JEDEC types
2N1809, 2N1816, 2N1823
2N1830, 2N2109, 2N2116
2N2123, 2N2130

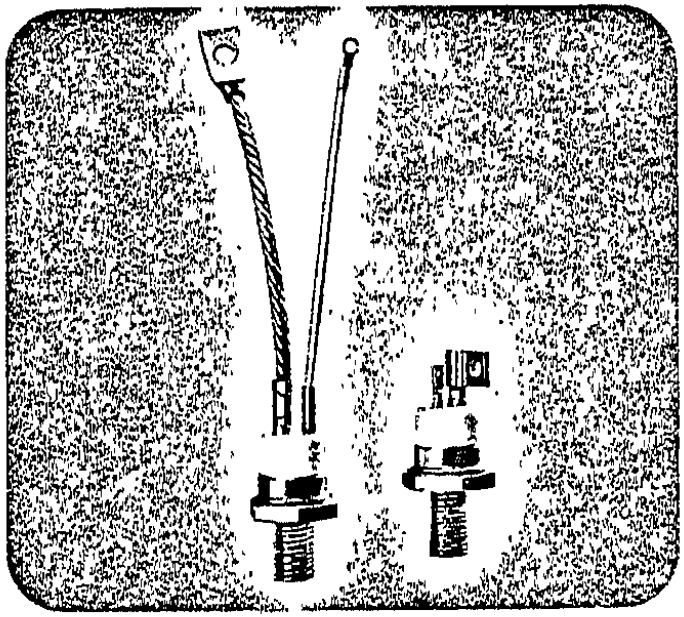
silicon power transistors

for switching, regulator and amplifier applications

technical data

54-662

30 amperes • 250 watts
collector-to-emitter voltage 50 to 300 volts



application

These 30 ampere NPN fused silicon transistors are designed for high-power applications. Each transistor is power tested to the range of conditions under which the device can be operated in field applications. The transistors feature hard solder construction, extremely low saturation resistance, low thermal impedance and absence of secondary voltage breakdown. Westinghouse true voltage ratings allow operation at rated collector emitter voltage under any emitter-base biasing conditions. Westinghouse peak pulse power ratings up to 6,000 watts assure devices free from secondary breakdown within maximum voltage and current ratings for reliable operation in inverter and switching applications.

maximum ratings

$T_C = 25° \pm 3°C$ unless otherwise specified

JEDEC type flexible leads				JEDEC type flag-type terminals				voltage collector to emitter, V_{CEA}, volts
2N1809	2N1816	2N1823	2N1830	2N2109	2N2116	2N2123	2N2130	50
2N1810	2N1817	2N1824	2N1831	2N2110	2N2117	2N2124	2N2131	100
2N1811	2N1818	2N1825	2N1832	2N2111	2N2118	2N2125	2N2132	150
2N1812	2N1819	2N1826	2N1833	2N2112	2N2119	2N2126	2N2133	200
2N1813				2N2113				250
2N1814				2N2114				300

Continuous collector dissipation, P_C, watts 250
Derating factor, watts/°C 2.22
Junction temperature, T_J, °C—Operating ..... −65 to +175
Storage ..... −65 to +175

Emitter to base, V_{EB}, volts 15
Collector to base, V_{CB}, volts ..... equals V_{CE}
Collector current, I_C, amps 30
Base current, I_B, amps 10
Max. collector current at $V_{CEX} = V_{CE}$ (from max. ratings), $T_J = 175°C$, $V_{BE} = -1.5$ Vdc, mAdc 30
Max. emitter current at $V_{EB} = 15$ Vdc, $T_J = 175°C$, $I_C = 0$, mAdc 25

▲The maximum rating (collector to emitter) of these transistors is well below the values of V_{CEX}, V_{CER}, V_{CES}, and V_{CEO}. This assures the user a safe operating level of voltage independent of bias conditions. Each transistor is power tested under full load to further identify a safe operating range of characteristics.

