



High voltage fast-switching NPN Power Transistor

General features

- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed
- In compliance with the 2002/93/EC European Directive

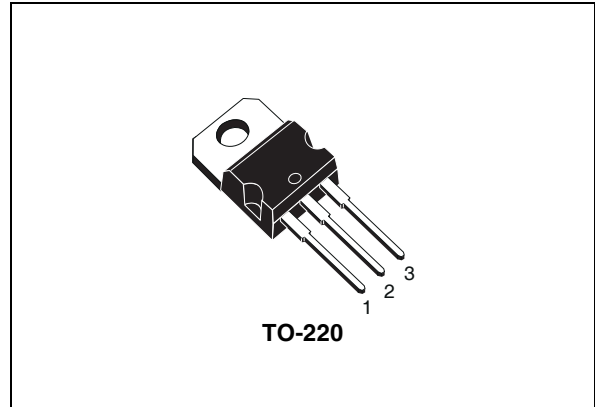
Description

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

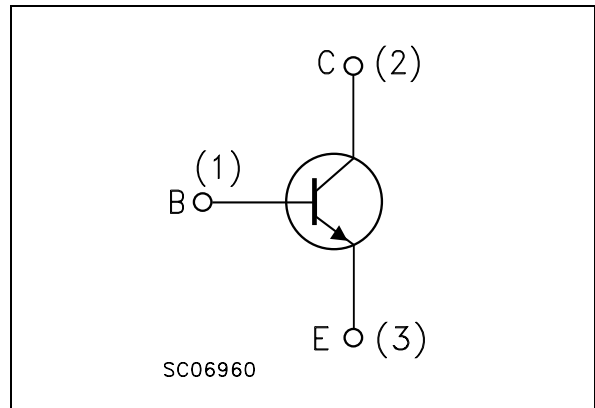
Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand an high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.

Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies.



Internal schematic diagram



Order codes

Part number	Marking	Package	Packaging
BUL741	BUL741	TO-220	Tube

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	1050	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	400	V
V_{EBO}	Emitter-base voltage ($I_C = 0, I_B = 2A, t_p < 10ms$)	$V_{(BR)EBO}$	V
I_C	Collector current	2.5	A
I_{CM}	Collector peak current ($t_p < 5ms$)	5	A
I_B	Base current	1.5	A
I_{BM}	Base peak current ($t_p < 5ms$)	3	A
P_{tot}	Total dissipation at $T_C = 25^\circ C$	60	W
T_{stg}	Storage temperature	-65 to 150	$^\circ C$
T_J	Max. operating junction temperature	150	$^\circ C$

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	2.08	$^\circ C/W$

2 Electrical characteristics

($T_{case} = 25^{\circ}C$ unless otherwise specified)

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{BE} = 0V$)	$V_{CE} = 1050V$		0.2	10	μA
I_{CEO}	Collector cut-off current ($I_B = 0$)	$V_{CE} = 400V$		10	250	μA
$V_{(BR)EBO}$	Emitter-base breakdown voltage ($I_C = 0$)	$I_E = 1mA$	15	19	24	V
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 10mA$	400	450		V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 0.7A$ $I_B = 0.14A$ $I_C = 2A$ $I_B = 0.6A$		0.15 0.5	0.5 1.5	V V
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 2A$ $I_B = 0.6A$		1.1	1.5	V
h_{FE}	DC current gain	$I_C = 0.1A$ $V_{CE} = 5V$ $I_C = 0.45A$ $V_{CE} = 3V$	48 25	70 35	100 50	
t_s t_f	Resistive load Storage time Fall time	$V_{CC} = 125V$ $I_C = 1A$ $I_{B1} = -I_{B2} = 0.2A$ $t_p = 300\mu s$ $V_{BE(off)} = -5V$		2.5 350	3.5 500	μs ns
E_{ar}	Repetitive avalanche energy	$L = 2mH$ $C = 1.8nF$ $V_{BE(off)} = -5V$	5			mJ

Note (1) Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Typical characteristic

