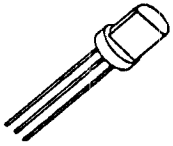


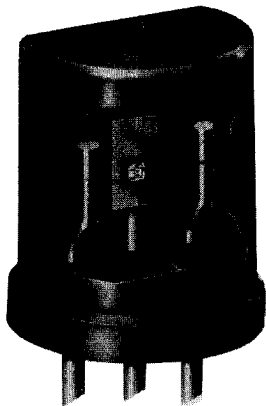
SILICON SIGNAL TRANSISTORS GENERAL PURPOSE AMPLIFIERS TO-98 PACKAGE

Device	Type	BV _{CEO} @ 10mA (V)	h _{FE}		V _{CE(SAT)}		f _T Typical (MHz)	C _{cb} @ 10V 1 MHz Typical (Pf)	P _T @ 25°C (mW)
			Min.-Max.	@ I _C , V _{CE} (V)	(V) Max. @	I _C , I _B			
2N4256	NPN	40	100-500	2mA, 5	0.125	10mA, 1.0mA	120	2	360
2N4424	NPN	40	180-540	2mA, 5	0.3	50mA, 3mA	150	5	360
2N4425	NPN	40	180-540	2mA, 5	0.3	50mA, 3mA	150	5	360
2N5172	NPN	25	100-500	10mA, 10	0.25	10mA, 1mA	100	2	360
2N5174	NPN	75	40-600	10mA, 5	0.95	10mA, 1.0mA	120	2	360
2N5232	NPN	50	250-500	2mA, 5	0.125	10mA, 1mA	150	2	360
2N5232A	NPN	50	260-500	2mA, 5	0.125	10mA, 1mA	150	2	360
2N5249	NPN	50	400-800	2mA, 5	0.125	10mA, 1mA	150	2	360
2N5249A	NPN	50	400-800	2mA, 5	0.125	10mA, 1mA	150	2	360
2N5305	NPN	25	2K-20K	2mA, 5	1.4	200mA, 0.2mA	60	4	400
2N5306	NPN	25	7K-70K	2mA, 5	1.4	200mA, 0.2mA	60	4	400
2N5307	NPN	40	2K-20K	2mA, 5	1.4	200mA, 0.2mA	60	4	400
2N5308	NPN	40	7K-70K	2mA, 5	1.4	200mA, 0.2mA	60	4	400
2N5309	NPN	50	60-120	10μA, 5	0.125	10mA, 1mA	150	2	360
2N5310	NPN	50	100-300	10μA, 5	0.125	10mA, 1mA	150	2	360
2N5311	NPN	50	250-500	10μA, 5	0.125	10mA, 1mA	150	2	360
2N5354	PNP	25	40-120	50mA, 1	0.25	50mA, 2.5mA	200	5	360
2N5355	PNP	25	100-300	50mA, 1	0.25	50mA, 2.5mA	200	5	360
2N5356	PNP	25	250-500	50mA, 1	0.25	50mA, 2.5mA	200	5	360
2N5365	PNP	40	40-120	50mA, 1	0.25	50mA, 2.5mA	350	5	360
2N5366	PNP	40	100-300	50mA, 1	0.25	50mA, 2.5mA	350	5	360
2N5418	NPN	25	40-120	50mA, 1	0.25	50mA, 2.5mA	250	4	400
2N5419	NPN	25	100-300	50mA, 1	0.25	50mA, 2.5mA	250	4	400
2N5420	NPN	25	250-500	50mA, 1	0.25	50mA, 2.5mA	250	4	400
2N6076	PNP	25	100-500	10mA, 10	0.25	10mA, 1.0mA	300	5	360
D16G6	NPN	12	20	8mA, 10	0.6	10mA, 1.0mA	1000	.9	200
D29E1	PNP	25	60-200	2mA, 2	0.75	500mA, 50mA	150	9.4	500
D29E2	PNP	25	150-500	2mA, 2	0.75	500mA, 50mA	165	9.4	500
D29E4	PNP	40	60-120	2mA, 2	0.75	500mA, 50mA	120	9.4	500
D29E5	PNP	40	100-200	2mA, 2	0.75	500mA, 50mA	135	9.4	500
D29E6	PNP	40	150-300	2mA, 2	0.75	500mA, 50mA	150	9.4	500
D29E9	PNP	60	60-120	2mA, 2	0.75	500mA, 50mA	120	9.4	500
D29E10	PNP	60	100-200	2mA, 2	0.75	500mA, 50mA	135	9.4	500
D33D21	NPN	25	60-200	2mA, 2	0.75	500mA, 50mA	150	9.4	625
D33D22	NPN	25	150-500	2mA, 2	0.75	500mA, 50mA	165	9.4	625
D33D24	NPN	40	60-120	2mA, 2	0.75	500mA, 50mA	120	9.4	625
D33D25	NPN	40	100-200	2mA, 1	0.75	500mA, 50mA	135	9.4	625
D33D26	NPN	40	150-300	2mA, 2	0.75	500mA, 50mA	150	9.4	625
D33D29	NPN	60	60-120	2mA, 2	0.75	500mA, 50mA	120	9.4	625
D33D30	NPN	60	100-200	2mA, 2	0.75	500mA, 50mA	135	9.4	625