electrical characteristics

characteristics and conditions ($T_C = 25° \pm 3°C$ unless otherwise specified.)	symbol	minimum	typical	maximum
2N1809 and 2N2109 series				
d-c current transfer ratio at $V_{CE} = 4$ Vdc, $I_C = 10$ Adc	h_{FE}	10	14	...
saturation resistance at $I_C = 10$ Adc, $I_B = 2$ Adc, ohms	$r_{CE(sat)}$	..	0.040	0.15
base voltage at $I_C = 10$ Adc, $I_B = 2$ Adc, Vdc	$V_{BE(sat)}$	..	1.35	2.5
common emitter beta cut-off frequency at $V_{CE} = 12$ Vdc, $I_C = 2.5$ Adc, kilocycles	f_{hfe}	..	14	...
turn on time at $I_C = 10$ Adc, $I_{B1} = 3$ Adc, $V_{CE} = 12$ Vdc, microseconds	$t_d + t_r$	..	12	...
turn off time at $V_{BE} = -6$ Vdc, $V_{CE} = 12$ Vdc, $I_{B2} = -3$ Adc, microseconds	$t_s + t_f$	..	14	....
2N1816 and 2N2116 series				
d-c current transfer ratio at $V_{CE} = 4$ Vdc, $I_C = 15$ Adc	h_{FE}	10	13.5	...
saturation resistance at $I_C = 15$ Adc, $I_B = 3$ Adc, ohms	$r_{CE(sat)}$	..	0.042	0.10
base voltage at $I_C = 15$ Adc, $I_B = 3$ Adc, Vdc	$V_{BE(sat)}$	..	1.50	2.5
common emitter beta cut-off frequency at $V_{CE} = 12$ Vdc, $I_C = 3.75$ Adc, kilocycles	f_{hfe}	..	14.5	....
turn on time at $I_C = 15$ Adc, $I_{B1} = 4.5$ Adc, $V_{CE} = 12$ Vdc, microseconds	$t_d + t_r$	..	17	...
turn off time at $V_{BE} = -6$ Vdc, $V_{CE} = 12$ Vdc, $I_{B2} = -4.5$ Adc, microseconds	$t_s + t_f$	..	13	....

electrical characteristics continued

characteristics and conditions (T_C = 25° ±3°C unless otherwise specified)	symbol	minimum	typical	maximum
2N1823 and 2N2123 series				
d-c current transfer ratio at V_{CE} = 4 Vdc, I_C = 20 Adc	h_{FE}	10	12.5	...
saturation resistance at I_C = 20 Adc, I_B = 4 Adc, ohms	$r_{CE(sat)}$	..	0.037	0.075
base voltage at I_C = 20 Adc, I_B = 4 Adc, Vdc	$V_{BE(sat)}$	..	1.8	2.5
common emitter beta cut-off frequency at V_{CE} = 12 Vdc, I_C = 5 Adc, kilocycles	f_{hfe}	..	16	...
turn on time at I_C = 20 Adc, I_{B1} = 6 Adc, V_{CE} = 12 Vdc, microseconds	t_d+t_r	..	20	...
turn off time at V_{BE} = −6 Vdc, V_{CE} = 12 Vdc, I_{B2} = −6 Adc, microseconds	t_s+t_f	..	15	...
2N1830 and 2N2130 series				
dc current transfer ratio at V_{CE} = 4 Vdc, I_C = 25 Adc	h_{FE}	10	14	...
saturation resistance at I_C = 25 Adc, I_B = 5 Adc, ohms	$r_{CE(sat)}$	..	0.035	0.06
base voltage at I_C = 25 Adc, I_B = 5 Adc, Vdc	$V_{BE(sat)}$	.	1.9	2.5
common emitter beta cut-off frequency at V_{CE} = 12 Vdc, I_C = 5 Adc, kc	f_{hfe}	..	14	...
turn on time at I_C = 25 Adc, I_{B1} = 7.5 Adc, V_{CE} = 12 Vdc, microseconds	t_d+t_r	..	15	...
turn off time at V_{BE} = −6 Vdc, V_{CE} = 12 Vdc, I_{B2} = −7.5 Adc, microseconds	t_s+t_f	..	15	...

