



SGSF313

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

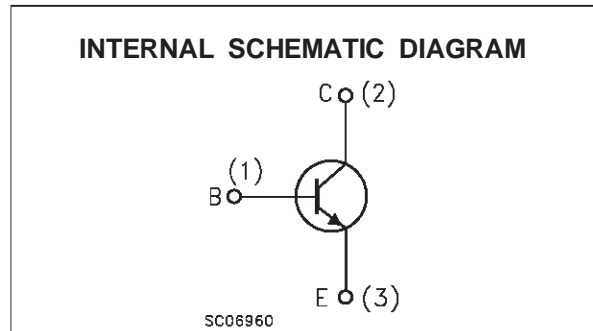
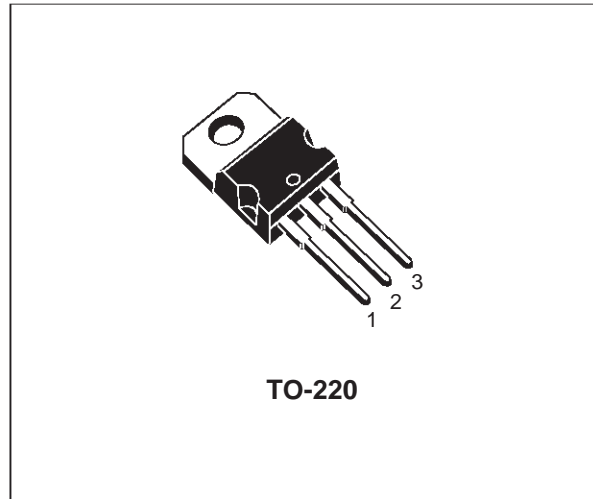
- HIGH VOLTAGE CAPABILITY (450V V_{CE0})
- VERY HIGH SWITCHING SPEED: $t_f = 35\text{ns}$
TYPICAL AT $I_C = 2.5\text{A}$, $I_{B1} = 0.5\text{A}$, $V_{BE\text{off}} = -5\text{V}$
- LOW SATURATION VOLTAGE
- COMPLETE CHARACTERIZATION AT 100°C

APPLICATION

- SWITCH MODE POWER SUPPLIES
- FLYBACK AND FORWARD SINGLE
TRANSISTOR LOW POWER CONVERTERS

DESCRIPTION

The device is high voltage NPN FAST-SWITCHING transistor designed to be used as switch in high efficiency OFF-LINE (220V mains) switching power supplies for consumer applications like sets VCR's and monitors.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEX}	Collector-Emitter Voltage ($V_{BE} = -2.5\text{V}$)	1000	V
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	1000	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	450	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	10	V
I_C	Collector Current	7	A
I_{CM}	Collector Peak Current ($t_p < 5\text{ ms}$)	10	A
I_B	Base Current	3	A
I_{BM}	Base Peak Current ($t_p < 5\text{ ms}$)	6	A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	70	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

THERMAL DATA

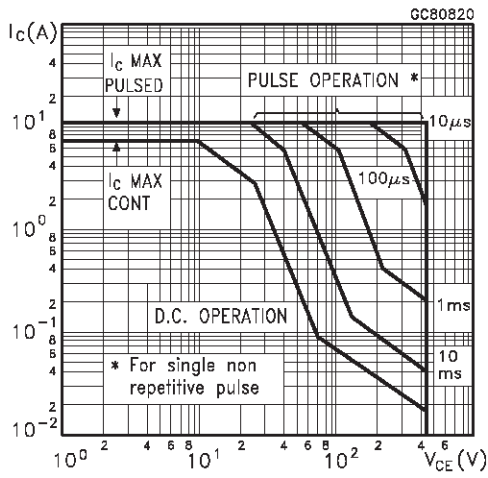
R _{thj-case}	Thermal Resistance Junction-Case	Max	1.78	°C/W
-----------------------	----------------------------------	-----	------	------

