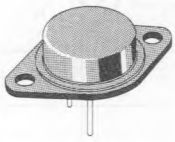
SGS-THOMSON MICROELECTRONICS

2N5301/02/03
2N4398/99/5745

MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

DESCRIPTION

The 2N5301/2/3, are silicon epitaxial-base NPN transistors in Jedec TO-3 metal case. They are intended for power amplifier and switching circuits. The complementary PNP types are the 2N4398/99 and 2N5745 respectively.



TO-3

INTERNAL SCHEMATIC DIAGRAMS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	PNP / NPN	2N5301 / 2N4398	2N5302 / 2N4399	2N5303 / 2N5745	Unit
V_{CEO}	Collector-emitter Voltage (I_B = 0)		40	60	80	V
V_{CBO}	Collector-base Voltage (I_E = 0)		40	60	80	V
V_{EBO}	Emitter-base Voltage (I_C = 0)		5	5	5	V
I_C	Collector Current		30	30	20	A
I_{CM}	Collector Peak Current		50			A
I_B	Base Current		7.5			A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25$ °C		200			W
T_{stg}	Storage Temperature		– 65 to 200			°C
T_j	Junction Temperature		200			°C

For PNP types voltage and current values are negative.

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	0.875	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified))

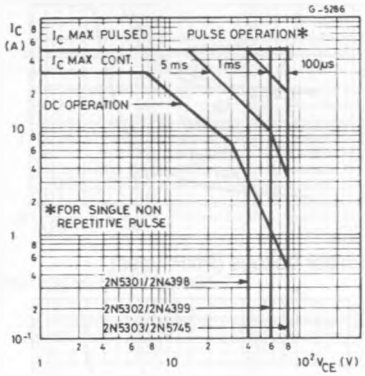
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V			5	mA
I_{CBO}	Collector Current (I_E = 0)	V_{CB} = rated V_{CBO}			1	mA
I_{CEV}	Collector Cutoff Current (V_{BE} = − 1.5 V)	V_{CE} = rated V_{CEO} for **2N4398/99, 2N5745** for **2N5301/2/3** V_{CE} = 30 V T_{case} = 150 °C for **2N4398/99** V_{CE} = 80 V T_{case} = 150 °C for **2N5745** V_{CE} = rated V_{CEO} T_{case} = 150 °C for **2N5301/2/3**			 5 1 10 10 10	 mA mA mA mA mA
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = rated V_{CEO}			5	mA
$V_{CEO(sus)}$*	Collector-emitter Sustaining Voltage (I_B = 0)	I_C = 200 mA for **2N4398, 2N5301** for **2N4399, 2N5302** for **2N5745, 2N5303**	 40 60 80			 V V V
h_{FE}*	DC Current Gain	I_C = 1 A V_{CE} = 2 V for **2N5745, 2N5303** I_C = 10 A V_{CE} = 2 V I_C = 20 A V_{CE} = 2 V for **2N4398/99, 2N5301/2** I_C = 15 A V_{CE} = 2 V I_C = 30 A V_{CE} = 4 V	40 15 5 15 5		 60 60 	
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 10 A I_B = 1 A for **2N4398/99, 2N5301/2** for **2N5745, 2N5303** I_C = 15 A I_B = 1.5 A for **2N4398/99, 2N5301/2** for **2N5745, 2N5303** I_C = 20 A I_B = 2 A for **2N4398/99, 2N5301/2** I_C = 20 A I_B = 4 A for **2N5745, 2N5303** I_C = 30 A I_B = 6 A for **2N4398/99, 2N5301/2**			 0.75 1 1 1.5 2 2 4	 V V V V V V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 10 A I_B = 1 A I_C = 15 A I_B = 1.5 A for **2N4398/99, 2N5301/2** for **2N5745, 2N5303** I_C = 20 A I_B = 2 A for **2N4398/99, 2N5301/2** I_C = 20 A I_C = 4 A for **2N5745, 2N5303**			1.7 1.8 2 2.5 2.5	V V V V V

ELECTRICAL CHARACTERISTICS (continued)

