



# ST13007N ST13007NFP

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

- HIGH VOLTAGE CAPABILITY
- NPN TRANSISTOR
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

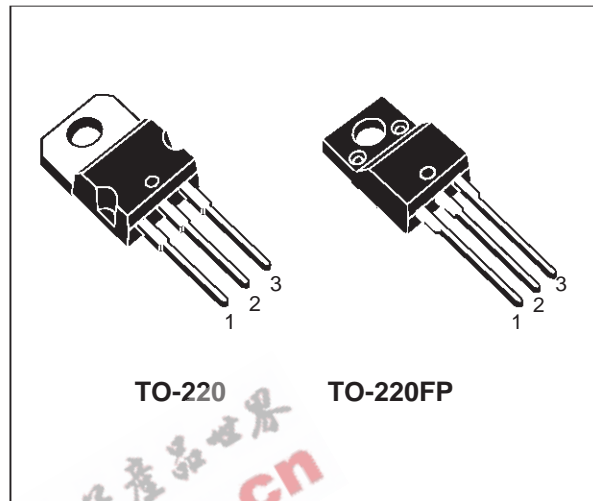
### APPLICATIONS

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

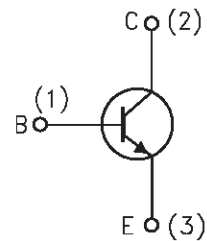
### DESCRIPTION

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.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		ST13007N	ST13007NFP	
$V_{CEV}$	Collector-Emitter Voltage ( $V_{BE} = -1.5V$ )	700		V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	400		V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	9		V
$I_C$	Collector Current	8		A
$I_{CM}$	Collector Peak Current	16		A
$I_B$	Base Current	4		A
$I_{BM}$	Base Peak Current	8		A
$P_{tot}$	Total Dissipation at $T_c \leq 25^\circ C$	80	33	W
$T_{stg}$	Storage Temperature	-65 to 150		$^\circ C$
$T_j$	Max. Operating Junction Temperature	150		$^\circ C$

## ST13007N / ST13007NFP

### THERMAL DATA

			TO-220	TO-220FP	
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.56	3.8	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-Ambient	Max	62.5	62.5	°C/W

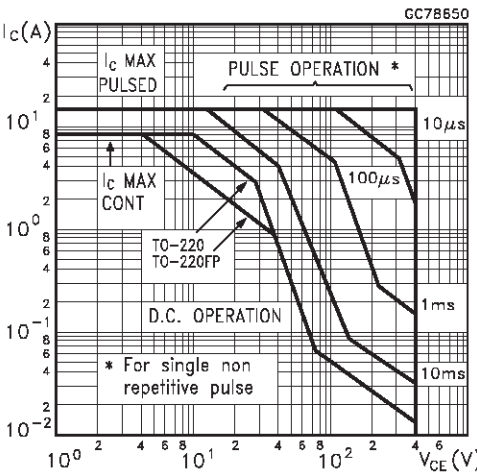
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	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			1 5	mA 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	I <sub>C</sub> = 10 mA	400			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 2 A I <sub>B</sub> = 0.4 A I <sub>C</sub> = 5 A I <sub>B</sub> = 1 A I <sub>C</sub> = 8 A I <sub>B</sub> = 2 A I <sub>C</sub> = 5 A I <sub>B</sub> = 1 A T <sub>c</sub> = 100 °C			1 2 3 3	V V V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 2 A I <sub>B</sub> = 0.4 A I <sub>C</sub> = 5 A I <sub>B</sub> = 1 A I <sub>C</sub> = 5 A I <sub>B</sub> = 1 A T <sub>c</sub> = 100 °C			1.2 1.6 1.5	V V V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 2 A V <sub>CE</sub> = 5 V Group A Group B I <sub>C</sub> = 5 A V <sub>CE</sub> = 5 V	15 26 5		28 40 30	
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 5 A V <sub>CL</sub> = 200 V I <sub>B1</sub> = 1 A V <sub>BEoff</sub> = -5 V R <sub>BB</sub> = 0 Ω		0.6 60	1.5 110	μs ns

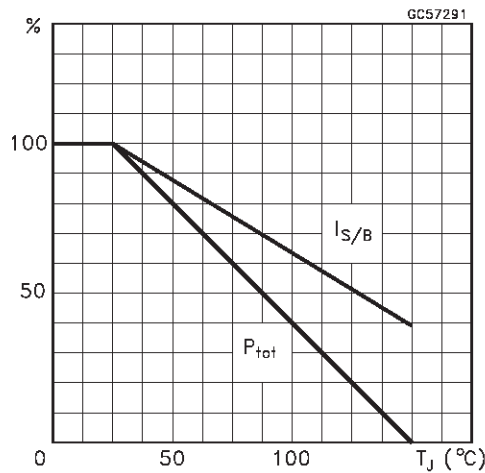
\* Pulsed: Pulse duration = 300 μs, duty cycle 2 %

Note : Product is pre-selected in DC current gain (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.

