



**MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS**

**DESCRIPTION**

The 2N5190, 2N5191, 2N5192 are silicon epitaxial-base NPN power transistors in Jedec TO-126 plastic package, intended for use in medium power linear and switching applications. The complementary PNP types are the 2N5193, 2N5194 and 2N5195 respectively.



**INTERNAL SCHEMATIC DIAGRAMS**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	NPN PNP*	2N5190 2N5193	2N5191 2N5194	2N5192 2N5195	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )		40	60	80	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )		40	60	80	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )			5		V
$I_C$	Collector Current			4		A
$I_{CM}$	Collector Peak Current ( $t \leq 10$ ms)			7		A
$I_B$	Base Current			1		A
$P_{TOT}$	Total Power Dissipation at $T_{case} \leq 25$ °C			40		W
$T_{stg}$	Storage Temperature			- 65 to 150		°C
$T_j$	Junction Temperature			150		°C

\* For PNP types voltage and current values are negative.

## THERMAL DATA

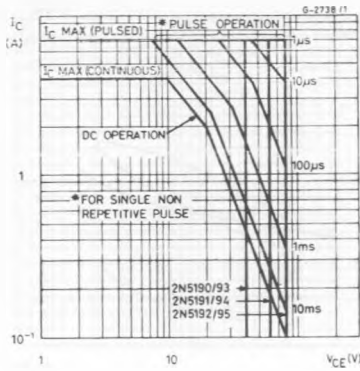
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	3.12	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	100	°C/W

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

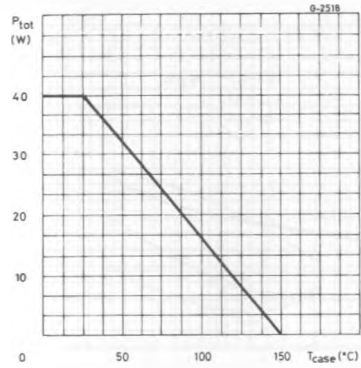
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>2N5190/93</b> $V_{CB} = 40\text{ V}$ for <b>2N5191/94</b> $V_{CB} = 60\text{ V}$ for <b>2N5192/95</b> $V_{CB} = 80\text{ V}$			100 100 100	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
$I_{CEX}$	Collector Cutoff Current ( $V_{EB} = 1.5\text{ V}$ )	for <b>2N5190/93</b> $V_{CE} = 40\text{ V}$ for <b>2N5191/94</b> $V_{CE} = 60\text{ V}$ for <b>2N5192/95</b> $V_{CE} = 80\text{ V}$ $T_{case} = 125\text{ °C}$ for <b>2N5190/93</b> $V_{CE} = 40\text{ V}$ for <b>2N5191/94</b> $V_{CE} = 60\text{ V}$ for <b>2N5192/95</b> $V_{CE} = 80\text{ V}$			100 100 100 2 2 2	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$ mA mA mA
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	for <b>2N5190/93</b> $V_{CE} = 40\text{ V}$ for <b>2N5191/94</b> $V_{CE} = 60\text{ V}$ for <b>2N5192/95</b> $V_{CE} = 80\text{ V}$			1 1 1	mA mA mA
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			1	mA
$V_{CEO(sus)}^*$	Collector-emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 100\text{ mA}$ for <b>2N5190/93</b> for <b>2N5191/94</b> for <b>2N5192/95</b>	40 60 80			V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 1.5\text{ A}$ $I_B = 0.15\text{ A}$ $I_C = 4\text{ A}$ $I_B = 1\text{ A}$ for <b>2N5190/91/92</b> for <b>2N5193/94/95</b>			0.6 1.4 1.2	V V V
$V_{BE}^*$	Base-emitter Voltage	$I_C = 1.5\text{ A}$ $V_{CE} = 2\text{ V}$			1.2	V
$h_{FE}^*$	DC Current Gain	$I_C = 1.5\text{ A}$ $V_{CE} = 2\text{ V}$ for <b>2N5190/93</b> for <b>2N5191/94</b> for <b>2N5192/95</b> $I_C = 4\text{ A}$ $V_{CE} = 2\text{ V}$ for <b>2N5190/93</b> for <b>2N5191/94</b> for <b>2N5192/95</b>	25 25 20 10 10 7		100 100 80	
$f_T$	Transistion Frequency	$I_C = 1\text{ A}$ $V_{CE} = 10\text{ V}$	2			MHz

\* Pulsed : pulse duration =  $300\mu\text{s}$  duty cycle = 1.5%.  
For NPN types voltage and current values are negative.

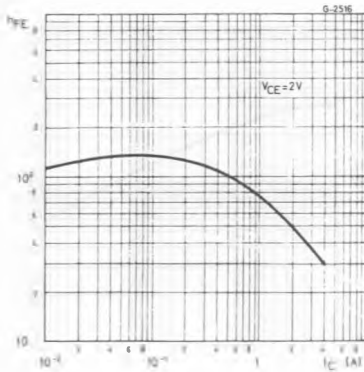
Safe Operating Areas.