typical characteristics

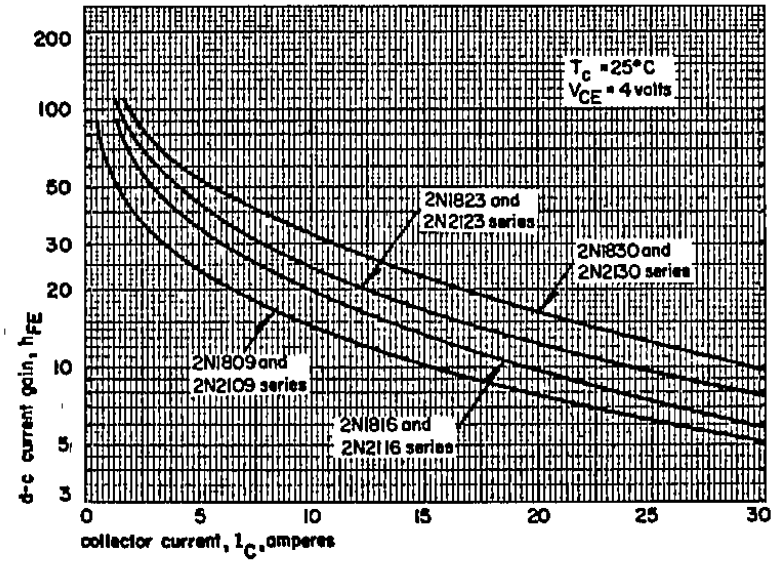


figure 1. D-c current gain versus collector current.

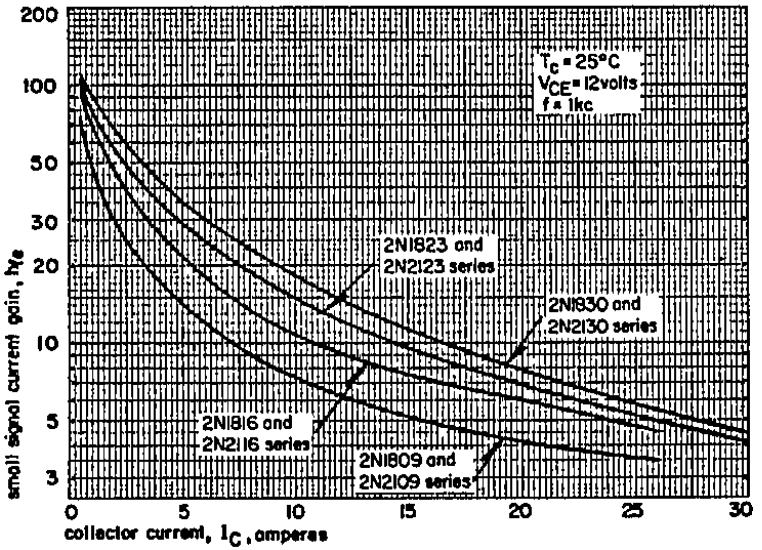


figure 2. Small signal gain versus collector current.

typical characteristics continued

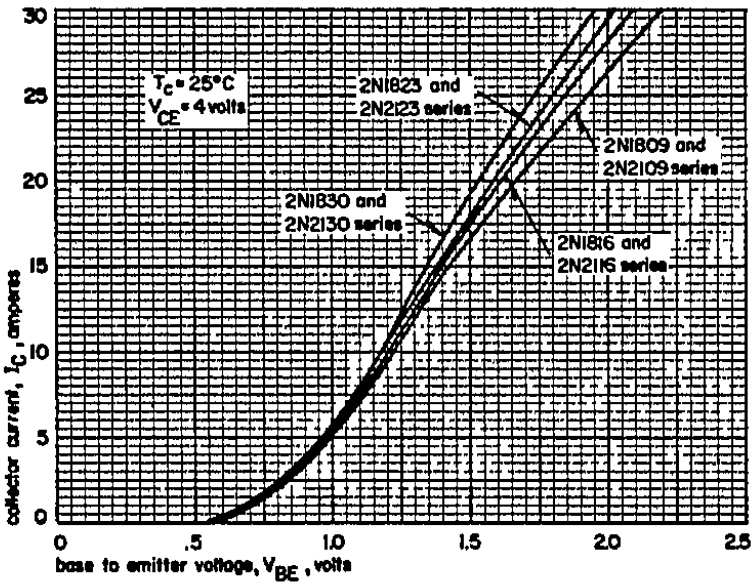


figure 3. Transconductance characteristics.

