TYPE	MATERIAL	POLARITY	REPLACEMENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS							
						P_D @ 25°C	Ref Point	T_J °C	V_{CB} (volts)	V_{CE-} (volts)	Subscript	h_{FE} @ I_C (min)	(max)	Units	$V_{CE(SAT)}$ @ I_C (volts)	Units	h_{f-}	Subscript	f_- Units	Subscript
2N992	G	P			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	44M	T
2N994	G	P			HSS	200M	A	150	15	6.0	O	45	140	10M	0.18	10M				
2N995	S	P		8-61	RFA	360M	A	200	20	15	O	35	140	20M	0.2	20M			100M	T
2N995A	S	P	2N3250	8-208	RFA	360M	A	200	20	15	O	35	140	20M	0.2	20M			100M	T
2N996	S	P	2N3248	8-204	RFA	360M	A	200	15	12	O	35		20M	0.3	60M			100M	T
2N997	S	N			AFA	500M	A	175	75	40	O	35		100*	1.6	100M				
2N998	S	N			SPP	500M	A	200	100	60	O				1.2	50M	1000	E		
2N999	S	N			SPP	500M	A	200	60	60	O				1.6	100M				
2N1000	G	N			MSA	150M	A	100	40	25	O	40		10M	0.25	100M			7.0M	E
2N1003	G	P			RFA	120M	A	100	35	20	U						10	E		
2N1004	G	P			VID	120M	A	100	35	20	U						10	E		
2N1005	S	N			AFA	150M	A	175	15	15	O	10	25	10M	0.6	10M				
2N1006	S	N			AFA	150M	A	175	15	15	O	25	150	10M	0.6	10M				
2N1007	G	P			LPA	35W	C	95	25	20	O	50	250	1.0A	1.0	2.0A	25	E	60K	T
2N1008	G	P		6-24	AFA	0.3W	C	85	20	15	R				0.25	0.1A	40	E		
2N1008A	G	P		6-24	AFA	0.3W	C	85	40	35	R				0.25	0.1A	40	E		
2N1008B	G	P		6-24	AFA	0.3W	C	85	60	55	R				0.25	0.1A	40	E		
2N1009	G	P			AFA	0.4W	C	85	35	35	R				0.25	0.1A	40	E	7.5K	E
2N1010	G	N			AFC	20M	A	55	10	10	O									
2N1011	G	P		7-44	LPA	35W	C	95	80	80	S	30	75	3.0A	1.5	3.0A	20	E	5.0K	E
2N1012	G	N			MSA	150M	A	100	40	22	O	40		100M	0.2	100M			3.0M	E
2N1014	G	P	2N1552	7-67	LPA	50W	C	100	100	65	O	20	50	4.0A	0.8	4.0A			0.5M	B
2N1015	S	N	2N3713	7-125	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				
2N1915F	S	N			PMS	150W	C	150	300	300	V	10		2.0A	1.5	2.0A				
2N1016	S	N	2N3713	7-125	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	A	85	30	10	O	70		20M	2.6	200M			15M	B
2N1018	G	P			MSS	200M	A	100	30	6.0	O	70		70M	2.6	200M			20M	B
2N1021	G	P		7-46	LPA	50W	C	95	100	100	X	23	70	1.0A	1.0	5.0A				
2N1021A	G	P	2N1021	7-46	LPA	150W	C	100	100	50	O	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	2N1022	7-46	LPA	150W	C	100	120	55	O	30	90	5.0A	0.5	5.0A			200K	T
2N1023	G	P	2N3323	9-71	RFA	120M	A	100	40	40	O	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	2N1553	7-67	LPA	90W	C	100	50	20	O	20	60	10A	1.0	10A				
2N1029A	G	P	2N1554	7-67	LPA	90W	C	100	60	30	O	20	60	10A	1.0	10A				
2N1029B	G	P	2N1555	7-67	LPA	90W	C	100	90	60	O	20	60	10A	1.0	10A				
