

# ST13007

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- IMPROVED SPECIFICATION:
  - LOWER LEAKAGE CURRENT
  - TIGHTER GAIN RANGE
  - DC CURRENT GAIN PRESELECTION
  - TIGHTER STORAGE TIME RANGE
- HIGH VOLTAGE CAPABILITY
- NPN TRANSISTOR
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125 °C
- LARGE RBSOA

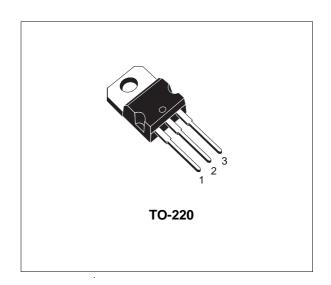
#### **APPLICATIONS**

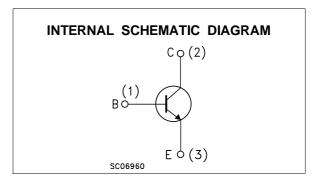
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES



The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

They use a Cellular Emitter structure to enhance switching speeds.





#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CEV}$	Collector-Emitter Voltage (V <sub>BE</sub> = -1.5V)	700	V
V <sub>CEO</sub>	Collector-Emitter Voltage (I <sub>B</sub> = 0)	400	V
V <sub>EBO</sub>	Emitter-Base Voltage (I <sub>C</sub> = 0)	9	V
Ic	Collector Current	8	Α
I <sub>CM</sub>	Collector Peak Current	16	Α
I <sub>B</sub>	Base Current	4	Α
I <sub>BM</sub>	Base Peak Current	8	Α
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> ≤ 25 °C	80	W
T <sub>stg</sub>	Storage Temperature	-65 to 150	°C
Tj	Max. Operating Junction Temperature	150	°C

July 1998 1/6

#### THERMAL DATA

## **ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

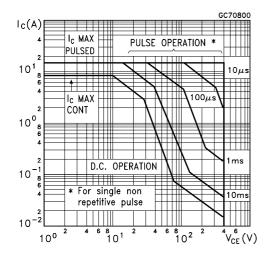
Symbol	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CEV</sub>	Collector Cut-off Current (V <sub>BE</sub> = -1.5V)	V <sub>CE</sub> = rated V <sub>CEV</sub> V <sub>CE</sub> = rated V <sub>CEV</sub> T <sub>c</sub> = 100 °C			10 0.5	μA mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 9 V			1	mA
V <sub>CEO(sus)</sub> *	Collector-Emitter Sustaining Voltage	Ic = 10 mA	400			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	$\begin{split} I_C &= 2 \text{ A} & I_B &= 0.4 \text{ A} \\ I_C &= 5 \text{ A} & I_B &= 1 \text{ A} \\ I_C &= 8 \text{ A} & I_B &= 2 \text{ A} \\ I_C &= 5 \text{ A} & I_B &= 1 \text{ A} & T_c &= 100 \text{ °C} \end{split}$			1 2 3 3	V V V
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = 2 A	2		1.2 1.6 1.5	V V V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 2 A	16 26 5		30 40 30	
t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Storage Time Fall Time	$I_{C} = 2 \text{ A}$ $V_{CC} = 300 \text{ V}$ $I_{B1} = 0.4 \text{ A}$ $I_{B2} = -0.4 \text{ A}$ $t_{p} = 30  \mu\text{s}$	3		4.5 350	μs ns
t <sub>s</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 5 A V <sub>CL</sub> = 250 V I <sub>B1</sub> = 1 A I <sub>B2</sub> = -2 A L = 200 μH		1.6 60	2.5 110	μs ns
t <sub>s</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 5 A V <sub>CL</sub> = 250 V I <sub>B1</sub> = 1 A I <sub>B2</sub> = -2 A L = 200 μH T <sub>c</sub> = 125 °C		2.3 110		μs ns

\* Pulsed: Pulse duration = 300 µs, duty cycle 2 %

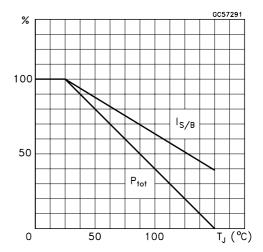
Note: DC current gain pre-selected product (Group A and Group B). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.

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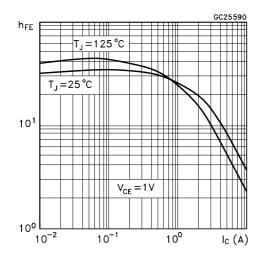
#### Safe Operating Areas



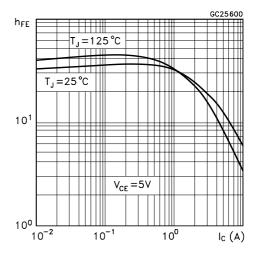
#### **Derating Curve**



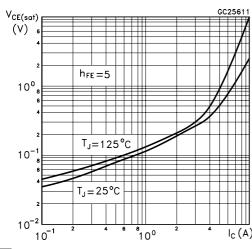
#### DC Current Gain



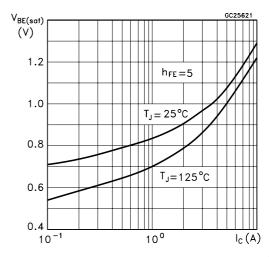
DC Current Gain



### Collector Emitter Saturation Voltage

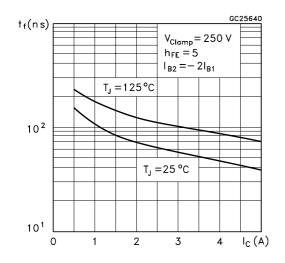


Base Emitter Saturation Voltage

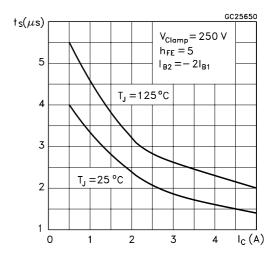


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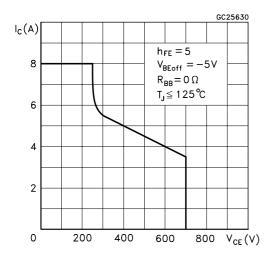
#### Inductive Fall Time



#### Inductive Storage Time



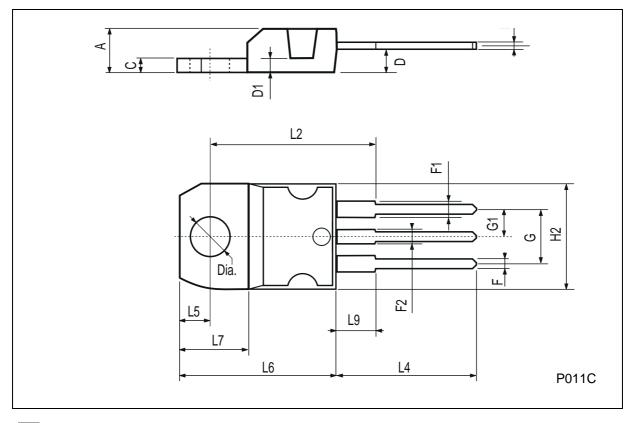
#### Reverse Biased SOA



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# **TO-220 MECHANICAL DATA**

DIM	mm					
DIM.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α	4.40		4.60	0.173		0.181
С	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
Е	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



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