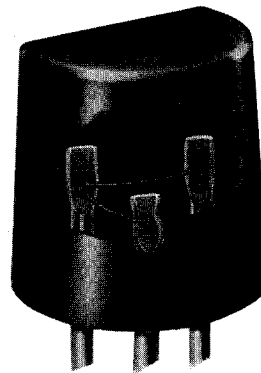


SILICON SIGNAL TRANSISTORS COMPLEMENTARY PAIRS TO-98 PACKAGE

DEVICE		BV _{CEO} (V)	h _{FE}		V _{CE(SAT)}		COMPLEMENT
NPN	PNP		Min.-Max.	@ I _C , V _{CE} (V)	(V) Max. @	I _C , I _B	
	2N5354	25	40-120	50mA, 1	0.25	50mA, 2.5mA	2N5418
	2N5355	25	100-300	50mA, 1	0.25	50mA, 2.5mA	2N5419
2N5418		25	40-120	50mA, 1	0.25	50mA, 2.5mA	2N5354
2N5419		25	100-300	50mA, 1	0.25	50mA, 2.5mA	2N5355
	2N6076	25	100-500	10mA, 10	0.25	10mA, 1.0mA	2N5172
	D29E1	25	60-200	2mA, 2	0.75	500mA, 50mA	D33D21
	D29E2	25	150-500	2mA, 2	0.75	500mA, 50mA	D33D22
	D29E4	40	60-120	2mA, 2	0.75	500mA, 50mA	D33D24
	D29E5	40	100-200	2mA, 2	0.75	500mA, 50mA	D33D25
	D29E6	40	150-300	2mA, 2	0.75	500mA, 50mA	D33D26
	D29E9	60	60-120	2mA, 2	0.75	500mA, 50mA	D33D29
	D29E10	60	100-200	2mA, 2	0.75	500mA, 50mA	D33D30
D33D21		25	60-200	2mA, 2	0.75	500mA, 50mA	D29E1
D33D22		25	150-500	2mA, 2	0.75	500mA, 50mA	D29E2
D33D24		40	60-120	2mA, 2	0.75	500mA, 50mA	D29E4
D33D25		40	100-200	2mA, 2	0.75	500mA, 50mA	D29E5
D33D26		40	150-300	2mA, 2	0.75	500mA, 50mA	D29E6
D33D29		60	60-120	2mA, 2	0.75	500mA, 50mA	D29E9
D33D30		60	100-200	2mA, 2	0.75	500mA, 50mA	D29E10



ENCAPSULATED TO-98



ENCAPSULATED TO-92

Silicon Transistors

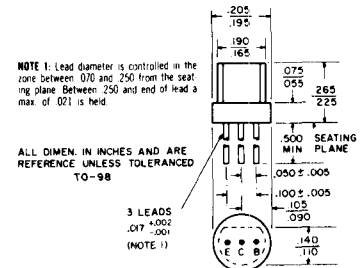
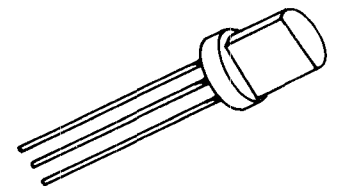


This series of economy transistors are PNP, silicon, planar, epitaxial, passivated devices. These units feature low collector saturation voltage, good current gain linearity over a wide collector current range, high gain-bandwidth product, and low noise. These characteristics make these units excellent for use in general purpose consumer and industrial amplifier and switching applications.

absolute maximum ratings: (25°C) (unless otherwise specified)

Voltages			
Collector to Emitter	V_{CEO}	-25	Volts
Emitter to Base	V_{EBO}	- 4	Volts
Collector to Base	V_{CBO}	-25	Volts
Current			
Collector (Continuous)	I_C	350	mA
Collector (Pulsed, 10 μ sec pulse width, = 2% Duty Cycle)	I_C	700	mA
Dissipation			
Total Power (Free Air at 25°C)*	P_T	360	mW
Total Power (Free Air at 55°C)*	P_T	260	mW
Temperature			
Storage	T_{stg}	-65 to +150	°C
Operating	T_j	+125	°C
Lead temperature, 1/16" \pm 1/32" from case for ten seconds maximum	T_L	+260	°C