2N1029C	G	P	2N1556	7-67	LPA	90W	C	100	100	70	O	20	60	10A	1.0	10A				
2N1030	G	P	2N1557	7-67	LPA	90W	C	100	50	20	O	50	100	10A	1.0	10A				
2N1030A	G	P	2N1558	7-67	LPA	90W	C	100	60	30	O	50	100	10A	1.0	10A				
2N1030B	G	P	2N1559	7-67	LPA			100	90	60	O	50	100	10A	1.0	10A				
2N1030C	G	P	2N1560	7-67	LPA			100	100	70	O	50	100	10A	1.0	10A				
2N1031	G	P	2N1553	7-67	LPA	90W	C	100	50	30	S	20	60	10A	1.0	10A	10	E	2.0K	E
2N1031A	G	P	2N1554	7-67	LPA	90W	C	100	60	40	S	20	60	10A	1.0	10A	10	E	2.0K	E
2N1031B	G	P	2N1555	7-67	LPA	90W	C	100	90	70	S	20	60	10A	1.0	10A	10	E	2.0K	E
2N1031C	G	P	2N1556	7-67	LPA	90W	C	100	100	80	S	20	60	10A	1.0	10A	10	E	2.0K	E
2N1032	G	P	2N1557	7-67	LPA	90W	C	100	50	30	S	50	100	10A	1.0	10A	25	E	2.0K	E
2N1032A	G	P			LPA	90W	C	100	60	40	S	50	100	10A	1.0	10A	25	E	2.0K	E
2N1032B	G	P			LPA	90W	C	100	90	70	S	50	100	10A	1.0	10A	25	E	2.0K	E
2N1032C	G	P			LPA	90W	C	100	100	80	S	50	100	10A	1.0	10A	25	E	2.0K	E
2N1034	S	P			AFA	250M	A	160	50	40	O				0.5	8.0M	9.0	E	150K	B
2N1035	S	P			AFA	250M	A	160	50	35	O				0.4	8.0M	18	E	200K	B
2N1036	S	P			AFA	250M	A	160	50	30	O				0.3	8.0M	34	E	300K	B
2N1037	S	P			AFA	250M	A	160	50	35	O				0.5	8.0M	9.0	E	150K	B
2N1038	G	P	2N2138	7-78	LPA	20W	C	95	40	40	V	20	60	1.0A	0.25	1.0A	18	E	8.0K	E
2N1039	G	P	2N2139	7-78	LPA	20W	C	95	60	60	V	20	60	1.0A	0.25	1.0A	18	E	8.0K	E
2N1040	G	P	2N2140	7-78	LPA	20W	C	95	80	80	V	20	60	1.0A	0.25	1.0A	18	E	8.0K	E
2N1041	G	P	2N2141	7-78	LPA	20W	C	95	100	100	V	20	60	1.0A	0.25	1.0A	18	E	8.0K	E
2N1042	G	P	2N2143	7-78	LPA	20W	C	100	40	40	V	20	60	3.0A	0.75	3.0A	2.0	E	250K	T
2N1043	G	P	2N2144	7-78	LPA	20W	C	100	60	60	V	20	60	3.0A	0.25	1.0A			250K	T
2N1044	G	P	2N2145	7-78	LPA	20W	C	100	80	80	V	20	60	3.0A	0.25	1.0A			250K	T
2N1045	G	P	2N2146	7-78	LPA	20W	C	100	100	100	V	20	60	3.0A	0.25	1.0A			250K	T
2N1046	G	P	2N2832	7-91	HPA	50W	C	100	100	50	O	40		5.0A	0.2	500M			15M	T
2N1046A	G	P	2N2832	7-91	HPA	50W	C	100	130	50	O	40		5.0A	0.4	5.0A			15M	T
2N1046B	G	P	2N2833	7-91	HPA	50W	C	100	130	50	O	20		10A	0.4	5.0A			15M	T
2N1047	S	N			LPA	40W	C	200	80			12	36	500M	7.5	500M				
2N1047A	S	N			LPA	40W	C	200	80	80	O	12	36	500M	7.5	500M			75K	E
2N1047B	S	N			LPA	40W	C	200	80	80	O	12	36	500M	2.0	500M			125K	E
2N1047C	S	N			LPA	40W	C	200	80	80	O	12	36	500M	1.0	500M			125K	E
2N1048	S	N			LPA	40W	C	200	120			12	36	500M	7.5	500M				
2N1048A	S	N			LPA	40W	C	200	120	120	O	12	36	500M	7.5	500M			75K	E
2N1048B	S	N			LPA	40W	C	200	120	120	O	12	36	500M	2.0	500M			125K	E
2N1048C	S	N			LPA	40W	C	200	120	120	O	12	36	500M	1.0	500M			125K	E

