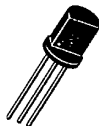


2N5305, 6, 6A, GES5305, 6, 6A

Silicon Darlington Transistors



TO-92



TO-98

The GE/RCA 2N5305, 06, 06A and GES5305, 6, and 6A are planar, epitaxial, passivated NPN silicon Darlington transistors designed for preamplifier stages requiring input impedances of several megohms or extremely low-level, high-gain low-noise amplifier applications. These types can

be used in medium-speed switching circuits in consumer and industrial control applications.

The 2N5305, 6, and 6A are supplied in JEDEC TO-98 package, the GES5305, 6, and 6A are supplied in JEDEC TO-92 package.

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

MAXIMUM RATINGS, Absolute-Maximum Values:

COLLECTOR TO EMITTER VOLTAGE (V_{CE0})	25 V
EMITTER TO BASE VOLTAGE (V_{EB0})	12 V
COLLECTOR TO BASE VOLTAGE (V_{CB0})	25 V
CONTINUOUS COLLECTOR CURRENT (I_C)	300 mA
COLLECTOR CURRENT (PULSED)* (I_C)	500 mA
CONTINUOUS BASE CURRENT (I_B)	50 mA
TOTAL POWER DISSIPATION ($T_A \leq 25^\circ\text{C}$) (P_T)	400 mW
DERATE FACTOR ($T_A > 25^\circ\text{C}$)	4 mW/ $^\circ\text{C}$
OPERATING TEMPERATURE (T_J)	-65° to +125°C
STORAGE TEMPERATURE (T_{STG})	-65° to +150°C
LEAD TEMPERATURE, 1/16" \pm 1/32" (1.58mm \pm 0.8mm) from case for 10s max (T_L)	+260°C

* Pulsed Conditions: Pulse width $\leq 300 \mu\text{s}$, Duty factor $\leq 2\%$.

Signal Transistors
2N5305, 6, 6A, GES5305, 6, 6A

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

CHARACTERISTICS	SYMBOL	LIMITS		UNITS
		MIN.	MAX.	
Collector-To-Emitter Breakdown Voltage ($I_C = 10\text{ mA}, I_B = 0$)	BV_{CEO}	25	—	V
Collector-To-Base Breakdown Voltage ($I_C = 0.1\mu\text{A}, I_E = 0$)	BV_{CBO}	25	—	
Emitter-To-Base Breakdown Voltage ($I_E = 0.1\mu\text{A}, I_C = 0$)	BV_{EBO}	12	—	
DC Forward Current Transfer Ratio ($I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$) 2N5305, GES5305 ($I_C = 100\text{ mA}, V_{CE} = 5\text{ V}$) 2N5305, GES5305 ($I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$) 2N5306, GES5306A ($I_C = 100\text{ mA}, V_{CE} = 5\text{ V}$) 2N5306, GES5306A	h_{FE}	2,000 6,000 7,000 20,000	20,000 — 70,000 —	—
Collector-To-Emitter Saturation Voltage ($I_C = 200\text{ mA}, I_B = 0.2\text{ mA}$)	$V_{CE(sat)}$	—	1.4	V
Base-To-Emitter Saturation Voltage ($I_C = 200\text{ mA}, I_B = 0.2\text{ mA}$)	$V_{BE(sat)}$	—	1.6	
Base-To-Emitter Voltage ($I_C = 200\text{ mA}, V_{CE} = 5\text{ V}$)	V_{BE}	—	1.5	
Collector-To-Base Cutoff Current ($V_{CB} = 25\text{ V}, I_E = 0$) ($V_{CB} = 25\text{ V}, I_E = 0, T_A = 100^\circ\text{C}$)	I_{CBO}	— —	100 20	nA μA
Small-Signal Current Transfer Ratio ($V_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 1\text{ KHZ}$) 2N5305, GES5305 ($V_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 1\text{ KHZ}$) 2N5306, 6A, GES5306, 6A ($V_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 10\text{ MHZ}$)	h_{fe} $ h_{fe} $	2,000 7,000 15.6	— — —	— dB
Input Capacitance ($V_{EB} = 0.5\text{ V}, f = 1\text{ MHZ}$)	C_{eb}	10.5 Typical		pF
Output Capacitance ($V_{CB} = 10\text{ V}, f = 1\text{ MHZ}$)	C_{cb}	7.6 Typical	10	
Input Impedance ($V_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 1\text{ KHz}$)		650 Typical		K Ω
Gain-Bandwidth Product ($V_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 10\text{ MHz}$)	f_T	60	—	MHZ
Noise Figure ($V_{CE} = 5\text{ V}, I_C = 0.6\text{ mA}, R_g = 160\text{ k}\Omega$, $f = 10\text{ Hz, to } 10\text{ kHz, Bandwidth} = 15.7\text{ kHz}$) 2N5306A, GES5306A	e_n	195 Typical	230	nV/ $\sqrt{\text{Hz}}$

