SGSD100
SGSD200

Complementary power Darlington transistors

Features

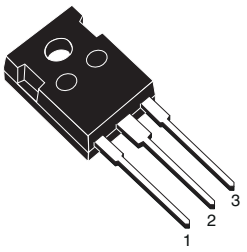
- Complementary NPN - PNP transistors
- Monolithic Darlington configuration

Applications

- Audio power amplifier
- DC-AC converter
- Easy driver for low voltage DC motor
- General purpose switching applications

Description

The SGSD100 is an epitaxial-base NPN power transistor in monolithic Darlington configuration mounted in TO-247 plastic package. It is inteded for use in general purpose and high current amplifier applications. The complementary PNP type is the SGSD200.



TO-247

Figure 1. Internal schematic diagrams

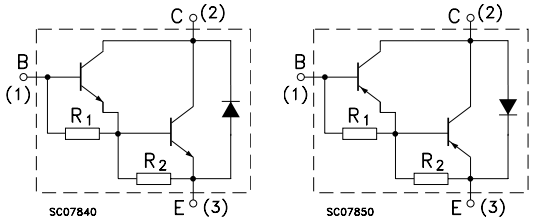


Table 1. Device summary

Order code	Marking	Package	Packaging
SGSD100	SGSD100	TO-247	Tube
SGSD200	SGSD200		

1 Absolute maximun rating

Table 2. Absolute maximum rating

Symbol	Parameter	Value		Unit
		NPN	SGSD100	
		PNP	SGSD200	
V_{CBO}	Collector-emitter voltage (I_E = 0)	80		V
V_{CEO}	Collector-emitter voltage (I_B = 0)	80		V
I_C	Collector current	25		A
I_{CM}	Collector peak current (t_P < 5ms)	40		A
I_B	Base current	6		A
I_{BM}	Base peak current (t_P < 5ms)	10		A
P_{TOT}	Total dissipation at $T_c \leq 25°C$	130		W
T_{stg}	Storage temperature	-65 to 150		°C
T_J	Max. operating junction temperature	150		°C

Note: For PNP type voltage and current values are negative

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case max	0.96	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CE} = 80 V			0.5	mA
		V_{CE} = 80 V T_C = 100 °C			1.5	mA
I_{CEV}	Collector cut-off current (V_{BE} = -0.3V)	V_{CE} = 80 V			0.1	mA
		V_{CE} = 80 V T_C = 100 °C			2	mA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 60 V			0.5	mA
		V_{CE} = 60 V T_C = 100 °C			1.5	mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			2	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 50 mA	80			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 5 A I_B = 20 mA		0.95	1.2	V
		I_C = 5 A I_B = 20 mA T_C = 100 °C		0.8		V
		I_C = 10 A I_B = 40 mA		1.2	1.75	V
		I_C = 10 A I_B = 40 mA T_C = 100 °C		1.3		V
		I_C = 20 A I_B = 80 mA		2	3.5	V
		I_C = 20 A I_B = 80 mA T_C = 100 °C		2.3		V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 20 A I_B = 80 mA		2.6	3.3	V
		I_C = 20 A I_B = 80 mA T_C = 100 °C		2.5		V
V_{BE} (1)	Base-emitter voltage	I_C = 10 A V_{CE} = 3 V	1	1.8	3	V
		I_C = 10 A V_{CE} = 3 V T_C = 100 °C		1.6		V
h_{FE} (1)	DC current gain	I_C = 5 A V_{CE} = 3 V	600	5000	15000	
		I_C = 5 A V_{CE} = 3 V T_C = 100 °C		8000		
		I_C = 10 A V_{CE} = 3 V	500	4000	12000	
		I_C = 10 A V_{CE} = 3 V T_C = 100 °C		8000		
		I_C = 20 A V_{CE} = 3 V	300	2000	6000	
		I_C = 20 A V_{CE} = 3 V T_C = 100 °C		2000		
V_F (1)	Diode forward voltage	I_F = 5 A		1.2		V
		I_F = 5 A T_C = 100 °C		0.85		V
		I_F = 10 A		1.6		V
		I_F = 10 A T_C = 100 °C		1.4		V
		I_F = 20 A		2.3		V
		I_F = 20 A T_C = 100 °C		1.3		V

