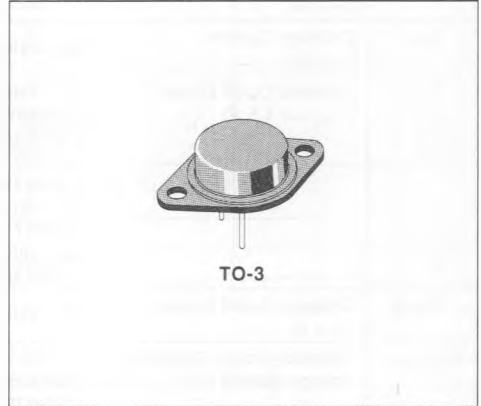


MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

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.



INTERNAL SCHEMATIC DIAGRAMS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	PNP	2N5301	2N5302	2N5303	Unit
		NPN	2N4398	2N4399	2N5745	
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 $T_{case} \leq 25^\circ C$		200			W
T_{stg}	Storage Temperature		- 65 to 200			$^\circ C$
T_J	Junction Temperature		200			$^\circ C$

For PNP types voltage and current values are negative.

THERMAL DATA

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

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

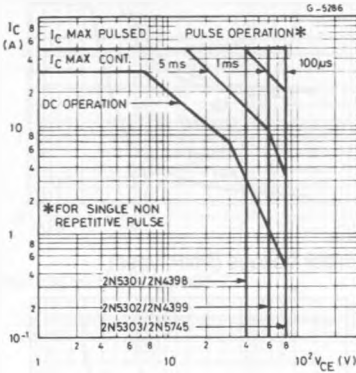
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5\text{ V}$			5	mA
I_{CBO}	Collector Current ($I_E = 0$)	$V_{CB} = \text{rated } V_{CBO}$			1	mA
I_{CEV}	Collector Cutoff Current ($V_{BE} = -1.5\text{ V}$)	$V_{CE} = \text{rated } V_{CEO}$ for 2N4398/99,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

ELECTRICAL CHARACTERISTICS (continued)

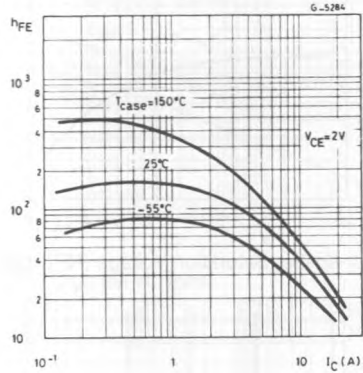
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{BE}^*	Base-emitter Voltage	$I_C = 10\text{ A}$ $V_{CE} = 2\text{ V}$ for 2N5745, 2N5303 $I_C = 15\text{ A}$ $V_{CE} = 2\text{ V}$ for 2N4398/99, 2N5301/2 $I_C = 20\text{ A}$ $V_{CE} = 4\text{ V}$ for 2N5745, 2N5303 $I_C = 30\text{ A}$ $V_{CE} =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

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

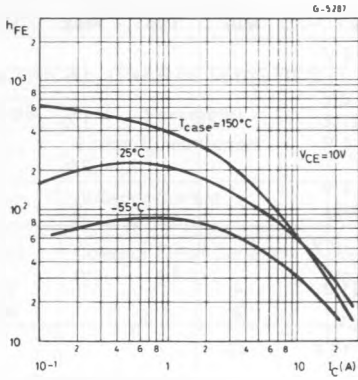
Safe Operating Areas.



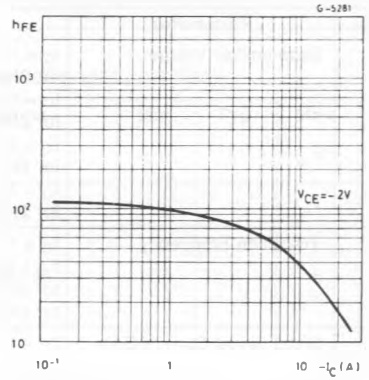
DC Current Gain (NPN types).



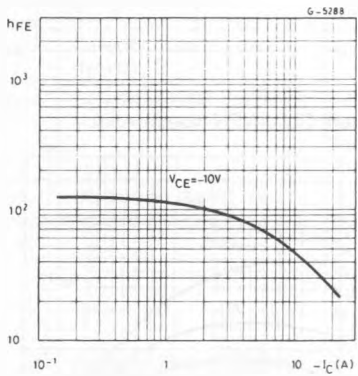
DC Current Gain (NPN types).



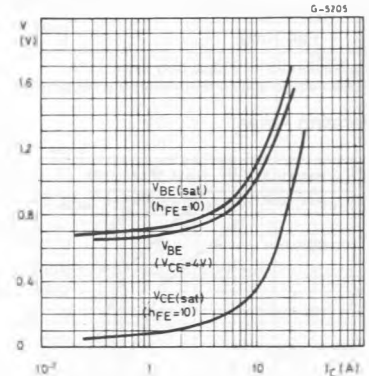
DC Current Gain (PNP types).