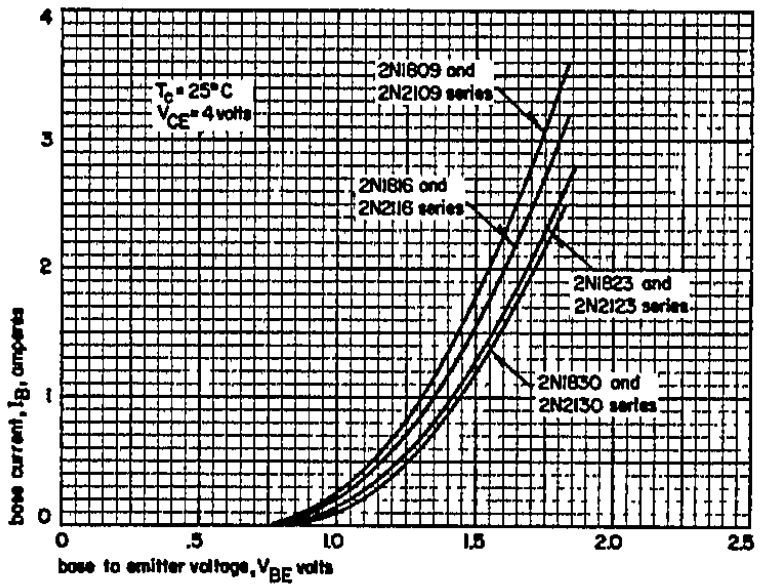


figure 4. Input characteristics.

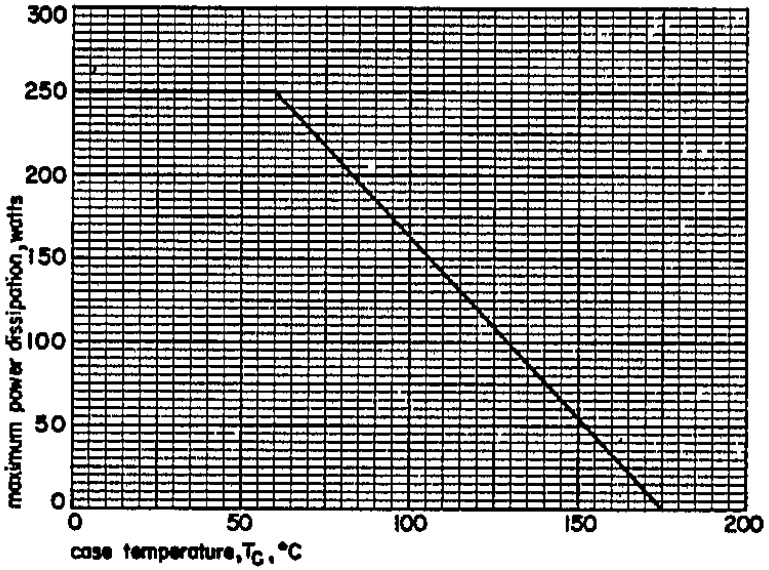


figure 5. Derating curve.