TERMINAL CONNECTIONS

TO-92 Package
 Lead 1 - Emitter
 Lead 2 - Base
 Lead 3 - Collector

TERMINAL CONNECTIONS

TO-98 Package
 Lead 1 - Emitter
 Lead 2 - Collector
 Lead 3 - Base

Signal Transistors

2N5305, 6, 6A, GES5305, 6, 6A

T.29.27

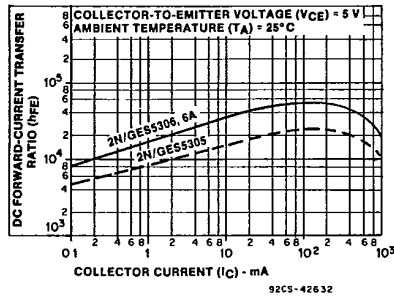


Fig. 1 - Typical dc forward-current transfer ratio characteristics.

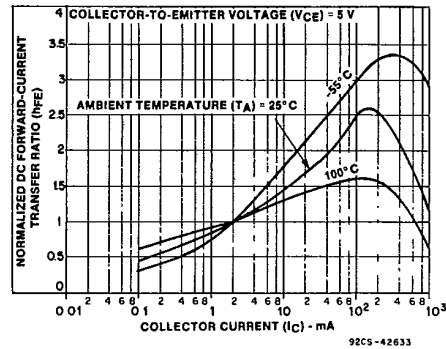


Fig. 2 - Normalized dc forward-current transfer ratio characteristics.

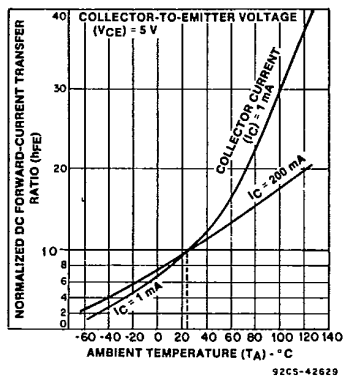


Fig. 3 - Normalized dc forward-current transfer ratio characteristics.

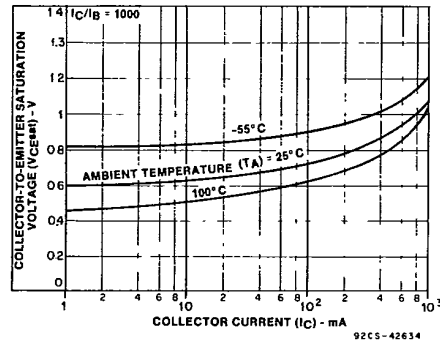


Fig. 4 - Typical collector-to-emitter saturation voltage characteristics.

