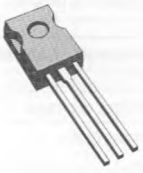
SGS-THOMSON MICROELECTRONICS

BD331/33/35
BD332/34/36

COMPLEMENTARY POWER DARLINGTONS

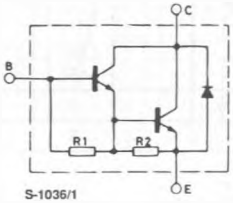
DESCRIPTION

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



SOT-82

INTERNAL SCHEMATIC DIAGRAMS



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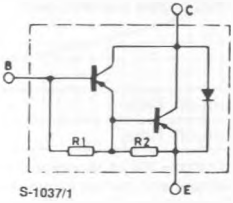

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ABSOLUTE MAXIMUM RATINGS

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 (tp < 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

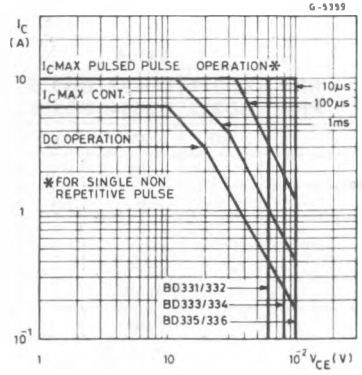
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	2.08	°C/W

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

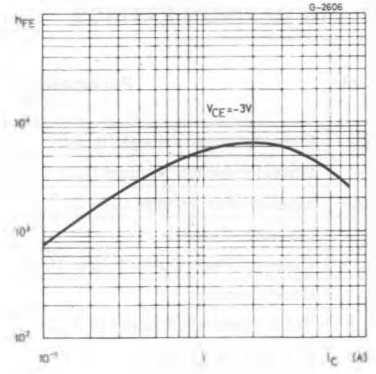
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = rated V_{CBO} T_{case} = 150 °C			0.2 2	mA mA
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 1/2 V_{CEO} max			0.5	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V			5	mA
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 3 A I_B = 12 mA			2	V
V_{BE}*	Base-emitter Voltage	I_C = 3 A V_{CE} = 3 V			2.5	V
h_{FE}*	DC Current Gain	I_C = 0.5 A V_{CE} = 3 V for **BD331, BD333, BD335** for **BD332, BD334, BD336** I_C = 3 A V_{CE} = 3 V for **BD331, BD333, BD335** for **BD332, BD334, BD336** I_C = 6 A V_{CE} = 3 V for **BD331, BD333, BD335** for **BD332, BD334, BD336**	 750 750 	 1900 2700 3000 400		
V_F*	Parallel Diode Forward Voltage	I_F = 3 A		1.8		V
h_{fe}	Small Signal Current Gain	I_C = 3 A V_{CE} = 3 V f = 1 MHz for **BD331, BD333, BD335** for **BD332, BD334, BD336**	 	 50 150	 	
t_{on}	Turn-on Time	I_C = 3 A V_{CC} = 30 V I_{B1} = − I_{B2} = 12 mA		1	2	µs
t_{off}	Turn-off Time			5	10	µs

* Pulsed : pulse duration = 300 µs, duty cycle ≤ 1.5 %.
For PNP types voltage and current values are negative.

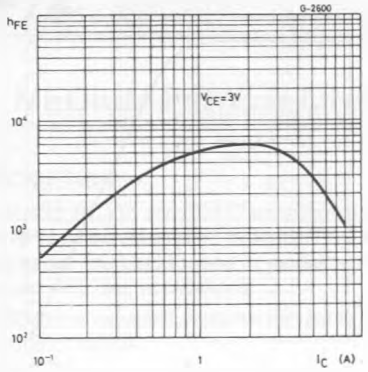
Safe Operating Areas.



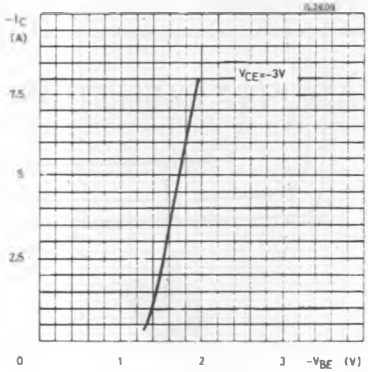
DC Current Gain (NPN types).