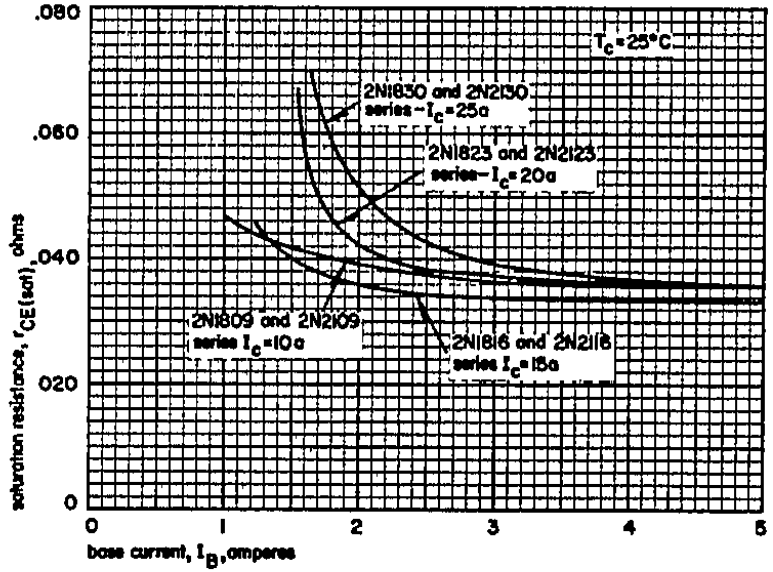


figure 6. Saturation characteristics versus base current.

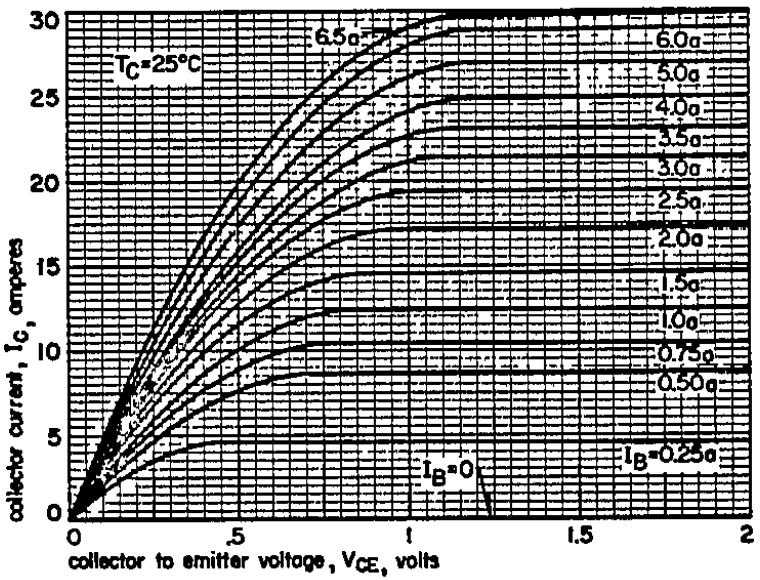


figure 7. Output characteristics—saturation region, 2N1809—2N2109 series.

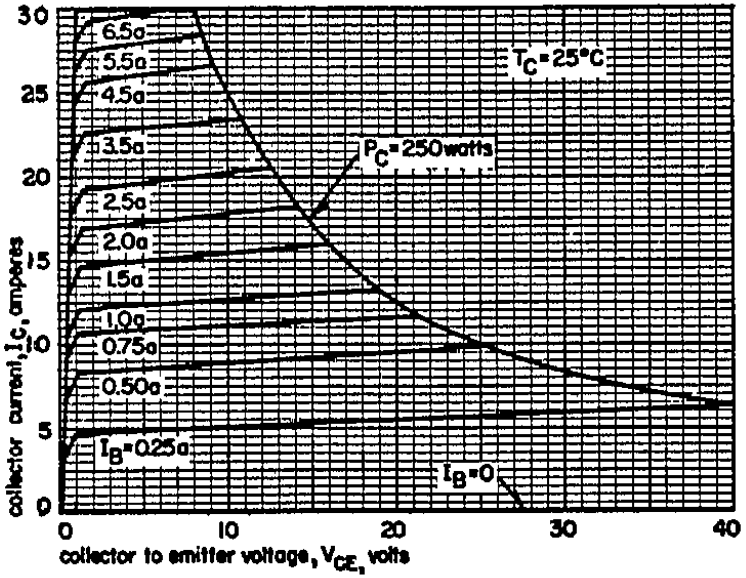


figure 8. Output characteristics, 2N1809—2N2109 series.

