

T-31-19
Signal Transistors

2N3858-60, 2N3858A, 2N3859A

Silicon Transistors



TO-98

The GE/RCA 2N3858, 2N3859 and 2N3860 are planar epitaxial passivated NPN silicon transistors designed primarily for

AM radio I.F. and converter applications. These types are supplied in JEDEC TO-98 package.

Devices in TO-98 package are supplied with and without seating flange (see Dimensional Outline).

MAXIMUM RATINGS, Absolute-Maximum Values:

	2N3858		
	2N3859	2N3858A	
	2N3860	2N3859A	
COLLECTOR TO EMITTER VOLTAGE (V_{CE0})	30	60	V
EMITTER TO BASE VOLTAGE (V_{EB0})	4	6	V
COLLECTOR TO BASE VOLTAGE (V_{CB0})	30	60	V
CONTINUOUS COLLECTOR CURRENT (I_C) (Note 1)	100	100	mA
TOTAL POWER DISSIPATION ($T_A \leq 25^\circ\text{C}$) (P_T) (Note 2)	360	360	mW
OPERATING TEMPERATURE (T_J)		-55 to +125	$^\circ\text{C}$
STORAGE TEMPERATURE (T_{stg})		-55 to +150	$^\circ\text{C}$
LEAD TEMPERATURE, 1/16" $\pm$ 1/32" (1.58mm $\pm$ 0.8mm) from case for 10s max (T_L)		+260	$^\circ\text{C}$

NOTES:

1. Determined from power limitations due to saturation voltage at this current.
2. Derate 3.6 mW/ $^\circ\text{C}$ increase in ambient temperature above 25°C .

File Number 2060

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

CHARACTERISTICS	SYMBOL	LIMITS			UNITS
		MIN.	TYP.	MAX.	
Collector Cutoff Current ($V_{CB} = 40V$)	I_{CBO}	—	—	50	nA
($V_{CB} = 40V, T_A = 100^\circ C$)		—	—	10	μA
Emitter Cutoff Current ($V_{EBO} = 5V$)	I_{EBO}	—	—	100	nA
DC Forward Current Transfer Ratio 2N3858A ($V_{CE} = 1V, I_C = 10mA$)	h_{FE}	60	—	—	—
2N3859A ($V_{CE} = 1V, I_C = 10mA$)		100	—	—	—
2N3858, 58A ($V_{CE} = 4.5V, I_C = 2mA$)		60	—	120	—
2N3859, 59A ($V_{CE} = 4.5V, I_C = 2mA$)		100	—	200	—
2N3860 ($V_{CE} = 4.5V, I_C = 2mA$)		150	—	300	—
Collector—Base Breakdown Voltage ($I_C = 0.1mA$)	BV_{CBO}	40	—	—	V
Emitter—Base Breakdown Voltage ($I_E = 0.1mA$)	BV_{EBO}	5	—	—	
Collector—Emitter Breakdown Voltage ($I_C = 1mA$)	BV_{CEO}	40	—	—	
Collector Saturation Voltage ($I_C = 10mA, I_B = 1mA$)	$V_{CE(SAT)}$	—	—	0.125	
Gain Bandwidth Product ($V_{CE} = 10V, I_C = 2mA$) 2N3858, A	f_T	90	125	250	MHz
2N3859, A		90	140	250	
2N3860		90	170	250	
Collector—Base Time constant ($V_{CE} = 10V, I_C = 2mA$)	$\tau_b C_c$	—	65	150	ps
Output Capacitance, Common Base ($V_{CB} = 10V, I_E = 0, f = 1Mc$)	C_{cbo}	2	2.7	4	pF
Input Capacitance, Common Base ($V_{EB} = 0.5V, I_E = 0, f = 1Mc$)	C_{ibo}	—	10	—	
Case Capacitance	—	—	0.66	—	

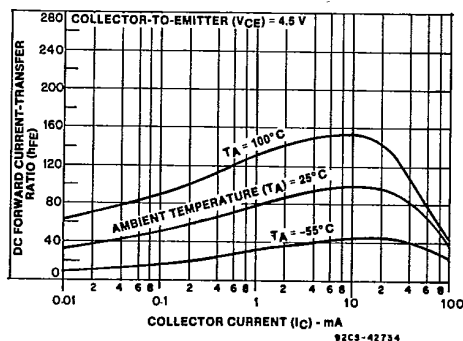


Fig. 1—Typical dc forward current transfer ratio characteristics for 2N3858 and 2N3858A.