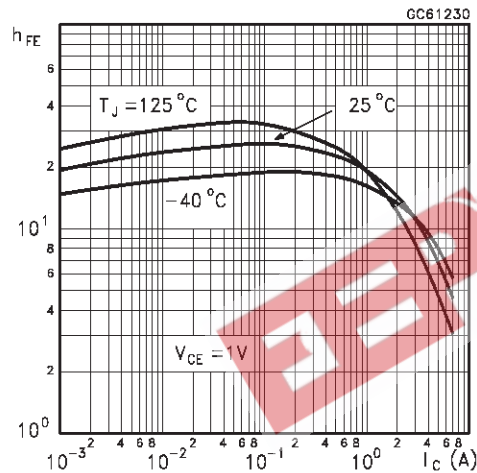
Safe Operating Areas



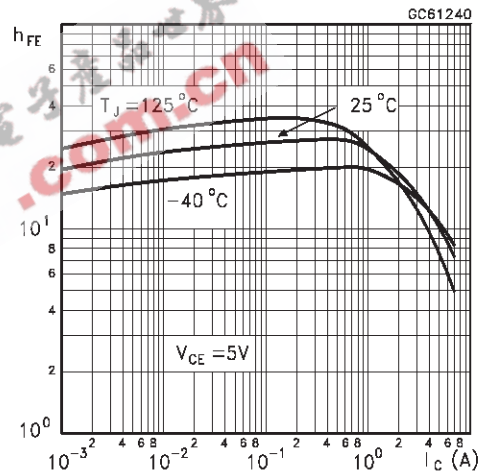
Derating Curve



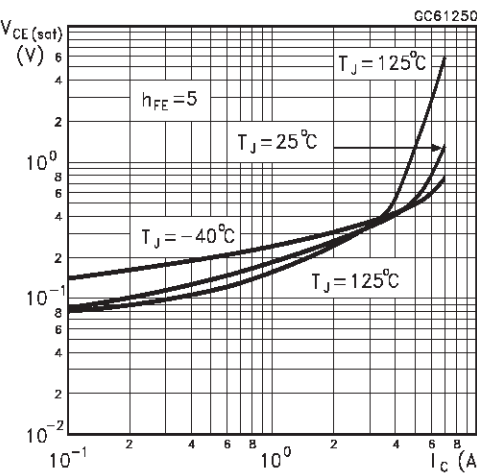
DC Current Gain



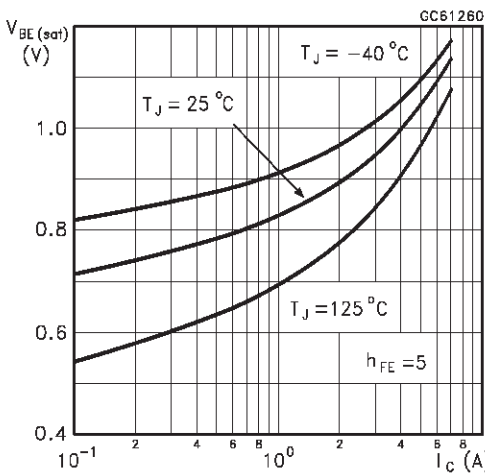
DC Current Gain



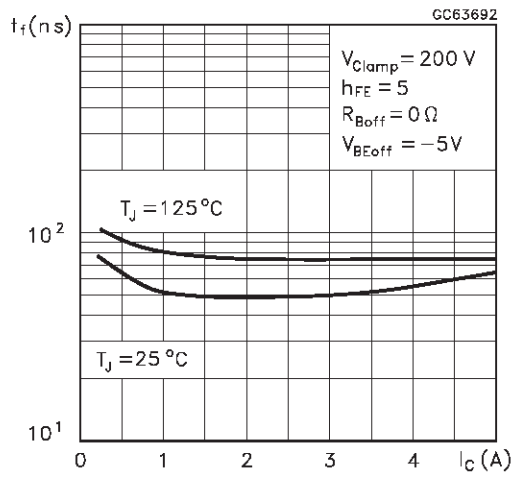
Collector Emitter Saturation Voltage