* Derate 3.6 mW/°C increase in ambient temperature above 25°C.



electrical characteristics: (25°C) (unless otherwise specified)

Static Characteristics		Min.	Typ.	Max.	
Collector Cutoff Current					
($V_{CB} = -25V$)	I_{CBO}			-100	nA
($V_{CB} = -25V, T_A = 100^\circ C$)	I_{CBO}			- 10	μA
($V_{CB} = -25V$)	I_{CES}			-100	nA
Emitter Cutoff Current ($V_{EB} = -4V$)	I_{EBO}			- 10	μA
Forward Current Transfer Ratio					
($V_{CE} = -10V, I_C = -2 mA$)	2N5354	h_{FE}	32		
($V_{CE} = -1V, I_C = -50 mA$)	2N5354	h_{FE}	40	120	
($V_{CE} = -5V, I_C = -300 mA$)	2N5354	h_{FE}	20		
($V_{CE} = -10V, I_C = -2 mA$)	2N5355	h_{FE}	80		
($V_{CE} = -1V, I_C = -50 mA$)	2N5355	h_{FE}	100	300	
($V_{CE} = -5V, I_C = -300 mA$)	2N5355	h_{FE}	40		
($V_{CE} = -10V, I_C = -2 mA$)	2N5356	h_{FE}	200		
($V_{CE} = -1V, I_C = -50 mA$)	2N5356	h_{FE}	250	500	
($V_{CE} = -5V, I_C = -300 mA$)	2N5356	h_{FE}	75		
Collector Emitter Breakdown Voltage					
($I_C = -10 mA$)	$V_{(BR)CEO}$	- 25			Volts
Collector Saturation Voltage					
($I_C = -50 mA, I_B = -2.5 mA$)	$V_{CE(sat)}$			-.250	Volts
($I_C = -300 mA, I_B = -30 mA$)	$V_{CE(sat)}$			-1.0	Volts

Base Saturation Voltage

($I_C = -50 \text{ mA}$, $I_B = -2.5 \text{ mA}$)
 ($I_C = -300 \text{ mA}$, $I_B = -30 \text{ mA}$)

	Min.	Typ.	Max.	
$V_{BE(sat)}$			-1.1	Volts
$V_{BE(sat)}$			-2.0	Volts

Base Emitter Voltage

($V_{CE} = -10V$, $I_C = -2 \text{ mA}$)

	Min.	Typ.	Max.	
V_{BE}	-0.5		-0.8	Volts

Dynamic Characteristics

Forward Current Transfer Ratio

($V_{CE} = -10V$, $I_C = 2 \text{ mA}$, $f = 1 \text{ kHz}$) 2N5354
 ($V_{CE} = -10V$, $I_C = 2 \text{ mA}$, $f = 1 \text{ kHz}$) 2N5355
 ($V_{CE} = -10V$, $I_C = 2 \text{ mA}$, $f = 1 \text{ kHz}$) 2N5356

	Min.	Typ.	Max.
h_{fe}	32		180
h_{fe}	80		450
h_{fe}	200		750

Output Capacitance, Common Base

($V_{CB} = -10V$, $I_E = 0$, $f = 1 \text{ MHz}$)

	Min.	Typ.	Max.
C_{cb}			8 pF

Input Capacitance, Common Base

($V_{EB} = -0.5V$, $I_C = 0$, $f = 1 \text{ MHz}$)

	Min.	Typ.	Max.
C_{eb}			35 pF

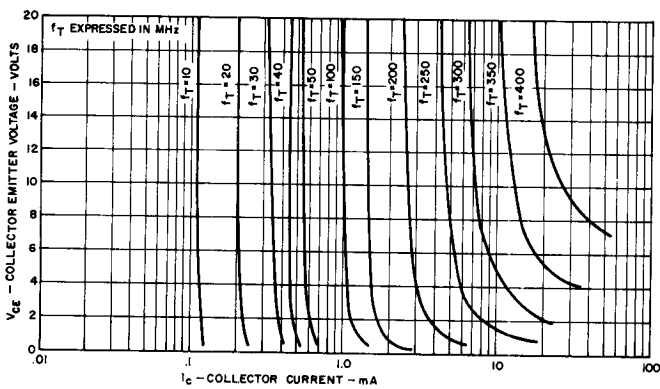
Gain Bandwidth Product

($V_{CE} = -10V$, $I_C = 2 \text{ mA}$)