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

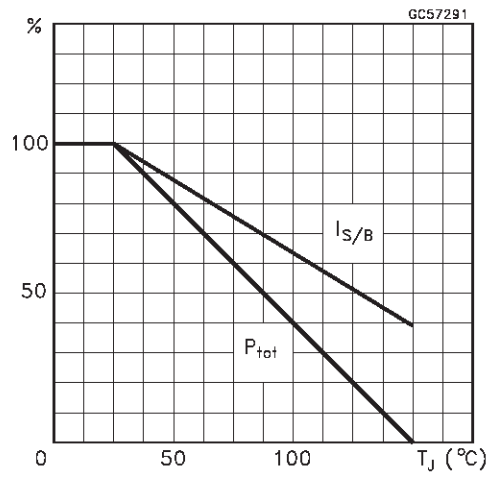
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 1000 V V _{CE} = 1000 V T _j = 125 °C			10 100	μA μA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{EC} = 450 V			100	μA
V _{CEO(sus)}	Collector-Emitter Sustaining Voltage	I _C = 100 mA L = 25 mH	450			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 1 A I _B = 0.1 A I _C = 2 A I _B = 0.4 A I _C = 2.5 A I _B = 0.5 A I _C = 1 A I _B = 0.1 A T _j = 125 °C I _C = 2 A I _B = 0.4 A T _j = 125 °C			0.5 0.45 0.75 0.6 0.8	V V V V V
V _{BE(sat)*}	Base-Emitter Saturation Voltage	I _C = 1 A I _B = 0.1 A I _C = 2 A I _B = 0.4 A I _C = 2.5 A I _B = 0.5 A			1.1 1.25 1.3	V V V
h _{FE*}	DC Current Gain	I _C = 1 A V _{CE} = 2.5 V I _C = 1 A V _{CE} = 5 V I _C = 2 A V _{CE} = 1 V I _C = 5 mA V _{CE} = 5 V I _C = 1 A V _{CE} = 2.5 V T _j = 125 °C I _C = 1 A V _{CE} = 5 V T _j = 125 °C I _C = 2 A V _{CE} = 1 V T _j = 125 °C	12 15 6 10	30	45	
t _{on} t _s t _f	RESISTIVE LOAD Turn-on Time Storage Time Fall Time	V _{CC} = 250 V I _C = 2.5 A I _{B1} = 0.5 A I _{B2} = -1 A		0.5 1.5 0.18	1 2.5 0.3	μs μs μs
t _{on} t _s t _f	RESISTIVE LOAD Turn-on Time Storage Time Fall Time	V _{CC} = 250 V I _C = 2.5 A I _{B1} = 0.5 A I _{B2} = -1 A With Antisaturation Network		0.5 1.1 0.13		μs μs μs
t _{on} t _s t _f	RESISTIVE LOAD Turn-on Time Storage Time Fall Time	V _{CC} = 250 V I _C = 2.5 A I _{B1} = 0.5 A V _{BE(off)} = -5 V		0.5 1.1 0.13		μs μs μs
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 2.5 A h _{FE} = 5A V _{BE(off)} = -5 V R _{BB} = 2 Ω V _{CL} = 300 V L = 300 μH		1 0.1	2 0.2	μs μs
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 2.5 A h _{FE} = 5A V _{BE(off)} = -5 V R _{BB} = 2 Ω V _{CL} = 300 V L = 300 μH T _j = 100 °C			3 0.3	μs μs

