

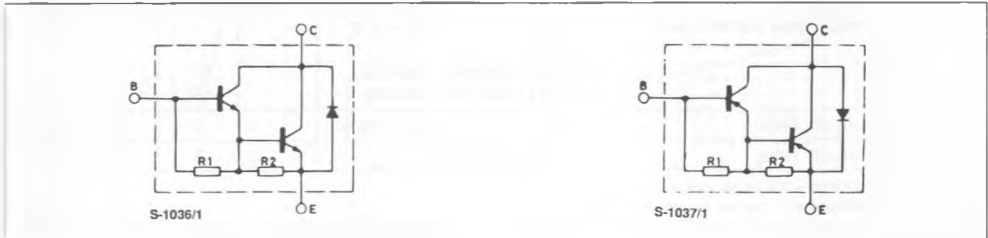
## COMPLEMENTARY POWER DARLINGTONS

### DESCRIPTION

The BD331, BD333, BD335 (NPN types) and BD332, BD334, BD336 (PNP types) are complementary epitaxial-base Darlingtonts in SOT-82 plastic package. They are intended for use in audio output stages, general amplifier and switching applications.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP	Value			Unit
			BD331 BD332	BD333 BD334	BD335 BD336	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )		60	80	100	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )		60	80	100	V
$V_{EBO}$	Base-emitter Voltage ( $I_C = 0$ )		5			V
$I_C$	Collector Current		6			A
$I_{CM}$	Collector Peak Current ( $t_p < 10$ ms)		10			A
$I_B$	Base Current		0.15			A
$P_{tot}$	Total Power Dissipation at $T_{case} \leq 25$ °C		60			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	2.08	$^{\circ}C/W$
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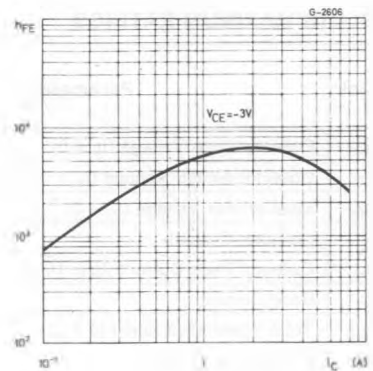
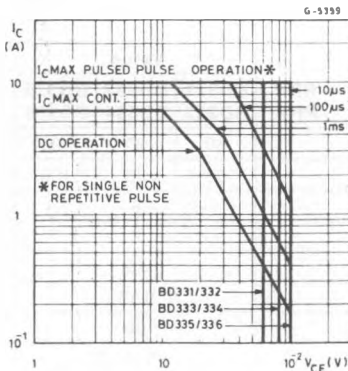
**ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25^{\circ}C$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	$V_{CB} = \text{rated } V_{CBO}$ $T_{case} = 150^{\circ}C$			0.2 2	mA mA
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	$V_{CE} = 1/2 V_{CEO \text{ max}}$			0.5	mA
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5 \text{ V}$			5	mA
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 3 \text{ A}$ $I_B = 12 \text{ mA}$			2	V
$V_{BE}^*$	Base-emitter Voltage	$I_C = 3 \text{ A}$ $V_{CE} = 3 \text{ V}$			2.5	V
$h_{FE}^*$	DC Current Gain	$I_C = 0.5 \text{ A}$ $V_{CE} = 3 \text{ V}$ for <b>BD331, BD333, BD335</b> for <b>BD332, BD334, BD336</b> $I_C = 3 \text{ A}$ $V_{CE} = 3 \text{ V}$ for <b>BD331, BD333, BD335</b> for <b>BD332, BD334, BD336</b> $I_C = 6 \text{ A}$ $V_{CE} = 3 \text{ V}$ for <b>BD331, BD333, BD335</b> for <b>BD332, BD334, BD336</b>	750 750	1900 2700		
$V_F^*$	Parallel Diode Forward Voltage	$I_F = 3 \text{ A}$		1.8		V
$h_{ie}$	Small Signal Current Gain	$I_C = 3 \text{ A}$ $V_{CE} = 3 \text{ V}$ $f = 1 \text{ MHz}$ for <b>BD331, BD333, BD335</b> for <b>BD332, BD334, BD336</b>		50 150		
$t_{on}$	Turn-on Time	$I_C = 3 \text{ A}$ $V_{CC} = 30 \text{ V}$		1	2	$\mu s$
$t_{off}$	Turn-off Time	$I_{B1} = -I_{B2} = 12 \text{ mA}$		5	10	$\mu s$

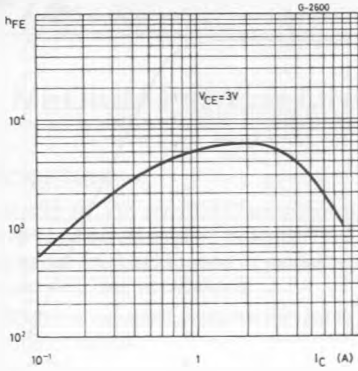
\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle < 1.5 %.  
For PNP types voltage and current values are negative.

