

COMPLEMENTARY SILICON  
 POWER DARLINGTON TRANSISTORS

- SGS-THOMSON PREFERRED SALESTYPES
- COMPLEMENTARY PNP - NPN DEVICES
- MONOLITHIC DARLINGTON CONFIGURATION

**APPLICATIONS:**

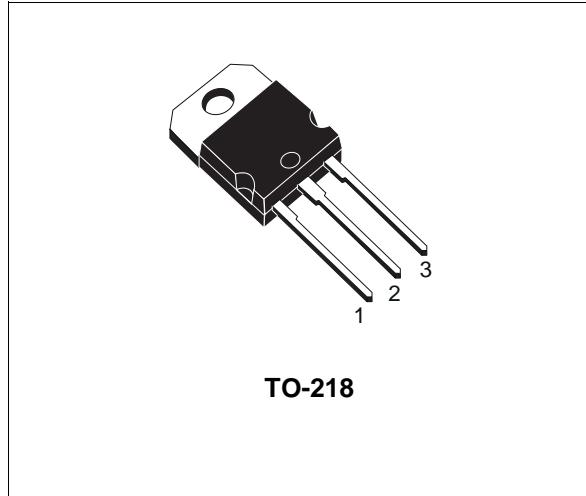
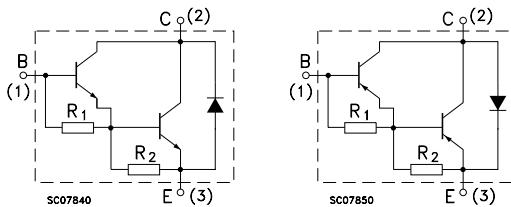
- GENERAL PURPOSE SWITCHING APPLICATION
- GENERAL PURPOSE AMPLIFIERS

**DESCRIPTION**

The SGSD100 is silicon epitaxial-base NPN power transistor in monolithic Darlington configuration mounted in TO-218 plastic package.

It is intended for use in general purpose and high current amplifier applications.

The complementary PNP type is the SGSD200.


**INTERNAL SCHEMATIC DIAGRAM**

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value		Unit
		NPN	SGSD100	
			SGSD200	
$V_{CBO}$	Collector-Base 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		40	A
$I_B$	Base Current		6	A
$I_{BM}$	Base Peak Current		10	A
$P_{tot}$	Total Dissipation at $T_c \leq 25^\circ\text{C}$		130	W
$T_{stg}$	Storage Temperature		-65 to 150	$^\circ\text{C}$
$T_j$	Max. Operating Junction Temperature		150	$^\circ\text{C}$

For PNP types voltage and current values are negative.

# SGSD100/SGSD200

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## THERMAL DATA

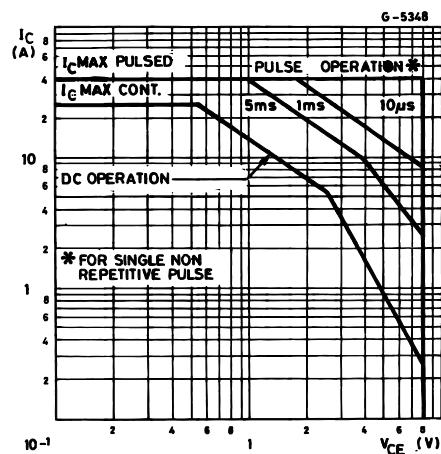
$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.96	$^{\circ}\text{C/W}$
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## ELECTRICAL CHARACTERISTICS ( $T_{case} = 25 \ ^{\circ}\text{C}$ unless otherwise specified)