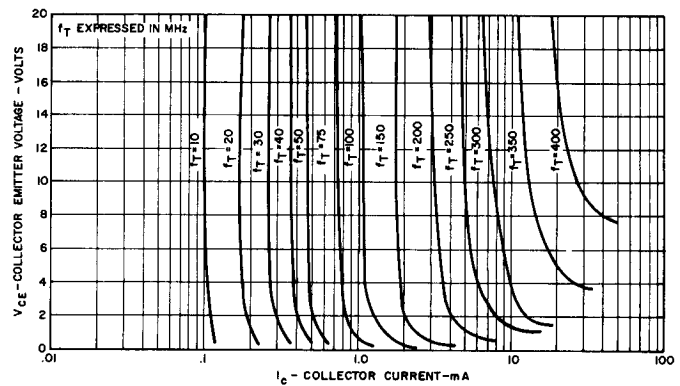
	Min.	Typ.	Max.
f_T		250	MHz

TYPICAL CONTOURS OF GAIN BANDWIDTH PRODUCT, (f_T) VS. COLLECTOR CURRENT

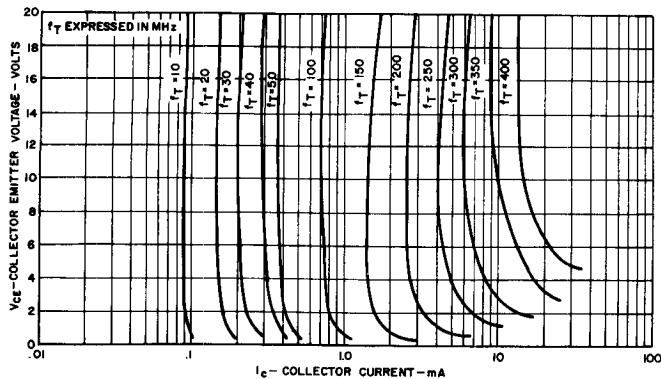
2N5354



2N5355

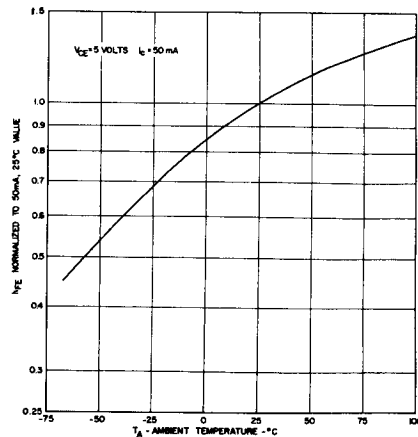


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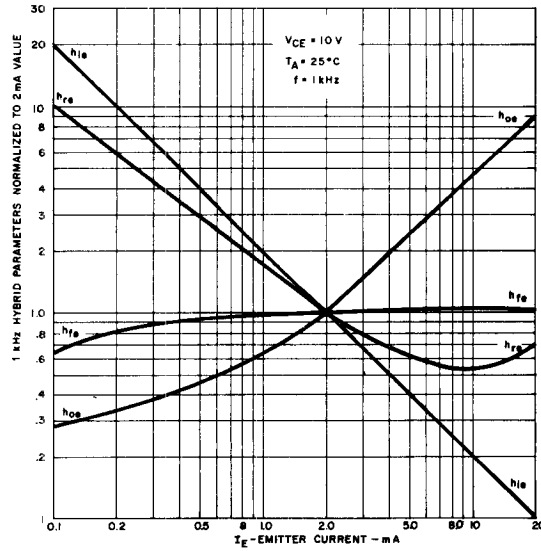


TYPICAL NORMALIZED H_{FE} VS. TEMPERATURE

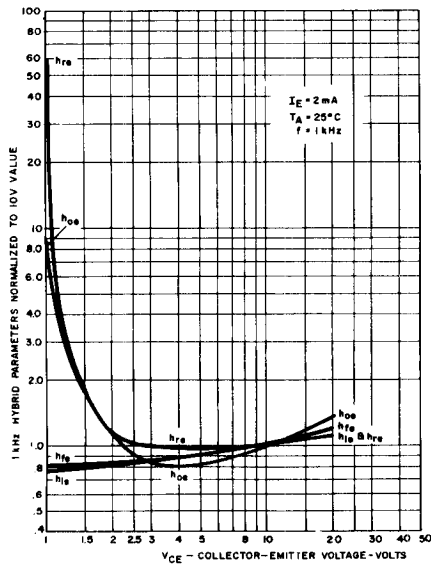
2N5354, 5355, 5356



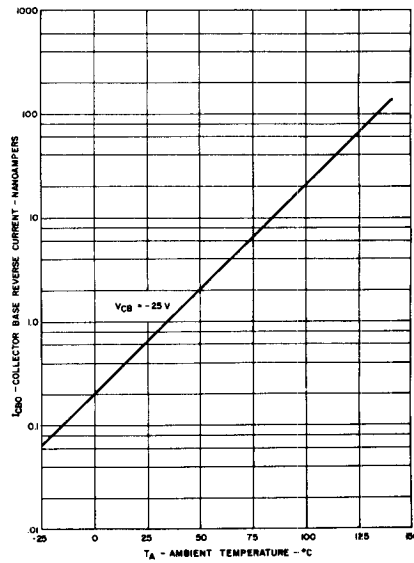
TYPICAL SMALL SIGNAL CHARACTERISTICS
VS.
EMITTER CURRENT
2N5354, 5355, 5356