Figure 1. Safe operating area

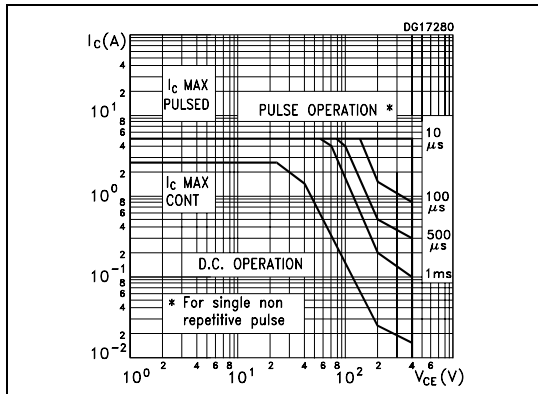


Figure 2. Derating curve

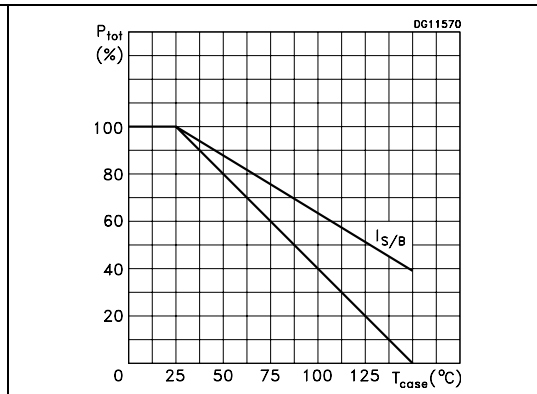


Figure 3. Output characteristics

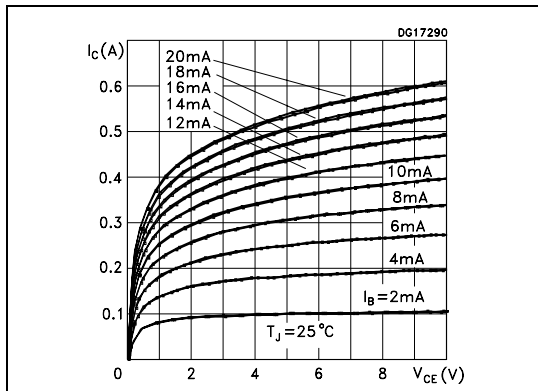


Figure 4. DC current gain

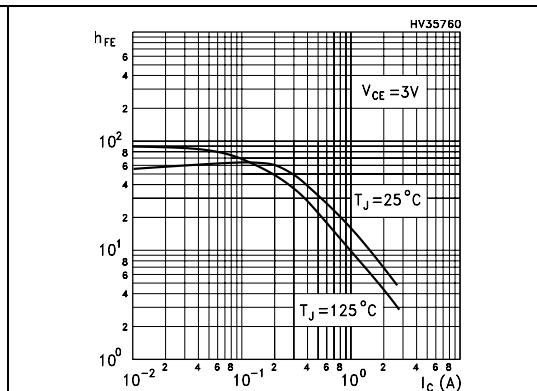


Figure 5. DC current gain

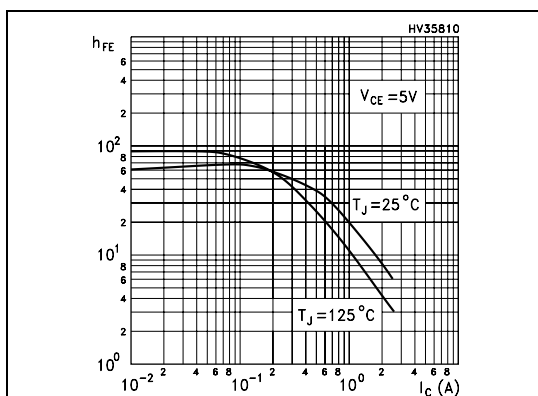


Figure 6. Base-emitter saturation voltage

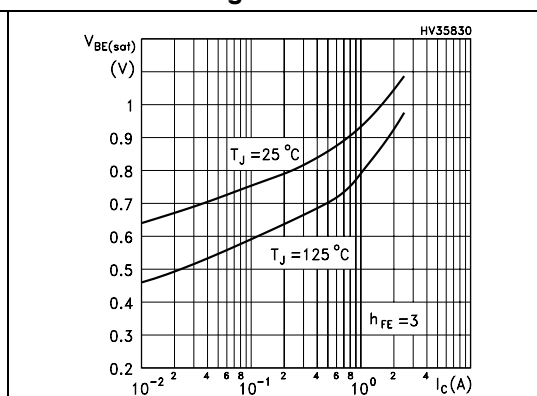


