2N3903, 2N3904, 2N3905, 2N3906

Silicon Transistors

TO-92

The GE/RCA 2N3903, 2N3904 NPN types and 2N3905, 2N3906 PNP types are planar epitaxial silicon transistors designed for general purpose switching and amplifier applications. PNP values are negative; observe proper polarity. These types are supplied in JEDEC TO-92 package.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	2N3903 2N3904	2N3905 2N3906	
COLLECTOR TO EMITTER VOLTAGE (V_{CEO})	40	−40	V
COLLECTOR TO BASE VOLTAGE (V_{CBO})	60	−60	V
EMITTER TO BASE VOLTAGE (V_{EBO})	6	−5	V
CONTINUOUS COLLECTOR CURRENT (I_C)	200		mA
TOTAL POWER DISSIPATION $T_A \leq 25°C$ (P_T)	350		mW
DERATE FACTOR, $T_A > 25°C$	2.8		mW/°C
OPERATING TEMPERATURE (T_J)	−55 to +135		°C
STORAGE TEMPERATURE (T_{STG})	−55 to +125		°C
LEAD TEMPERATURE, 1/16" ± 1/32" from case for 10s max (T_L)	+230		°C

File Number **2056**

2N3903, 2N3904, 2N3905, 2N3906

T-37-15

T-35-11

ELECTRICAL CHARACTERISTICS, At Ambient Temperature (T_A) = 25°C Unless Otherwise Specified

CHARACTERISTICS	SYMBOL	LIMITS								UNITS
		2N3903 2N3904				2N3905 2N3906				
		MIN.		MAX.		MIN.		MAX		
Collector-Emitter Breakdown Voltage (I_C = 1mA, I_B = 0)	$V_{(BR)ECO}$	40		–		–40		–		V
Collector-Base Breakdown Voltage (I_C = 10μA, I_E = 0)	$V_{(BR)CBO}$	60		–		–40		–		V
Emitter-Base Breakdown Voltage (I_E = 10μA, I_C = 0)	$V_{(BR)EBO}$	6		–		–5		–		V
Collector Cutoff Curernt (V_{CE} = 30V, $V_{BE(OFF)}$ = 3V)	I_{CEV}	–		50		–		–50		nA
Base Cutoff Current (V_{CE} = 30V, $V_{BE(OFF)}$ ½ 3V)	I_{BEV}	–		50		–		–50		nA
Collector-Emitter Saturation Voltage (I_C = 10mA, I_B = 1mA)*	$V_{CE(SAT)}$	–		0.2		–		–0.25		V
(I_C = 50mA, I_B = 5mA)*		–		0.3		–		–0.4		V
Base Emitter Saturation Voltage (I_C = 10mA, I_B = 1mA)*	$V_{BE(SAT)}$	0.65		0.85		0.65		–0.85		V
(I_C = 50mA, I_B = 5mA)*		–		0.95		–		–0.95		V
–	–	2N3903		2N3904		2N3905		2N3906		–
–	–	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	–
DC Forward Current Transfer Ratio (V_{CE} = 1V, I_C = 100μA)	h_{FE}	20	–	40	–	30	–	60	–	–
(V_{CE} = 1V, I_C = 1 mA)	h_{FE}	35	–	70	–	40	–	80	–	–
(V_{CE} = 1V, I_C = 10 mA)*	h_{FE}	50	150	100	300	50	150	100	300	–
(V_{CE} = 1V, I_C = 50 mA)*	h_{FE}	30	–	60	–	30	–	60	–	–
(V_{CE} = 1V, I_C = 100 mA)*	h_{FE}	15	–	30	–	15	–	30	–	–
Collector-Base Capacitance (V_{CB} = 5V, I_E = 0, f = 1MHz)	C_{cb}	–	4	–	4	–	4.5	–	4.5	pF
Emitter-Base Capacitance (V_{EB} = 5V, I_E = 0, f = 1MHz)	C_{eb}	–	8	–	8	–	8	–	10	pF
Gain Bandwidth Product (V_{CE} = 20V, I_E = 10mA, f = 100MHz)	f_T	250	–	300	–	200	–	250	–	MHz

*Pulse conditions: ≤ 300 μs pulse width, ≤ 2% duty cycle.

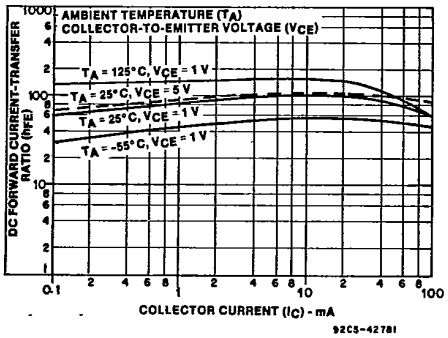

Fig. 1—Typical dc forward current transfer ratio characteristics for 2N3903.

