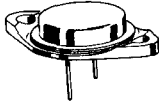


TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS									
						P <sub>D</sub> @ 25°C	P <sub>Point</sub> Ref	T <sub>J</sub> °C	V <sub>CB</sub> (volts)	V <sub>CE--</sub> (volts)	Subscript	h <sub>FE</sub> @ I <sub>C</sub>		V <sub>CE(SAT)</sub> @ I <sub>C</sub>		h <sub>FE</sub>	Subscript	f <sub>T</sub> Units	Subscript		
												(min)	(max)	Units	(volts)					Units	
2N992	G	P	2N3250 2N3248	8-61 8-208 8-204	RFC	67M	A	75	20	20	R	40		1.0M		40	E				
2N993	G	P			RFC	67M	A	75	20	20	R	40		1.0M		40	E				
2N994	G	P			HSS	200M	A	150	15	6.0	0	45	140	10M	0.18	10M					
2N995	S	P			RFA	360M	A	200	20	15	0	35	140	20M	0.2	20M			100M	T	
2N995A	S	P			RFA	360M	A	200	20	15	0	35	140	20M	0.2	20M			100M	T	
2N996	S	P			RFA	360M	A	200	15	12	0	35		20M	0.3	60M			100M	T	
2N997	S	N			AFA	500M	A	175	75	40	0	35		100*	1.6	50M					
2N998	S	N			SPP	500M	A	200	100	60	0				1.2	100M	1000	E			
2N999	S	N			SPP	500M	A	200	60	60	0				1.6	100M					
2N1000	G	N			MSA	150M	A	100	40	25	0			40	10M	0.25	100M			7.0M	E
2N1002	G	N			RFA	120M	A	100	35	20	0										
2N1004	G	P			WID	120M	A	100	35	20	0										
2N1005	S	N			AFA	150M	A	175	15	15	0	10	25	10M	0.6	10M					
2N1006	S	N			AFA	150M	A	175	15	15	0	25	150	10M	0.6	10M					
2N1007	G	P	LPA	35W	C	95	25	20	0	50	250	1.0A	1.0	2.0A			60K	T			
2N1008	G	P	AFA	0.3W	C	85	20	15	R				0.25	0.1A							
2N1008A	G	P	AFA	0.3W	C	85	40	35	R				0.25	0.1A							
2N1008B	G	P	AFA	0.3W	C	85	60	55	R				0.25	0.1A							
2N1009	G	P	AFA	0.4W	C	85	35	35	R				0.25	0.1A							
2N1010	G	N	APC	20M	A	55	10	10	0												
2N1011	G	P	LPA	35W	C	95	80	80	S	30	75	3.0A	1.5	3.0A			5.0K	E			
2N1012	G	N	MSA	150M	A	100	40	25	0	20		100M	0.2	100M			3.0M	E			
2N1014	G	P	LPA	50M	A	100	100	65	0	40	50	4.0A	0.8	4.0A			0.5M	E			
2N1015	S	N	PMS	150W	C	150	30	30	V	10		2.0A	1.5	2.0A							
2N1015A	S	N	PMS	150W	C	150	60	60	V	10		2.0A	1.5	2.0A							
2N1015B	S	N	PMS	150W	C	150	100	100	V	10		2.0A	1.5	2.0A							
2N1015C	S	N	PMS	150W	C	150	150	150	V	10		2.0A	1.5	2.0A							
2N1015D	S	N	PMS	150W	C	150	200	200	V	10		2.0A	1.5	2.0A							
2N1015E	S	N	PMS	150W	C	150	250	250	V	10		2.0A	1.5	2.0A							
2N1015F	S	N	PMS	150W	C	150	300	300	V	10		2.0A	1.5	2.0A							
2N1016	S	N	PMS	150W	C	150	30	30	V	10		5.0A	2.5	5.0A							
2N1016A	S	N	PMS	150W	C	150	60	60	V	10		5.0A	2.5	5.0A							
2N1016B	S	N	PMS	150W	C	150	100	100	V	10		5.0A	2.5	5.0A							
2N1016C	S	N	PMS	150W	C	150	150	150	V	10		5.0A	2.5	5.0A							
2N1016D	S	N	PMS	150W	C	150	200	200	V	10		5.0A	2.5	5.0A							
2N1016E	S	N	PMS	150W	C	150	250	250	V	10		5.0A	2.5	5.0A							
2N1016F	S	N	PMS	150W	C	150	300	300	V	10		5.0A	2.5	5.0A							
