

EPITAXIAL-BASE NPN/PNP



BD433 BD434
BD435 BD436
BD437 BD438

MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

The BD 433, BD 435 and BD 437 are silicon epitaxial-base NPN power transistors in Jedec TO-126 plastic package, intended for use in medium power linear and switching applications.

The BD 433 is especially suitable for use in car-radio output stages.

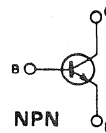
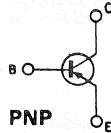
The complementary PNP types are the BD 434, BD 436 and BD 438 respectively.

ABSOLUTE MAXIMUM RATINGS

	NPN PNP*	BD433 BD434	BD435 BD436	BD437 BS438
V_{CBO}	Collector-base voltage ($I_E = 0$)	22V	32V	45V
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	22V	32V	45V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	22V	32V	45V
V_{EBO}	Emitter-base voltage ($I_C = 0$)		5V	
I_C	Collector current		4A	
I_{CM}	Collector peak current ($t \leq 10ms$)		7A	
I_B	Base current		1A	
P_{tot}	Total power dissipation at $T_{case} \leq 25^\circ C$		36W	
T_{stg}	Storage temperature		-65 to $150^\circ C$	
T_j	Junction temperature		$150^\circ C$	

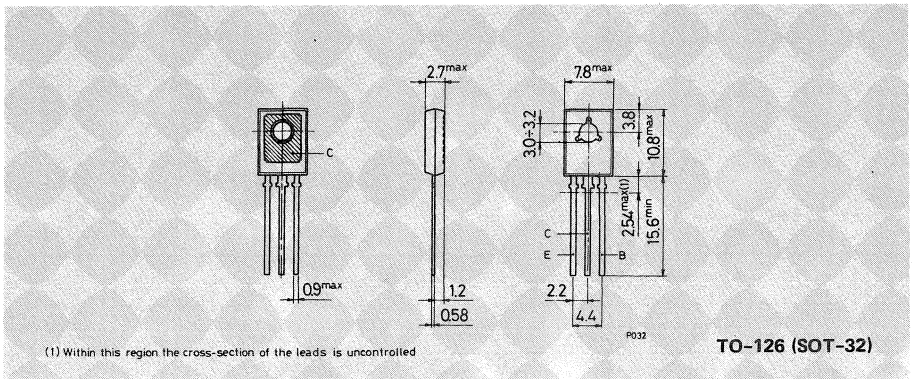
* For PNP types voltage and current values are negative

INTERNAL SCHEMATIC DIAGRAMS



MECHANICAL DATA

Dimensions in mm





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

Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current ($I_E = 0$)	for BD433/34 for BD435/36 for BD437/38	$V_{CB} = 22V$ $V_{CB} = 32V$ $V_{CB} = 45V$	100 100 100	μA μA μA
I_{CES}	Collector cutoff current ($V_{BE} = 0$)	for BD433/34 for BD435/36 for BD437/38	$V_{CE} = 22V$ $V_{CE} = 32V$ $V_{CE} = 45V$	100 100 100	μA μA μA
I_{EBO}	Emitter cutoff current ($I_C = 0$)	$V_{EB} = 5V$		1	mA
$V_{CEO(sus)}$ *	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 100mA$	for BD433/34 for BD435/36 for BD437/38	22 32 45	V V V
$V_{CE(sat)}$ *	Collector-emitter saturation voltage	$I_C = 2A$	$I_B = 0.2A$ for BD433/34 for BD435/36 for BD437/38	0.2 0.5 0.2 0.5 0.2 0.6	V V V
V_{BE} *	Base-emitter voltage	$I_C = 10 mA$ $I_C = 2 A$	$V_{CE} = 5V$ $V_{CE} = 1V$ for BD433/34 for BD435/36 for BD437/38	0.58 1.1 1.1 1.2	V V V V
h_{FE} *	DC current gain	$I_C = 10 mA$ $I_C = 500mA$ $I_C = 2 A$	$V_{CE} = 5V$ for BD433/34 for BD435/36 for BD437/38 $V_{CE} = 1V$ $V_{CE} = 1V$ for BD433/34 for BD435/36 for BD437/38	40 130 40 130 30 130 85 140 50 50 40	— — — — — — —
h_{FE1}/h_{FE2} *	Matched pair	$I_C = 500mA$	$V_{CE} = 1V$	1.4	—
f_T	Transition frequency	$I_C = 250mA$	$V_{CE} = 1V$	3	MHZ