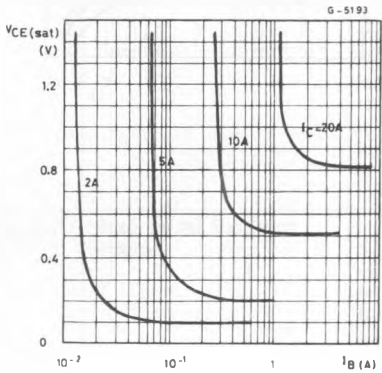
DC Current Gain (PNP types).



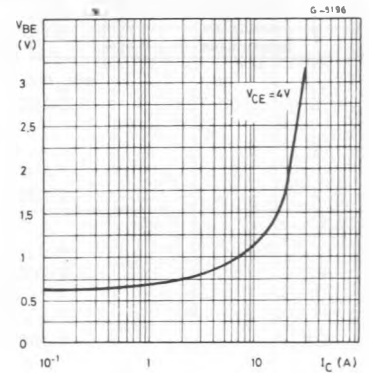
Saturation Voltage (NPN types).



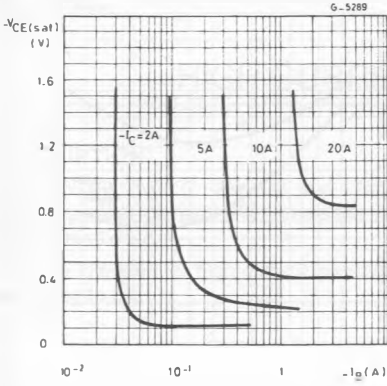
Collector-emitter Saturation Voltage (NPN types).



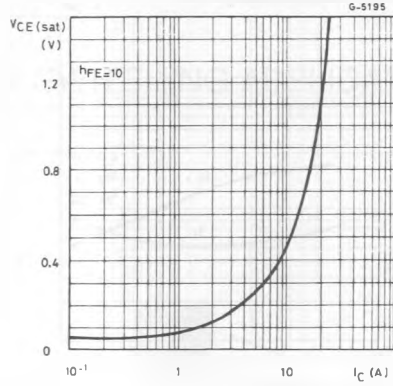
Base-emitter Voltage (PNP types).



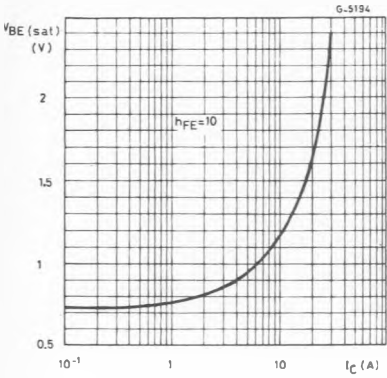
Collector-emitter Saturation Voltage (PNP types).



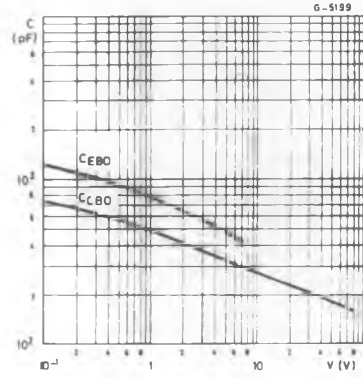
Collector-emitter Saturation Voltage (PNP types).



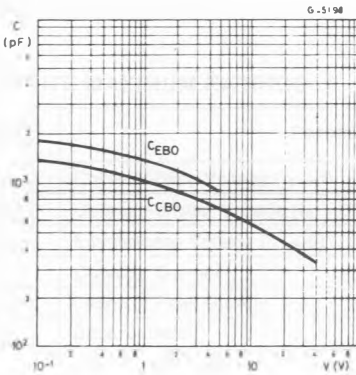
Base-emitter Saturation Voltage (PNP types).



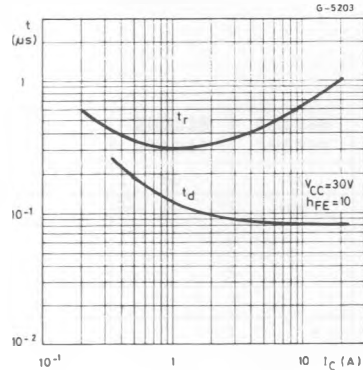
Capacitances (NPN types).



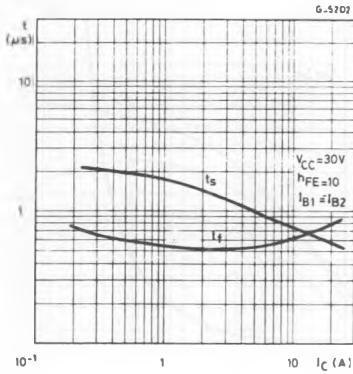
Capacitances (PNP types).



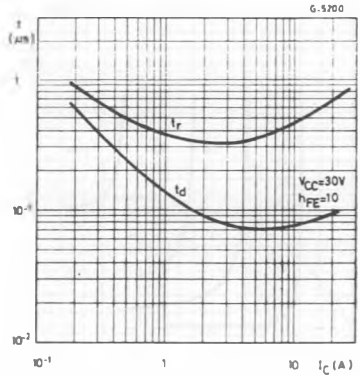
Turn-on Time (NPN types).



Turn-off Time (NPN types).



Turn-on Time (PNP types).



Turn-off Time (PNP types).

