2N2522–2N2617

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
2N2522	S	N			AFA	0.4W	A	200	60	60	O	50		1.0M	0.5	10M	76	E	50M	B
2N2523	S	N			AFA	0.4W	A	200	60	45	O	40	120	10*	0.5	10M	60	E	45M	T
2N2524	S	N			AFA	0.4W	A	200	60	45	O	100	300	10*	0.5	10M	150	E	45M	T
2N2525	S	N			HPA	25W	C	200	100	80	O	10		0.35A	0.8	1.0A			154M	T
2N2526	G	P		7-87	PHS	85W	C	110	80	80	O	20	50	3.0A	0.8	10A			30K	T
2N2527	G	P		7-87	PHS	85W	C	110	120	120	O	20	50	3.0A	0.8	10A			30K	T
2N2528	G	P		7-87	PHS	85W	C	110	160	160	O	20	50	3.0A	0.8	10A			30K	T
2N2529	S	N			AFA	150M	A	175	45	40	O	10	20	1.0M	2.0	10M	12	E	6.0M	B
2N2530	S	N			AFA	150M	A	175	45	40	O	12	35	1.0M	2.0	10M	18	E	10M	B
2N2531	S	N			AFA	150M	A	175	45	40	O	20	80	1.0M	2.0	10M	36	E	12M	B
2N2532	S	N			AFA	150M	A	175	45	40	O	45	185	1.0M	2.0	10M	76	E	16M	B
2N2533	S	N			AFA	150M	A	175	45	40	O	20	55	10M	1.5	10M	19	E	10M	B
2N2534	S	N			AFA	150M	A	175	45	40	O	45	150	10M	1.5	10M	39	E	20M	B
2N2535	G	P			AFA	10W	C	100	60	30	O	40	120	0.4A	0.5	1.0A	15	E	8.0K	E
2N2536	G	P			AFA	10W	C	100	80	40	O	40	120	0.4A	0.5	1.0A	15	E	8.0K	E
2N2537	S	N		8-151	HSS	0.8W	A	200	60	30	O	50	150	150M	0.45	150M			250M	T
2N2538	S	N		8-151	HSS	0.8W	A	200	60	30	O	100	300	150M	0.45	150M			250M	T
2N2539	S	N		8-151	HSS	0.5W	A	200	60	30	O	50	150	150M	0.45	150M			250M	T
2N2540	S	N		8-151	HSS	0.5W	A	200	60	30	O	100	300	150M	0.45	150M			250M	T
2N2541	G	P			MSS	215M	A	100	30	14	O	60	250	50M	0.25	50M			10M	B
2N2542 thru 2N2550	Thyristors, see Table on Page 1-154																			
2N2551	S	P			AFA	0.4W	A	200	150	150	O	15	45	0.1A	1.2	0.1A				
2N2552	G	P			LPA	20W	C	100	40	40	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2553	G	P			LPA	20W	C	100	60	60	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2554	G	P			LPA	20W	C	100	80	80	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2555	G	P			LPA	20W	C	100	100	100	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2556	G	P			LPA	20W	C	100	40	40	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2557	G	P			LPA	20W	C	100	60	60	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2558	G	P			LPA	20W	C	100	80	80	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2559	G	P			LPA	20W	C	100	100	100	V	20	60	1.0A	0.25	1.0A	18	E	225K	T
2N2560	G	P			LPA	20W	C	100	40	40	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2561	G	P			LPA	20W	C	100	60	60	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2562	G	P			LPA	20W	C	100	80	80	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2563	G	P			LPA	20W	C	100	100	100	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2564	G	P			LPA	20W	C	100	40	40	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2565	G	P			LPA	20W	C	100	60	60	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2566	G	P			LPA	20W	C	100	80	80	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2567	G	P			LPA	20W	C	100	100	100	V	20	60	3.0A	0.75	3.0A	25	E	250K	T