**Safe Operating Areas.**

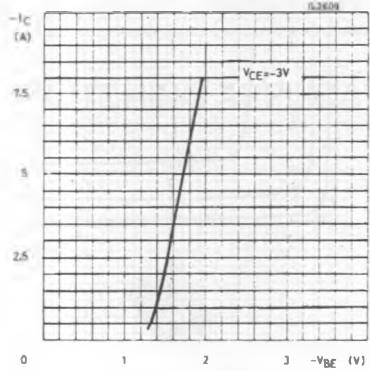
**DC Current Gain (NPN types).**



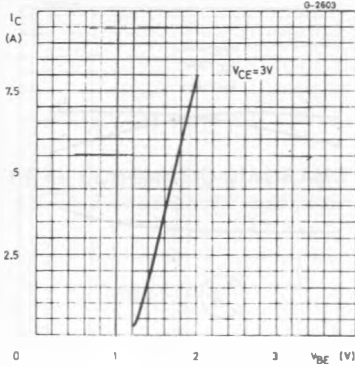
DC Current gain (PNP types).



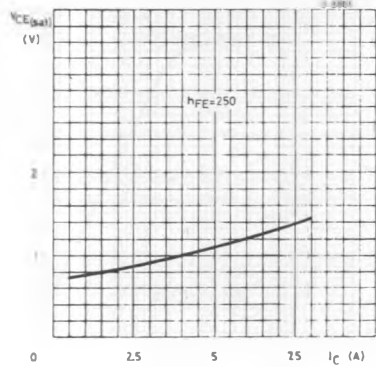
DC Transconductance (NPN types).



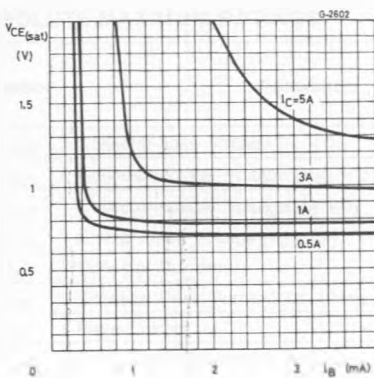
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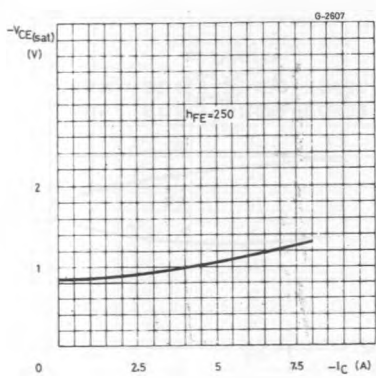
Collector-emitter Saturation Voltage (NPN types).



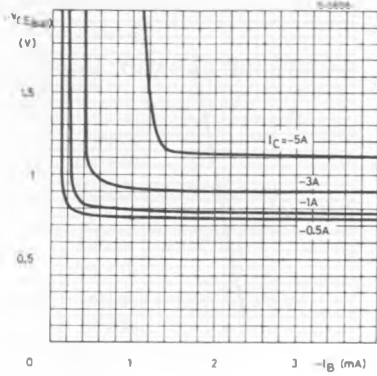
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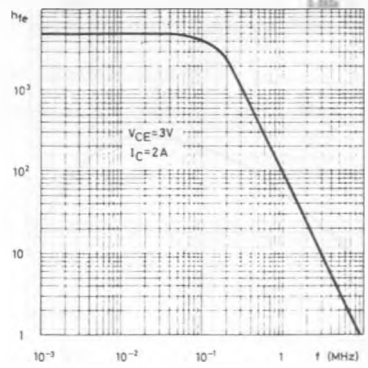
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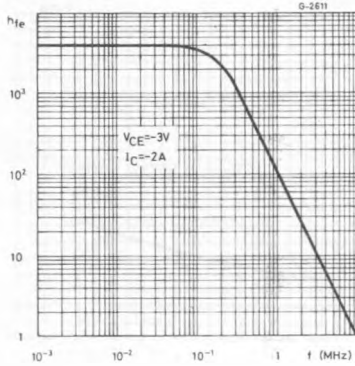
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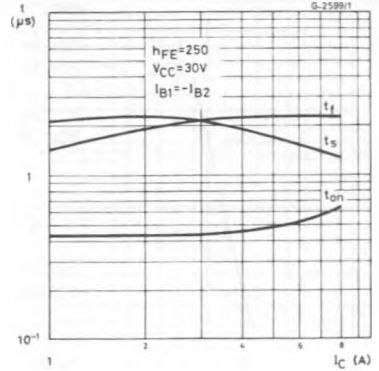
Small Signal Current Gain (NPN types).



Small Signal Current Gain (PNP types).



Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).