Figure 7. Collector-emitter saturation voltage

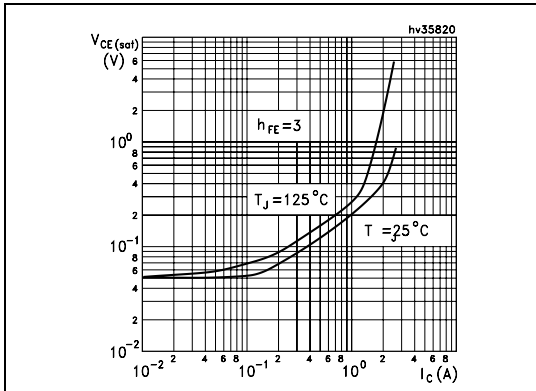


Figure 8. Resistive load switching on times

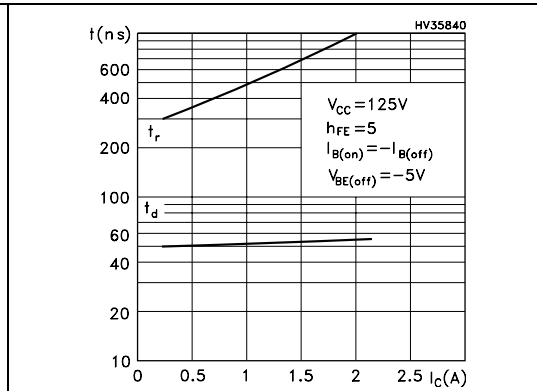


Figure 9. Resistive load switching on times

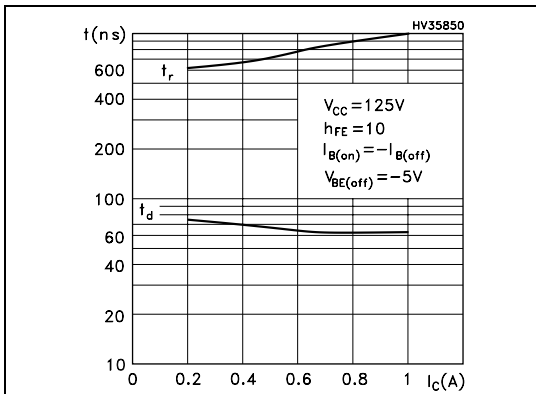


Figure 10. Resistive load switching off times

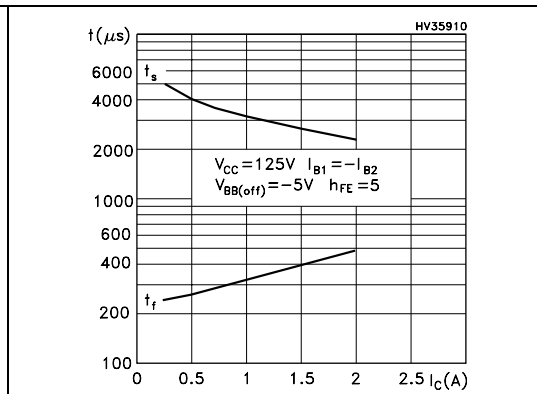


Figure 11. Resistive load switching off times

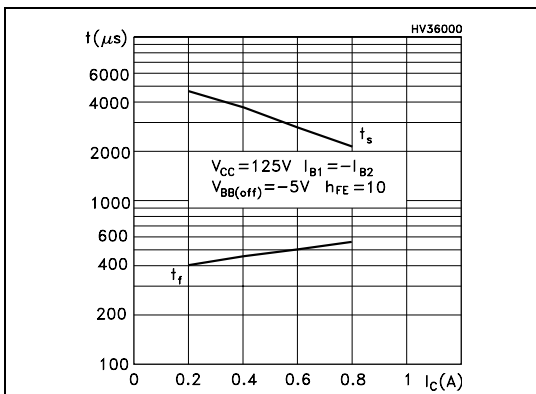
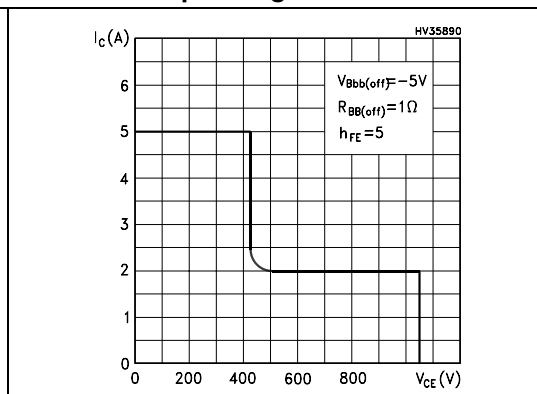


