

TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS									
						P _D	Ref Point	T _J	V _{CB}	V _{CE} —	Subscript	h _{FE} @ I _C		V _{CE(SAT)} @ I _C		h _{FE} —	Subscript	f _T —	Subscript	
						@ 25°C	°C	(volts)	(volts)	(min)		(max)	Units	(volts)	Units					Units
2N3962	S	P			AFA	0.36W	A	200	60	60	0	100	300	10*	0.25	10M	100	E	40M	T
2N3963	S	P			AFA	0.36W	A	200	80	80	0	100	300	10*	0.25	10M	100	E	40M	T
2N3964	S	P			AFA	0.36W	A	200	45	45	0	250	500	10*	0.25	10M	250	E	50M	T
2N3965	S	P			AFA	0.36W	A	200	60	60	0	250	500	10*	0.25	10M	250	E	50M	T
2N3966	Field Effect Transistors, see Table on Page 1-166																			
thru																				
2N3972	S	N	2N4400	5-34	MSC	0.36W	A	150	60	30	0	35	100	10M	0.3	0.15A			200M	T
2N3973	S	N	2N4401	5-34	MSC	0.36W	A	150	60	30	0	55	200	10M	0.3	0.15A			200M	T
2N3974	S	N	2N4400	5-34	MSC	0.36W	A	150	60	30	0	35	100	10M	0.3	0.15A			200M	T
2N3975	S	N	2N4400	5-34	MSC	0.36W	A	150	60	30	0	55	200	10M	0.3	0.15A			200M	T
2N3976	S	P			CHP	0.4W	A	200	15	10	0	40		5.0M	0.1	5.0M			1.0M	T
2N3977	S	P			CHP	0.4W	A	200	25	20	0	30		5.0M	0.15	5.0M			1.0M	T
2N3978	S	P			CHP	0.4W	A	200	40	35	0	20		5.0M	0.15	5.0M			1.0M	T
2N3979	Unijunction Transistor, see Table on Page 1-174																			
2N3980	S	N			HSS	0.8W	A	200	60	30	0	30	120	0.15A	0.4	0.15A			250M	T
2N3981	S	N			HSS	0.8W	A	200	50	20	0	40	140	0.15A	0.4	0.15A			250M	T
2N3982	S	N			RFC	0.2W	A	150	30	12	0	30		4.0M					500M	T
2N3983	S	N			RFC	0.2W	A	150	30	12	0	20		4.0M					400M	T
2N3984	S	N			RFC	0.2W	A	150	30	12	0	20		4.0M					300M	T
2N3985	S	N			RFC	0.2W	A	150	30	12	0	20		4.0M					300M	T
2N3986	Thyristors, see Table on Page 1-154																			
thru																				
2N3992																				
2N3993																				
2N3994	Field Effect Transistor, see Table on Page 1-166																			
2N3995	G	P	2N2929	9-33	RFA	0.3W	A	100	20	12	0	40	200	2.0M			150	E	0.6G	T
2N3996	S	N			PHS	2.0W	A	200	100	80	0	40	120	1.0A	0.25	1.0A			40M	T
2N3997	S	N			PHS	2.0W	A	200	100	80	0	80	240	1.0A	0.25	1.0A			40M	T
2N3998	S	N			PHS	2.0W	A	200	100	80	0	40	120	1.0A	0.25	1.0A			40M	T
2N3999	S	N			PHS	2.0W	A	200	100	80	0	80	240	1.0A	0.25	1.0A			40M	T
2N4000	S	N			PHS	1.0W	A	200	100	80	0	30	120	0.5A	0.3	0.5A			40M	T
2N4001	S	N			PHS	1.0W	A	200	120	100	0	40	120	0.5A	0.3	0.5A			40M	T
2N4002	S	N			LPA	4.0W	A		100	80	0	20	80	15A			30	E	30M	B
2N4003	S	N			LPA	4.0W	A		120	100	0	20	80	15A			30	E	30M	B
2N4004	S	N			LPA	1.2W	A		100	80	0	30	150	10A					30M	B
2N4005	S	N			LPA	1.2W	A		120	100	0	30	150	10A					30M	B
2N4006	S	P			AFA	400M	A	200	10	6.0	0						40	E	20M	T
2N4007	S	P			MSA	400M	A	200	20	15	0						30	E	15M	T
2N4008	S	P			MSA	400M	A	200	35	30	0						20	E	15M	T
2N4009	Matched Pair 2N4006																			
2N4010	Matched Pair 2N4007																			
2N4011	Matched Pair 2N4008																			
2N4012	S	N		9-110	LPA	11.6W	C	200	65	40	0	4.0	40	1.0A	1.0	0.25A			400M	T
2N4013	S	N		8-257	HSS	360M	A	200	60	40	0		150	100M					300M	T
