



MEDIUM POWER

Type No.	Case Style	V _{CB0} (V) Min	V _{CE0} (V) Min	V _{EB0} (V) Min	I _{CES} * I _{CB0} (nA) @ V _{CB} (V) Max	h _{FE} Min Max @ I _C (mA) & V _{CE} (V)	V _{CE(SAT)} (V) & V _{BE(SAT)} (V) @ I _C (mA) Max Min Max	C _{ob} (pF) Max	f _T (MHz) @ I _C (mA) Min Max	t _{off} (ns) Max	NF (dB) Max	Test Conditions	Process No.
2N4030	TO-39	60	60	5	50 50	15 1A 5 25 500 5 40 100 5 30 120 0.1 5	1.0 1A 5 0.5 500 5 0.15 0.9 150	20	100 400 50	400		3	67
2N4031	TO-39	80	80	5	50 60	10 1A 5 25 500 5 40 120 100 5 30 0.1 5	0.5 500 5 0.15 0.9 150	20	100 400 50	400		3	67
2N4032	TO-39	60	60	5	50 50	40 1A 5 70 500 5 100 300 100 5 75 0.1 5	1.0 1A 5 0.5 500 5 0.15 0.9 150	20	150 500 50	400		3	67
2N4033	TO-39	80	80	5	50 60	25 1A 5 70 500 5 100 300 100 5 75 0.1 5	0.5 500 5 0.15 0.9 150	20	150 500 50	400		3	67
2N4036	TO-39	90	65	7	20 60	20 500 10 40 140 150 10 20 0.1 10	0.6 1.4 150	30	60 50	700		4	67
2N4037	TO-39	60	40	7	250 60	50 250 150 10 15 1 10	1.4 150	30	60 50				67
2N4314	TO-39	90	65		250 60	50 250 150 10 15 1 10	1.4 150	30	60 50				67
40319	TO-39		40		250 15	35 200 50 4	1.4 150						67
TN4030	TO-237 (91)	60	60	5	50 50	30 0.1 5 40 120 100 5 25 500 5 15 1A 5	0.5 500 5 0.15 0.9 150 1.0 1A	20	100 400 50				67
TN4033	TO-237 (91)	80	80	5	50 60	75 0.1 5 100 300 100 5 70 500 5 25 1A 5	0.15 0.9 150 0.5 500	20	150 500 50				67
TN4314	TO-237 (91)	90	65		250 60	15 1 10 50 250 150 10	1.4 150		60 50				67
TN3244	TO-237 (91)	40	40	5	50 30	60 150 1 50 150 500 1 25 750 5	0.3 1.1 150 0.5 0.75 1.5 500 1.0 2.0 750	25	175 50				70

TEST CONDITIONS:

(1) I_C = 50 mA, V_{CC} = 100V, I_B¹ = I_B² = 5 mA. (2) I_C = 500 μA, V_{CE} = 10V, f = 1 kHz. (3) I_C = 500 mA, V_{CC} = 30V, I_B¹ = I_B² = 50 mA. (4) I_C = 150 mA, V_{CC} = 30V, I_B¹ = I_B² = 15 mA. (5) I_C = 100 μA, V_{CC} = 10V, f = 1 kHz. (6) I_C = 500 mA, V_{CC} = 30V, I_B¹ = I_B² = 50 mA.

Conversion of Bipolar Metal Can to Plastic

Metal P/N	Plastic Equivalent	Electrical Equivalency*	Process	Metal P/N	Plastic Equivalent	Electrical Equivalency*	Process
2N697	2N4400	A	13	2N2905	TN2905	E	63
2N706	MPS706	E	21	2N2905A	TN2905A	E	63
2N708	PN3646	N	22	2N2906	PN2906	E	63
2N718	2N4400	A	13	2N2906A	PN2906A	E	63
2N722	PN2906	N	63	2N2907	PN2907	E	63
2N744	PN2369	N	21	2N2907A	PN2907A	E	63
2N753	PN2369	N	21	2N3009	PN3646	N	22
2N760A	2N4409	N	07	2N3011	PN2369	N	21
2N834	MPS834	E	21	2N3012	PN3640	A	65
2N869A	PN3640	A	65	2N3013	PN3646	E	22
2N915	MPS6565	A	27	2N3019	TN3019	E	12
2N917	PN3563	E	43	2N3020	TN3020	E	12
2N918	PN918	E	43	2N3053	2N3053	E	12
2N929	2N4409	N	07	2N3117	2N5210	N	07
2N930	PN930	E	07	2N3133	MPS3703	N	63
2N956	PN2222A	N	19	2N3134	PN3645	N	63
2N995A	PN3640	A	65	2N3135	MPS3703	N	63
2N1132	PN2906	N	63	2N3136	PN3645	N	63
2N1613	PN2221A	N	19	2N3250	2N3905	A	66
2N1711	PN2222A	N	19	2N3251	2N3906	A	66
2N2218	TN2218	E	19	2N3300	2N4401	A	13
2N2218A	TN2218A	E	19	2N3301	2N4400	A	13
2N2219	TN2219	E	19	2N3302	2N4401	A	13
2N2219A	TN2219A	E	19	2N3304	PN3639	A	65
2N2221	PN2221	E	19	2N3440	TN3440	E	36
2N2221A	PN2221A	E	19	2N3724	TN3724	E	25
2N2222	PN2222	E	19	2N3725	TN3725	E	25
2N2222A	PN2222A	E	19	2N3944	2N3903	N	23
2N2369	PN2369	E	21	2N3947	2N3904	N	23
2N2369A	PN2369A	E	21	2N3962	2N5086	N	62
2N2483	2N5209	N	07	2N3964	2N5087	N	62
2N2484	2N5210	N	07	2N3965	2N5087	N	62
2N2604	2N5086	N	62	2N4033	TN4033	E	67
2N2605	2N5086	N	62	2N4036	TN4036	E	67
2N2894	PN3640	A	65	2N4037	TN4037	E	67
2N2894A	PN3639	A	65	2N4208	PN3640	N	65
2N2904	TN2904	E	63	2N4209	PN3640	N	65
2N2904A	TN2904A	E	63				