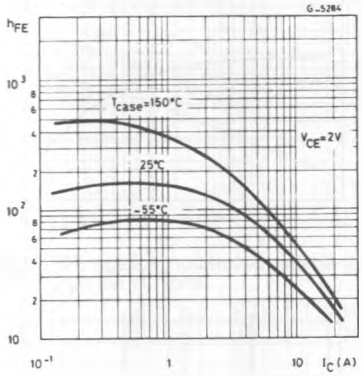
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{BE}*	Base-emitter Volage	I_C = 10 A V_{CE} = 2 V for **2N5745, 2N5303**			1.5	V
		I_C = 15 A V_{CE} = 2 V for **2N4398/99, 2N5301/2**			1.7	V
		I_C = 20 A V_{CE} = 4 V for **2N5745, 2N5303**			2.5	V
		I_C = 30 A V_{CE} = 4 V for **2N4398/99, 2N5301/3**			3	V
f_T	Transition Frequency	I_C = 1 A V_{CE} = 10 V f = 1 MHz				
		for **2N4398/99, 2N5301/2**	4			MHz
		for **2N5745, 2N5303**	2			MHz
h_{fe}	Small Signal Current Gain	I_C = 1 A V_{CE} = 10 A f = 1KHz	40			
t_r	Rise Time	V_{CC} = 30 V I_C = 10 A I_{B1} = − I_{B2} = 1 A			1	µs
t_s	Storage Time				2	µs
t_f	Fall Time				1	µs

* Pulsed : pulse duration = 300µs, duty cycle ≤ 2%.
For PNP types voltage and current values are negative.

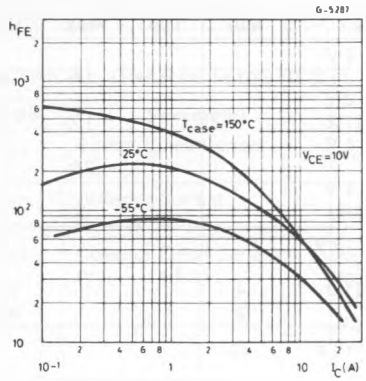
Safe Operating Areas.



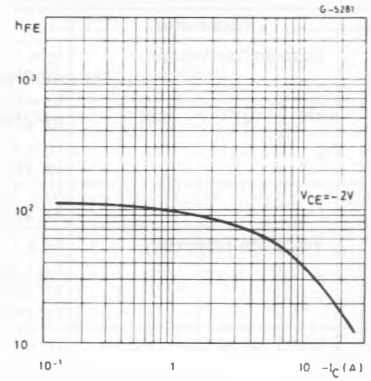
DC Current Gain (NPN types).



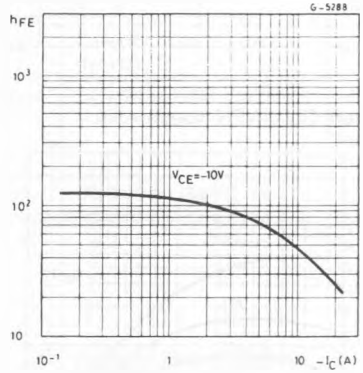
DC Current Gain (NPN types).



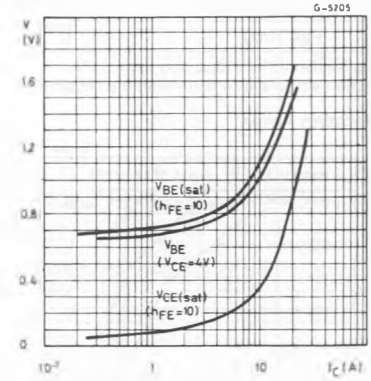
DC Current Gain (PNP types).



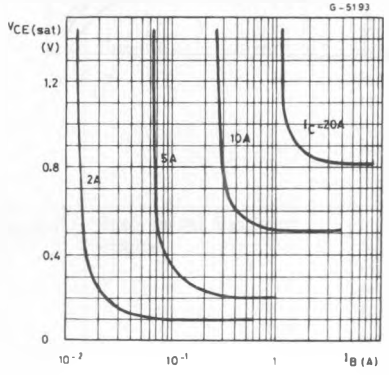
DC Current Gain (PNP types).



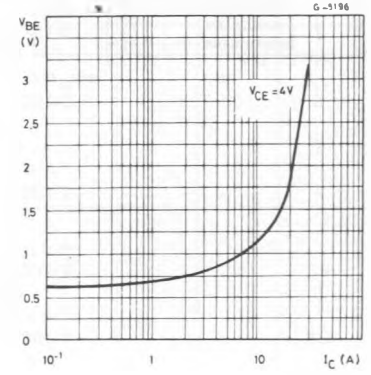
Saturation Voltage (NPN types).