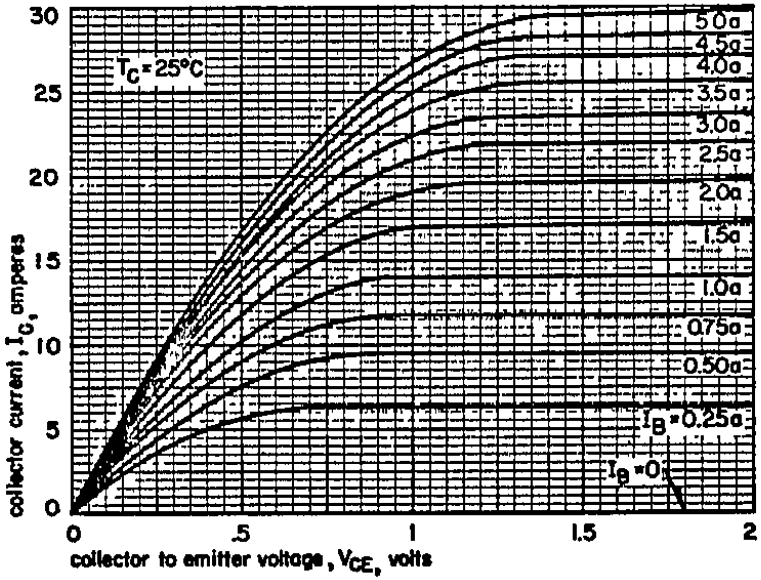


figure 9. Output characteristics—saturation region, 2N1816—2N2116 series.

