

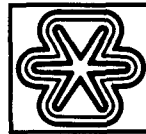
TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS									
						P _D	Ref Point	T _J	V _{CB}	V _{CE}	Subscript	h _{FE} @ I _C		V _{CE(SAT)} @ I _C		h _{FE}	Subscript	f _T		Subscript
						@ 25°C	°C	(volts)	(volts)	(min)		(max)	Units	(volts)	Units			Units	Units	
2N3582	S	P	MJ2251	7-200	VID	0.4W	A	200	50	0	100	300	0.1M	0.5	5.0M	100	E	30M	T	
2N3583	S	N			HPA	35W	C	200	250	175	0	40	200	0.5A	5.0	1.0A	25	F	10M	T
2N3584	S	N	2N3767	7-142	PMS	35W	C	200	330	250	0	8.0	140	1.0A	0.75	1.0A		E	10M	T
2N3585	S	N			PMS	35W	C	200	440	300	0	8.0	140	1.0A	0.75	1.0A		E	10M	T
2N3586	S	P			CHP	125M	A	200	45	45	0								0.1M	T
2N3587	S	N			DFA	0.5W	A	200	60	45	0	80	500	1.0M	1.0	10M		E	80M	T
2N3588	G	P			RFC	0.1W	A	85	25	20	0	20		1.0M				E	200M	T
2N3589	S	N			HPA	2.0W	A	175	200	200	R	30	90	0.2A	2.0	0.2A	30	E	15M	T
2N3590	S	N			HPA	2.0W	A	175	200	200	R	75	150	0.2A	2.0	0.2A	75	E	15M	T
2N3591	S	N			HPA	1.0W	A	175	200	200	R	30	90	0.2A	2.0	0.2A	30	E	15M	T
2N3592	S	N			HPA	1.0W	A	175	200	200	R	75	150	0.2A	2.0	0.2A	75	E	15M	T
2N3593	S	N			HPA	1.0W	A	175	200	200	R	30	90	0.2A	2.0	0.2A	30	E	15M	T
2N3594	S	N			HPA	1.0W	A	175	200	200	R	75	150	0.2A	2.0	0.2A	75	E	15M	T
2N3595	S	N			HPA	1.5W	A	175	200	200	R	30	90	0.2A	2.0	0.2A	30	E	15M	T
2N3596	S	N			HPA	1.5W	A	175	200	200	R	75	150	0.2A	2.0	0.2A	75	E	15M	T
2N3597	S	N	2N3767	7-142	PHS	100W	C	200	60	40	0	40	120	10A	0.5	10A	75	E	30M	T
2N3598	S	N	2N3446	7-111	PHS	100W	C	200	80	60	0	40	120	10A	0.5	10A	75	E	30M	T
2N3599	S	N	2N3447	7-111	PHS	100W	C	200	100	80	0	40	120	10A	0.5	10A	75	E	30M	T
2N3600	S	N			RFA	0.2W	A	200	30	15	0	20	150	3.0M			40	E	850M	T
2N3601	G	P			PMS	0.286W	C	100	100	40	0	60	180	1.0A	0.2	0.1A	50	E	20M	T
2N3602	G	P			PMS	0.286W	C	100	100	40	0	60	180	1.0A	0.2	0.1A	50	E	20M	T
2N3603	G	P			PMS	0.286W	C	100	130	55	0	60	180	1.0A	0.2	0.1A	50	E	20M	T
2N3604	G	P			PMS	0.286W	C	100	130	55	0	60	180	1.0A	0.2	0.1A	50	E	20M	T
2N3605	S	N	MPS3646	5-95	MSC	0.2W	A	150	18	14	0	30		10M	0.25	10M		E	300M	T
2N3605A	S	N			MSS	320M	A	120	40	15	0	30	120	10M	0.25	10M		E	300M	T
2N3606	S	N	MPS3646	5-95	MSC	0.2W	A	150	18	14	0	30		10M	0.25	10M		E	300M	T
2N3606A	S	N			MSS	320M	A	120	40	15	0	30	120	10M	0.25	10M		E	300M	T
2N3607	S	N	MPS3646	5-95	MSC	0.2W	A	150	18	14	0	30		10M	0.25	10M		E	300M	T
2N3608					Field Effect Transistors, see Table on Page 1-166															
thru																				
2N3610																				
2N3611	G	P		7-118	LPA	85W	C	110	40	30	S	35	70	3.0A	0.25	3.0A	40	E	0.3M	T
2N3612	G	P		7-118	LPA	85W	C	110	60	45	S	35	70	3.0A	0.25	3.0A	40	E	0.3M	T
2N3613	G	P		7-118	LPA	85W	C	110	40	30	S	60	120	3.0A	0.25	3.0A	60	E	0.3M	T
2N3614	G	P		7-118	LPA	85W	C	110	60	45	S	60	120	3.0A	0.25	3.0A	60	E	0.3M	T
2N3615	G	P		7-121	LPA	85W	C	110	80	60	S	30	60	3.0A	0.25	3.0A	40	E	0.3M	T
2N3616	G	P		7-121	LPA	85W	C	110	100	75	S	30	60	3.0A	0.25	3.0A	40	E	0.3M	T