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

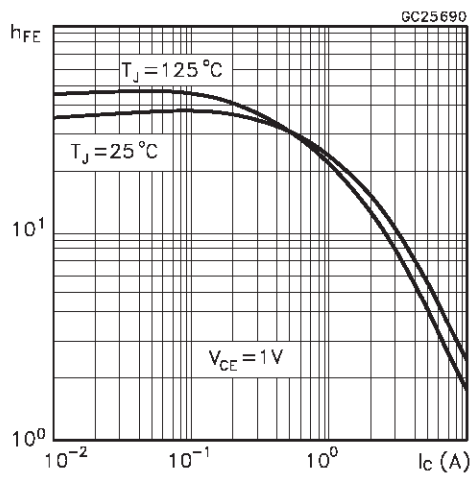
Safe Operating Area Thermal Impedance



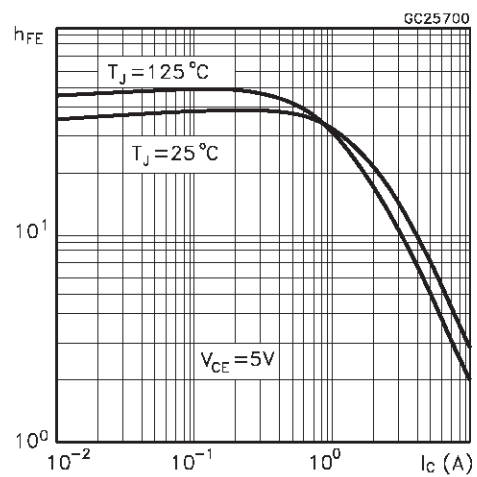
Derating Curve



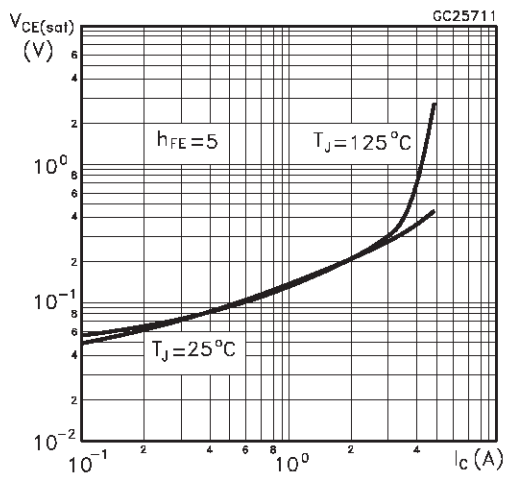
DC Current Gain



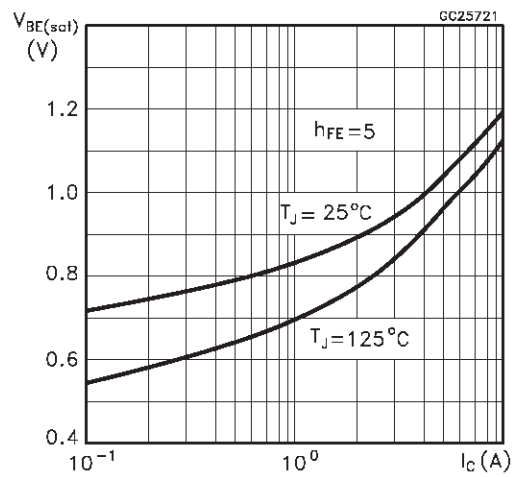
DC Current Gain



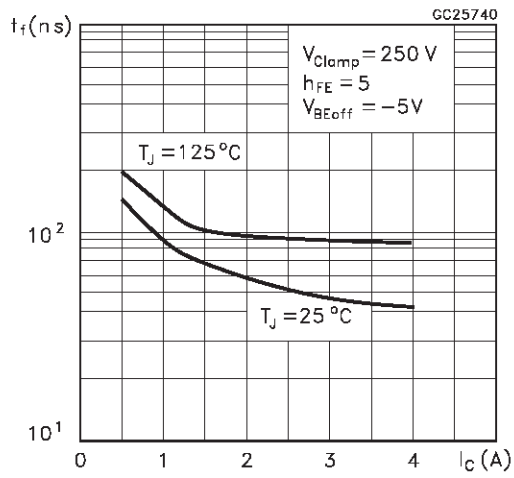
Collector Emitter Saturation Voltage