2N1017	G	P	MSA	150M	C	85	30	10	0	70		20M	2.6	200M			15M	B			
2N1018	G	P	MSS	200M	A	100	30	6.0	0	70		70M	2.6	200M			20M	T			
2N1021	G	P	LPA	50W	C	95	100	100	X	23	70	1.0A	1.0	5.0A							
2N1021A	G	P	LPA	150W	C	100	100	30	V	30	90	5.0A	0.5	5.0A			200K	T			
2N1022	G	P	LPA	50W	C	95	120	120	X	23	70	5.0A	1.0	5.0A							
2N1022A	G	P	LPA	150W	C	100	120	55	0	30	90	5.0A	0.5	5.0A			200K	T			
2N1023	G	P	RFA	120M	A	100	40	40	0	20	175	1.5M									
2N1024	S	P	AFA	0.25W	A	175	18	15	U						9.0	E	1.0M	B			
2N1025	S	P	AFA	0.25W	A	175	40	35	U						9.0	E	1.0M	B			
2N1026	S	P	AFA	0.25W	A	175	40	35	U						18	E	2.0M	B			
2N1027	S	P	AFA	0.25W	A	175	18	15	U						18	E	4.0M	B			
2N1028	S	P	AFA	0.25W	A	175	12	10	U						9.0	E	7.2M	T			
2N1029	G	P	LPA	90W	C	100	50	20	0	20	60	10A	1.0	10A							
2N1029A	G	P	LPA	90W	C	100	60	30	0	20	60	10A	1.0	10A							
2N1029B	G	P	LPA	90W	C	100	90	60	0	20	60	10A	1.0	10A							
2N1029C	G	P	LPA	90W	C	100	100	70	0	20	60	10A	1.0	10A							
2N1030	G	P	LPA	90W	C	100	50	20	0	50	100	10A	1.0	10A							
2N1030A	G	P	LPA	90W	C	100	60	30	0	50	100	10A	1.0	10A							
2N1030B	G	P	LPA	90W	C	100	90	60	0	50	100	10A	1.0	10A							
2N1030C	G	P	LPA	90W	C	100	100	70	0	50	100	10A	1.0	10A							
2N1031	G	P	LPA	90W	C	100	50	30	S	20	60	10A	1.0	10A			2.0K	E			
2N1031A	G	P	LPA	90W	C	100	60	40	S	20	60	10A	1.0	10A			2.0K	E			
2N1031B	G	P	LPA	90W	C	100	90	70	S	20	60	10A	1.0	10A			2.0K	E			
2N1031C	G	P	LPA	90W	C	100	100	80	S	20	60	10A	1.0	10A							
2N1032	G	P	LPA	90W	C	100	50	30	S	50	100	10A	1.0	10A			25	E			
2N1032A	G	P	LPA	90W	C	100	60	40	S	50	100	10A	1.0	10A			25	E			
2N1032B	G	P	LPA	90W	C	100	90	70	S	50	100	10A	1.0	10A			25	E			
2N1032C	G	P	LPA	90W	C	100	100	80	S	50	100	10A	1.0	10A			25	E			
2N1034	S	P	AFA	250M	A	160	50	40	0				0.5	8.0M	9.0	E	150K	B			
2N1035	S	P	AFA	250M	A	160	50	35	0				0.4	8.0M	18	E	200K	B			
2N1036	S	P	AFA	250M	A	160	50	30	0				0.3	8.0M	34	E	300K	B			
2N1037	S	P	AFA	250M	A	160	50	35	0				0.5	8.0M	9.0	E	150K	B			
2N1038	G	P	LPA	20W	C	95	40	40	V	20	60	1.0A	0.25	1.0A			8.0K	E			
2N1039	G	P	LPA	20W	C	95	60	60	V	20	60	1.0A	0.25	1.0A			8.0K	E			
2N1040	G	P	LPA	20W	C	95	80	80	V	20	60	1.0A	0.25	1.0A			8.0K	E			
2N1041	G	P	LPA	20W	C	95	100	100	V	20	60	1.0A	0.25	1.0A	18	E	8.0K	E			
2N1042	G	P	LPA	20W	C	100	40	40	V	20	60	3.0A	0.75	3.0A	2.0	E	250K	T			
2N1043	G	P	LPA	20W	C	100	60	60	V	20	60	3.0A	0.25	1.0A			250K	T			
2N1044	G	P	LPA	20W	C	100	80	80	V	20	60	3.0A	0.25	1.0A			250K	T			
2N1045	G	P	LPA	20W	C	100	100	100	V	20	60	3.0A	0.25	1.0A			250K	T			
2N1046	G	P	HPA	50W	C	100	100	50	0	40		5.0A	0.2	500M			15M	T			
2N1046A	G	P	HPA	50W	C	100	130	50	0	40		5.0A	0.4	5.0A			15M	T			
2N104																					