2N2568	G	N			HPA	1.0W	C	100	32	32	S	10	60	40M	0.75	100M			600M	T
2N2569	S	N			CHP	300M	A	200	20	5.0	O	50		100*					100M	T
2N2570	S	N			CHP	300M	A	200	20	5.0	O	50		100*					100M	T
2N2571	S	N			CHP	300M	A	200	20	15	O	50		100M					100M	T
2N2572	S	N			CHP	300M	A	200	20	15	O	50		100M						
2N2573 thru 2N2579	Thyristors, see Table on Page 1-154																			
2N2580	S	N			PMS	150W	C	150	400	400	O	10	40	5.0A	0.7	5.0A			30K	E
2N2581	S	N			PMS	150W	C	150	400	400	O	25	65	5.0A	1.0	10A			30K	E
2N2582	S	N			PMS	150W	C	150	500	500	O	10	40	5.0A	0.7	5.0A			30K	E
2N2583	S	N			PMS	150W	C	150	500	500	O	25	65	5.0A	1.0	10A			30K	E
2N2584	S	N			PMS	150W	C	150	600	600	O	10	40	5.0A	0.7	5.0A			30K	E
2N2585	S	N			PMS	150W	C	150	600	600	O	25	65	5.0A	1.0	10A			30K	E
2N2586	S	N			AFA	300M	A	175	60	45	O	120	360	10*	0.5	10M	150	E	1.5K	T
2N2587	G	P			RFA	150M	A	100	30	30	S	15	100	8.0M	0.5	50M	0.95	B	320M	T
2N2588	G	P			RFA	150M	A	100	40	20	O	50	150	1.5M			50	E	75M	T
2N2589	S	N			PMS	150W	C	200	150	150	O	17	51	7.0A	1.05	7.0A	5.0	E	0.25M	T
2N2590	S	P			VID	0.4W	A	200	100	60	O	10		0.1M	0.4	10M	40	E	50M	T
2N2591	S	P			VID	0.4W	A	200	100	60	O	20		0.1M	0.4	10M	70	E	70M	T
2N2592	S	P			VID	0.4W	A	200	100	60	O	40		0.1M	0.4	10M	115	E	90M	T
2N2593	S	P			VID	0.4W	A	200	100	60	O	60		0.1M	0.4	10M	160	E	110M	T
2N2594	S	N			AFA	5.0W	C	200	80	90	R	50	150	100M	1.0	200M	15	E	40M	T
2N2595	S	P			VID	0.4W	A	200	80	60	O	15	60	5.0M	0.5	10M	20	E	30M	T
2N2596	S	P			VID	0.4W	A	200	80	60	O	30	120	5.0M	0.5	10M	40	E	40M	T
2N2597	S	P			VID	0.4W	A	200	80	60	O	60	240	5.0M	0.5	10M	80	E	60M	T
2N2598	S	P			VID	0.4W	A	200	125	80	O	15	60	5.0M	0.5	10M	20	E	30M	T
2N2599	S	P			VID	0.4W	A	200	125	80	O	30	120	5.0M	0.5	10M	40	E	40M	T
2N2599A	S	P			VID	0.4W	A	200	125	100	O	30	120	5.0M	0.5	10M	40	E	40M	T
2N2600	S	P			VID	0.4W	A	200	125	80	O	60	240	5.0M	0.5	10M	80	E	60M	T
2N2600A	S	P			VID	0.4W	A	200	125	100	O	60	240	5.0M	0.5	10M	80	E	60M	T
2N2601	S	P			VID	0.4W	A	200	60	60	O	12		1.0M	0.5	10M	18	E	20M	T
2N2602	S	P			VID	0.4W	A	200	60	60	O	25		1.0M	0.5	10M	36	E	40M	T
2N2603	S	P			VID	0.4W	A	200	60	60	O	50		1.0M	0.5	10M	76	E	60M	T
2N2604	S	P			VID	0.4W	A	200	60	45	O	40		10*	0.5	10M	60	E	30M	T
2N2605	S	P	2N3798	8-278	VID	0.4W	A	200	60	45	O	100		10*	0.5	10M	150	E	30M	T
2N2605A	S	P			VID	0.4W	A	200	60	45	O	50	200	1.0*	0.25	10M	200	E	45M	T
2N2606 thru 2N2609	Field Effect Transistors, see Table on Page 1-166																			
2N2610	S	N			AFA	0.15W	A	150	45	40	O				1.0	5.0M	4.5	E		
2N2611	S	N			LPA	2.0W	A	175	120	100	O	7.0	36	0.2A	1.7	0.2A	12	E	4.0M	T
2N2612	G	P	2N1559	7-67	LPA	75W	C	100	65	65	V	85	250	10A	1.0	10A				
2N2613	G	P	2N1193	6-30	AFA	120M	A	100	30	25	R						120	E	4.0M	B
2N2614	G	P	2N1193	6-30	AFA	120M	A	100	40	35	R						100	E	4.0M	B
2N2615	S	N			SPP	300M	A	200	30	15	O	20	200	3.0M	0.5	3.0M			500M	T
2N2616	S	N	2N1559	7-67	SPP	300M	A	200	30	15	O	20	200	3.0M	0.4	10M			600M	T
2N2617	S	P			AFC	0.25W	A	150	25			15	80	20M			25	E		