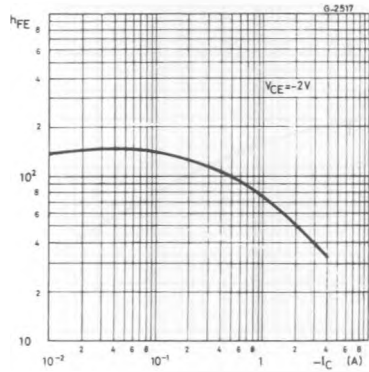
Power Rating Chart.



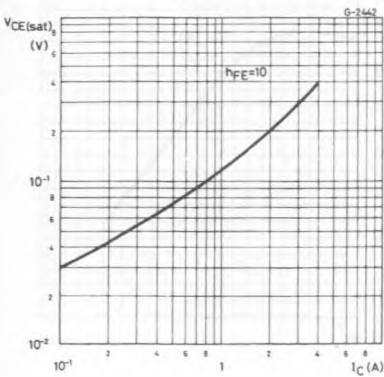
DC Current Gain (NPN types).



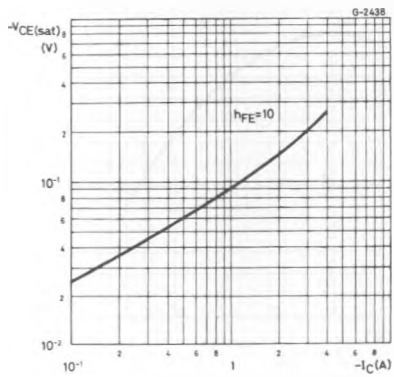
DC Current Gain (PNP types).



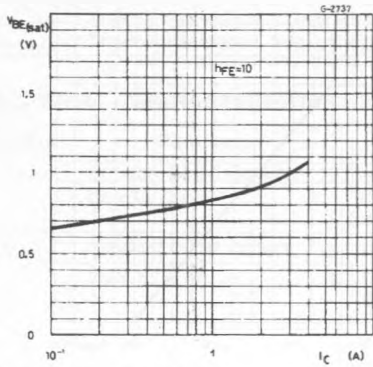
Collector-emitter Saturation Voltage (NPN types).



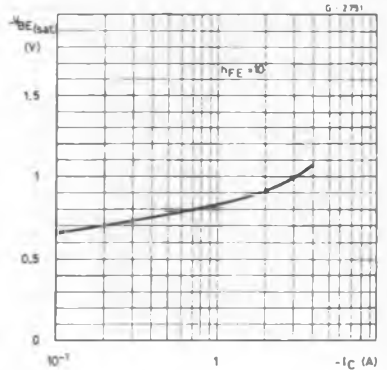
Collector-emitter Saturation Voltage (PNP types).



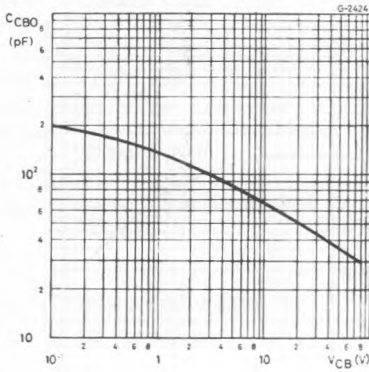
Base-emitter Saturation Voltage (NPN types).



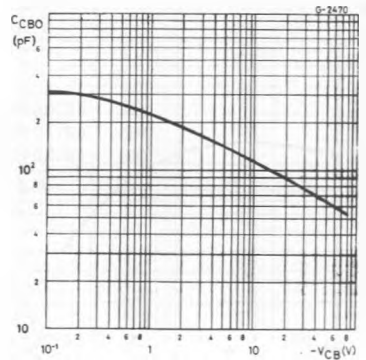
Base-emitter Saturation Voltage (PNP types).



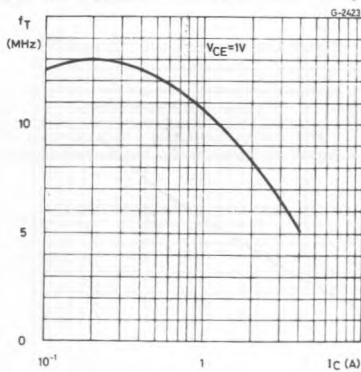
Collector-base Capacitance (NPN types).



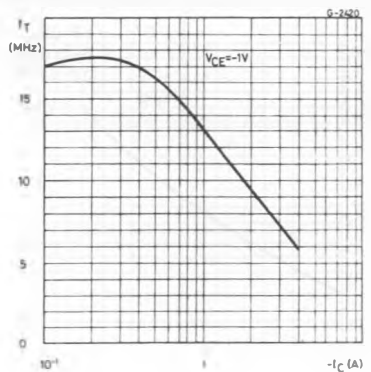
Collector-base Capacitance (PNP types).



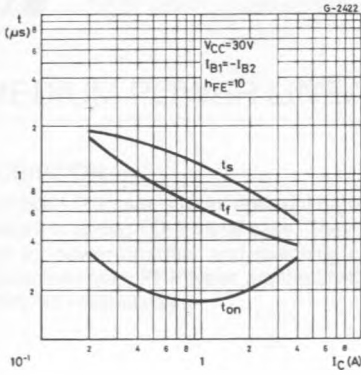
Transition Frequency (NPN types).



Transition Frequency (PNP types).



Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).