TYPICAL
SMALL SIGNAL CHARACTERISTICS
VS.
COLLECTOR VOLTAGE
2N5354, 5355, 5356



TYPICAL
COLLECTOR CUTOFF CURRENT
(Icbo) VS. TEMPERATURE
2N5354, 5355, 5356



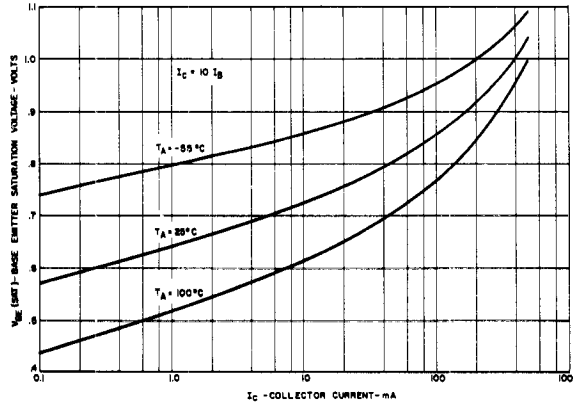
TYPICAL SMALL SIGNAL
CHARACTERISTICS

f = 1 kHz, V_{CE} = 10V, I_E = 2 mA

Symbol	Characteristic	2N5354	2N5355	2N5356	Units
h _{ie}	Input Resistance	1300	2000	8700	ohms
h _{oe}	Output Conductance	24	37	100	μmhos
h _{fe}	Forward current transfer ratio	100	150	450	
h _{re}	Reverse voltage feedback ratio	1.5	2.0	4.0	× 10 ⁻⁴

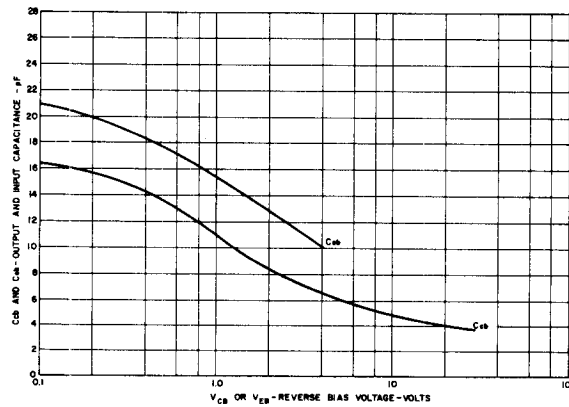
**TYPICAL
BASE SATURATION VOLTAGE
VS.
COLLECTOR CURRENT**