2N3617	G	P		7-121	LPA	85W	C	110	80	60	S	45	90	3.0A	0.25	3.0A	60	E	0.3M	T
2N3618	G	P		7-121	LPA	85W	C	110	100	75	S	45	90	3.0A	0.25	3.0A	60	E	0.3M	T
2N3619	S	N			HPA	7.5W	C	175	75	40	0	40		1.0A	0.75	1.0A		E	200M	T
2N3620	S	N			HPA	7.5W	C	175	75	40	0	40		1.0A	1.0	3.0A		E	200M	T
2N3621	S	N			HPA	30W	C	175	75	40	0	40		1.0A	1.25	5.0A		E	200M	T
2N3622	S	N			HPA	30W	C	175	75	40	0	40		1.0A	1.25	5.0A		E	200M	T
2N3623	S	N			HPA	7.5W	C	175	75	40	0	40		1.0A	0.75	1.0A		E	200M	T
2N3624	S	N			HPA	7.5W	C	175	75	40	0	40		1.0A	1.0	3.0A		E	200M	T
2N3625	S	N			HPA	30W	C	175	75	40	0	40		1.0A	1.25	5.0A		E	200M	T
2N3626	S	N			HPA	30W	C	175	75	40	0	40		1.0A	1.25	5.0A		E	200M	T
2N3627	S	N			HPA	7.5W	C	175	100	50	0	40		1.0A	0.75	1.0A		E	200M	T
2N3628	S	N			HPA	7.5W	C	175	100	50	0	40		1.0A	1.0	3.0A		E	200M	T
2N3629	S	N			HPA	30W	C	175	100	50	0	40		1.0A	1.25	5.0A		E	200M	T
2N3630	S	N			HPA	30W	C	175	100	50	0	40		1.0A	1.25	5.0A		E	200M	T
2N3631					Field Effect Transistors, see Table on Page 1-166															
2N3632	S	N		9-74	HPA	23W	C	200	65	40	0	10	150	0.25A	1.0	1.0A		E	250M	T
2N3633	S	N			HNS	0.3W	A	200	15	6.0	0	50	150	10M	0.21	3.0M		E	1.3G	T
2N3634	S	P		8-249	VID	1.0W	A	200	140	140	0	50	150	50M			40	E	150M	T
2N3635	S	P		8-249	VID	1.0W	A	200	140	140	0	100	300	50M			80	E	200M	T
2N3636	S	P		8-249	VID	1.0W	A	200	175	175	0	50	150	50M			40	E	150M	T
2N3637	S	P		8-249	VID	1.0W	A	200	175	175	0	100	300	50M			80	E	200M	T
2N3638	S	P			HSS	0.3W	A	125	25	25	0	30		50M	0.25	50M	25	E	100M	T
2N3638A	S	P			HSS	0.3W	A	125	25	25	0	100		50M	0.25	50M	100	E	150M	T
2N3639	S	P	MPS3639	5-90	HSS	0.2W	A	125	6.0	6.0	0	30	120	10M	0.16	10M		E	500M	T
2N3640	S	P	MPS3640	5-93	HSS	0.2W	A	125	12	12	0	30	120	10M	0.2	10M		E	500M	T
2N3641	S	N	MPS6530	5-118	HPA	0.35W	A	125	60	30	0	40	120	0.15A	0.22	0.15A		E	250M	T
2N3642	S	N	MPS6530	5-118	HPA	0.35W	A	125	60	45	0	40	120	0.15A	0.22	0.15A		E	250M	T
2N3643	S	N	MPS6531	5-118	HPA	0.35W	A	125	60	30	0	100	300	0.15A	0.22	0.15A		E	250M	T
2N3644	S	P			HSS	0.3W	A	125	45	45	0	115	300	50M	0.25	50M		E	200M	T
2N3645	S	P			HSS	0.3W	A	125	60	60	0	115	300	50M	0.25	50M		E	200M	T
2N3646	S	N	MPS3645	5-95	HSS	0.2W	A	125	40	15	0	30	120	30M	0.2	30M		E	350M	T
2N3647	S	N		8-243	HSS	0.4W	A	200	40	10	0	25	150	0.15A	0.25	10M	20	E	350M	T
2N3648	S	N		8-243	HSS	0.4W	A	200	40	15	0	30	120	0.15A	0.25	10M	20	E	450M	T
2N3649					Thyristors, see Table on Page 1-154															
thru																				
2N3658																				
2N3659	S	N			VID	4.0W	C	200	220	170	0	20		10M			20	E	50M	T
2N3660	S	P			HPA	5.0W	C	200	40	30	0	25	100	0.5A	1.2	0.5A		E	25M	T
2N3661	S	P			HPA	5.0W	C	200	60	50	0	25	100	0.5A	1.2	0.5A		E	25M	T
2N3662	S	N			RFC	0.2W	A	125	18	12	0	20		8.0M				E	700M	T
2N3663	S	N			RFC	0.2W	A	125	30	12	0	20		8.0M				E	700M	T
2N3664	S	N			HPA	5.0W	C	200	60	60	0	8.0		50M	0.75	0.25A		E	300M	T
2N3665	S	N			HNS	5.0W	C	200	120	80	0	200	120</							