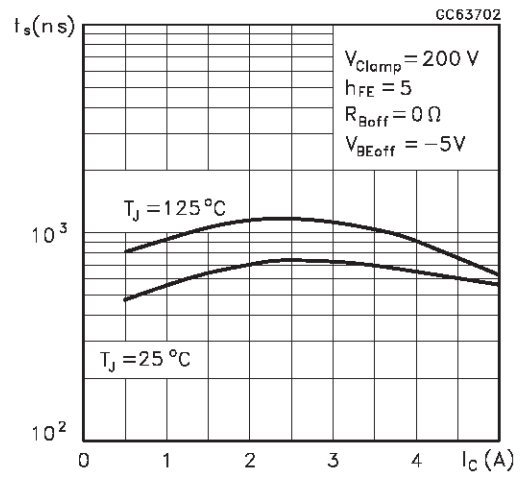
Base Emitter Saturation Voltage



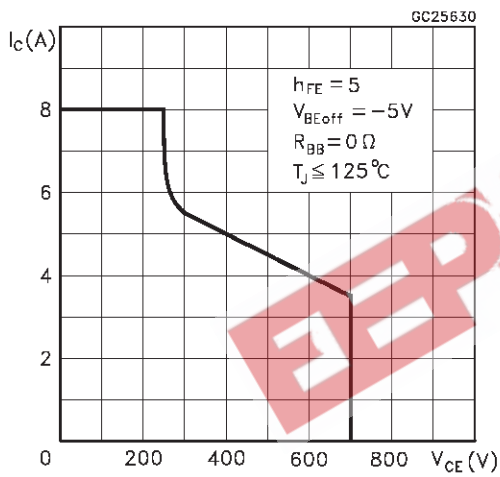
Inductive Fall Time



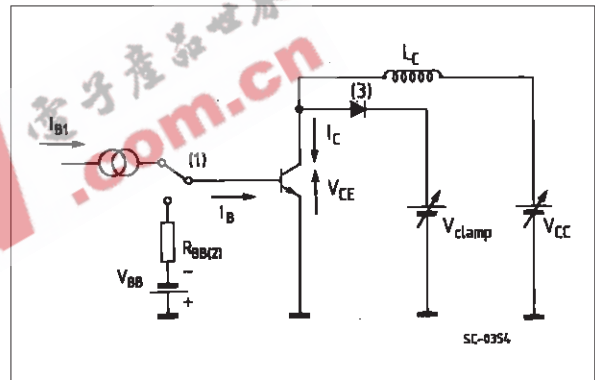
Inductive Storage Time



Reverse Biased SOA



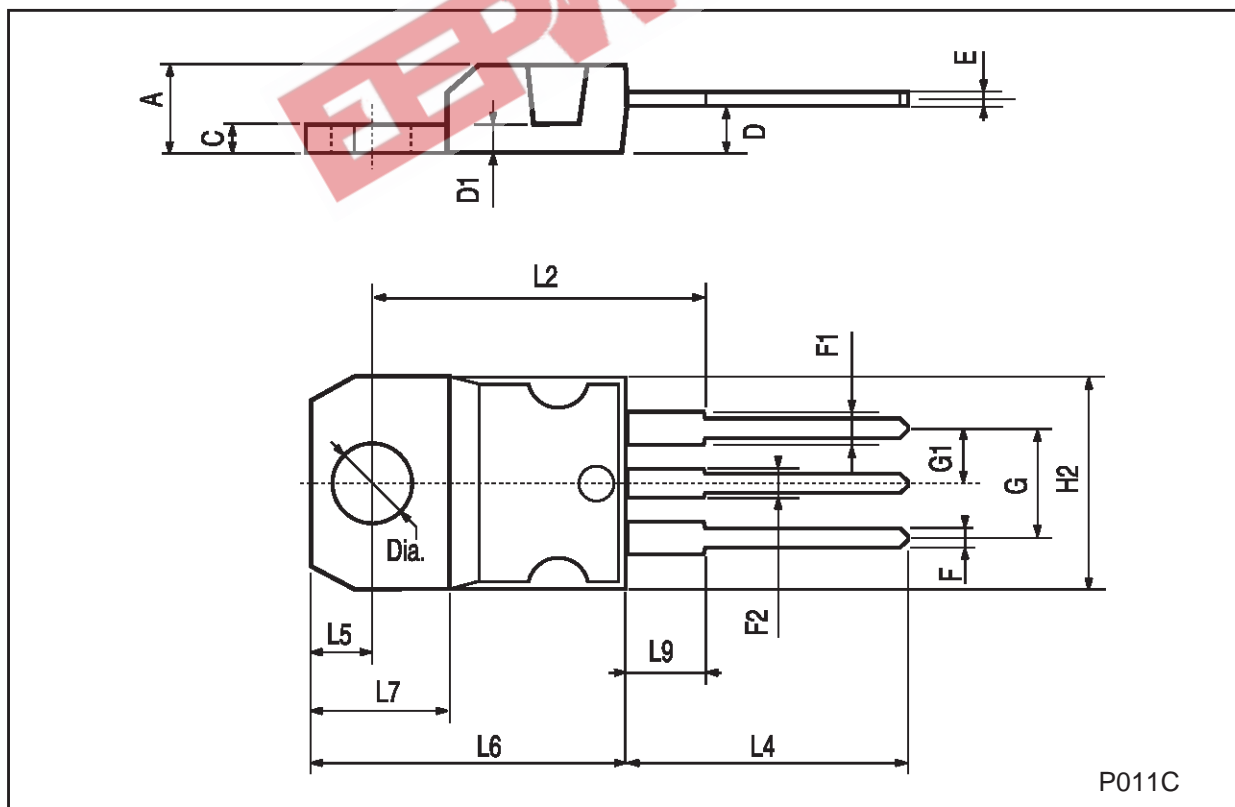
RBSOA and Inductive Load Switching Test Circuits