2N5354, 5355, 5356



**TYPICAL
OUTPUT CAPACITANCE AND INPUT CAPACITANCE
VS.
REVERSE BIAS VOLTAGE**

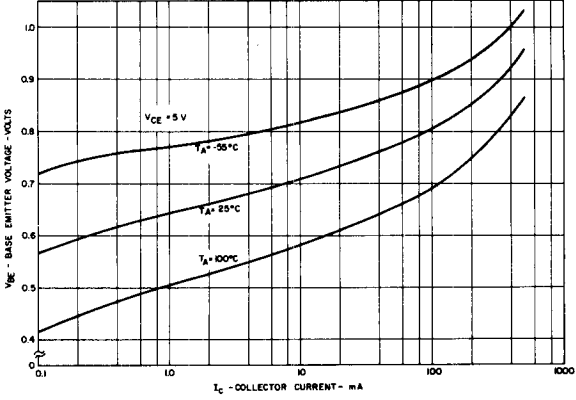
2N5354, 5355, 5356



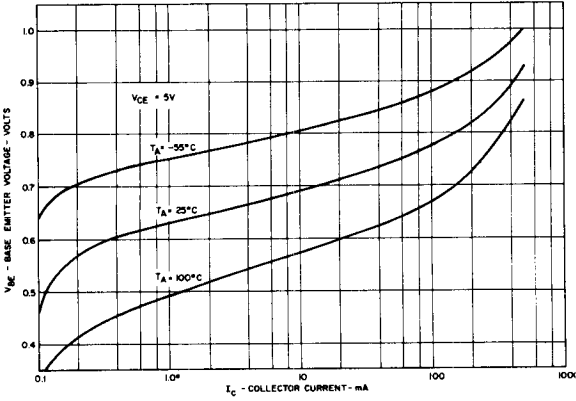
2N5354, 5, 6

TYPICAL TRANSFER CHARACTERISTICS

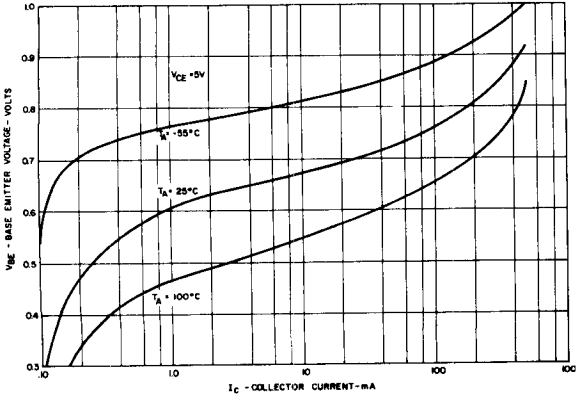
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2N5355

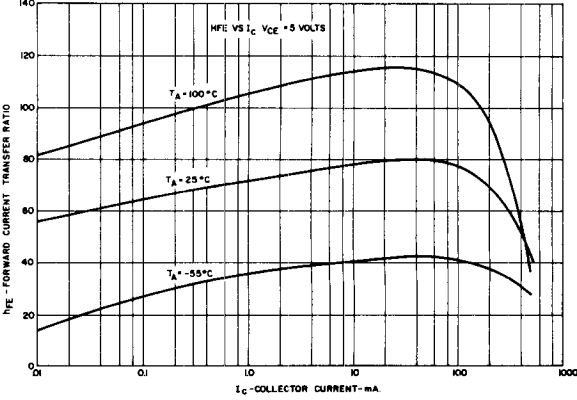


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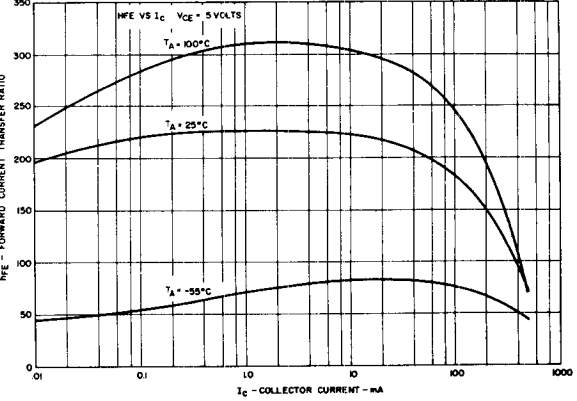


TYPICAL FORWARD CURRENT TRANSFER RATIO VS. COLLECTOR CURRENT

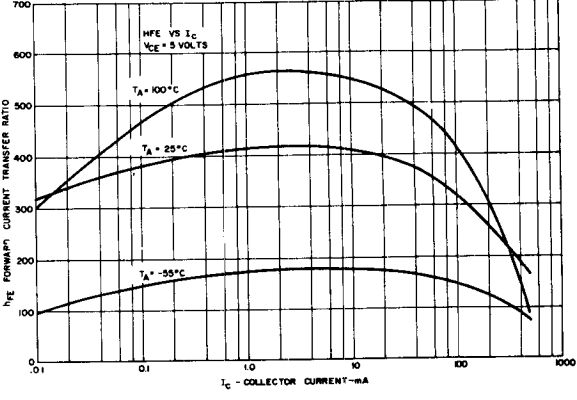
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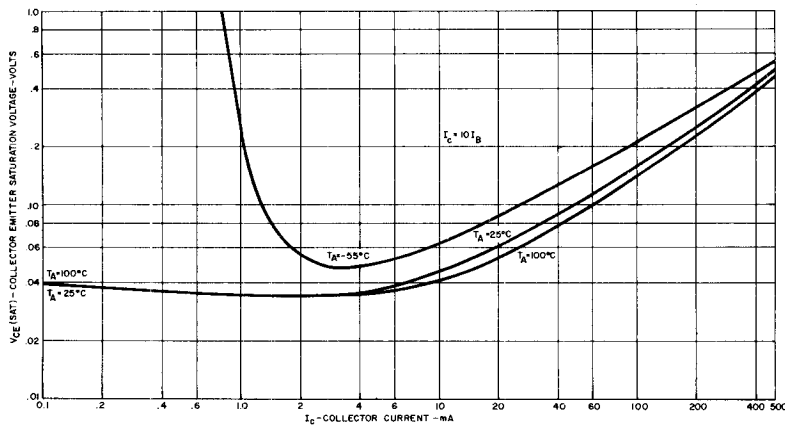
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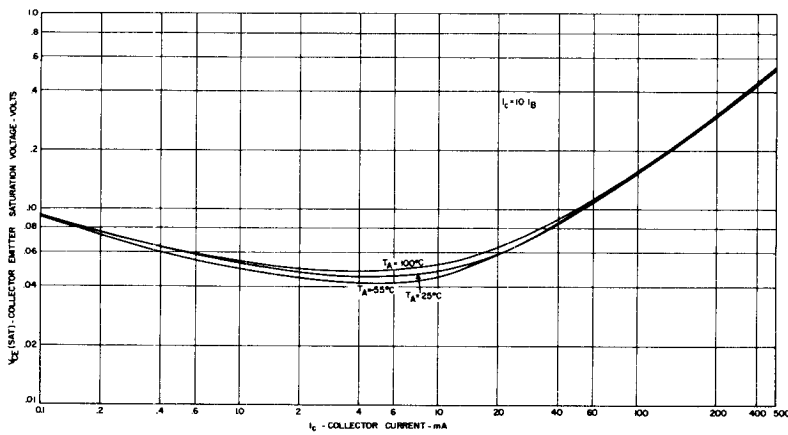
TYPICAL COLLECTOR SATURATION VOLTAGE
VS.
COLLECTOR CURRENT