DC Current gain (PNP types).



DC Transconductance (NPN types).



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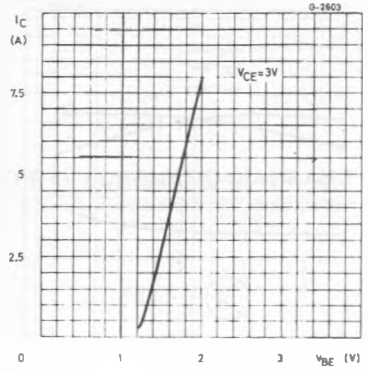
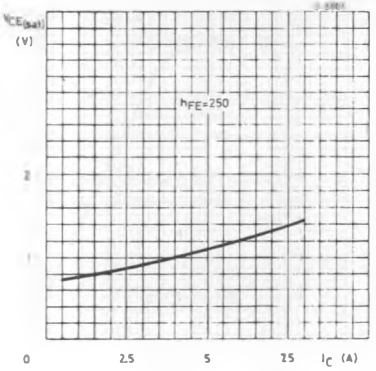


Collector-emitter Saturation Voltage (NPN types).



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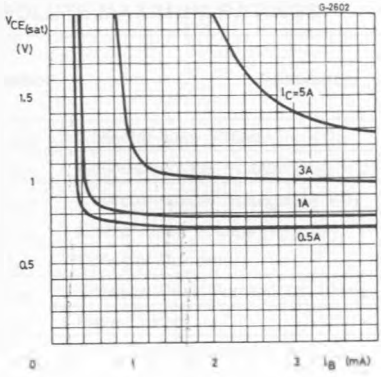

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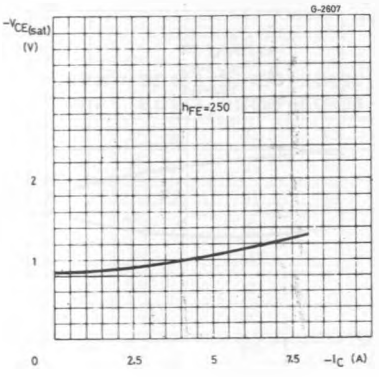

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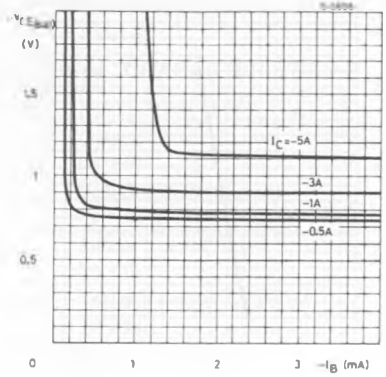
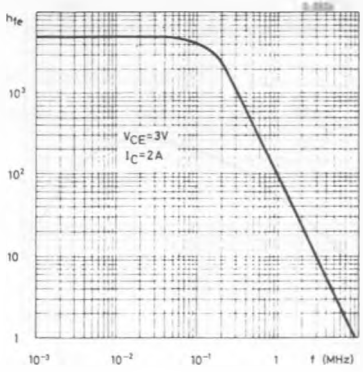


Small Signal Current Gain (NPN types).



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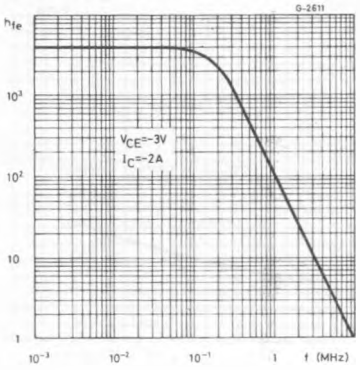
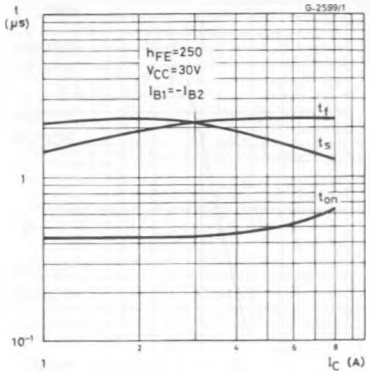


Saturated Switching Characteristics (NPN types).



Saturated Switching Characteristics (PNP types).