GERMANIUM MILLIWATT TRANSISTORS

This line of low-frequency, low-power transistors consists of a wide selection of highly reliable germanium PNP devices designed for general purpose switching, amplifier, and control applications.

The line is generally characterized by devices having a power rating to 225 mW, a maximum operating temperature range from -65°C to +100°C, and a typical cutoff frequency ($f_{\alpha b}$) to 8 MHz.

QUICK SELECTION GUIDE — FOR AMPLIFIER / OSCILLATOR AND SWITCHING APPLICATIONS TO 20 KILOCYCLES

The following transistors merit first consideration within the specified gain-voltage groups. All of the specified devices have collector power dissipation ratings (P_D) of 150-225 mW, and a maximum operating junction temperature of 100°C.

MINIMUM DC CURRENT GAIN (h_{FE})	TRANSISTOR VOLTAGE RATING; V_{CER} (R = 10 k)			
	12-24	25-39	40-49	50-60
20	—	2N524	MA910 ③	2N2042
30	2N322	2N525 2N1191 ①	2N1924 2N1186	—
40	2N323 2N1008 ① ②	2N526 2N1192 ①	2N1008A ① ② 2N1925	2N1008B ① ② 2N2043
60	2N324 2N1705	2N527 2N1175	2N1926	—
90	2N467 2N508 MA1706	2N1193 ① 2N2171 2N3427	2N1188	—
130	MA1707	2N3428	—	—
180	MA1708	2N1194 ① MA1702		—

① Small Signal Current Gain h_{fe} ② V_{CEO} ③ V_{CES}

COMPLETE NUMERICAL-ALPHABETICAL LISTING

Type	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS					MILITARY and Hi-Rel Type
						h_{FE} @ V_{CE} & I_C				$f_{\alpha b}$	
	P_D mW	T_J °C	V_{CBO} volts	V_{CER} (R = 10 k) volts	I_C mA	min	max	volts	mA	typ MHz	
2N319	225	100	—	20	500	25	42	1	20	1.0 ⑤	
2N320	225	100	—	20	500	34	65	1	20	1.5 ⑤	
2N321	225	100	—	20	500	53	121	1	20	2.0 ⑤	
2N322	225	100	—	18	500	34	65	1	20	1.0 ⑤	
2N323	225	100	—	18	500	53	121	1	20	1.5 ⑤	
2N324	225	100	—	18	500	72	198	1	20	2.0 ⑤	
2N331	200	100	30	V_{EB} = 12	200	30	70	6	1	1.5	JAN 2N331
2N381	225	100	50	25	400	35	65	1	20	3	
2N382	225	100	50	25	400	60	95	1	20	4	
2N383	225	100	50	25	400	75	120	1	20	5	
2N398	50	85	105	V_{pt} = 105	100	20	—	0.35	5	1.0	USN 2N398
2N398A	150	100	105	V_{pt} = 105	200	20		0.35	5	1.0	
2N460	225	100	45	35 ⑦	400	31	200	6	1 ②	4	
2N461	225	100	45	35 ⑦	400	0.94 h_b	0.972	6	1 ②	1.2	USAF 2N461
2N464	200	100	45	40	100	14	—	6	1	1.0	
2N465	200	100	45	30	100	27	—	6	1	1.5	USA 2N465
2N466	200	100	35	20	100	56	—	6	1	2.0	JAN 2N466
2N467	200	100	35	15	100	112	—	6	1	2.5	USA 2N467
2N508	225	100	—	18	500	99	198	1	20	2.5 ⑤	
2N524	225	100	—	30	500	25	42	1	20	0.8 ⑤	2N524A ①
2N525	225	100	—	30	500	34	65	1	20	1.0 ⑤	2N525A ①
2N526	225	100	—	30	500	53	90	1	20	1.3 ⑤	JAN 2N526 2N526A ①
2N527	225	100	—	30	500	72	121	1	20	1.5 ⑤	2N527A ①
2N650	200	100	45	30	500	30	70	6	1	1.5	2N650A ① USN 2N650A
2N651	200	100	45	30	500	50	120	6	1	2.0	2N651A ① USN 2N651A
2N652	200	100	45	30	500	100	225	6	1	2.5	2N652A ① USN 2N652A
2N653	200	100	30	25	250	30	70	6	1	1.5	
2N654	200	100	30	25	250	50	125	6	1	2.0	
2N655	200	100	30	25	250	100	250	6	1	2.5	
2N1008	200	100	20	20 ⑥	300	40 h_{fe}	150	5	10	—	
2N1008A	200	100	40	40 ⑥	300	40 h_{fe}	150	5	10	—	
2N1008B	200	100	60	60 ⑥	300	40 h_{fe}	150	5	10	—	
2N1175	225	100	—	25	500	70	140	1	20	1.5 ⑤	
2N1185	200	100	45	30	500	190	400	6	1	3.0	
2N1186	200	100	60	45	500	30	70	6	1	1.5	
2N1187	200	100	60	45	500	50	120	6	1	2.0	
2N1188	200	100	60	45	500	100	225	6	1	2.5	
2N1189	200	100	45	30	500	60	—	1	10 ②	3.5	
2N1190	200	100	45	30	500	100	—	1	10 ②	4.5	
2N1191	200	100	40	25	200	30	70	6	1	1.5	
2N1192	200	100	40	25	200	50	125	6	1	2.0	