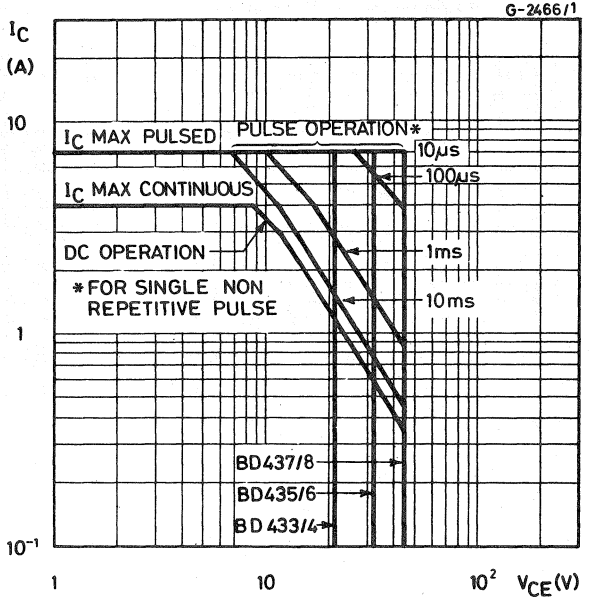
* Pulsed: pulse duration = 300 μs , duty cycle = 1.5%

For PNP types voltage and current values are negative

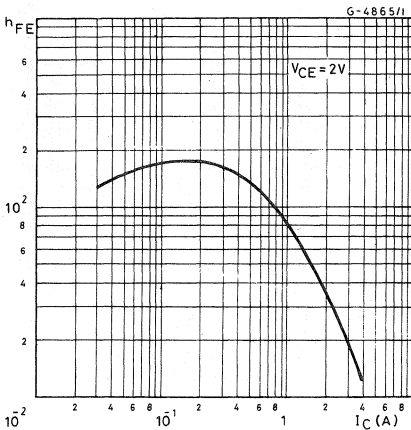


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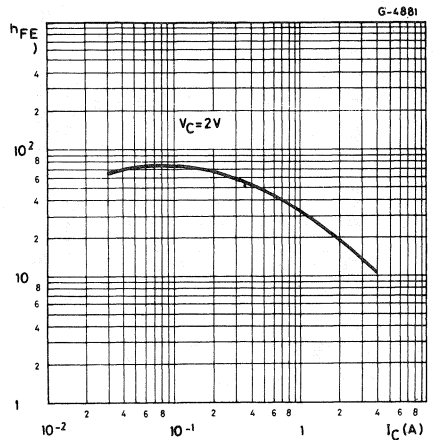
Safe operating areas



DC current gain (NPN types)



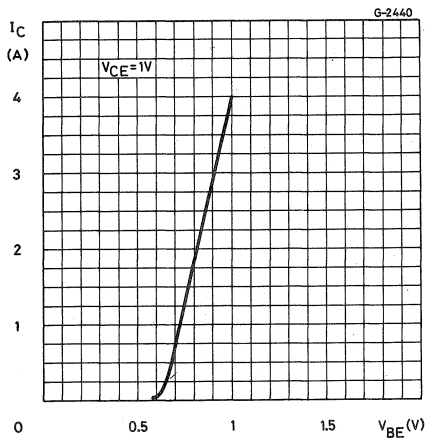
DC current gain (PNP types)



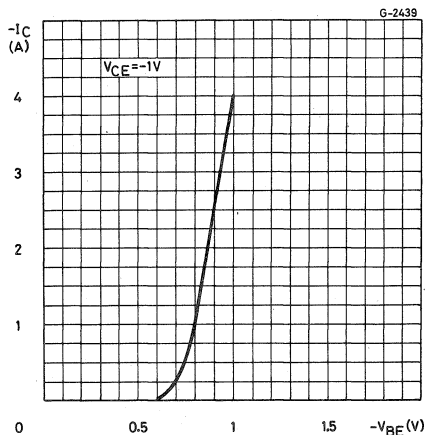


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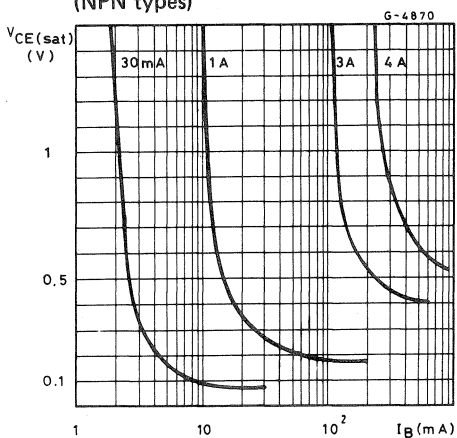
DC transconductance (NPN types)