GENERAL PURPOSE SWITCHING AND AMPLIFIER TRANSISTORS (SILICON)

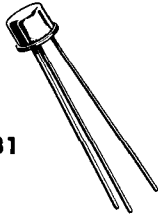
Current versus Voltage

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	2N2192 2N2193	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						

2N3634 thru 2N3637 (SILICON)



**$V_{CEO} = 140-175\text{ V}$
 $f_T = 150 - 200\text{ MHz}$**



CASE 31
(TO-5)

PNP silicon annular transistor for high-voltage switching and low-power amplifier applications.

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	2N3634 2N3635	2N3636 2N3637	Unit
Collector-Emitter Voltage	V_{CEO}	140	175	Vdc
Collector-Base Voltage	V_{CB}	140	175	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current	I_C	1.0		Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	1.0 5.71		Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	5.0 28.6		Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^\circ\text{C}$

FIGURE 1 — JUNCTION CAPACITANCE VARIATIONS

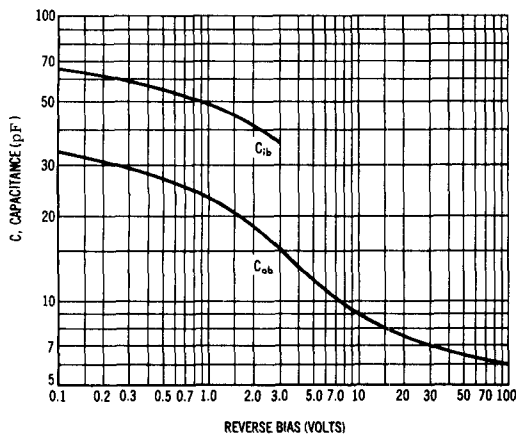
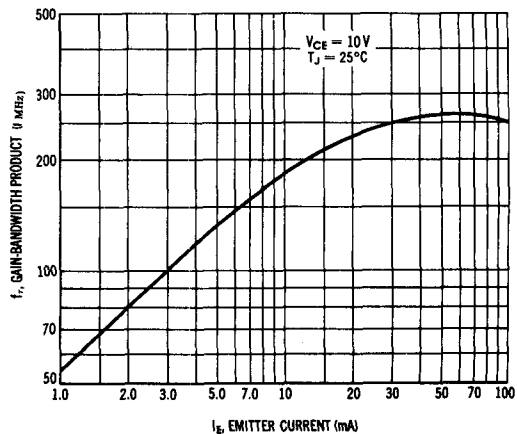