**2N1021 (GERMANIUM)**  
**2N1022**

**$V_{CB} = 100-120 \text{ V}$**   
 **$I_C = 5 \text{ A}$**   
 **$P_D = 85 \text{ W}$**



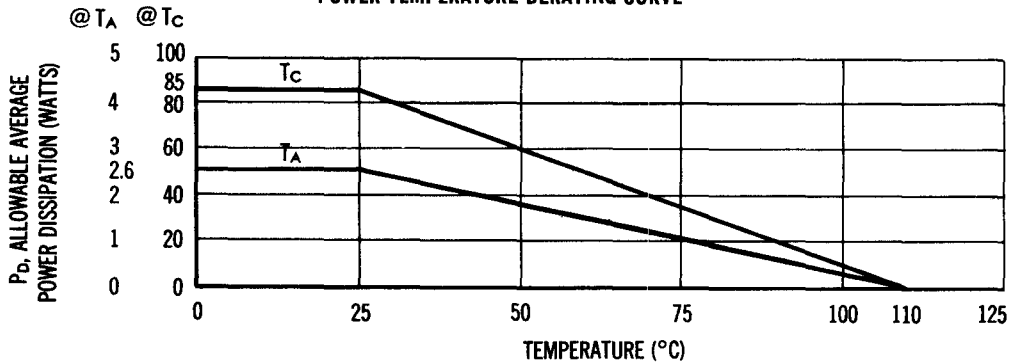
PNP germanium power transistor for industrial and general purpose power amplifier and switching applications.

**CASE 1**  
(TO-3)

**MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Rating	Symbol	2N1021	2N1022	Unit
Collector-Base Voltage	$V_{CB}$	100	120	Volts
Collector-Emitter Voltage	$V_{CEX}$	100	120	Volts
Collector-Emitter Voltage	$V_{CEO}$	← 50 →		Volts
Emitter-Base Voltage	$V_{EB}$	← 30 →		Volts
Collector Current	$I_C$	← 5 →		Amp
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	← -65 to +110 →		$^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	← 85 →		Watts
		← 1 →		$\text{W}/^\circ\text{C}$

**POWER-TEMPERATURE DERATING CURVE**



**2N1021, 2N1022** (continued)

ELECTRICAL CHARACTERISTICS (T<sub>c</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Collector-Base Cutoff Current (V <sub>CB</sub> = 50 Vdc)                      2N1021	I <sub>CBO</sub>	—	0.5	mAdc
(V <sub>CB</sub> = 60 Vdc)                      2N1022		—	0.5	
(V <sub>CB</sub> = 100 Vdc)                      2N1021		—	2	
(V <sub>CB</sub> = 120 Vdc)                      2N1022		—	2	
(V <sub>CB</sub> = 50 Vdc, T <sub>C</sub> = +55°C)                      2N1021		—	8	
(V <sub>CB</sub> = 60 Vdc, T <sub>C</sub> = +55°C)                      2N1022		—	8	
Collector-Emitter Breakdown Voltage* (I <sub>C</sub> = 200 mAdc)	BV <sub>CEO</sub> *	50	—	Vdc
Emitter-Base Cutoff Current (V <sub>EB</sub> = 10 Vdc)	I <sub>EBO</sub>	—	0.5	mAdc
(V <sub>EB</sub> = 30 Vdc)		—	2	
Base-Emitter Voltage (V <sub>CE</sub> = -1.5 Vdc, I <sub>C</sub> = 1.0 Adc)	V <sub>BE</sub>	—	3	Vdc
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 5 Adc, I <sub>B</sub> = 500 mAdc)	V <sub>CE(sat)</sub>	—	0.5	Vdc
DC Current Gain (I <sub>C</sub> = 1 Adc, V <sub>CE</sub> = 1.5 Vdc)	h <sub>FE</sub>	40	—	—
(I <sub>C</sub> = 3 Adc, V <sub>CE</sub> = 1.5 Vdc)		35	—	
(I <sub>C</sub> = 5 Adc, V <sub>CE</sub> = 1.5 Vdc)		30	90	
(I <sub>C</sub> = 7 Adc, V <sub>CE</sub> = 1.5 Vdc)		22	—	
Input Impedance (I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 1.5 Vdc)	h <sub>ie</sub>	—	28	ohms
Current Gain-Bandwidth Product (I <sub>C</sub> = 1.0 Adc, V <sub>CE</sub> = 2 Vdc)	f <sub>T</sub>	200	—	kHz

\*Sweep Test: 1/2 sine wave, 60 Hz .