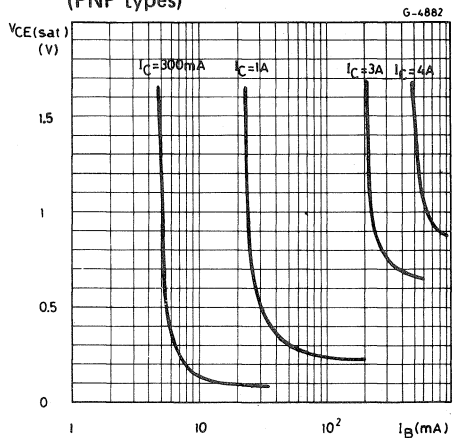
DC transconductance (PNP types)



Collector-emitter saturation voltage (NPN types)



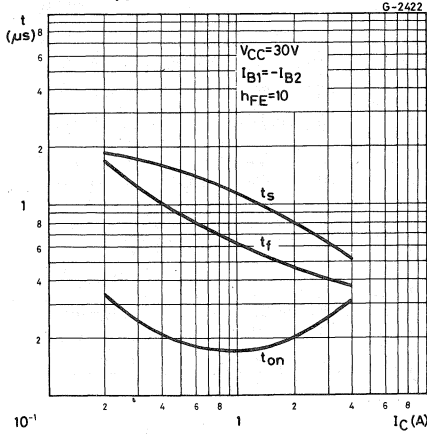
Collector-emitter saturation voltage (PNP types)



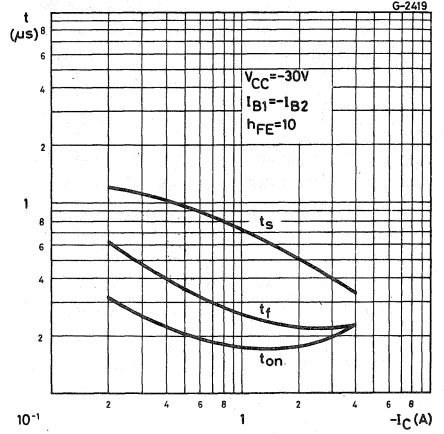


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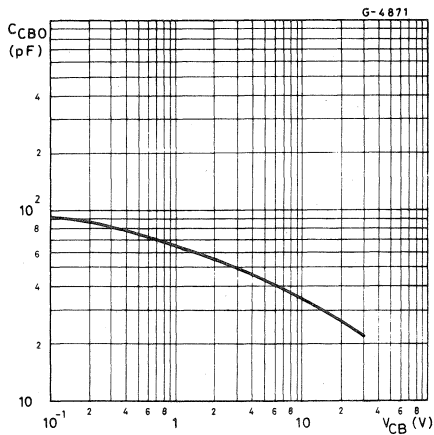
Saturated switching characteristics
(NPN types)



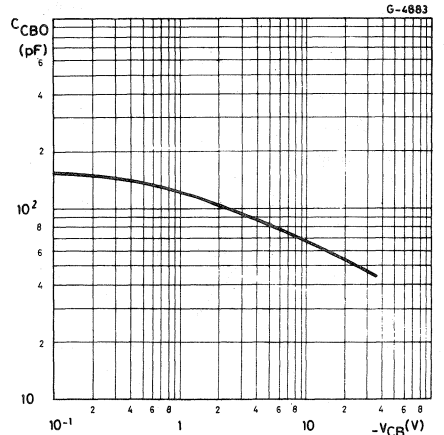
Saturated switching characteristics
(PNP types)



Collector-base capacitance (NPN types)



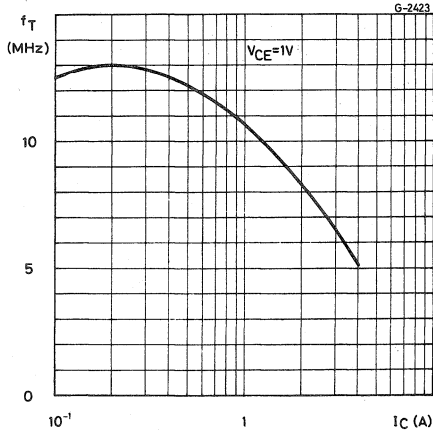
Collector-base capacitance (PNP types)



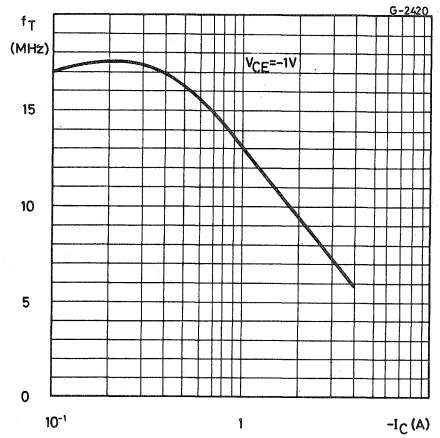


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Transition frequency (NPN types)



Transition frequency (PNP types)



Power rating chart