2N1008, A, B
2N1008B USA/JAN

V_{CB} = 60 V
h_{fe} = 40-150 (min-max)

CASE 31
(TO-5)
All leads isolated

PNP germanium transistor for audio driver and medium speed switching applications.

MAXIMUM RATINGS

Rating	Symbol	2N1008	2N1008A	2N1008B	Unit
Collector-Base Voltage	V_{CB}	20	40	60	Volts
Collector-Emitter Voltage	V_{CEO}	20	40	60	Volts
Emitter-Base Voltage	V_{EB}	15			Volts
Collector Current	I_C	300			mAdc
Base Current	I_B	30			mAdc
Collector Dissipation T_A = 25°C derate T_C = 25°C derate	P_D	 200 2.78 300 4.0			 mW mW/°C mW mW/°C
Junction and Storage Temperature Range	T_J, T_{stg}	-65 to +100			°C

ELECTRICAL CHARACTERISTICS (At 25°C unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	UNIT
Collector Leakage Current	I_{CBO}				μAdc
(V_{CB} = 10 Vdc) 2N1008		---	5	10	
(V_{CB} = 10 Vdc, T_A = 85°C) 2N1008		---	---	500	
(V_{CB} = 25 Vdc) 2N1008A		---	5	10	
(V_{CB} = 25 Vdc, T_A = 85°C) 2N1008A		---	---	500	
(V_{CB} = 45 Vdc) 2N1008B		---	7	15	
(V_{CB} = 45 Vdc, T_A = 85°C) 2N1008B		---	---	750	
Emitter Leakage Current	I_{EBO}				μAdc
(V_{EB} = 10 Vdc) 2N1008		---	5	10	
2N1008A		---	---	10	
2N1008B		---	---	10	
Collector-Emitter Breakdown Voltage	BV_{CER}				Vdc
(I_C = 1.0 mAdc, R_{BE} = 10 K)					
2N1008		15	---	---	
2N1008A		35	---	---	
2N1008B		55	---	---	
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 10 mAdc)	V_{CE} (sat)	---	---	0.25	Vdc
Small Signal Current Gain (I_C = -10 mAdc, V_{CE} = 5.0 Vdc, f = 1 kHz)	h_{fe}	40	---	150	---
Input Resistance (V_{CB} = 6 V, I_E = 1 mA)	h_{ie}	200	---	1000	ohms