2N4014	S	N		8-257	HSS	360M	A	200	80	50	0		150	100M					300M	T
2N4015	S	P			DFA	0.4W	A	200	60	60	0	135	350	1.0M	0.25	50M	135	E	200M	T
2N4016	S	P			DFA	0.4W	A	200	60	60	0	135	350	1.0M	0.25	50M	135	E	200M	T
2N4017	S	P			AFA	600M	A	200	80	80	0	100	500	1.0M					40M	T
2N4018	S	P			AFA	400M	A	200	60	60	0						100	E	7.0M	T
2N4019	S	P			AFA	400M	A	200	45	45	0						250	E	50M	T
2N4020	S	P			DFA	0.4W	A	200	45	45	0	250	500	10*	0.25	10M	250	E	50M	T
2N4021	S	P			DFA	0.4W	A	200	60	60	0	100	350	10*	0.25	10M	100	E	40M	T
2N4022	S	P			DFA	0.4W	A	200	60	60	0	250	500	10*	0.25	10M	250	E	50M	T
2N4023	S	P			DFA	0.4W	A	200	45	45	0	250	500	10*	0.25	10M	250	E	50M	T
2N4024	S	P			DFA	0.4W	A	200	60	60	0	100	350	10*	0.25	10M	100	E	40M	T
2N4025	S	P			DFA	0.4W	A	200	60	60	0	250	500	10*	0.25	10M	250	E	50M	T
2N4026	S	P			AFA	0.5W	A	200	60	60	0	40	120	0.1A	1.0	1.0A			100M	T
2N4027	S	P			AFA	0.5W	A	200	80	80	0	40	120	0.1A	0.5	0.5A			100M	T
2N4028	S	P			AFA	0.5W	A	200	60	60	0	100	300	0.1A	1.0	1.0A			150M	T
2N4029	S	P			AFA	0.5W	A	200	80	80	0	100	300	0.1A	0.5	0.5A			150M	T
2N4030	S	P			AFA	0.8W	A	200	60	60	0	40	120	0.1A	1.0	1.0A			100M	T
2N4031	S	P			AFA	0.8W	A	200	80	80	0	40	120	0.1A	0.5	0.5A			100M	T
2N4032	S	P			AFA	0.8W	A	200	60	60	0	100	300	0.1A	1.0	1.0A			150M	T
2N4033	S	P			AFA	0.8W	A	200	80	80	0	100	300	0.1A	0.5	0.5A			150M	T
2N4034	S	P			HSS	0.36W	A	200	40	40	0	70	200	10M	0.13	1.0M	50	E	400M	T
2N4035	S	P			HSS	0.36W	A	200	40	40	0	150	300	10M	0.13	1.0M	150	E	450M	T
2N4036	S	P			MSS	5.0W	A	200	90	65	0	40	140	0.15A					60M	T
2N4037	S	P			MSS	1.0W	A	200	60	40	0	50	250	0.15A					60M	T
2N4040	S	N			HPA	17.5W	C	200	60	40	0	10	80	0.1A	2.0	1.0A			400M	T
2N4041	S	N			HPA	10W	C	200	60	40	0	10	80	75M	2.0	0.5A			400M	T
2N4042	S	N			DFA	0.3W	C	200	60	60	0	200	600	10*	0.35	1.0M			200M	T
2N4043	S	N			DFA	0.3W	C	200	45	45	0	80	800	10*	0.35	1.0M			150M	T
2N4044	S	N			DFA	0.4W	C	200	60	60	0	200	600	10*	0.35	1.0M			200M	T
2N4045	S	N			DFA	0.4W	C	200	45	45	0	80	800	10*	0.35	1.0M			150M	T
2N4046	S	N		8-296	HSS	800M	A	200	50	30	0		150	100M					250M	T
2N4047	S	N		8-296	HSS	800M	A	200	80	50	0		150	100M					250M	T
2N4048	G	P		7-152	LPA	170W	C	110	45	30	0	60	120	15A	0.30	60A			2.0K	E
2N4049	G	P		7-152	LPA	170W	C	110	60	45	0	60	120	15A	0.30	60A			2.0K	E
2N4050	G	P		7-152	LPA	170W	C	110	75	60	0	60	120	15A	0.30	60A			2.0K	E
2N4051	G	P		7-152	LPA	170W	C	110	45	30	0	60	180	15A	0.30	60A			2.0K	E
2N4052	G	P		7-152	LPA	170W	C	110	60	45	0	60	180	15A	0.30	60A			2.0K	E
2N4053	G	P		7-152	LPA	170W	C	110	75	60	0	60	180	15A	0.30	60A			2.0K	E
2N4054	S	N			LPA	6.25W	C	150	300	300	0	30	90	50M	5.0	75M			15M	T
2N4055	S	N			LPA	6.25W	C	150	250	250	0	30	90	50M	5.0	75M			15M	T
2N4056	S	N			LPA	6.25W	C	150	200	200	0	30	90	50M	5.0	75M			15M	T
2N4057	S	N			LPA	6.25W	C	150	150	150	0	30	90	50M	5.0	75M			15M	T
2N4058	S	P	MP56522	5-113	AFC	0.25W	A	150	30	30	0	100	400	0.1M	0.7	10M	100	E	15M	T
2N4059	S	P	MP56516	5-113	AFC	0.25W	A	150	30	30	0	45	660	1.0M	0.7	10M	45	E		T