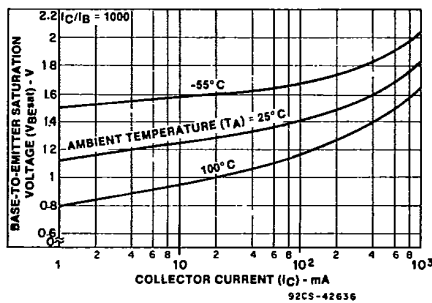


Fig. 5 - Typical base-to-emitter saturation voltage characteristics.

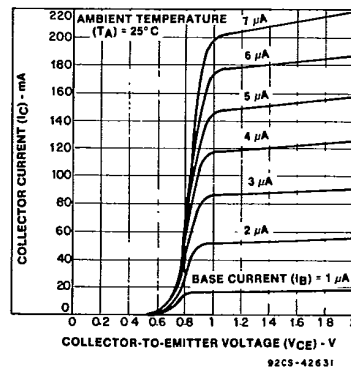


Fig. 6 - Typical output characteristics.

Signal Transistors
2N5305, 6, 6A, GES5305, 6, 6A

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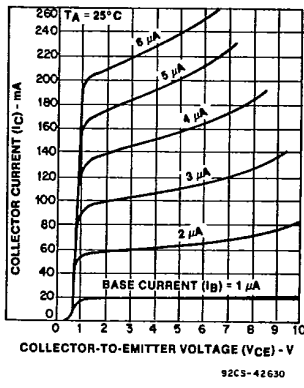


Fig. 7 - Typical output characteristics.

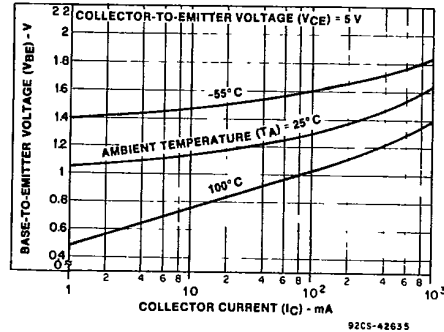


Fig. 8 - Typical transfer characteristics.

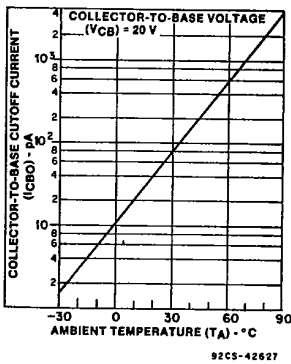


Fig. 9 - Typical collector-to-base cutoff current characteristic.

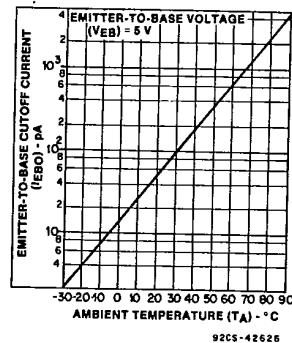
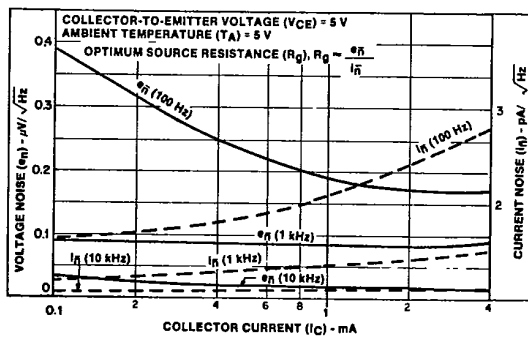


Fig. 10 - Typical emitter-to-base cutoff current characteristic.



NOTE:
 DUE TO THE NOISE CHARACTERISTICS OF THIS DEVICE
 VERSUS FREQUENCY, CALCULATION OF NOISE FIGURE
 (NF) FROM e_n, i_n VALUES IS NOT ACCURATE (AS IS THE
 CASE WITH FIELD-EFFECT TRANSISTORS (FETs)).

Fig. 11 - Equivalent input noise-voltage and noise-current characteristics