QUICK SELECTOR GUIDES — SILICON HIGH-SPEED SWITCHING AND GENERAL PURPOSE TRANSISTORS

The following two tables categorize the silicon devices included in this section into two classifications — those intended for general-purpose switching and amplifier applications, and those recommended primarily for high-speed saturated switching purposes.

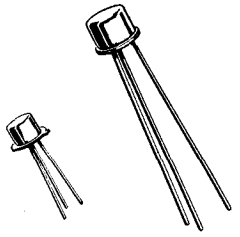
Only the preferred devices — those that merit first consideration for new designs — are listed. In each table, the devices are grouped in voltage and current ranges. The voltage given is the minimum collector-emitter breakdown voltage (BV_{CEO}). The current range columns represent operating current values for which optimum current gain (h_{FE}) and/or collector-emitter saturation voltage ($V_{CE(sat)}$) are specified in the data sheets.

SATURATED SWITCHING TRANSISTORS (SILICON)
Current versus Voltage

	OPTIMUM COLLECTOR CURRENT											
BV_{CEO} Min Volts	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		3.0 A to 5.0 A	
	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
0 ↓ 19	2N3010 2N3493 MM709 MM1748	2N2894 2N3546 2N4411	2N2369A 2N3009 2N3010 2N3011 2N3013 2N3210 2N3211	2N2894 2N3546	2N3009 2N3013 2N3510 2N3511 2N3647 2N3648		2N3303		2N3303			
20 ↓ 29	2N702 2N703		2N2501 2N3014 2N3227 2N3508 2N3509		2N2476 2N2477 2N2501 2N2847 2N2848							
30 ↓ 39			2N2537 2N2538 2N2539 2N2540		2N2537 2N2538 2N2539 2N2540 2N2845 2N2846 2N3015 2N3724 2N4013 2N4046		2N3252 2N3724 2N3734 2N3736 2N4013 2N4046		2N3734 2N3736			
40 ↓ 59			2N3725 2N4014		2N3725 2N4014 2N4047	2N3467 2N3468	2N3253 2N3444 2N3725 2N3735 2N3737 2N4014 2N4047	2N3467 2N3468 2N3762 2N3764	2N3444 2N3735 2N3737	2N3762 2N3764	2N3506 2N3507	
60 79								2N3763 2N3765		2N3763 2N3765		

2N2537 thru 2N2540 (SILICON)

$V_{CEO} = 30$ V
$f_T = 400$ MHz Typ



NPN silicon annular Star transistors for high-speed switching.

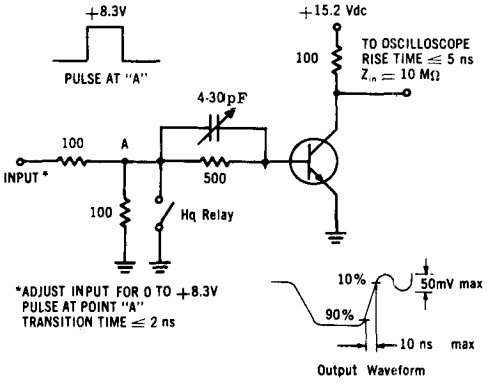
CASE 22 (TO-18)	CASE 31 (TO-5)
2N2539	2N2537
2N2540	2N2538