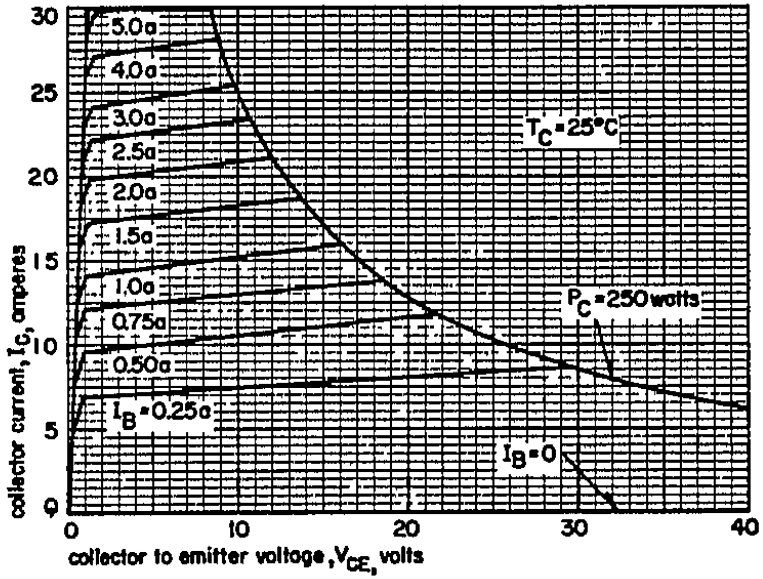


figure 10. Output characteristics, 2N1816—2N2116 series

typical characteristics continued

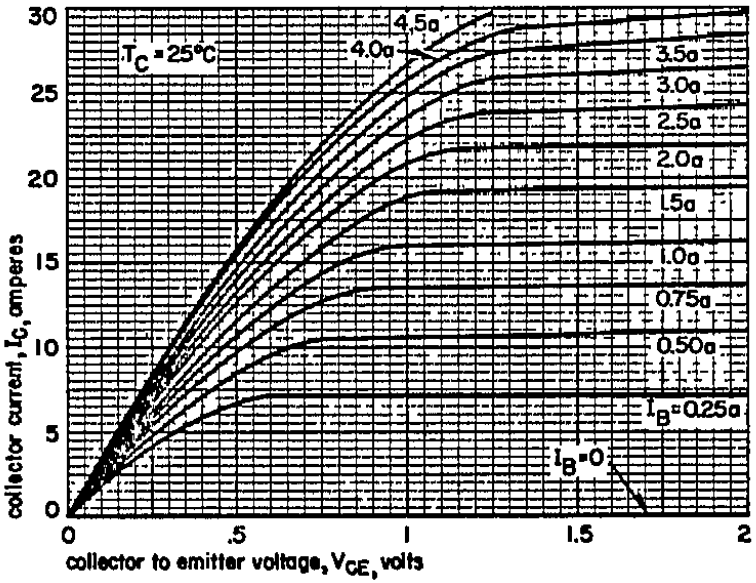


figure 11. Output characteristics—saturation region, 2N1823—2N2123 series.

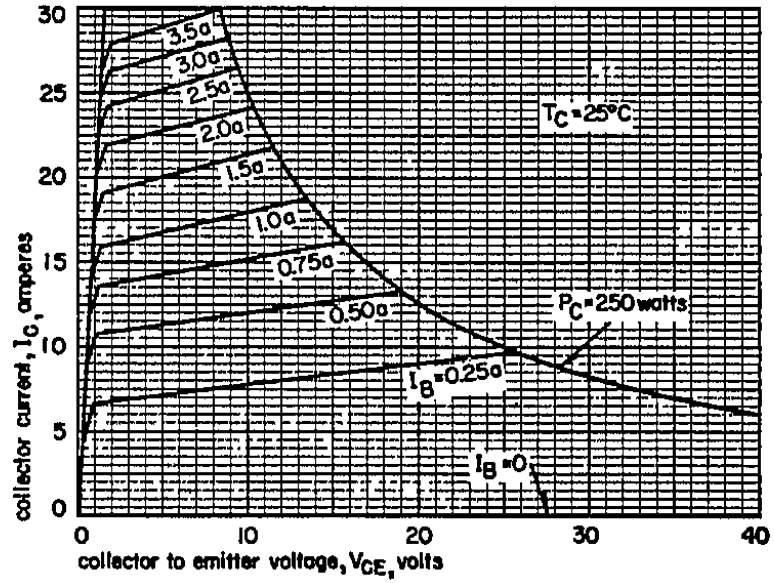


figure 12. Output characteristics, 2N1823—2N2123 series

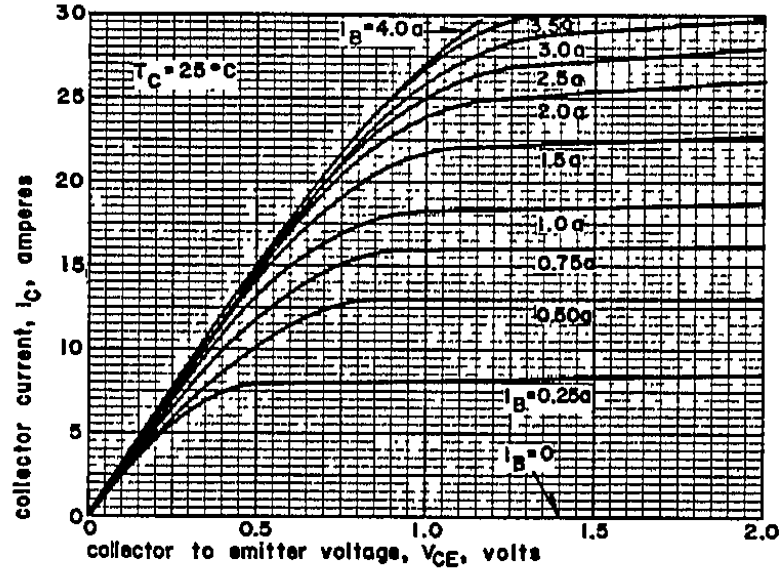


figure 13. Output characteristics—saturation region, 2N1830—2N2130 series.