2N3459- 2N4338

FIELD-EFFECT TRANSISTORS INDEX (continued)

TYPE	POLARITY	PAGE NUMBER	I _{DSS}		I _{GSS} I _{DGO} *	Breakdown Voltage		Y _{fs}		C _{ISS} pF	NF	@	f	NOTE
			Min mA	Max mA		V _(BR) Volts	Sub- script	Min μmhos	Max μmhos		$\frac{dB}{\sqrt{Hz}}$		Units	
2N3459	N		0.8	4.0	0.25	50	DGO	1500	6000	18	4.0			
2N3460	N		0.2	1.0	0.25	50	DGO	800	4500	18	4.0			
2N3465	N		1.0	5.0	1.0	40	DGO	400	1200	15	5.0			
2N3466	N		1.0	5.0	1.0	40	DGO	400	1200	15	5.0			
2N3573	P		0.02	0.1	0.6	25	GSS	100	300	6.0	3.0			
2N3574	P		0.075	0.375	0.6	25	GSS	200	600	6.0	3.0			
2N3575	P		0.2	1.0	0.6	25	GSS	300	900	6.0	3.0			
2N3578	P		0.9	4.5	15	20	GSS	1200	3500	65				
2N3631	N		2.0	10		20	DSX	1400	2800	7.5				
2N3684	N		2.5	7.5	0.1	50	GS	2000	3000	4.0	0.5			
2N3685	N		1.0	3.0	0.1	50	GS	1500	2500	4.0	0.5			
2N3686	N		0.4	1.2	0.1	50	GS	1000	2000	4.0	0.5			
2N3687	N		0.1	0.5	0.1	50	GS	500	1500	4.0	0.15*			
2N3695	P		1.25	3.75	0.1	30	GS	1000	1750	5.0	0.2*			
2N3696	P		0.5	1.5	0.1	30	GS	750	1250	5.0	0.2*			
2N3697	P		0.2	0.6	0.1	30	GS	500	1000	5.0	0.2*			
2N3698	P		0.05	0.25	0.1	30	GS	250	750	5.0	0.2*			
2N3796	N	10-4	0.5	3.0	0.001	25	DSX	900	1800	6.0	4.0			
2N3797	N	10-4	2.0	6.0	0.001	20	DSX	1500	3000	8.0	4.0			
2N3819	N		2.0	20	2.0	25	GSS	2000	6500	8.0				
2N3820	P		0.3	15	20	20	GSS	800	5000	32				
2N3821	N	10-8	0.5	2.5	0.1	50	GSS	1500	4500	6.0	5.0	10	H	
2N3822	N	10-8	2.0	10	0.1	50	GSS	3000	6500	6.0	5.0	10	H	
2N3823	N	10-10	4.0	20	0.5	30	DGS	3500	6500	6.0	2.5	100	M	
2N3824	N	10-8			0.1	50	GSS			6.0				
2N3882	P		0.25		0.1	30	DS	1000	2400	4.0	3.0			
2N3909	P		0.3	15	10	20	DGS	1000	5000	32				
2N3921	N		1.0	10	0.25	50	GSS	1500	7500	18	2.0	1.0	K	Dual
2N3922	N		1.0	10	0.25	50	GSS	1500	7500	18	2.0	1.0	K	Dual
2N3934	N		0.25	1.3	0.1	50	GSS	300	900	7.0	2.0	100	H	Dual
2N3935	N		0.25	1.3	0.1	50	GSS	300	900	7.0	2.0	100	H	Dual
2N3954	N		0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100	H	Dual
2N3955	N		0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100	H	Dual