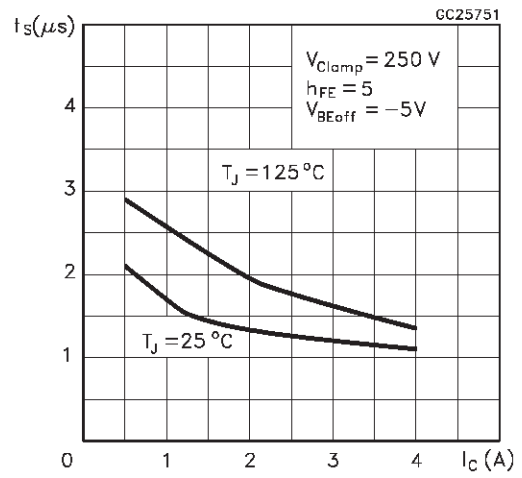
Base Emitter Saturation Voltage



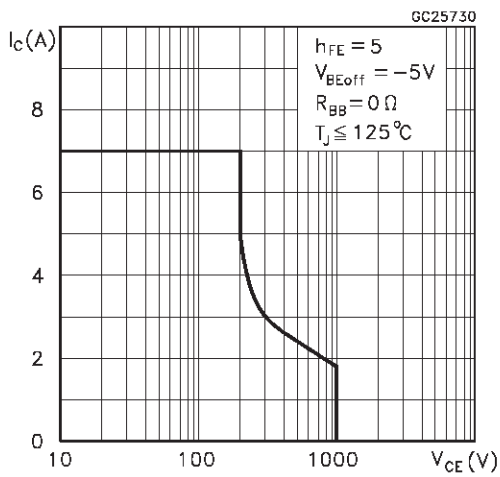
Inductive Fall Time



Inductive Storage Time

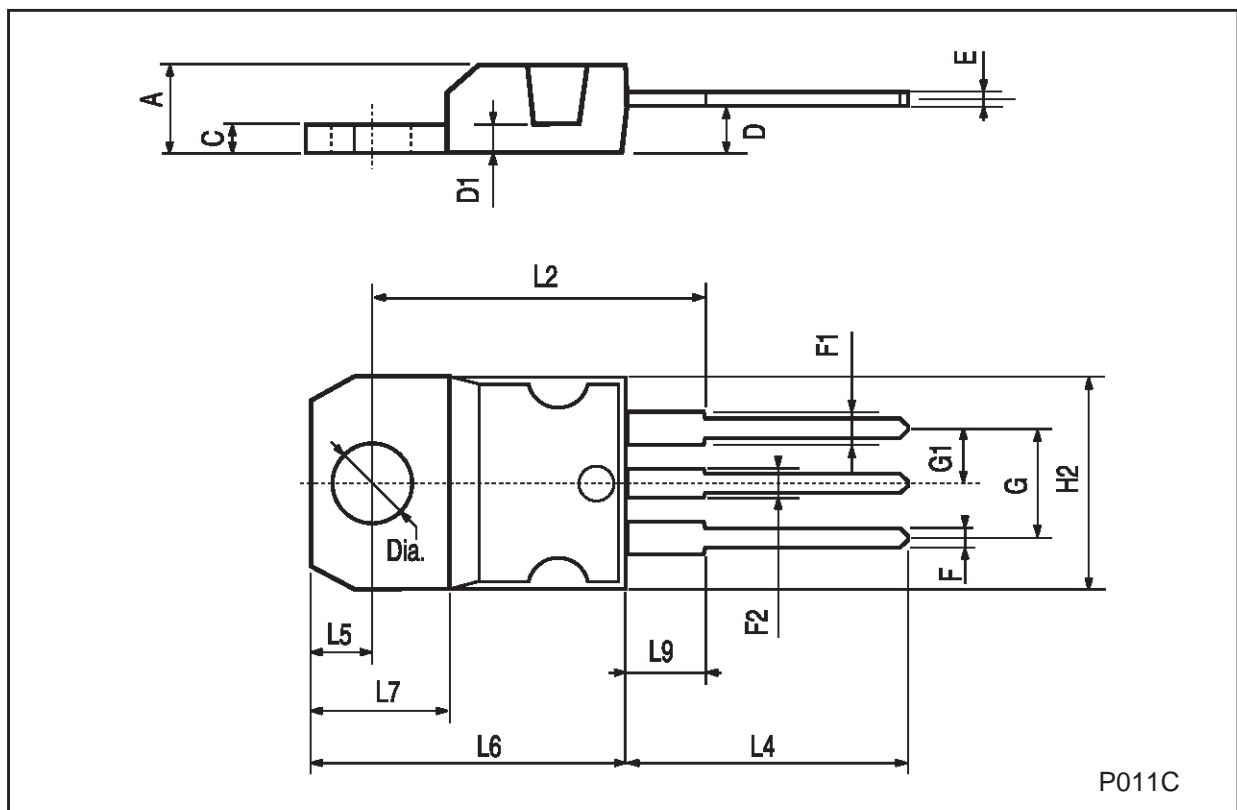


Reverse Biased SOA



TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



P011C

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1998 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>