* E = Exact electrical equivalent

N = Near electrical equivalent

A = Approximate electrical equivalent

Note: On "N" and "A" categories please refer to device specification section for deviation from metal can specifications.

This list is for use when an alternative to a metal can transistor is needed.

To facilitate conversions on the most popular types National is offering the "PN" series, TO-92 devices that use the same die type and are screened to same electrical specifications. The TO-92 transistors produced by National Semiconductor are the most advanced Plastic Transistors ever manufactured. They utilize epoxy B encapsulation and a copper lead frame to give a power dissipation of up to 625 mW @ $T_A = 25^\circ\text{C}$. These transistors provide electrical performance and reliability equivalent to their metal can versions in most applications where T_J does not exceed 150°C .

The same situation is applicable to the "TN" series, except that the National-originated TO-237 (TO-92 +) case outline is used, which permits power dissipation of up to 1.0W @ $T_A = 25^\circ\text{C}$.

Substitution Guide for Non-Listed Power Part Types

Industry Part No.	Package	NSC Part No.	Package	Industry Part No.	Package	NSC Part No.	Package
2N2102	TO-39	TN2102	TO-237	2N6411	TO-126 (rev)	MJE210	TO-126
2N2218A	TO-18	TN2218A	TO-237	2N6412	TO-126 (rev)	MJE180	TO-126
2N2219A	TO-18	TN2219A	TO-237	2N6413	TO-126 (rev)	MJE181	TO-126
2N2905	TO-18	TN2905	TO-237	2N6414	TO-126 (rev)	MJE170	TO-126
2N3019	TO-39	TN3019	TO-237	2N6415	TO-126 (rev)	MJE171	TO-126
2N3020	TO-39	TN3020	TO-237	2N6416	TO-126 (rev)	MJE241	TO-126
2N3053	TO-39	TN3053	TO-237	2N6417	TO-126 (rev)	MJE243	TO-126
2N3054	TO-66	NSP3054	TO-220	2N6418	TO-126 (rev)	MJE251	TO-126
2N3724	TO-39	TN3724	TO-237	2N6419	TO-126 (rev)	MJE253	TO-126
2N3725	TO-39	TN3725	TO-237	2N6465	TO-66	TIP41C	TO-220
2N3735	TO-39	TN3735	TO-237	2N6530	TO-220	TIP101	TO-220
2N3740	TO-66	NSP3740	TO-220	2N6531	TO-220	TIP102	TO-220
2N3741	TO-66	NSP3741	TO-220	BD575	Mot Case 199	NSP575	TO-220
2N4033	TO-39	TN4033	TO-237	BD576	Mot Case 199	NSP576	TO-220
2N4037	TO-39	TN4037	TO-237	BD577	Mot Case 199	NSP577	TO-220
2N4063	TO-37	MJE3439	TO-126	BD578	Mot Case 199	NSP578	TO-220
2N4064	TO-37	MJE3440	TO-126	BD579	Mot Case 199	NSP579	TO-220
2N5974	TO-127	NSP5974	TO-220	BD579	Mot Case 199	NSP578	TO-220
2N5975	TO-127	NSP5975	TO-220	BD580	Mot Case 199	NSP580	TO-220
2N5976	TO-127	NSP5976	TO-220	BD581	Mot Case 199	NSP581	TO-220
2N5977	TO-127	NSP5977	TO-220	BD582	Mot Case 199	NSP582	TO-220
2N5978	TO-127	NSP5978	TO-220	BD585	Mot Case 199	NSP585	TO-220
