

TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS												
						P _D @ 25°C	V _{CE} Ref Point	T _J °C	V _{CB} (volts)	V _{CE} (volts)	Subscript	h _{FE} @ I _C		V _{CE(SAT)} @ I _C		h _f Units	Subscript	f _L Units	Subscript				
												(min)	(max)	Units	(volts)					Units			
2N3962	S	P			AFA	0.36W	A	200	60	60	0	100	300	10*	0.25	1.0M	100	E	4.0M	T			
2N3963	S	P			AFA	0.36W	A	200	80	80	0	100	300	10*	0.25	1.0M	100	E	4.0M	T			
2N3964	S	P			AFA	0.36W	A	200	45	45	0	250	500	10*	0.25	1.0M	250	E	5.0M	T			
2N3965	S	P			AFA	0.36W	A	200	60	60	0	250	500	10*	0.25	1.0M	250	E	5.0M	T			
2N3966	thru Field Effect Transistors, see Table on Page 1-166																						
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	2N4401	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	thru Unijunction Transistor, see Table on Page 1-174																						
2N3978	S	P			CHP	0.4W	A	200	25	20	0	30		5.0M	0.15	5.0M			1.0M	T			
2N3979	S	P			CHP	0.4W	A	200	40	35	0	20		5.0M	0.15	5.0M			1.0M	T			
2N3980	thru Field Effect Transistors, see Table on Page 1-166																						
2N3981	S	N			HSS	0.8W	A	200	60	30	0	30	120	0.15A	0.4	0.15A			250M	T			
2N3982	S	N			HSS	0.8W	A	200	50	20	0	40	140	0.15A	0.4	0.15A			250M	T			
2N3983	S	N			RFC	0.2W	A	150	30	12	0	30		4.0M					500M	T			
2N3984	S	N			RFC	0.2W	A	150	30	12	0	20		4.0M					400M	T			
2N3985	S	N			RFC	0.2W	A	150	30	12	0	20		4.0M					300M	T			
2N3986	thru Thyristors, see Table on Page 1-154																						
2N3992																							
2N3993																							
2N3994	Field Effect Transistor, see Table on Page 1-166																						
2N3995	S	P	2N2929	9-33	RFA	0.3W	A	100	20	12	0	40	200	2.0M					150	E	0.6G	T	
2N3996	S	P			PHS	2.0W	A	200	100	80	0	40	120	1.0A	0.25	1.0A					4.0M	T	
2N3997	S	N			PHS	2.0W	A	200	100	80	0	80	240	1.0A	0.25	1.0A					4.0M	T	
2N3998	S	N			PHS	2.0W	A	200	100	80	0	40	120	1.0A	0.25	1.0A					4.0M	T	
2N3999	S	N			PHS	2.0W	A	200	100	80	0	80	240	1.0A	0.25	1.0A					4.0M	T	
2N4000	S	N			PHS	1.0W	A	200	100	80	0	30	120	0.5A	0.3	0.5A					4.0M	T	
2N4001	S	N			PHS	1.0W	A	200	120	100	0	40	120	0.5A	0.3	0.5A					4.0M	T	
2N4002	S	N			LPA	4.0W	A	100	80	20	0	80	15A						30	E	30M	B	
2N4003	S	N			LPA	4.0W	A	120	100	20	0	80	15A						30	E	30M	B	
2N4004	S	N			LPA	1.2W	A	100	80	20	0	30	150	10A							30M	B	
2N4005	S	N			LPA	1.2W	A	120	100	20	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							4.0M	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	5.0M	T
2N4020	S	P			DFA	0.4W	A	200	45	45	0	250	500	10*	0.25	10M				250	E	5.0M	T
2N4021	S	P			DFA	0.4W	A	200	60	60	0	100	350	10*	0.25	10M				100	E	4.0M	T
2N4022	S	P			DFA	0.4W	A	200	60	60	0	250	500	10*	0.25	10M				250	E	5.0M	T
2N4023	S	P			DFA	0.4W	A	200	45	45	0	250	500	10*	0.25	10M				250	E	5.0M	T
2N4024	S	P			DFA	0.4W	A	200	60	60	0	100	350	10*	0.25	10M				100	E	4.0M	T
2N4025	S	P			DFA	0.4W	A	200	60	60	0	250	500	10*	0.25	10M				250	E	5.0M	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					400M	T	
2N4035	S	P			HSS	0.36W	A	200	40	40	0	150	300	10M	0.13	1.0M				150	E	4.5M	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	S	G		7-152	LPA	170W	C	110	45	30	0	60	120	15A	0.30	60A					2.0K	E	
2N4049	S	G		7-152																			

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* ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)	2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014	$V_{CE(sat)}$ *	-	0.25	Vdc
($I_C = 100\text{ mAdc}$, $I_B = 10\text{ mAdc}$)			-	0.20	
($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$)			-	0.26	
($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)			-	0.32	
($I_C = 800\text{ mAdc}$, $I_B = 80\text{ mAdc}$)			-	0.40	
($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)			-	0.42	
($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)			-	0.52	
Base-Emitter Saturation Voltage* ($I_C = 10\text{ mAdc}$, $I_B = 1.0\text{ mAdc}$)	2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014 2N3724, 2N4013 2N3725, 2N4014	$V_{BE(sat)}$ *	-	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	
($I_C = 1.0\text{ Adc}$, $I_B = 100\text{ mAdc}$)			-	-	0.95

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
				30	ns

* Pulse Test: Pulse Width = 300 μs , Duty Cycle = 1.0%.

FIGURE 1 — SWITCHING TIMES TEST CIRCUIT