FIGURE 2 — GAIN-BANDWIDTH PRODUCT



2N3634 thru 2N3637 (continued)

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

Characteristic	Fig. No.	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage* ($I_C = 10 \text{ mA}$, $I_B = 0$)	2N3634, 2N3635 2N3636, 2N3637	-	BV_{CEO}^*	140 175	- - Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{A}$, $I_E = 0$)	2N3634, 2N3635 2N3636, 2N3637	-	BV_{CBO}	140 175	- - Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{A}$, $I_C = 0$)		-	BV_{EBO}	5.0	- Vdc
Collector Cutoff Current ($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$)		-	I_{CBO}	-	100 nAdc
Emitter Cutoff Current ($V_{BE} = 3.0 \text{ Vdc}$, $I_C = 0$)		-	I_{EBO}	-	50 nAdc

ON CHARACTERISTICS

DC Current Gain* ($I_C = 0.1 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	2N3634, 2N3636 2N3635, 2N3637	3, 4, 5, 6	h_{FE}^*	40 80	- - -	-
($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	2N3634, 2N3636 2N3635, 2N3637			45 90	- -	
($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	2N3634, 2N3636 2N3635, 2N3637			50 100	- -	
($I_C = 50 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	2N3634, 2N3636 2N3635, 2N3637			50 100	150 300	
($I_C = 150 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	2N3634, 2N3636 2N3635, 2N3637			25 50	- -	
Collector-Emitter Saturation Voltage* ($I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$) ($I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$)		11, 12	$V_{CE(sat)}^*$	- -	0.4 1.1	Vdc
Base-Emitter Saturation Voltage* ($I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$) ($I_C = 50 \text{ mA}$, $I_B = 5.0 \text{ mA}$)		11, 12	$V_{BE(sat)}^*$	- 0.65	0.8 0.9	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain-Bandwidth Product ($V_{CE} = 30 \text{ Vdc}$, $I_C = 30 \text{ mA}$, $f = 100 \text{ MHz}$)	2N3634, 2N3636 2N3635, 2N3637	2	f_T	150 200	- -	MHz
Output Capacitance ($V_{CB} = 20 \text{ Vdc}$, $I_E = 0$, $f = 100 \text{ kHz}$)		1	C_{ob}	-	10	pF
Input Capacitance ($V_{BE} = 1.0 \text{ Vdc}$, $I_C = 0$, $f = 100 \text{ kHz}$)		1	C_{ib}	-	75	pF
Input Impedance ($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	2N3634, 2N3636 2N3635, 2N3637	7	h_{ie}	100 200	600 1200	ohms
Voltage Feedback Ratio ($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)		10	h_{re}	-	3.0	$\times 10^{-4}$
Small-Signal Current Gain ($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	2N3634, 2N3636 2N3635, 2N3637	9	h_{fe}	40 80	160 320	-
Output Admittance ($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)		8	h_{oe}	-	200	μmhos
Noise Figure ($I_C = 0.5 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$, $R_S = 1.0 \text{ k ohms}$, $f = 1.0 \text{ kHz}$)		-	NF	-	3.0	dB

SWITCHING CHARACTERISTICS

Turn-On Time	($V_{CC} = 100 \text{ Vdc}$, $V_{BE} = 4.0 \text{ Vdc}$, $I_C = 50 \text{ mA}$, $I_{B1} = I_{B2} = 5.0 \text{ mA}$)	13, 14	t_{on}	-	400	ns
Turn-Off Time		13, 15	t_{off}	-	600	ns

* Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

2N3634 thru 2N3637 (continued)

