

2N3262-2N3371

TYPE	MATERIAL	POLARITY	REPLACE- MENT	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		V _{CE(SAT)} @ I _C		h _{FE}	Subscript	f _T	Subscript	
						(min)	(max)	Units		Units		(min)	(max)	Units		(min)	(max)			
2N3262	S	N			HSS	8.75W	C	200	100	80	0	40		0.5A	0.6	1.0A			150M	T
2N3263	S	N			PMS	75W	C	200	150	90	0	20	55	15A	1.0	20A			20M	T
2N3264	S	N			PMS	75W	C	200	120	60	0	20	80	15A	1.6	20A			20M	T
2N3265	S	N			PMS	125W	C	200	150	90	0	20	55	15A	1.0	20A			20M	T
2N3266	S	N			PMS	125W	C	200	120	60	0	20	80	15A	1.6	20A			20M	T
2N3267	S	N			RFA	75W	A	100	15	8.0	0	10	500	3.0M			15	E	900M	T
2N3268	G	P			RFA	75W	A	100	15	8.0	0	10	500	3.0M			40	E	900M	T
2N3269	S	N			AFA	0.15W	A	200	45	45	0	12	80	10M	1.0	5.0M			2.5M	B
thru Thyristors, see Table on Page 1-154																				
2N3276	Field Effect Transistors, see Table on Page 1-166																			
2N3277	Field Effect Transistors, see Table on Page 1-166																			
2N3278	Field Effect Transistors, see Table on Page 1-166																			
2N3279	G	P		9-49	RFA	0.1W	A	100	30	20	0	10	70	3.0M	0.3	5.0M	10	E	400M	T
2N3280	G	P		9-49	RFA	0.1W	A	100	30	20	0	10	70	3.0M	0.3	5.0M	10	E	400M	T
2N3281	G	P		9-49	RFA	0.1W	A	100	30	15	0	10	100	3.0M	0.5	5.0M	10	E	300M	T
2N3282	G	P		9-49	RFA	0.1W	A	100	30	15	0	10	100	3.0M	0.5	5.0M	10	E	300M	T
2N3283	G	P		9-51	RFC	0.1W	A	100	25	25	0	10		3.0M			10	E	250M	T
2N3284	G	P		9-51	RFC	0.1W	A	100	25	25	0	10		3.0M			10	E	250M	T
2N3285	G	P		9-51	RFC	0.1W	A	100	20	20	0	5.0		3.0M			5.0	E	250M	T
2N3286	G	P		9-51	RFC	0.1W	A	100	20	20	0	5.0		3.0M			5.0	E	250M	T
2N3287	S	N		9-54	RFA	0.2W	A	200	40	20	0	15	100	2.0M	0.3	5.0M	15	E	350M	T
2N3288	S	N		9-54	RFA	0.2W	A	200	40	20	0	15	100	2.0M	0.3	5.0M	15	E	350M	T
2N3289	S	N		9-54	RFA	0.2W	A	200	30	15	0	10	150	2.0M	0.4	5.0M	10	E	300M	T
2N3290	S	N		9-54	RFA	0.2W	A	200	30	15	0	10	150	2.0M	0.4	5.0M	10	E	300M	T
2N3291	S	N		9-56	RFC	0.2W	A	200	25	25	0	10		2.0M			10	E	250M	T
2N3292	S	N		9-56	RFC	0.2W	A	200	25	25	0	10		2.0M			10	E	250M	T
2N3293	S	N		9-56	RFC	0.2W	A	200	20	20	0	10		2.0M			10	E	250M	T
2N3294	S	N		9-56	RFC	0.2W	A	200	20	20	0	10		2.0M			10	E	250M	T
2N3295	S	N		9-58	MPA	800M	A	175	60	60	0	20	60	10M	0.5	0.15A			200M	T
2N3296	S	N		9-61	MPA	700M	A	175	60	60	0	5.0	50	40M	0.5	0.4A			100M	T
2N3297	S	N		9-64	MPA	25W	C	175	60	60	0	2.5	35	0.4A	0.5	1.0A			100M	T
2N3298	S	N		9-67	HPA	1.0W	C	175	25	15	0	80	240	10M					200M	T
2N3299	S	N		8-219	HSS	0.8W	A	200	60	30	0	40	120	0.15A	0.22	0.15A			250M	T
2N3300	S	N		8-219	HSS	0.8W	A	200	60	30	0	100	300	0.15A	0.22	0.15A			250M	T
2N3301	S	N		8-219	HSS	0.36W	A	200	60	30	0	40	120	0.15A	0.22	0.15A			250M	T