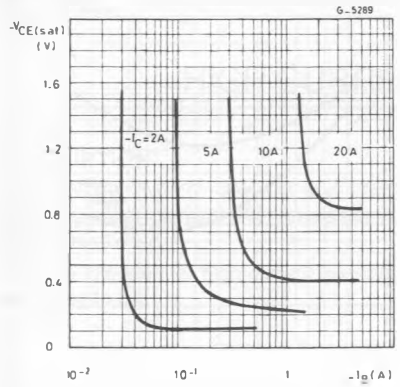
Collector-emitter Saturation Voltage (NPN types).



Base-emitter Voltage (PNP types).



Collector-emitter Saturation Voltage (PNP types).



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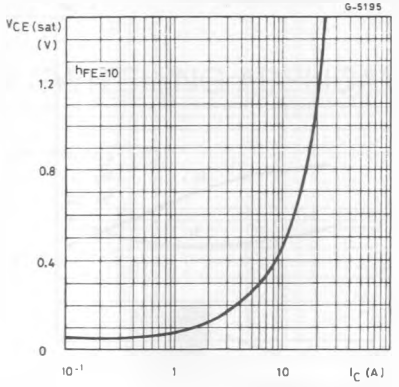
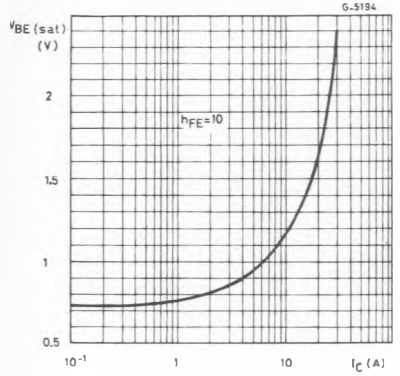
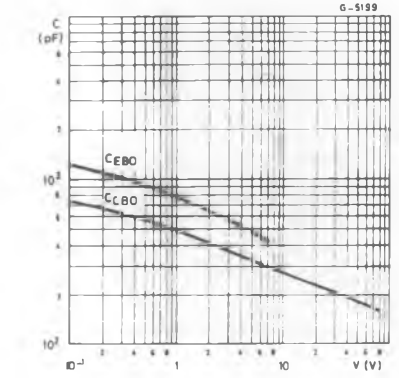


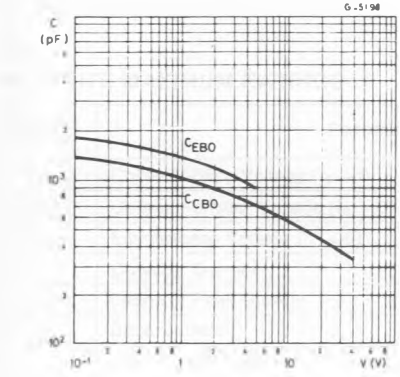
Base-emitter Saturation Voltage (PNP types).



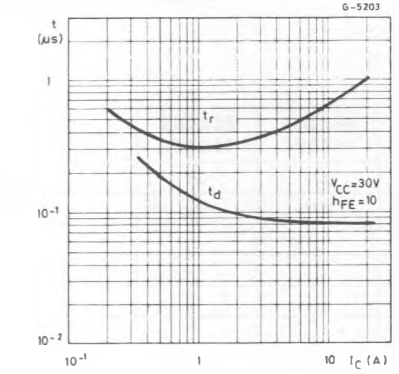
Capacitances (NPN types).



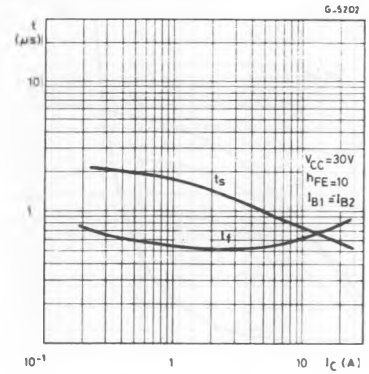
Capacitances (PNP types).



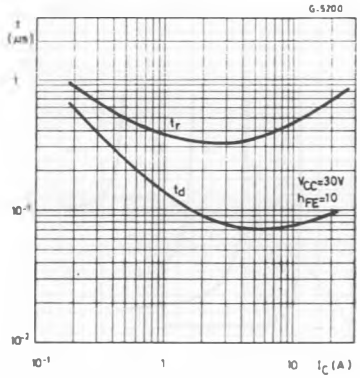
Turn-on Time (NPN types).



Turn-off Time (NPN types).



Turn-on Time (PNP types).



Turn-off Time (PNP types).