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$E_{s/b}$	Second breakdown energy	V_{CC} = 30 V L = 3 mH V_{CC} = 30 V L = 3 mH T_C = 100 °C	250 250			mJ mJ
$I_{s/b}$	Second breakdown current	V_{CE} = 25 V t = 500 ms	6			A

1. *Pulsed : Pulse duration = 300 µs, duty cycle ≤1.5%*

Note: For PNP type voltage and current values are negative

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

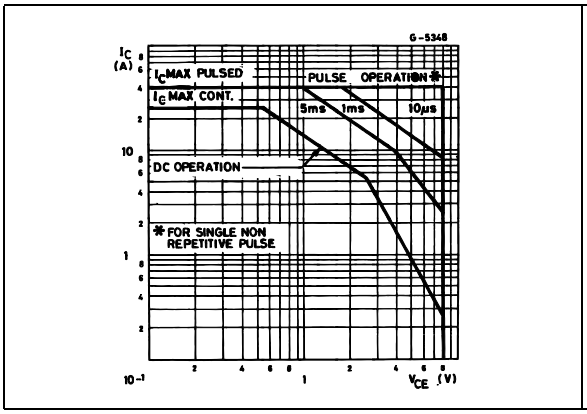


Figure 3. DC current gain (NPN type)

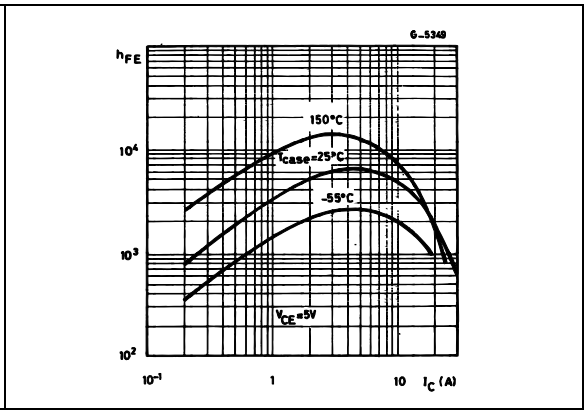


Figure 4. DC current gain (PNP type)

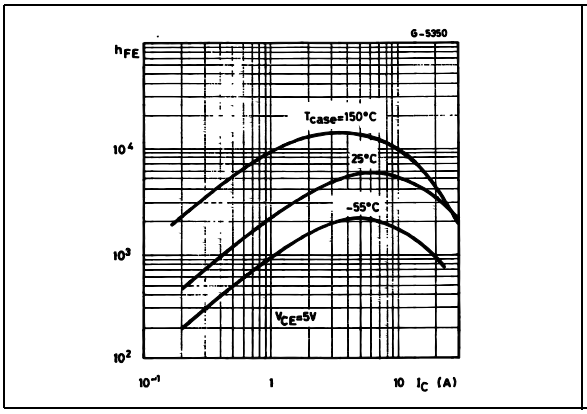


Figure 5. DC current gain (NPN type)

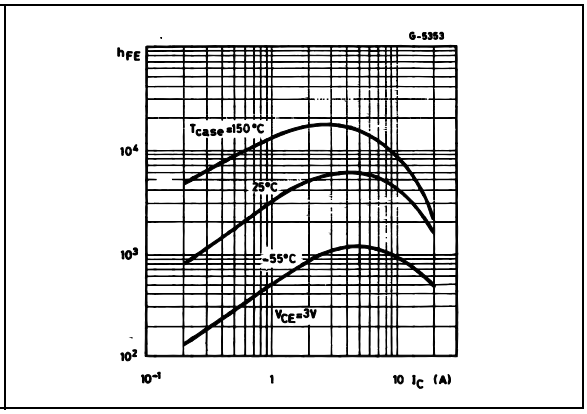


Figure 6. DC current gain (PNP type)

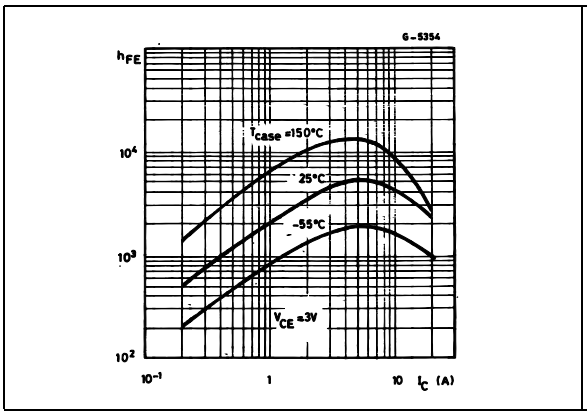


Figure 7. Collector-emitter saturation voltage (NPN type)