2N3302	S	N		8-219	HSS	0.36W	A	200	60	30	0	100	300	0.15A	0.22	0.15A			250M	T
2N3303	S	N		8-221	HSS	0.6W	A	200	25	12	0	30	120	0.3A	0.33	0.3A			450M	T
2N3304	S	N		8-223	MSS	0.3W	A	200	6.0	6.0	0	30	120	10M	0.16	10M			500M	T
2N3305	S	P			AFA	0.6W	A	200	50	40	0	40	120	0.1M	0.2	10M	40	E	20M	T
2N3306	S	P			AFA	0.6W	A	200	50	40	0	100	300	0.1M	0.2	10M	70	E	20M	T
2N3307	S	P		9-69	RFA	0.2W	A	200	40	35	0	40	250	2.0M	0.4	3.0M	40	E	300M	T
2N3308	S	P		9-69	RFA	0.2W	A	200	30	25	0	25	250	2.0M	0.4	3.0M	25	E	300M	T
2N3309	S	N	2N3553	9-74	MPA	3.5W	C	175	50	50	0	5.0	100	30M	0.5	0.25A			300M	T
2N3309A	S	N	2N3553	9-74	MPA	5.0W	C	200	60	60	0	8.0	80	50M	0.5	0.25A			300M	T
2N3310	S	N			HPA	0.3W	A	200	35	15	0	10		20M	0.5	20M			300M	T
2N3311	G	P		7-108	LPA	170W	C	110	30	30	0	60	120	3.0A	0.1	3.0A	30	E	1.0K	E
2N3312	G	P		7-108	LPA	170W	C	110	45	45	0	60	120	3.0A	0.1	3.0A	30	E	1.0K	E
2N3313	G	P		7-108	LPA	170W	C	110	60	60	0	60	120	3.0A	0.1	3.0A	30	E	1.0K	E
2N3314	G	P		7-108	LPA	170W	C	110	30	30	0	100	200	3.0A	0.1	3.0A	40	E	1.0K	E
2N3315	G	P		7-108	LPA	170W	C	110	45	45	0	100	200	3.0A	0.1	3.0A	40	E	1.0K	E
2N3316	G	P		7-108	LPA	170W	C	110	60	60	0	100	200	3.0A	0.1	3.0A	40	E	1.0K	E
2N3317	S	P			CHP	0.15W	A	140	30	30	0								6.4M	T
2N3318	S	P			CHP	0.15W	A	140	15	15	0								7.6M	T
2N3319	S	P			CHP	0.15W	A	140	10	6.0	0								12M	T
2N3320	G	P			HSS	60M	A	100	15	10	0	50		20M	0.19	40M			600M	T
2N3321	G	P			HSS	60M	A	100	12	7.0	0	100		10M	0.12	10M			600M	T
2N3322	G	P			HSS	60M	A	100	12	7.0	0	30		40M	0.25	20M			600M	T
2N3323	G	P		9-71	RFC	0.15W	A	100	35	35	0	30	200	3.0M			30	E	200M	T
2N3324	G	P		9-71	RFC	0.15W	A	100	35	35	0	30	200	3.0M			30	E	200M	T
2N3325	G	P		9-71	RFC	0.15W	A	100	35	35	0	30	200	3.0M			30	E	200M	T
2N3326	S	N	2N218A	8-114	HSA	0.8W	A	175	60	45	0	40	120	0.15A	0.4	0.15A			250M	T
2N3327	S	N			HPA	20W	C	200	65	65	0	10		0.5A					100M	T
2N3328	Field Effect Transistors, see Table on Page 1-166																			
2N3336	Field Effect Transistors, see Table on Page 1-166																			
2N3337	S	N	2N3287	9-54	RFA	0.3W	A	200	40	40	0	30	300	4.0M			30	E	400M	T
2N3338	S	N	2N3289	9-54	RFA	0.3W	A	200	40	40	0	30	300	4.0M			30	E	400M	T
2N3339	S	N	2N3288	9-54	RFA	0.3W	A	200	40	40	0	30	300	4.0M			30	E	400M	T
2N3340	S	N			MSS	0.4W	A	175	30	20	0	40		10*					70M	T
2N3341	S	N			MSS	0.4W	A	175	30	20	0	40		10*					50M	T
2N3342	S	P			MSS	0.25W	A	175	20	8.0	0	30		5.0M						T
2N3343	S	P			CHP	0.25W	A	175	25	8.0	0	20		0.25M					2.0M	T
2N3344	S	P			CHP	0.25W	A	175	30	30	0	25		1.0M					2.0M	T
2N3345	S	P			CHP	0.25W	A	175	50	50	0	15		1.0M					2.0M	T
2N3346	S	P			CHP	0.25W	A	175	50	50	0	25		1.0M					2.0M	T
2N3347	S	P			DFA	300M	A	175	60	45	0	40	300	10*	0.5	10				