FIGURE 3 — CURRENT GAIN CHARACTERISTICS versus JUNCTION TEMPERATURE

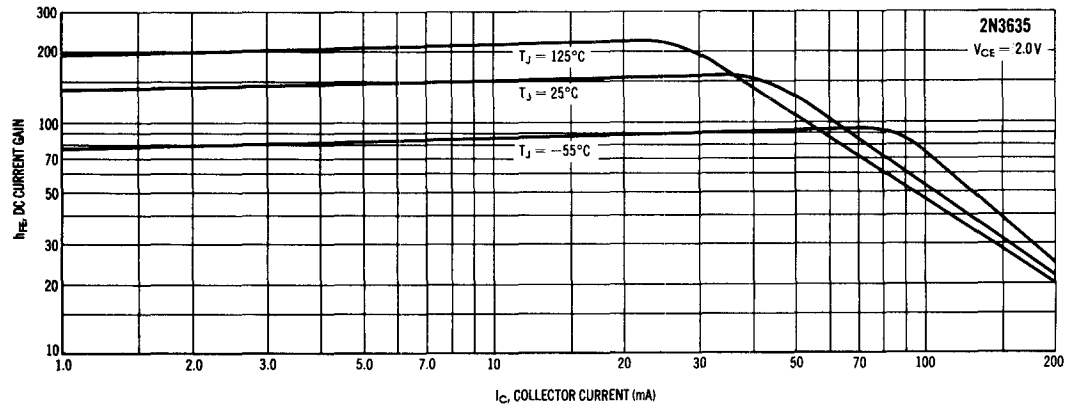
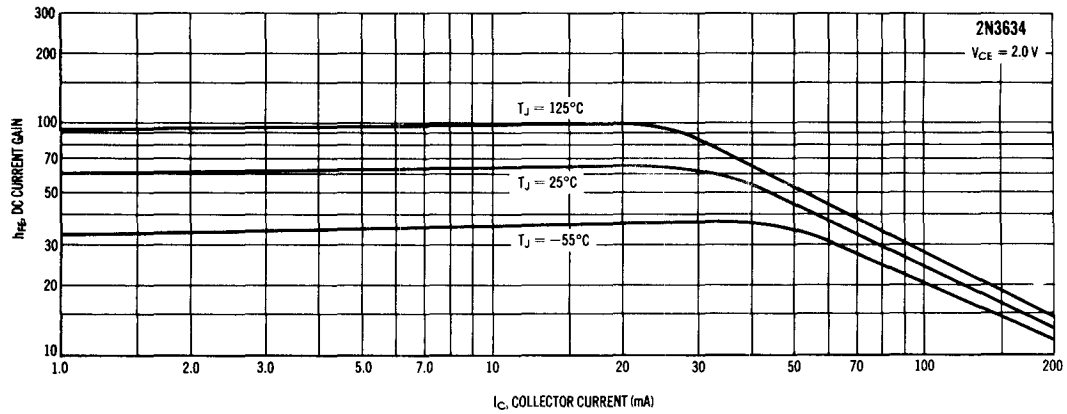
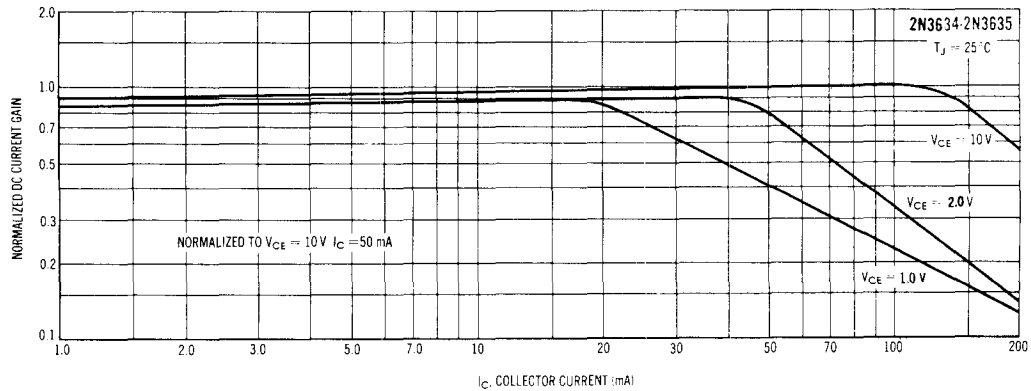


FIGURE 4 — CURRENT GAIN CHARACTERISTICS versus COLLECTOR EMITTER VOLTAGE



2N3634 thru 2N3637 (continued)