2N5979	TO-127	NSP5979	TO-220	BD586	Mot Case 199	NSP586	TO-220
2N5980	Mot Case 90	2N6489	TO-220	BD587	Mot Case 199	NSP587	TO-220
2N5981	Mot Case 90	MJE2955T	TO-220	BD588	Mot Case 199	NSP588	TO-220
2N5982	Mot Case 90	2N6491	TO-220	BD589	Mot Case 199	NSP589	TO-220
2N5983	Mot Case 90	MJE3055T	TO-220	BD590	Mot Case 199	NSP590	TO-220
2N5984	Mot Case 90	MJE3055T	TO-220	BD595	Mot Case 199	NSP595	TO-220
2N5985	Mot Case 90	2N6488	TO-220	BD596	Mot Case 199	NSP596	TO-220
2N6021	TO-220	2N6126	TO-220	BD597	Mot Case 199	NSP597	TO-220
2N6022	TO-220	2N6126	TO-220	BD601	Mot Case 199	NSP601	TO-220
2N6023	TO-220	2N6124	TO-220	BD602	Mot Case 199	NSP602	TO-220
2N6024	TO-220	2N6124	TO-220	BD603	Mot Case 199	NSP603	TO-220
2N6025	TO-220	2N6125	TO-220	BD604	Mot Case 199	NSP604	TO-220
2N6026	TO-220	2N6125	TO-220	BD605	Mot Case 199	NSP605	TO-220
2N6040	Mot Case 199	TIP125	TO-220	BD606	Mot Case 199	NSP606	TO-220
2N6041	Mot Case 199	TIP126	TO-220	BD607	Mot Case 199	NSP607	TO-220
2N6042	Mot Case 199	TIP127	TO-220	BD608	Mot Case 199	NSP608	TO-220
2N6043	Mot Case 199	TIP120	TO-220	BD609	Mot Case 199	NSP609	TO-220
2N6044	Mot Case 199	TIP121	TO-220	BD610	Mot Case 199	NSP610	TO-220
2N6045	Mot Case 199	TIP122	TO-220	BD695	Mot Case 199	NSP695	TO-220
2N6098	TO-220	2N6099	TO-220	BD695A	Mot Case 199	NSP695A	TO-220
2N6100	TO-220	2N6101	TO-220	BD700	Mot Case 199	NSP700	TO-220
2N6101	TO-220	2N6101	TO-220	BD700A	Mot Case 199	NSP700A	TO-220
2N6102	TO-220	2N6102	TO-220	BD701	Mot Case 199	NSP701	TO-220
2N6103	TO-220	2N6103	TO-220	BD702	Mot Case 199	NSP702	TO-220
2N6106	TO-220	2N6107	TO-220	D45E1	TO-220	TIP125	TO-220
2N6108	TO-220	2N6109	TO-220	D45E2	TO-220	TIP125	TO-220
2N6109	TO-220	2N6109	TO-220	D45E3	TO-220	TIP126	TO-220
2N6110	TO-220	2N6111	TO-220	FT2955	TO-220	MJE2955T	TO-220
2N6111	TO-220	2N6111	TO-220	FT3055	TO-220	MJE3055T	TO-220
2N6175	Plastic TO-5	2N5656	TO-126	MJE29	Mot Case 199	TIP29	TO-220
2N6176	Plastic TO-5	2N5656	TO-126	MJE29A	Mot Case 199	TIP29A	TO-220
2N6177	Plastic TO-5	2N5657	TO-126	MJE29B	Mot Case 199	TIP29B	TO-220
2N6178	Plastic TO-5	MJE182	TO-126	MJE29C	Mot Case 199	TIP29C	TO-220
2N6179	Plastic TO-5	MJE181	TO-126	MJE30	Mot Case 199	TIP30	TO-220
2N6180	Plastic TO-5	MJE172	TO-126	MJE30A	Mot Case 199	TIP30A	TO-220
2N6181	Plastic TO-5	MJE171	TO-126	MJE30B	Mot Case 199	TIP30B	TO-220
2N6406	TO-126 (rev)	MJE171	TO-126	MJE30C	Mot Case 199	TIP30C	TO-220
2N6407	TO-126 (rev)	MJE172	TO-126	MJE33	Mot Case 199	TIP41	TO-220
2N6408	TO-126 (rev)	MJE181	TO-126	MJE33A	Mot Case 199	TIP41A	TO-220
2N6409	TO-126 (rev)	MJE182	TO-126	MJE33B	Mot Case 199	TIP41B	TO-220
2N6410	TO-126 (rev)	MJE200	TO-126	MJE33C	Mot Case 199	TIP41C	TO-220