2N5354, 5, 6

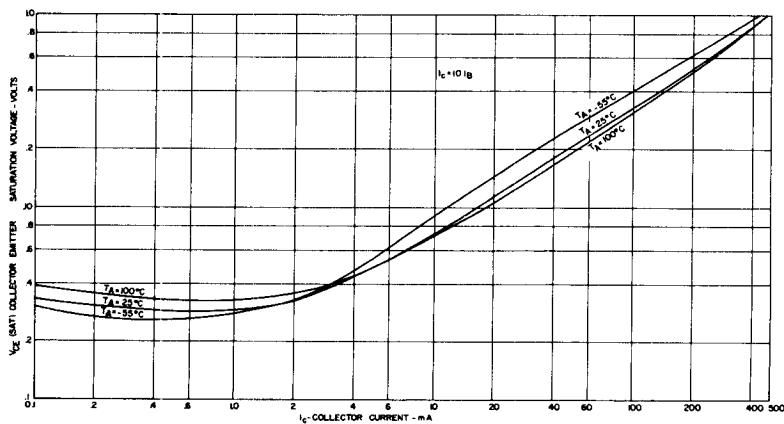
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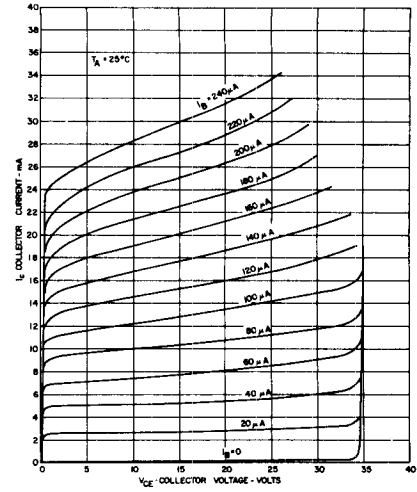
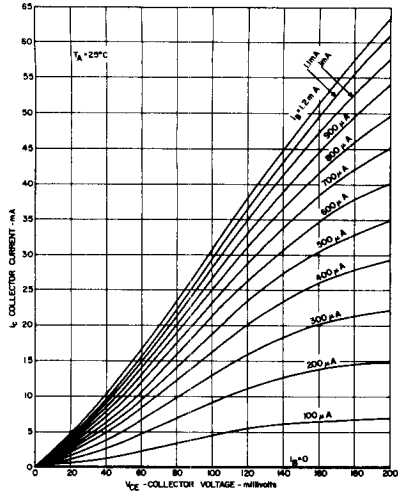


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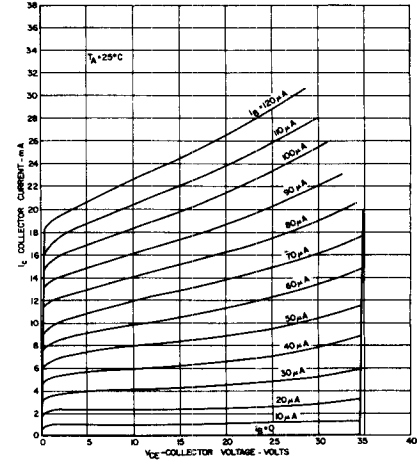
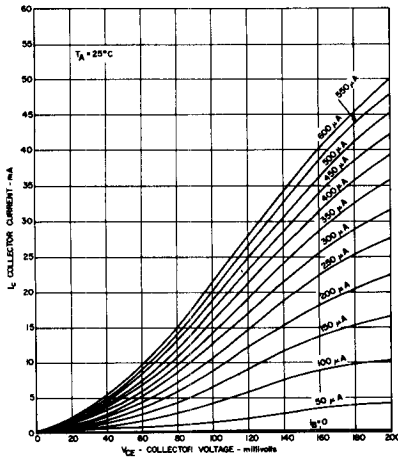