FIGURE 5 — CURRENT GAIN CHARACTERISTICS versus JUNCTION TEMPERATURE

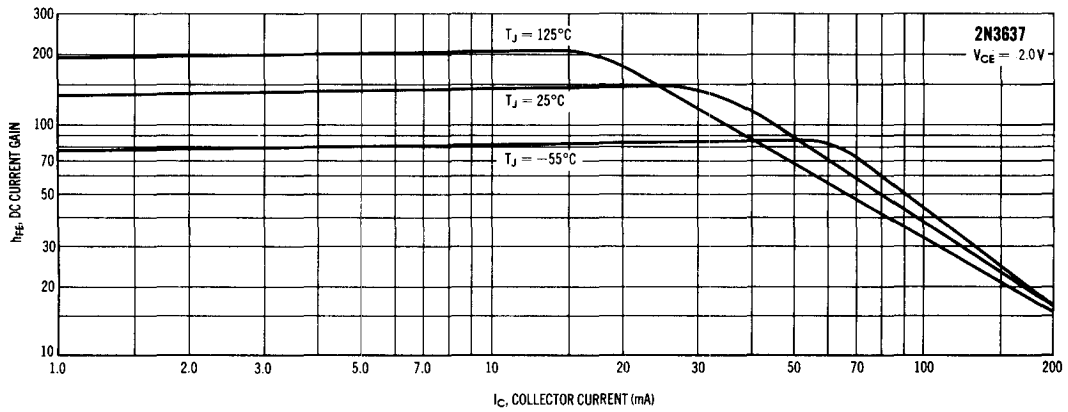
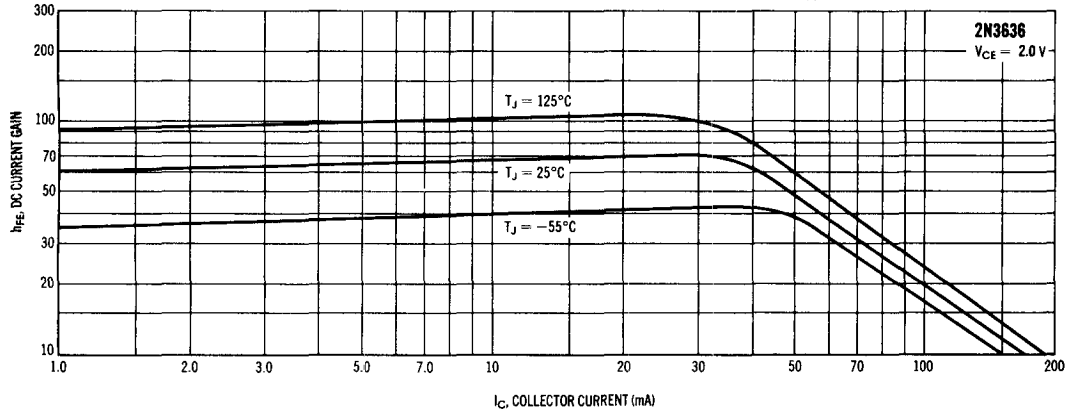
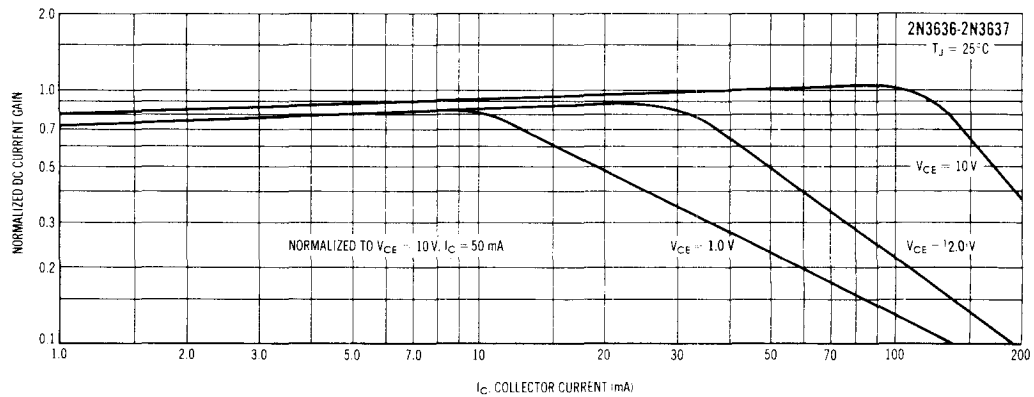


FIGURE 6 — CURRENT GAIN CHARACTERISTICS versus COLLECTOR EMITTER VOLTAGE



2N3634 thru 2N3637 (continued)

