

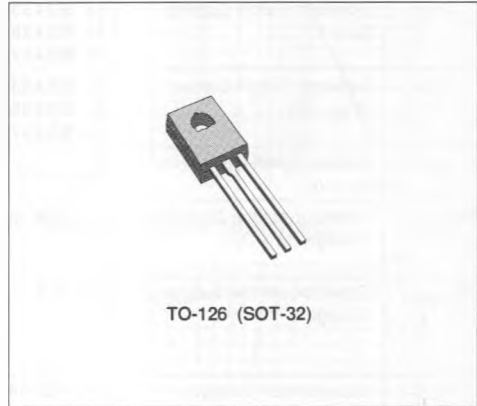
## MEDIUM POWER LINEAR AND SWITCHING APPLICATION

### DESCRIPTION

The BD433, BD435 and BD437 are silicon epitaxial-base NPN power transistors in Jedec TO-126 plastic package, intended for use in medium power linear and switching applications.

The BD433 is especially suitable for use in car-radio output stages.

The complementary PNP types are the BD434, BD436 and BD438 respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value			Unit
			BD433 BD434	BD435 BD436	BD437 BD438	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )		22	32	45	V
$V_{CES}$	Collector-emitter Voltage ( $V_{BE} = 0$ )		22	32	45	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )		22	32	45	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		36			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**

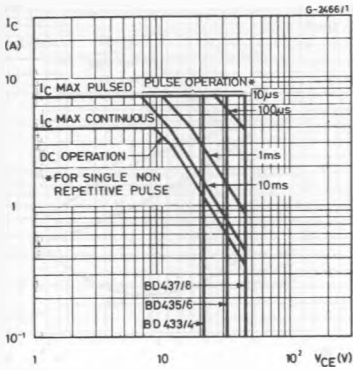
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	3.5	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	100	°C/W

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

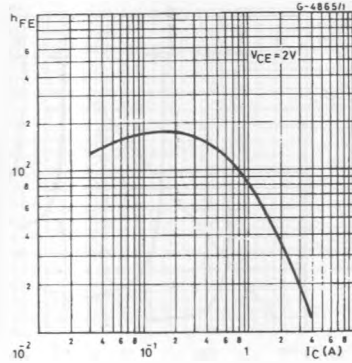
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>	$V_{CB} = 22\ \text{V}$ $V_{CB} = 32\ \text{V}$ $V_{CB} = 45\ \text{V}$			100 100 100	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
$I_{CES}$	Collector Cutoff Current ( $V_{BE} = 0$ )	for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>	$V_{CE} = 22\ \text{V}$ $V_{CE} = 32\ \text{V}$ $V_{CE} = 45\ \text{V}$			100 100 100	$\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
$I_{EBO}$	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>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>	22 32 45			V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 2\ \text{A}$	$I_B = 0.2\ \text{A}$ for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>		0.2 0.2 0.2	0.5 0.5 0.6	V V V
$V_{BE}^*$	Base-emitter Voltage	$I_C = 10\ \text{mA}$ $I_C = 2\ \text{A}$	$V_{CE} = 5\ \text{V}$ $V_{CE} = 1\ \text{V}$ for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>		0.58	1.1 1.1 1.2	V V V
$h_{FE}^*$	DC Current Gain	$I_C = 10\ \text{mA}$  $I_C = 500\ \text{mA}$ $I_C = 2\ \text{A}$	$V_{CE} = 5\ \text{V}$ for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b> $V_{CE} = 1\ \text{V}$ $V_{CE} = 1\ \text{V}$ for <b>BD433/34</b> for <b>BD435/36</b> for <b>BD437/38</b>	40 40 30 85 50 50 40	130 130 130 140		
$h_{FE1}/h_{FE2}^*$	Matched Pair	$I_C = 500\ \text{mA}$	$V_{CE} = 1\ \text{V}$			1.4	
$f_T$	Transition Frequency	$I_C = 250\ \text{mA}$	$V_{CE} = 1\ \text{V}$	3			MHz

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

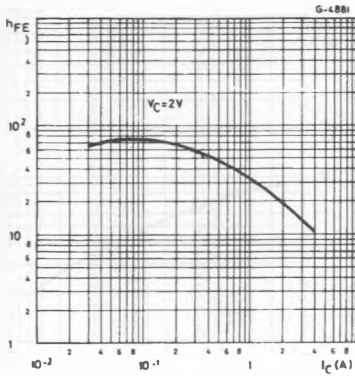
Safe Operating Areas.



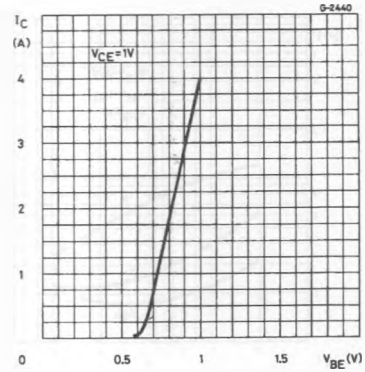
DC Current Gain (NPN types).