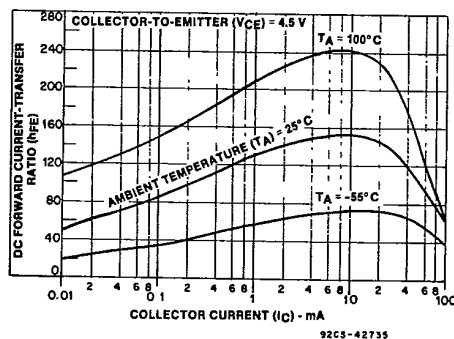


Fig. 2—Typical dc forward-current transfer ratio characteristics for 2N3859 and 2N3859A.

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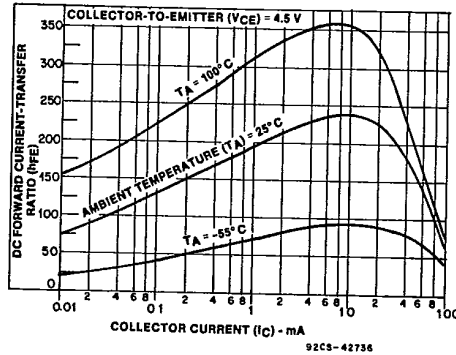


Fig. 3—Typical dc forward-current transfer ratio characteristics for 2N3860.

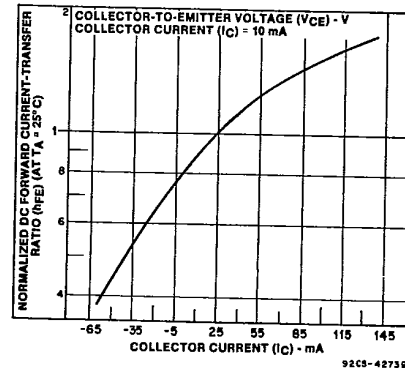


Fig. 4—Normalized dc forward current transfer ratio characteristic for all types.

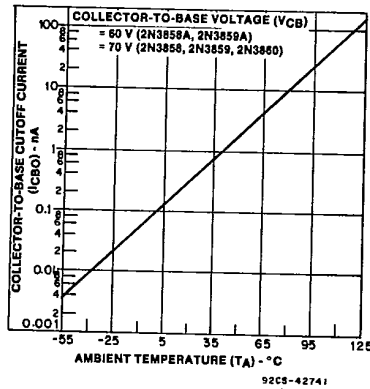


Fig. 5—Typical collector-to-base cutoff current characteristic for all types.

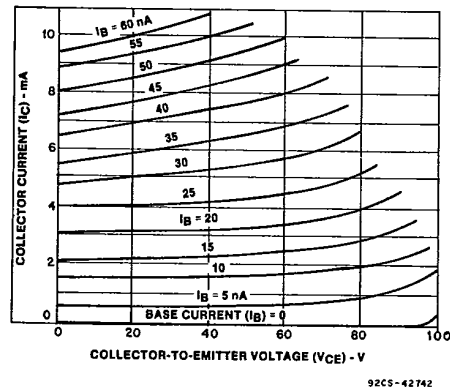


Fig. 6—Typical collector characteristics for 2N3858.

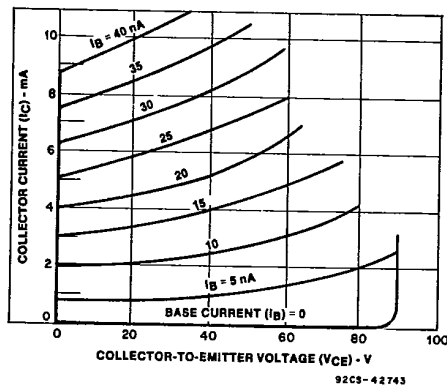


Fig. 7—Typical collector characteristics for 2N3859.

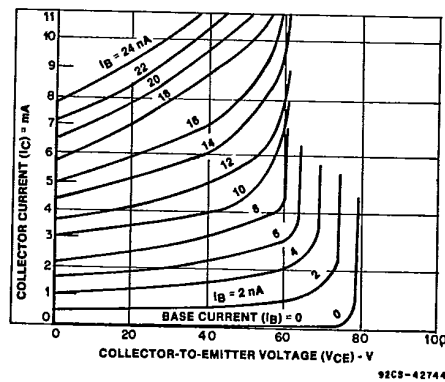


Fig. 8—Typical collector characteristics for 2N3860.