FIGURE 7 — INPUT IMPEDANCE

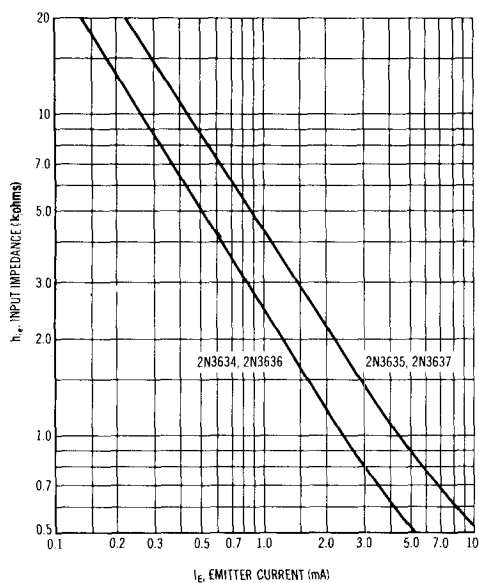


FIGURE 8 — OUTPUT IMPEDANCE

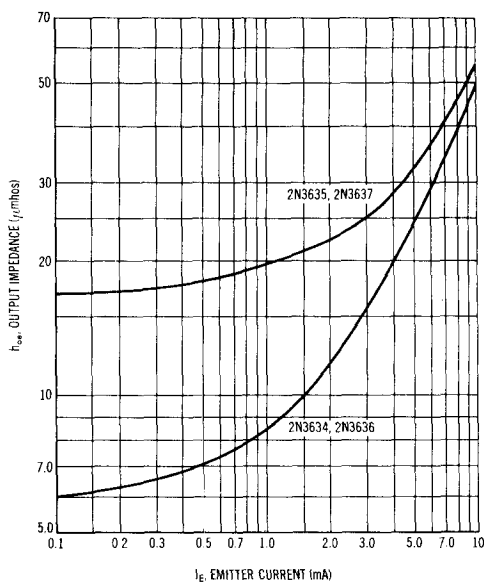


FIGURE 9 — CURRENT GAIN

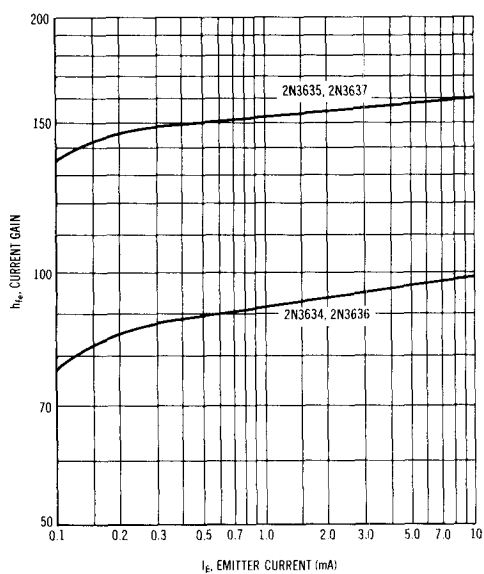
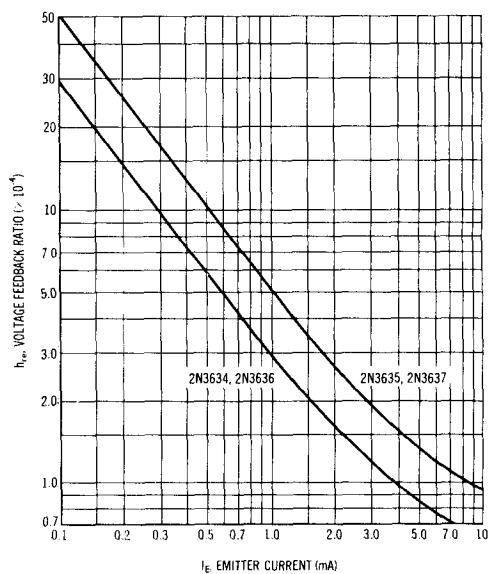


FIGURE 10 — VOLTAGE FEEDBACK RATIO



2N3634 thru 2N3637 (continued)