TYPICAL COLLECTOR CHARACTERISTICS

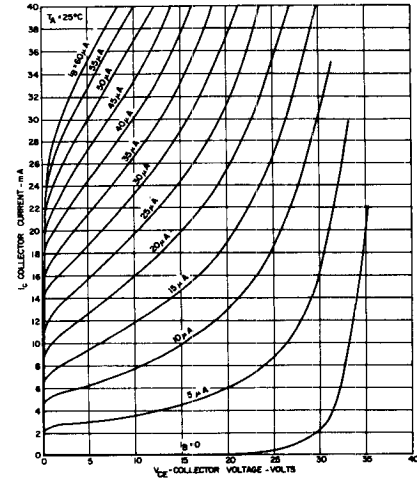
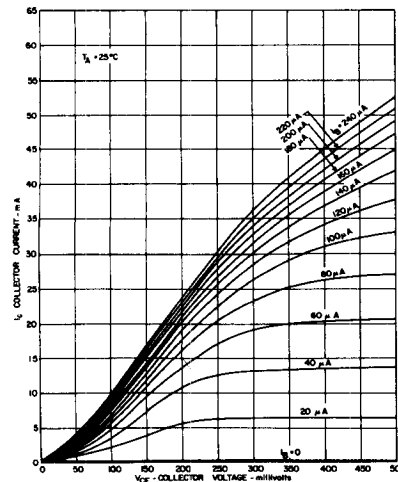
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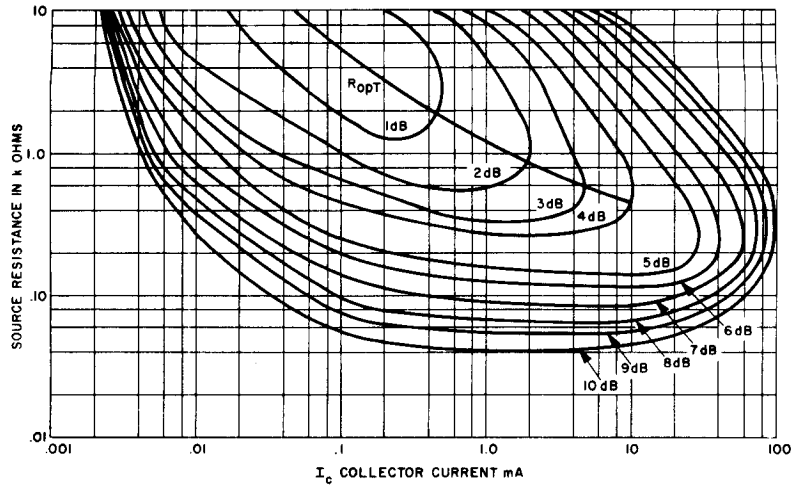
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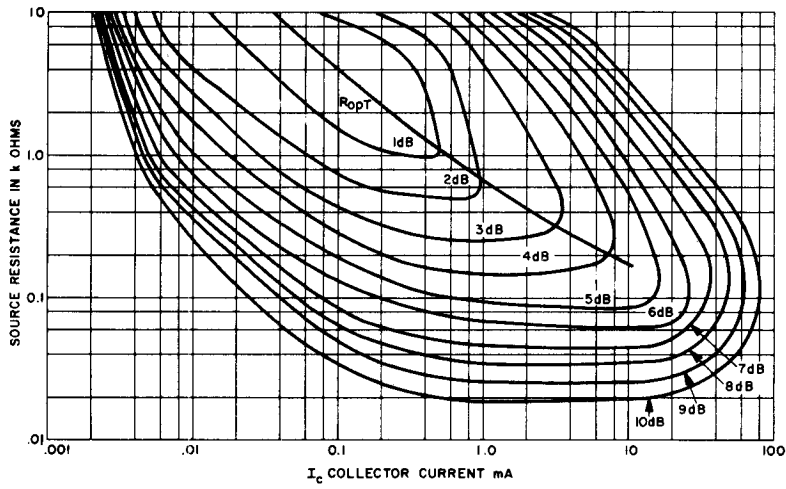
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