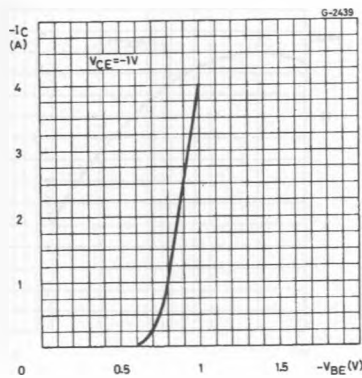
DC Current gain (PNP types).



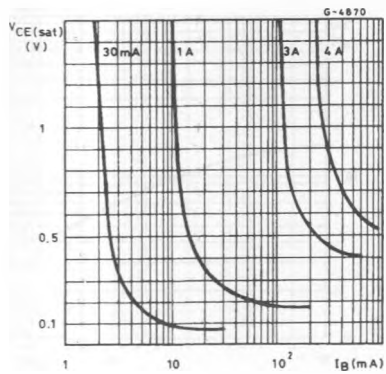
DC Transconductance (NPN types).



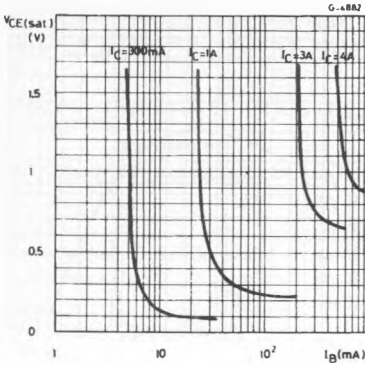
DC Transconductance (PNP types).



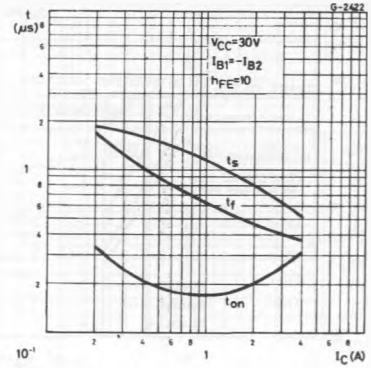
Collector-emitter Saturation Voltage (NPN types).



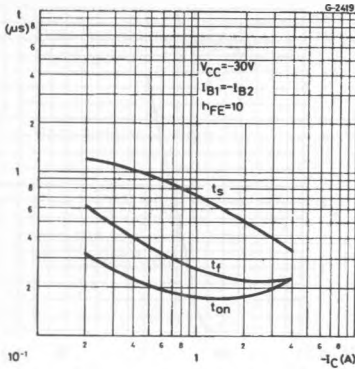
Collector-emitter Saturation Voltage (PNP types).



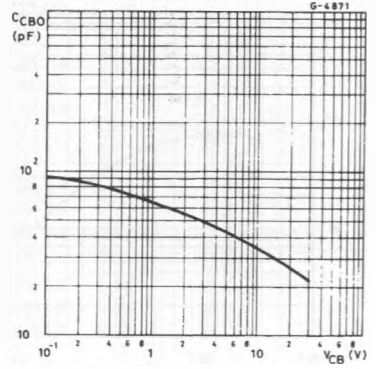
Saturated Switching Characteristics (NPN types).



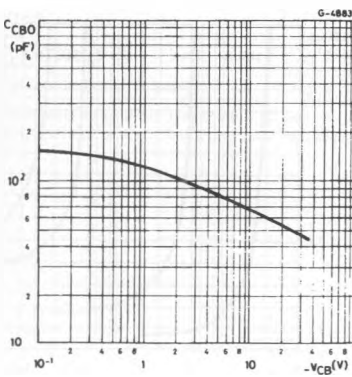
Saturated Switching Characteristics (PNP types).



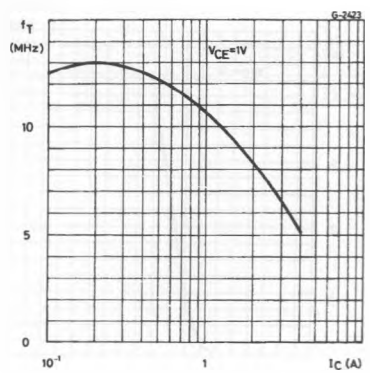
Collector-base Capacitance (NPN types).



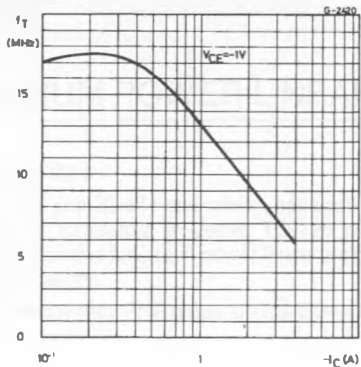
Collector-base Capacitance (PNP types).



Transition Frequency (NPN types).



Transition Frequency (PNP types).



Power Rating Chart.