FIGURE 11 — SATURATION VOLTAGES

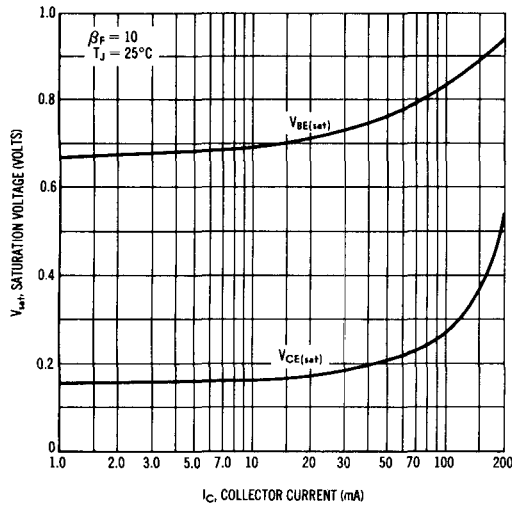


FIGURE 12 — TEMPERATURE COEFFICIENTS

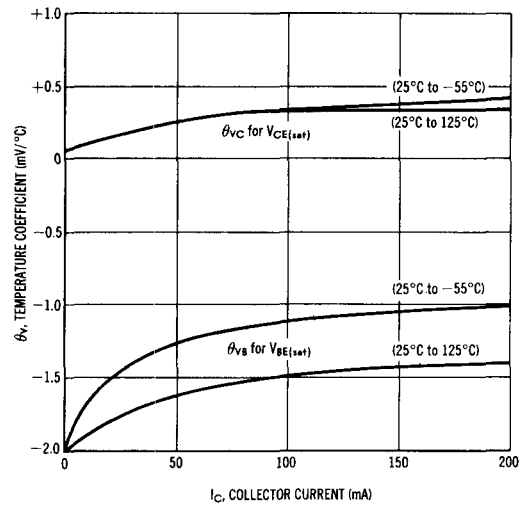
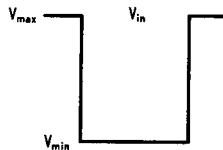


FIGURE 13 — SWITCHING TIME TEST CIRCUIT



P.W. $\approx 20 \mu\text{s}$
DUTY CYCLE $\leq 2\%$
RISE TIME $\leq 20 \text{ ns}$

	V_{max}	V_{min}
TURN-ON	+4.0 V	-5.65 V
TURN-OFF	+4.1 V	-5.9 V

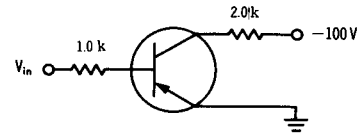


FIGURE 14 — TURN-ON TIME VARIATIONS WITH VOLTAGE

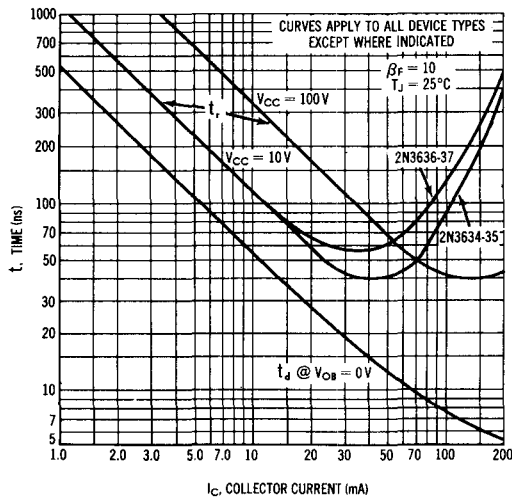
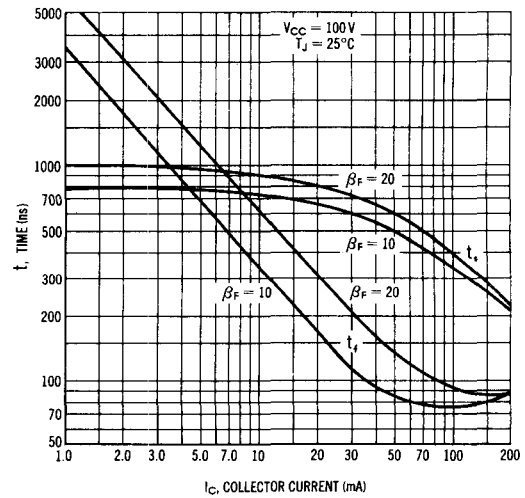


FIGURE 15 — TURN-OFF TIME VARIATIONS WITH CIRCUIT GAIN



2N3647 (SILICON)

2N3648

For Specifications, See 2N3510 Data Sheet