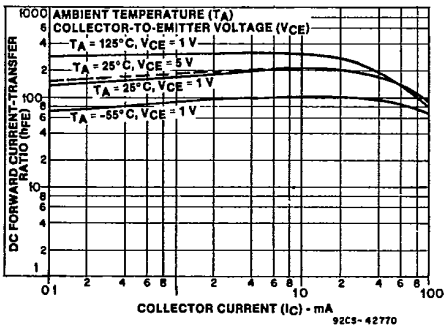

Fig. 2—Typical dc forward current transfer ratio characteristics for 2N3904.

Signal Transistors

2N3903, 2N3904, 2N3905, 2N3906

T-37-15

T-35-11

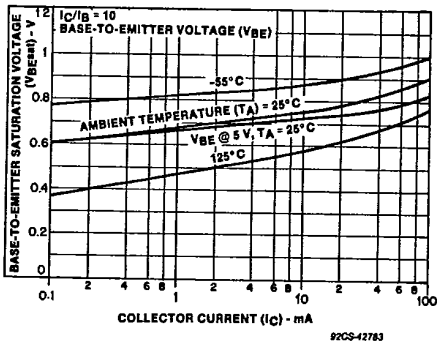

Fig. 3—Typical base-to-emitter saturation voltage characteristics for 2N3903 and 2N3904.

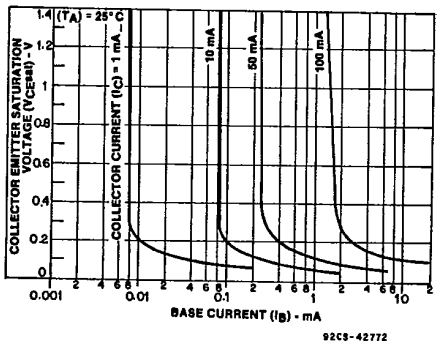

Fig. 4—Typical collector-to-emitter saturation voltage characteristics for 2N3903 and 2N3904.

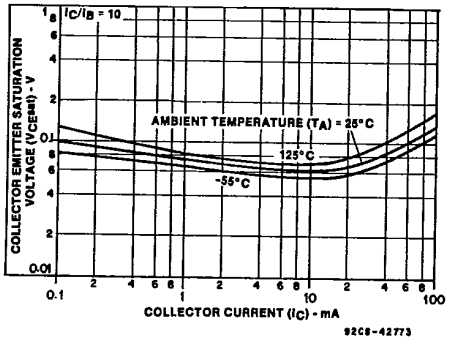

Fig. 5—Typical collector-to-emitter saturation voltage characteristics for 2N3903.

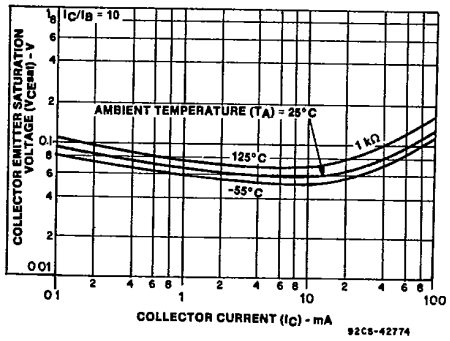

Fig. 6—Typical collector-to-emitter saturation voltage characteristics for 2N3904.

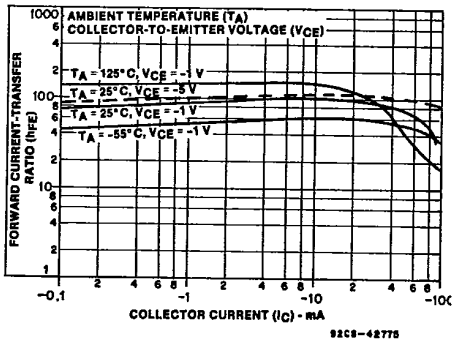

Fig. 7—Typical dc forward-current transfer ratio characteristics for 2N3905.

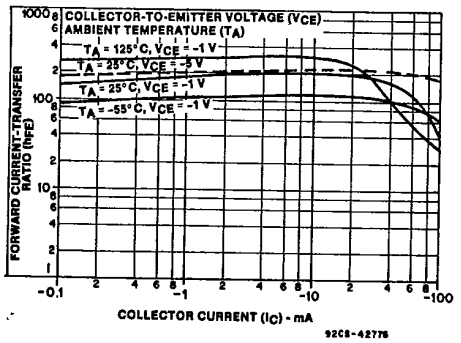

Fig. 8—Typical dc forward-current transfer ratio characteristics for 2N3906.