2N3956	N		0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100	H	Dual
2N3957	N		0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100	H	Dual
2N3958	N		0.5	5.0	0.1	50	GSS	1000		4.0	0.5	100	H	Dual
2N3966	N		2.0		0.1	30	DGS			6.0				
2N3967	N		2.5	10	0.1	30	DGS	1600	2400	5.0				
2N3968	N		1.0	5.0	0.1	30	DGS	1400	2000	5.0				
2N3969	N		0.4	2.0	0.1	30	DGS	950	1450	5.0				
2N3970	N		50	150	0.25*	40	DGS			25				
2N3971	N		25	75	0.25*	40	DGS			25				
2N3972	N		5.0	30	0.25*	40	DGS			25				
2N3993	P		10		1.2*	25	GSS	6000	12000	16				
2N3994	P		2.0		1.2*	25	GSS	4000	10000	16				
2N4065	P			0.005	0.0025	25	GSS			4.5				
2N4066	P				0.0025	25	GSS			7.0				
2N4082	N		0.25	1.3	0.1	50		300		7.0				Dual
2N4083	N		0.25	1.3	0.1	50		300		7.0				Dual
2N4084	N		1.0	10	0.25	50		1500		18				Dual
2N4085	N		1.0	10	0.25	50		1500		18				Dual
2N4091	N		30		0.2*	40	DGO			16				
2N4092	N		15		0.2*	40	DGO			16				
2N4093	N		8.0		0.2*	40	DGO			16				
2N4117	N		0.03	0.09	0.01	40	GSS	70	210	3.0				
2N4117A	N		0.03	0.09	0.001	40	DGO			3.0				
2N4118	N		0.08	0.24	0.01	40	GSS	80	250	3.0				
2N4118A	N		0.08	0.24	0.001	40	DGO			3.0				
2N4119	N		0.2	0.6	0.01	40	GSS	100	330	3.0				
2N4119A	N		0.2	0.6	0.001	40	DGO			3.0				
2N4139	N		8.0	11	1.0	50	DGO			18				
2N4220	N	10-11	0.5	3.0	0.1	30	GSS	1000	4000	6.0				
2N4220A	N	10-11	0.5	3.0	0.1	30	GSS	1000	4000	6.0	2.5	1.0	H	
2N4221	N	10-11	2.0	6.0	0.1	30	GSS	2000	5000	6.0				
2N4221A	N	10-11	2.0	6.0	0.1	30	GSS	2000	5000	6.0	2.5	1.0	H	
2N4222	N	10-11	5.0	15	0.1	30	GSS	2500	6000	6.0				
2N4222A	N	10-11	5.0	15	0.1	30	GSS	2500	6000	6.0	2.5	1.0	H	
2N4223	N	10-15	3.0	18	0.25	30	GSS	3000	7000	6.0	5.0	200	M	
2N4224	N	10-15	2.0	20	0.5	30	GSS	2000	7500	6.0				
2N4267	P			0.001	0.005	30	GSS			15				
2N4268	P			0.001	0.005	30	GSS			15				
2N4302	N			5.0	1.0	30	DGO			6.0				
2N4303	N			10	1.0	30	DGO			6.0				
2N4304	N			15	1.0	30	DGO			6.0				
2N4338	N		0.2	0.6	0.1	50	DGO			6.0				

