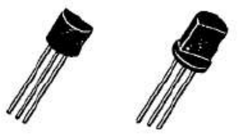
2N5305, 6, 6A, GES5305, 6, 6A

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_{CEO})	25 V
EMITTER TO BASE VOLTAGE (V_{EBO})	12 V
COLLECTOR TO BASE VOLTAGE (V_{CBO})	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 ($T_A \leq 25°C$) (P_T)	400 mW
DERATE FACTOR ($T_A > 25°C$)	4 mW/°C
OPERATING TEMPERATURE (T_J)	−65° to +125°C
STORAGE TEMPERATURE (T_{STG})	−65° to +150°C
LEAD TEMPERATURE, 1/16" ± 1/32" (1.58mm ± 0.8mm) from case for 10s max (T_L)	+260°C

*Pulsed Conditions: Pulse width ≤ 300 µs, Duty factor ≤ 2%.

File Number **2065**

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

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

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

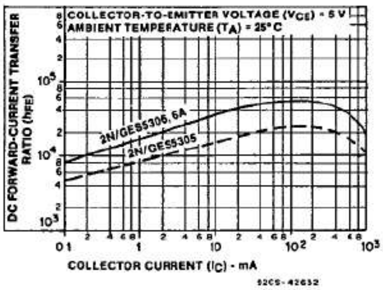


Fig. 1 — Typical dc forward-current transfer ratio characteristics.

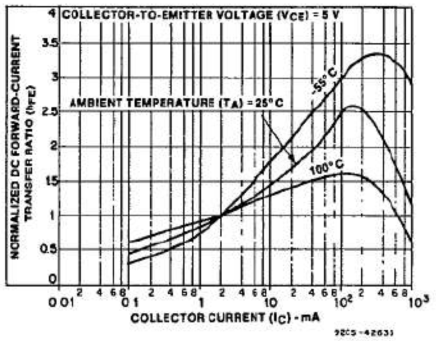


Fig. 2 — Normalized dc forward-current transfer ratio characteristics.

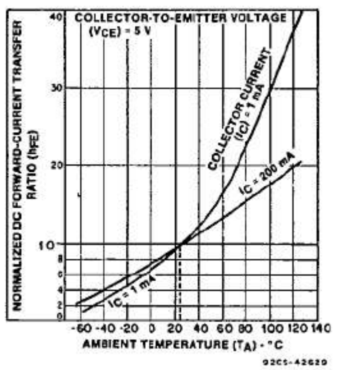


Fig. 3 — Normalized dc forward-current transfer ratio characteristics.

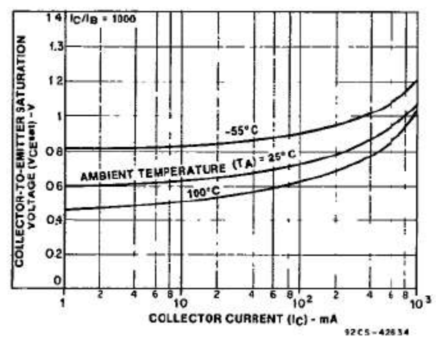


Fig. 4 — Typical collector-to-emitter saturation voltage characteristics.

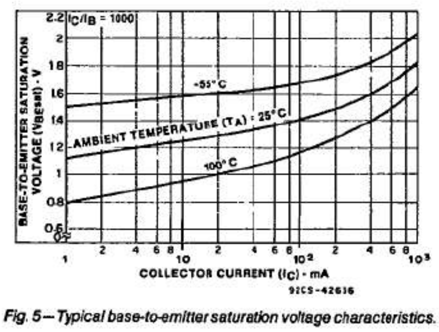


Fig. 5 — Typical base-to-emitter saturation voltage characteristics.

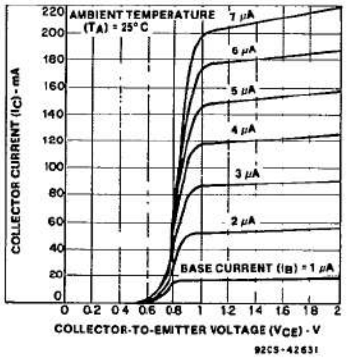


Fig. 6 — Typical output characteristics.

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

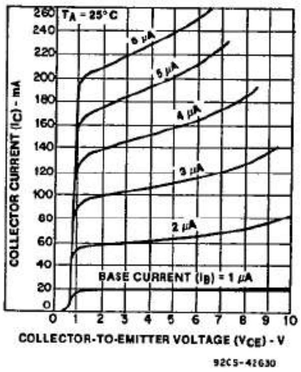


Fig. 7—Typical output characteristics.

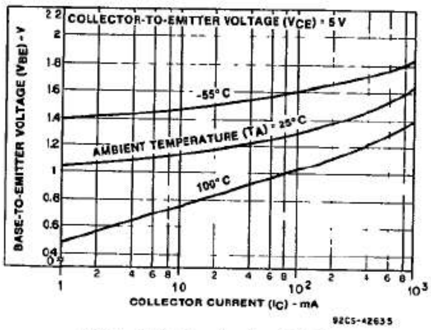


Fig. 8—Typical transfer characteristics.

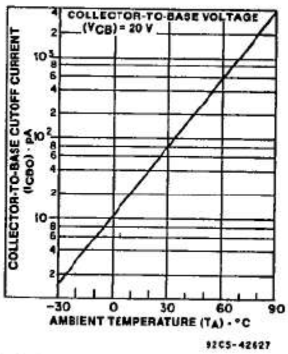


Fig. 9—Typical collector-to-base cutoff current characteristic.

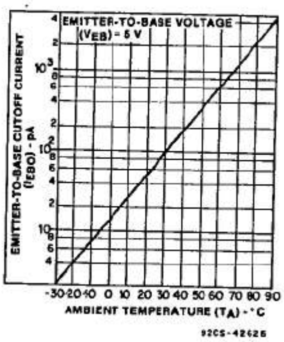
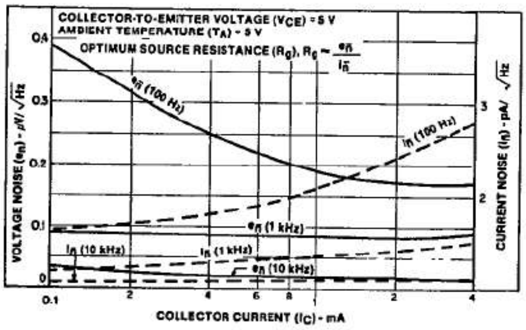


Fig. 10—Typical emitter-to-base cutoff current characteristic.



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)].

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