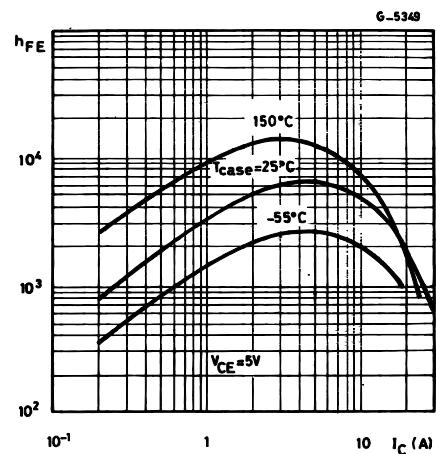
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cut-off Current ( $I_E = 0$ )	$V_{CE} = 80 \text{ V}$ $V_{CE} = 80 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$			0.5 1.5	mA mA
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -0.3\text{V}$ )	$V_{CE} = 80 \text{ V}$ $V_{CE} = 80 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$			0.1 2	mA mA
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	$V_{CE} = 60 \text{ V}$ $V_{CE} = 60 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$			0.5 1.5	mA mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5 \text{ V}$			2	mA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage	$I_C = 50 \text{ mA}$	80			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 5 \text{ A} \quad I_B = 20 \text{ mA}$ $I_C = 5 \text{ A} \quad I_B = 20 \text{ mA} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_C = 10 \text{ A} \quad I_B = 40 \text{ mA}$ $I_C = 10 \text{ A} \quad I_B = 40 \text{ mA} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_C = 20 \text{ A} \quad I_B = 80 \text{ mA}$ $I_C = 20 \text{ A} \quad I_B = 80 \text{ mA} \quad T_c = 100 \ ^{\circ}\text{C}$		0.95 0.8 1.2 1.3 2 2.3	1.2 1.75	V V V V V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 20 \text{ A} \quad I_B = 80 \text{ mA}$ $I_C = 20 \text{ A} \quad I_B = 80 \text{ mA} \quad T_c = 100 \ ^{\circ}\text{C}$		2.6 2.5	3.3	V V
$V_{BE*}$	Base-Emitter Voltage	$I_C = 10 \text{ A} \quad V_{CE} = 3 \text{ V}$ $I_C = 10 \text{ A} \quad V_{CE} = 3 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$	1	1.8 1.6	3	V V
$h_{FE*}$	DC Current Gain	$I_C = 5 \text{ A} \quad V_{CE} = 3 \text{ V}$ $I_C = 5 \text{ A} \quad V_{CE} = 3 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_C = 10 \text{ A} \quad V_{CE} = 3 \text{ V}$ $I_C = 10 \text{ A} \quad V_{CE} = 3 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_C = 20 \text{ A} \quad V_{CE} = 3 \text{ V}$ $I_C = 20 \text{ A} \quad V_{CE} = 3 \text{ V} \quad T_c = 100 \ ^{\circ}\text{C}$	600 500 300	5000 8000 4000 8000 2000 2000	15000 12000 6000	
$V_F*$	Diode Forward Voltage	$I_F = 5 \text{ A}$ $I_F = 5 \text{ A} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_F = 10 \text{ A}$ $I_F = 10 \text{ A} \quad T_c = 100 \ ^{\circ}\text{C}$ $I_F = 20 \text{ A}$ $I_F = 20 \text{ A} \quad T_c = 100 \ ^{\circ}\text{C}$		1.2 0.85 1.6 1.4 2.3 1.3		V V V V V V
$E_{s/b}$	Second Breakdown Energy	$V_{CC} = 30 \text{ V} \quad L = 3 \text{ mH}$ $V_{CC} = 30 \text{ V} \quad L = 3 \text{ mH} \quad T_c = 100 \ ^{\circ}\text{C}$	250 250			mJ mJ
$I_{s/b}$	Second Breakdown Current	$V_{CE} = 25 \text{ V} \quad t = 500 \text{ ms}$	6			A

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

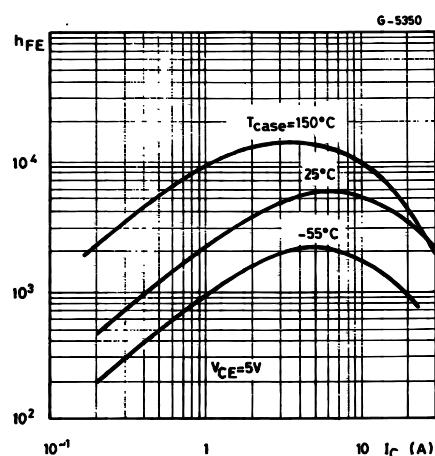
Safe Operating Areas



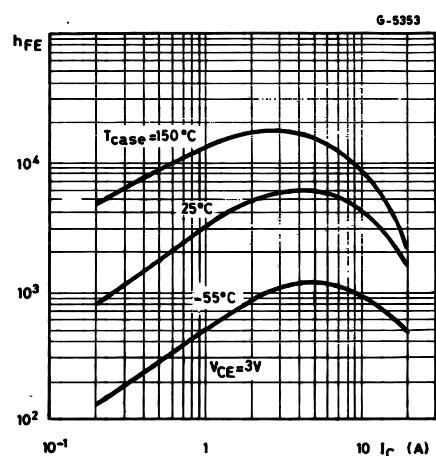
DC Current Gain (NPN type)



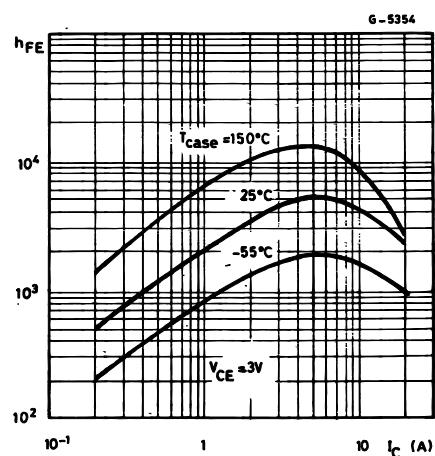
DC Current Gain (PNP type)