2N3724, 2N3725 — 2N4013, 2N4014 (continued)

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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ON CHARACTERISTICS (continued)

Collector-Emitter Saturation Voltage* ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)		$V_{CE(sat)}^*$	-	0.25	Vdc
($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$)		2N3724, 2N4013	-	0.20	
		2N3725, 2N4014	-	0.26	
($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$)		2N3724, 2N4013	-	0.32	
		2N3725, 2N4014	-	0.40	
($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)		2N3724, 2N4013	-	0.42	
		2N3725, 2N4014	-	0.52	
($I_C = 800\text{ mAdc}$, $I_B = 80\text{ mAdc}$)		2N3724, 2N4013	-	0.65	
		2N3725, 2N4014	-	0.80	
($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)		2N3724, 2N4013	-	0.75	
		2N3725, 2N4014	-	0.95	
Base-Emitter Saturation Voltage* ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)		$V_{BE(sat)}^*$	-	0.76	Vdc
($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$)			-	0.86	
($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$)			-	1.1	
($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)			0.9	1.2	
($I_C = 800\text{ mAdc}$, $I_B = 80\text{ mAdc}$)			-	1.5	
($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)			-	1.7	

SMALL-SIGNAL CHARACTERISTICS

Current-Gain-Bandwidth Product ($I_C = 50\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	300	-	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 140\text{ kHz}$)	C_{ob}	-	12	pF
		-	10	
Input Capacitance ($V_{BE} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 140\text{ kHz}$)	C_{ib}	-	55	pF

SWITCHING CHARACTERISTICS

Turn-On Time	$(V_{CC} = 30\text{ Vdc}$, $V_{BE(off)} = 3.8\text{ Vdc}$, $I_C = 500\text{ mAdc}$, $I_{B1} = 50\text{ mAdc}$) (See Figure 1)	t_{on}	-	35	ns
Delay Time		t_d	-	10	ns
Rise Time		t_r	-	30	ns
Turn-Off Time	$(V_{CC} = 30\text{ Vdc}$, $I_C = 500\text{ mAdc}$, $I_{B1} = I_{B2} = 50\text{ mAdc}$) (See Figure 1)	t_{off}	-	60	ns
Storage Time		t_s	-	50	ns
Fall Time		t_f	-	25	ns
	2N3724, 2N4013		-	30	
	2N3725, 2N4014		-		

* Pulse Test: Pulse Width = $300\text{ }\mu\text{s}$, Duty Cycle = 1.0%.

FIGURE 1 — SWITCHING TIMES TEST CIRCUIT