- 1) Fast electronic switch
- 2) Non-inductive Resistor
- 3) Fast recovery rectifier

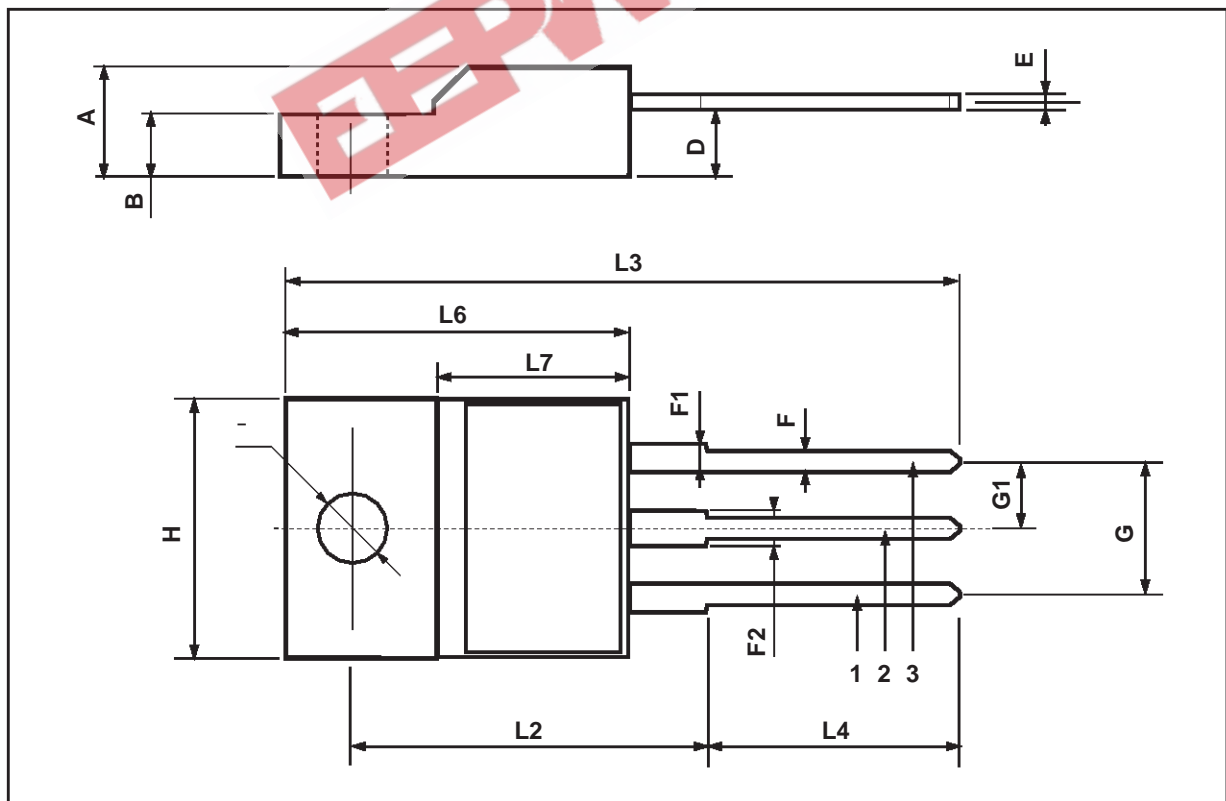
## TO-220 MECHANICAL DATA

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



**TO-220FP MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126



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