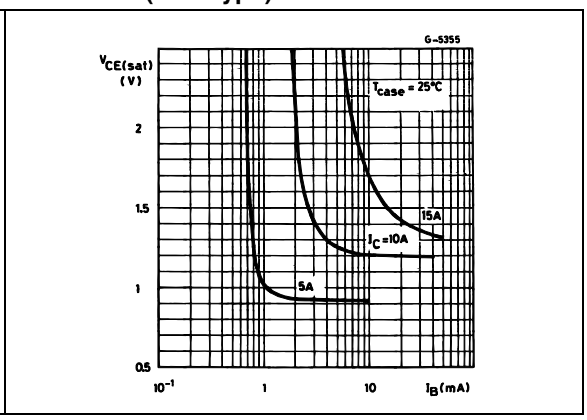
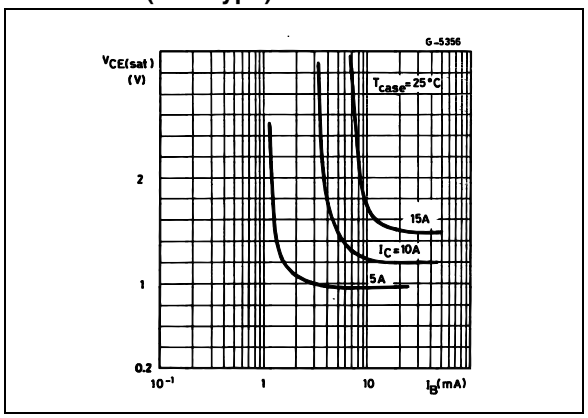


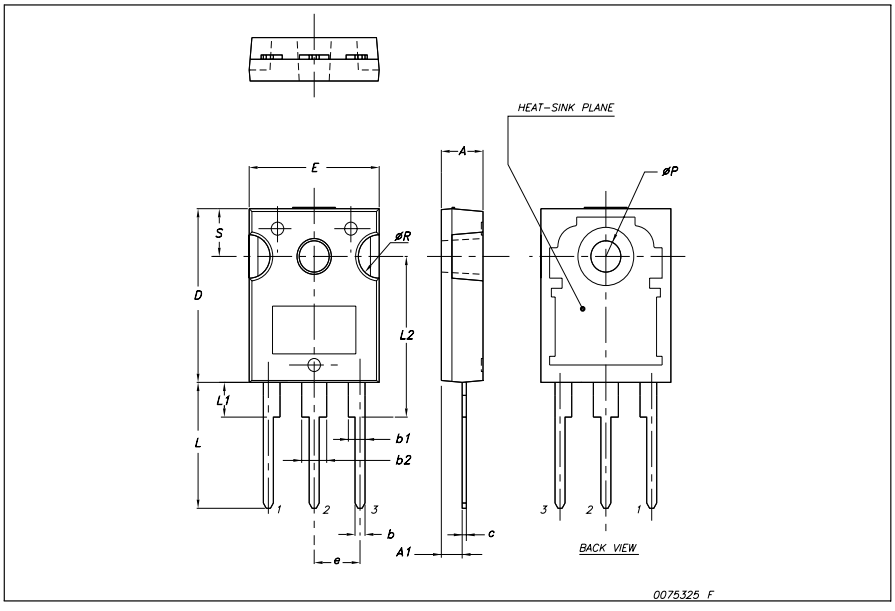
Figure 8. Base-emitter saturation voltage (PNP type)



3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

TO-247 Mechanical data			
Dim.	**mm.**		
	Min.	**Typ**	**Max.**
A	4.85		5.15
A1	2.20		2.60
b	1.0		1.40
b1	2.0		2.40
b2	3.0		3.40
c	0.40		0.80
D	19.85		20.15
E	15.45		15.75
e		5.45	
L	14.20		14.80
L1	3.70		4.30
L2		18.50	
øP	3.55		3.65
øR	4.50		5.50
S		5.50	



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
11-Oct-2003	3	
24-Jan-2007	4	Package change from TO-218 to TO-247.

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