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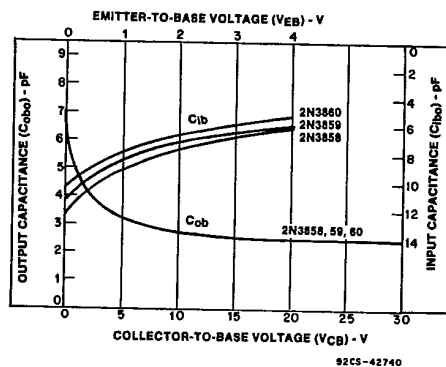


Fig. 9—Typical output and input characteristics for 2N3858, 2N3859 and 2N3860.

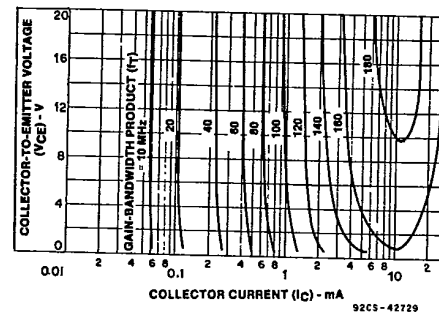


Fig. 10—Typical gain-bandwidth characteristics for 2N3858 and 2N3858A.

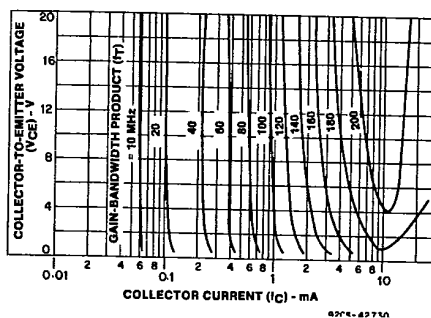


Fig. 11—Typical gain-bandwidth product characteristics for 2N3859 and 2N3859A.

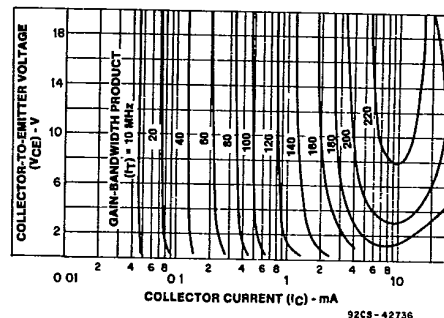


Fig. 12—Typical gain-bandwidth product characteristics for 2N3860.

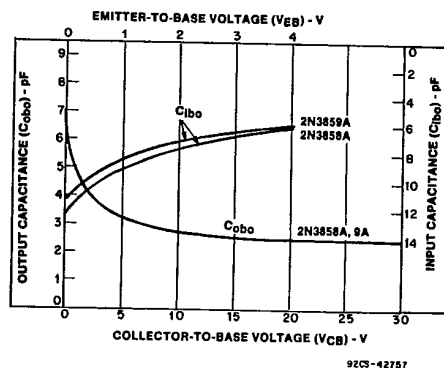


Fig. 13—Typical output and input capacitance characteristics for 2N3858A and 2N3859A.

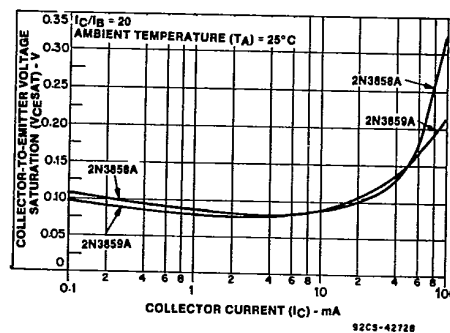


Fig. 14—Typical collector-to-emitter saturation voltage characteristics 2N3858A and 2N3859A.

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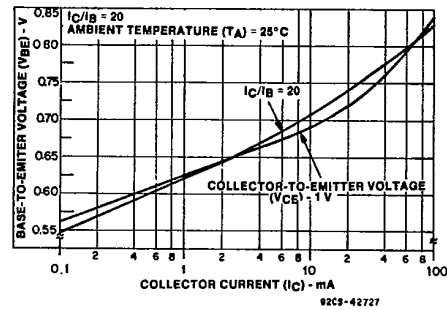


Fig. 15—Typical base-to-emitter voltage characteristics for 2N3858A and 2N3859A.

TERMINAL CONNECTIONS

Lead 1 - Emitter
Lead 2 - Collector
Lead 3 - Base