SGS-THOMSON
MICROELECTRONICS

SGSD93E
SGSD93F
SGSD93G

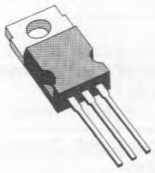
EPITAXIAL PLANAR NPN

ADVANCE DATA

- DAMPER DIODE

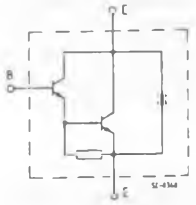
AUTOMOTIVE

- SWITCHING APPLICATION



TO-220

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

The SGSD93E/93F/93G are silicon epitaxial planar NPN transistors in Darlington configuration mounted in Jedec TO-220 plastic package.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		SGSD93E	SGSD93F	SGSD93G	
V_{CBO}	Collector-base Voltage (I_E = 0)	160	180	200	V
V_{CES}	Collector-emitter Voltage (V_{BE} = 0)	140	160	180	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	140	160	180	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	5			V
I_C	Collector Current	12			A
I_{CM}	Collector Peak Current	15			A
I_B	Base Current	0.2			A
P_{tot}	Total Dissipation at T_c < 25 °C	80			W
T_{stg}	Storage Temperature	– 65 to 150			°C
T_j	Max. Operating Junction Temperature	150			°C

THERMAL DATA

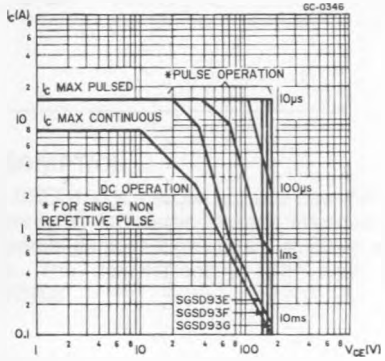
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	1.56	°C/W

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

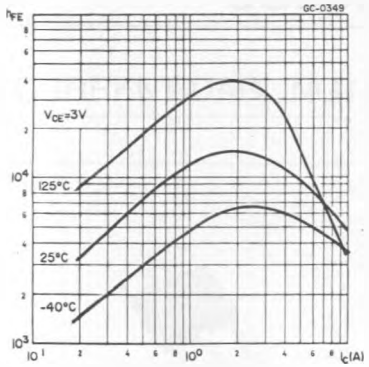
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 160 V for **SGSD93E**			50	μA
		V_{CB} = 180 V for **SGSD93F**			50	μA
		V_{CB} = 200 V for **SGSD93G**			50	μA
		V_{CB} = 160 V for **SGSD93E**			2	mA
		V_{CB} = 180 V for **SGSD93F**			2	mA
		V_{CB} = 200 V for **SGSD93G**			2	mA
		T_c = 150 °C				
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 140 V for **SGSD93E**			0.5	mA
		V_{CE} = 160 V for **SGSD93F**			0.5	mA
		V_{CE} = 180 V for **SGSD93G**			0.5	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{BE} = – 5 V			0.1	mA
$V_{CEO(sus)}$*	Collector-emitter Sustaining Voltage	I_C = 0.1 A for **SGSD93E**	140			V
		I_C = 0.1 A for **SGSD93F**	160			V
		I_C = 0.1 A for **SGSD93G**	180			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 5 A I_B = 5 mA			1.4	V
		I_C = 10 A I_B = 20 mA			2.0	V
		I_C = 5 A I_B = 5 mA T_c = 150 °C			1.4	V
		I_C = 10 A I_B = 20 mA T_c = 150 °C			2.2	V
		I_C = 5 A I_B = 5 mA T_c = – 40 °C			1.6	V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 5 A I_B = 5 mA			2.0	V
		I_C = 10 A I_B = 20 mA			2.8	V
		I_C = 5 A I_B = 5 mA T_c = 150 °C			2.0	V
		I_C = 5 A I_B = 5 mA T_c = – 40 °C			2.2	V
h_{FE}*	DC Current Gain	I_C = 150 mA V_{CE} = 1 V	500			
		I_C = 3 A V_{CE} = 3 V	1000			
		I_C = 5 A V_{CE} = 3 V	1000		20000	
		I_C = 10 A V_{CE} = 3 V	750			
V_F*	Diode Forward Voltage	I_F = 5 A			1.8	V
		I_F = 10 A			3.0	V
h_{fe}	Small Signal Current Gain	I_C = 1 A V_{CE} = 5 V f = 5 MHz		25		
	RESISTIVE LOAD					
t_{on}	Turn-on Time	I_C = 6 A I_{B1} = – I_{B2} = 24 mA	500	700	1100	ns
t_s	Storage Time	V_{CC} = 30 V	1.4	3.2	5.0	μs
t_f	Fall Time		1.5	2.5	4.5	μs

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

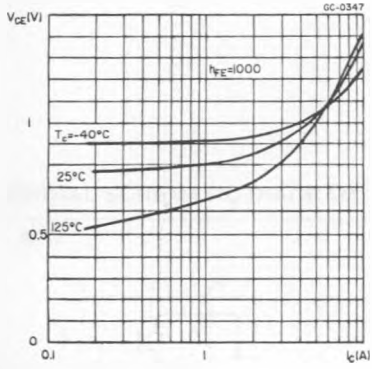
Safe Operating Areas.



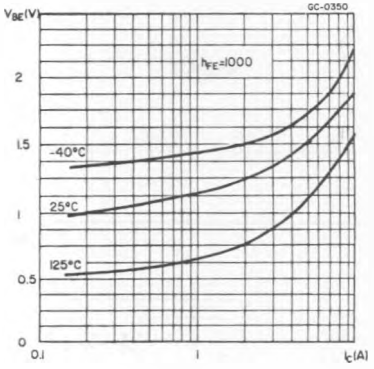
DC Current Gain.



Collector-emitter Saturation Voltage.



Base-emitter Saturation Voltage.



Emitter-collector Voltage.