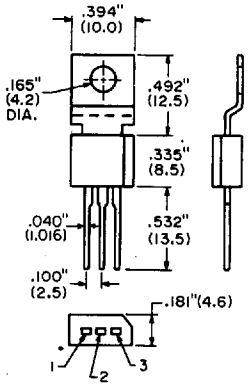
Transistor Outlines (cont'd)

Fig. T39
TO-202M



ECG	1	2	3	TAB
78	B	C	E	C
79	B	C	E	C
186A	B	C	E	C
187A	B	C	E	C
228A	E	B	C	C

Fig. T40
TO-202EC
ECG
474

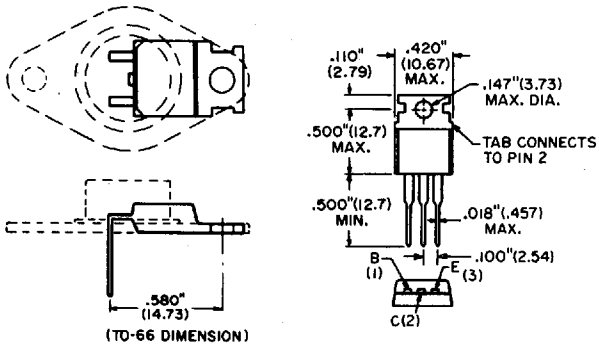


PIN 1 - BASE
2 - EMITTER, TAB
3 - COLLECTOR

Fig. T41
TO-220
ECG

51	262	2315
54	263	2325
55	264	2332
56	291	2333
66*	292	2334
67*	331	2343
152	332	2344
153	375	2380*
196	376	2381*
197	377	2382*
198	378	2383*
235	379	2385*
236	398	2387*
241	2303	2388*
242	2312	2390*
261	2313	

* Basing - GDS



Mechanical Interchangeability of TO-220 Plastic Package with TO-66 Case — See Detailed Illustration Page 1-30.

Fig. T41-1
TO-220J
ECG
2336
2337
2339

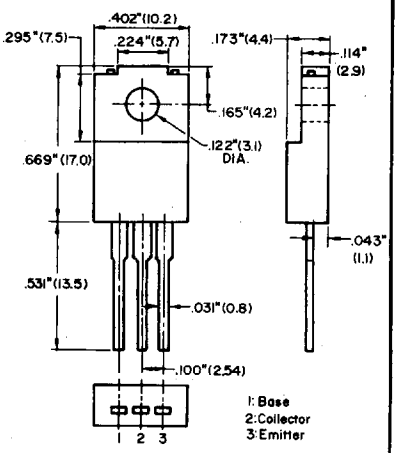
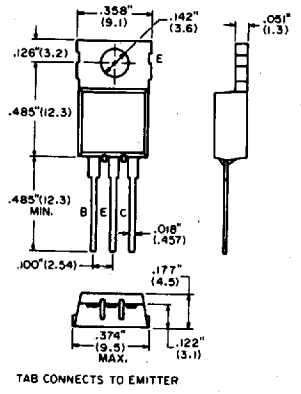
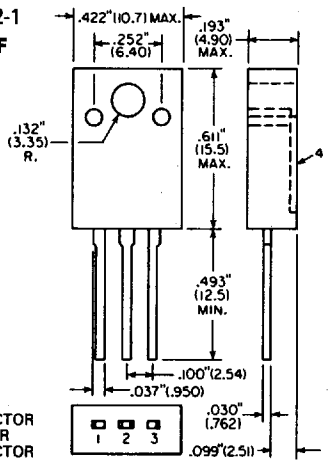


Fig. T42
TO-220EC
ECG
342
343



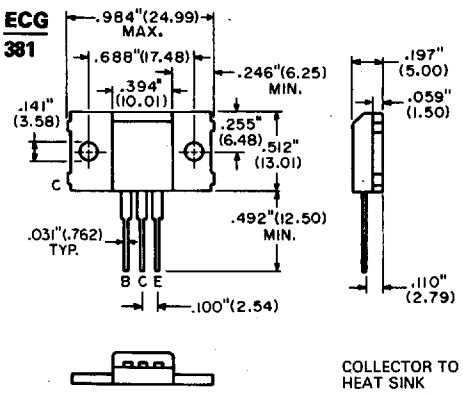
TAB CONNECTS TO EMITTER

Fig. T42-1
TO-220F
ECG
2326



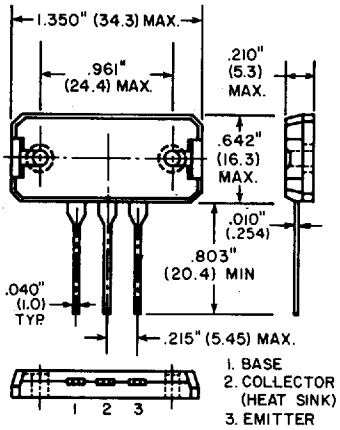
1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

Fig. T43
TB-33
ECG
381



COLLECTOR TO HEAT SINK

Fig. T44
TB-34
ECG
33
34



1. BASE
2. COLLECTOR (HEAT SINK)
3. EMITTER

Fig. T44-1
TB-35
ECG
58
59
92
93

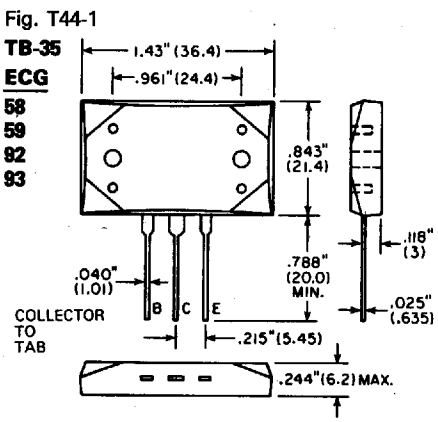


Fig. T45
TO-126
ECG
39
157
184
185
253
254
295
373
374
2327
2338