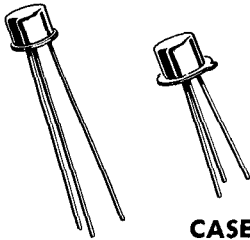
GENERAL PURPOSE SWITCHING AND AMPLIFIER TRANSISTORS (SILICON)

Current versus Voltage

BV _{CEO} Min Volts	OPTIMUM COLLECTOR CURRENT									
	0 to 10 mA		10 mA to 100 mA		100 mA to 500 mA		500 mA to 1.0 A		1.0 A to 3.0 A	
	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
15 ↓ 29	2N916 2N2330 2N2331		2N916 2N1983 2N1984		2N696 2N697 2N718 2N1420 2N2195	2N1991				
30 ↓ 39			2N2218 2N2219 2N2221 2N2222	2N3133 2N3134 2N3135 2N3136	2N2218 2N2219 2N2221 2N2222 2N3299 2N3300 2N3301 2N3302	2N2800 2N2801 2N2837 2N2838 2N3133 2N3134 2N3135 2N3136				
49 ↓ 59	2N758 2N795 2N760 2N915 2N929 2N930 2N3946 2N3947	2N3250 2N3251 MM4048	2N2218A 2N2219A 2N2221A 2N2222A 2N2224 2N3946 2N3947	2N3250 2N3251	2N2194 2N2218A 2N2219A 2N2221A 2N2222A	2N2904 2N2905 2N2906 2N2907 2N3485 2N3486 2N4890	2N3192 2N3193	2N3244 2N3245	2N3506 2N3507	
60 ↓ 79	2N758A 2N759A 2N760A 2N929A 2N930A MM2483 MM2484	2N3798 2N3799 2N3250A 2N3251A	2N910 2N911 2N1990	2N3250A 2N3251A	2N656 2N699	2N2904A 2N2905A 2N2906A 2N2907A 2N3485A 2N3486A				
80 ↓ 99	2N739 2N740	2N3494 2N3496	2N720A 2N1893 2N2405	2N3494 2N3496	2N720A 2N3019 2N3020		2N3019 2N3020			
100 ↓ 149	2N4924	2N3495 2N3497 2N4928	2N3498 2N3499 2N4924	2N3495 2N3497 2N3634 2N3635 2N4928	2N3498 2N3499 2N4924	2N3634 2N3635				
150 ↓ 249	2N3114 2N4925 2N4926	2N4929 2N4930	2N3500 2N3501 2N4925 2N4926	2N3635 2N3637 2N4929 2N4930	2N3500 2N3501 2N4925	2N3636 2N3637				
250 UP	2N3742 2N4927	2N3743 2N4931	2N3742 2N4927	2N3743 2N4931						

2N3299 thru 2N3302 (SILICON)

$V_{CEO} = 30\text{ V}$
 $I_C = 500\text{ mA}$
 $P_D = 360\text{ to }800\text{ mW}$



CASE 31
(TO-5)
2N3299
2N3300

CASE 22
(TO-18)
2N3301
2N3302

NPN silicon annular transistors for high-speed switching circuits and DC to UHF amplifier applications.