Collector connected to case

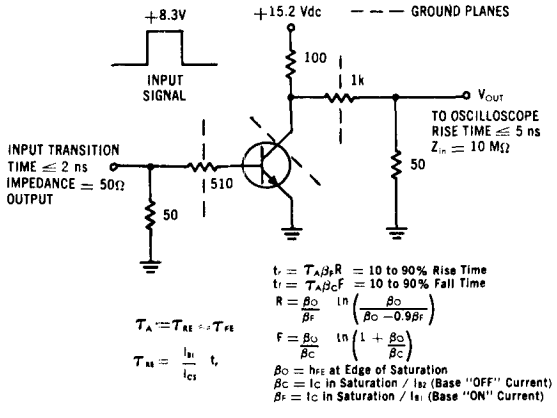
MAXIMUM RATINGS

Rating	Symbol	2N2537 2N2538 (TO-5)	2N2539 2N2540 (TO-18)	Unit
Collector-Base Voltage	V_{CB}	60	60	Vdc
Collector-Emitter Voltage	V_{CEO}	30	30	Vdc
Collector-Emitter Voltage	V_{CER}	40	40	Vdc
Emitter-Base Voltage	V_{EB}	5	5	Vdc
Total Device Dissipation 25°C Case Temperature Derate above 25°C	P_D	 3 17.2	 1.8 10.3	Watts mW/°C
Total Device Dissipation 25°C Ambient Temperature Derate above 25°C	P_D	 0.8 4.57	 0.5 2.86	Watts mW/°C
Junction Temperature	T_J	-65 to +200		°C
Storage Temperature	T_{stg}	-65 to +200		°C

TOTAL CONTROL CHARGE TEST CIRCUIT



ACTIVE REGION TIME CONSTANT TEST CIRCUIT



2N2537 thru 2N2540 (continued)

ELECTRICAL CHARACTERISTICS (At 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
Collector Cutoff Current (V_{CB} = 40 Vdc, I_E = 0) (V_{CB} = 40 Vdc, I_E = 0, T_A = 150°C)		I_{CBO}	 – –	 0.250 200	μAdc
Emitter Cutoff Current (V_{EB} = 3 Vdc, I_C = 0)		I_{EBO}	–	0.05	μAdc
Collector Cutoff Current (V_{BE} = 0.2 Vdc, V_{CE} = 20 Vdc)		I_{CEX}	–	0.250	μAdc
Base Cutoff Current (V_{BE} = 0.2 Vdc, V_{CE} = 20 Vdc) (V_{BE} = 0.2 Vdc, V_{CE} = 20 Vdc, T_A = 150°C)		I_{BL}	 – –	 0.250 200	μAdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)		BV_{CBO}	60	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, pulsed, I_B = 0)		BV_{CEO}	30	–	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, pulsed, $R_{BE} \leq 10\ \Omega$)		BV_{CER}	40	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		BV_{EBO}	5	–	Vdc
Collector Saturation Voltage* (I_C = 150 mAdc, I_B = 15 mAdc) (I_C = 500 mAdc, I_B = 50 mAdc)		$V_{CE(sat)}$	 – –	 0.45 1.6	Vdc
Base-Emitter Saturation Voltage (I_C = 150 mAdc, I_B = 15 mAdc)* (I_C = 500 mAdc, I_B = 50 mAdc)		$V_{BE(sat)}$	 – –	 1.3 2.6	Vdc
DC Forward Current Transfer Ratio		h_{FE}			–
(I_C = 1 mAdc, V_{CE} = 10 Vdc)	2N2537, 2N2539		20	–	
	2N2538, 2N2540		35	–	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	2N2537, 2N2539		30	–	
	2N2538, 2N2540		50	–	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)*	2N2537, 2N2539		50	150	
	2N2538, 2N2540		100	300	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)*	2N2537, 2N2539		20	–	
	2N2538, 2N2540		30	–	
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz)		C_{ob}	–	8	pF
Input Capacitance (V_{EB} = 0.5 Vdc, I_C = 0, f = 100 kHz)		C_{ib}	–	25	pF
Small Signal Forward Current Transfer Ratio (V_{CE} = 20 Vdc, I_C = 20 mAdc, f = 100 MHz)		h_{fe}	2.5	–	–

*Pulse Test: Pulse width ≤ 300 μs, duty cycle ≤ 2%

SWITCHING CHARACTERISTICS

Characteristic	Symbol	Max.	Unit
Total Control Charge	Q_T	750	pC
Storage Time (I_C = I_{B1} = I_{B2} = 20 mAdc, V_{CC} = 5 V)	τ_S	20	ns
Active Region Time Constant	τ_A	2.0	ns
Turn-on Time (I_{B1} = I_{B2} = 15 mAdc, I_C = 150 mAdc, V_{CC} = 7 Vdc, R_L = 40 Ω)	t_{on}	40	ns
Turn-off Time (I_{B1} = I_{B2} = 15 mAdc, I_C = 150 mAdc, V_{CC} = 7 Vdc, R_L = 40 Ω)	t_{off}	40	ns