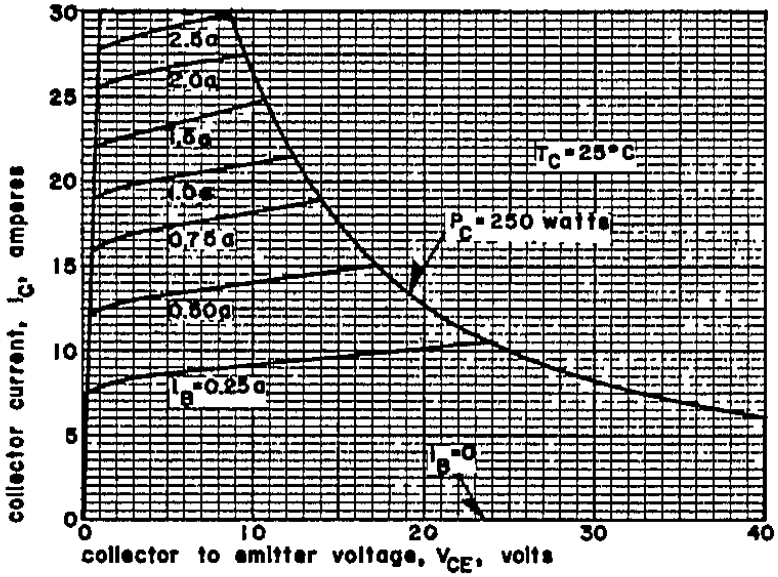
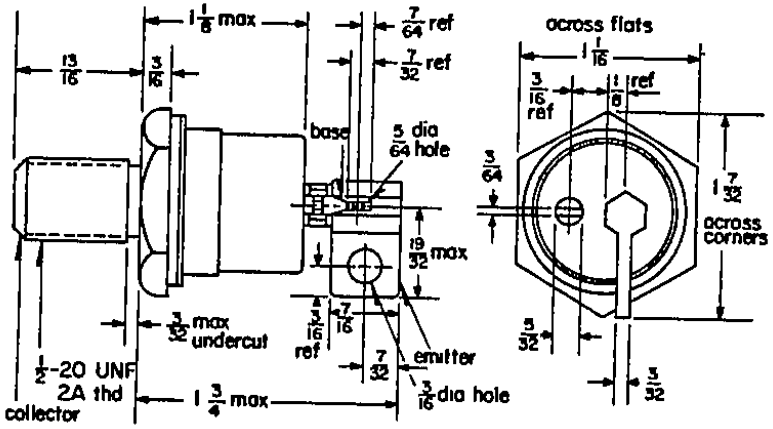
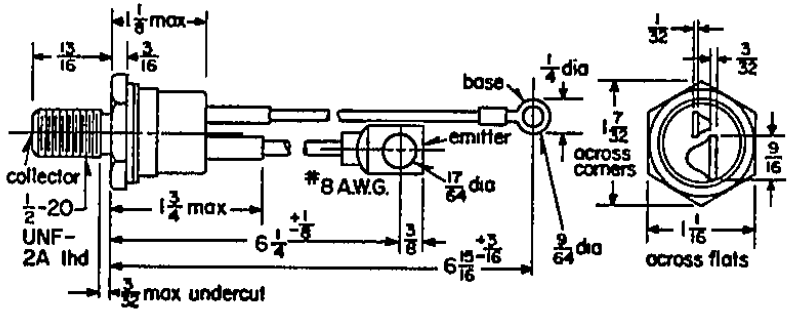
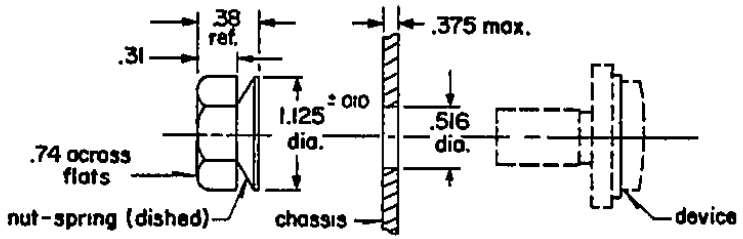


figure 14. Output characteristics, 2N1830—2N2130 series.

dimensions in inches







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