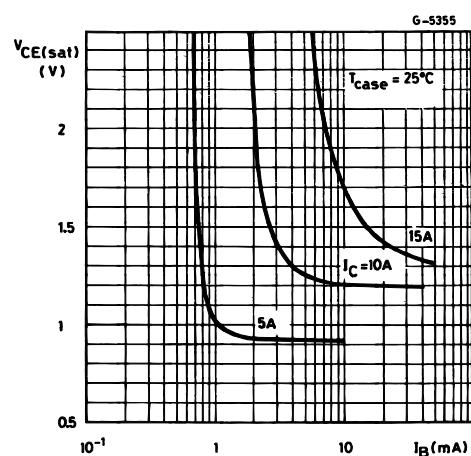
DC Current Gain (NPN type)



DC Current Gain (PNP type)



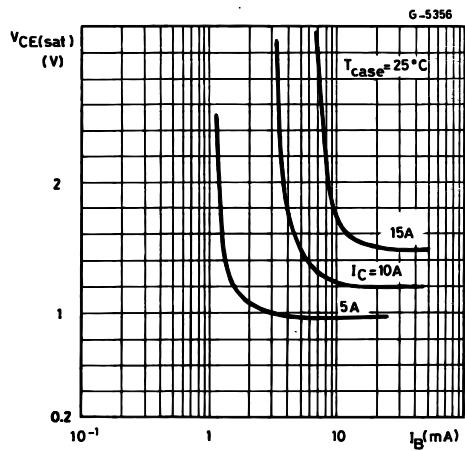
Collector-Emitter Saturation Voltage (NPN type)



## SGSD100/SGSD200

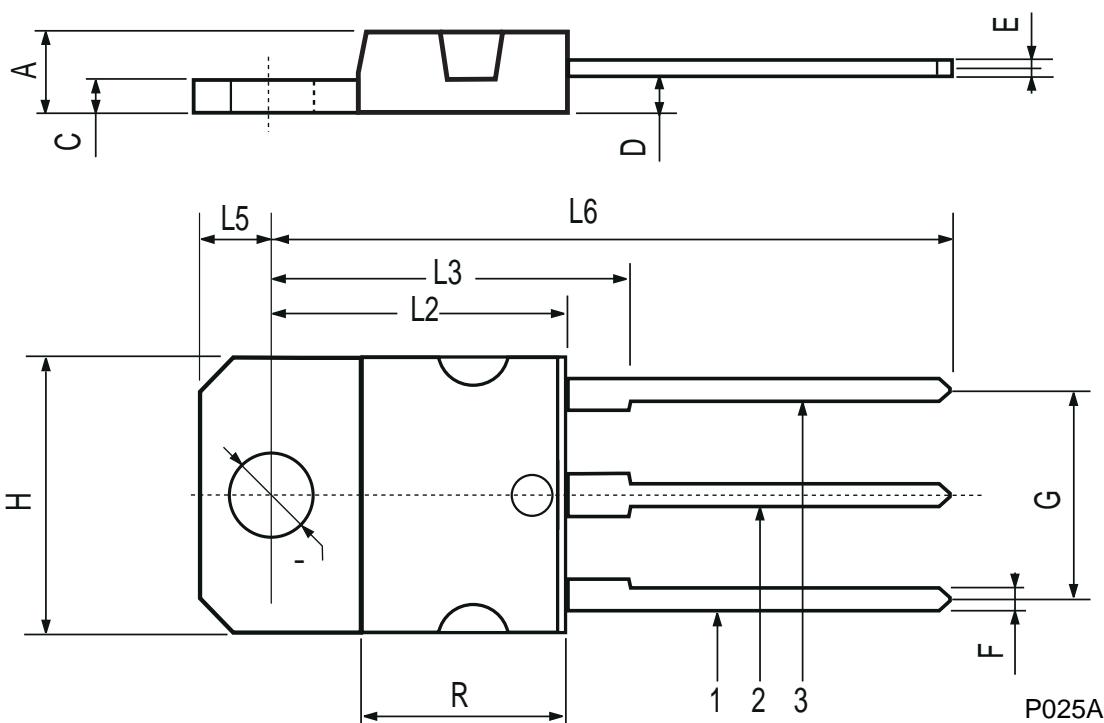
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Collector-Emitter Saturation Voltage (PNP type)



## TO-218 (SOT-93) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		4.9	0.185		0.193
C	1.17		1.37	0.046		0.054
D		2.5			0.098	
E	0.5		0.78	0.019		0.030
F	1.1		1.3	0.043		0.051
G	10.8		11.1	0.425		0.437
H	14.7		15.2	0.578		0.598
L <sub>2</sub>	–		16.2	–		0.637
L <sub>3</sub>		18			0.708	
L <sub>5</sub>	3.95		4.15	0.155		0.163
L <sub>6</sub>		31			1.220	
R	–		12.2	–		0.480
Ø	4		4.1	0.157		0.161



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