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage (Applicable 0 to 10 mA _{dc})	V_{CEO}	30	Vdc	
Collector-Base Voltage	V_{CB}	60	Vdc	
Emitter-Base Voltage	V_{EB}	5.0	Vdc	
Collector Current	I_C	500	mA _{dc}	
Operating Junction Temperature Range	T_J	-65 to +200	°C	
Storage Temperature Range	T_{stg}	-65 to +300	°C	
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	2N3299 2N3300	2N3301 2N3302	Watt mW/°C
		0.8 4.56	0.36 2.06	
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	3.0 17.2	1.8 10.3	Watts mW/°C

FIGURE 1 — SATURATED TURN-ON SWITCHING TIME TEST CIRCUIT

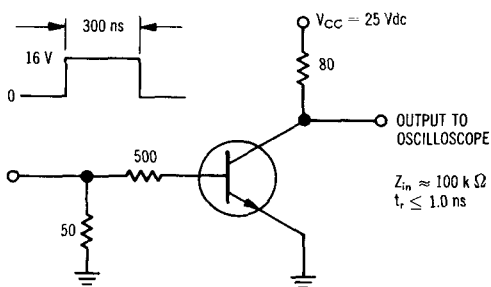
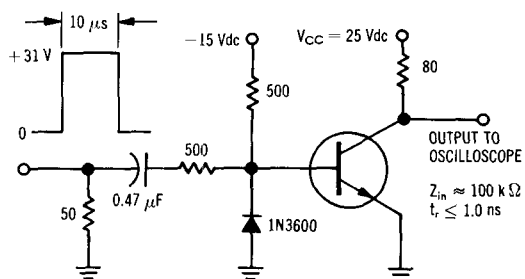


FIGURE 2 — SATURATED TURN-OFF SWITCHING TIME TEST CIRCUIT



— Switching and General Purpose Transistors —

2N3299 thru 2N3302 (continued)

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage* ($I_C = 10\text{ mAdc}$, $I_B = 0$)	BV_{CEO}^*	30	-	Vdc
Collector-Base Breakdown Voltage ($I_C = 10\ \mu\text{Adc}$, $I_E = 0$)	BV_{CBO}	60	-	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10\ \mu\text{Adc}$, $I_C = 0$)	BV_{EBO}	5.0	-	Vdc
Collector Cutoff Current ($V_{CE} = 50\text{ Vdc}$, $V_{BE} = 0$) ($V_{CE} = 50\text{ Vdc}$, $V_{BE} = 0$, $T_A = 150^\circ\text{C}$)	I_{CES}	-	0.01 10	μAdc
Emitter Cutoff Current ($V_{BE} = 3.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	-	10	nAdc
Base Current ($V_{CE} = 50\text{ Vdc}$, $V_{BE} = 0$)	I_B	-	10	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 0.1\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)	2N3299, 2N3301 2N3300, 2N3302	h_{FE}	20 35	- -	-
($I_C = 1.0\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)	2N3299, 2N3301 2N3300, 2N3302		25 50	- -	
($I_C = 10\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)*	2N3299, 2N3301 2N3300, 2N3302		35 75	- -	
($I_C = 150\text{ mAdc}$, $V_{CE} = 1.0\text{ Vdc}$)*	2N3299, 2N3301 2N3300, 2N3302		20 50	- -	
($I_C = 150\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)*	2N3299, 2N3301 2N3300, 2N3302		40 100	120 300	
($I_C = 500\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)*	2N3299, 2N3301 2N3300, 2N3302		20 50	- -	
Collector-Emitter Saturation Voltage ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) ($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$) ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)		$V_{CE(sat)}$	- - -	0.22 0.45 0.6	Vdc
Base-Emitter Saturation Voltage ($I_C = 150\text{ mAdc}$, $I_B = 15\text{ mAdc}$) ($I_C = 300\text{ mAdc}$, $I_B = 30\text{ mAdc}$) ($I_C = 500\text{ mAdc}$, $I_B = 50\text{ mAdc}$)		$V_{BE(sat)}$	- - -	1.1 1.3 1.5	Vdc
Base-Emitter On Voltage ($I_C = 150\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$)		$V_{BE(on)}$	-	1.1	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product ($I_C = 50\text{ mAdc}$, $V_{CE} = 10\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	250	-	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 140\text{ kHz}$)	C_{ob}	-	8.0	pF
Input Capacitance ($V_{BE} = 2.0\text{ Vdc}$, $I_C = 0$, $f = 140\text{ kHz}$)	C_{ib}	-	20	pF
Turn-On Time (Figure 1) ($V_{CC} = 25\text{ Vdc}$, $I_C \approx 300\text{ mAdc}$, $I_{B1} \approx 30\text{ mAdc}$)	t_{on}	-	60	ns
Turn-Off Time (Figure 2) ($V_{CC} = 25\text{ Vdc}$, $I_C \approx 300\text{ mAdc}$, $I_{B1} = I_{B2} \approx 30\text{ mAdc}$)	t_{off}	-	150	ns

* Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$; Duty Cycle $\leq 2\%$.