Figure 12. Reverse biased safe operating area



2.2 Test circuits

Figure 13. Resistive load switching test circuit

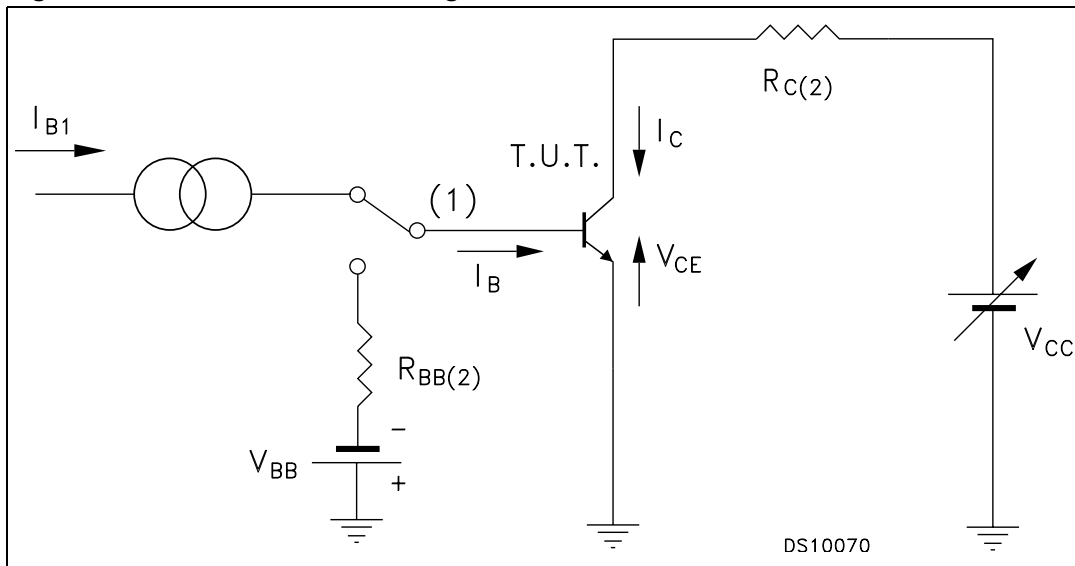
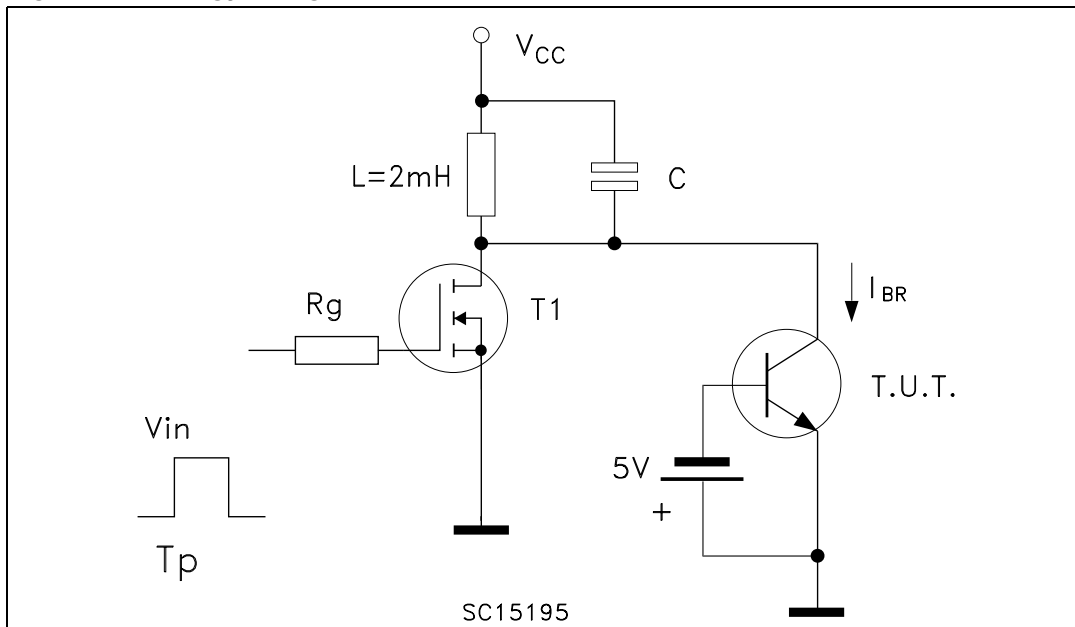


Figure 14. Energy rating test circuit

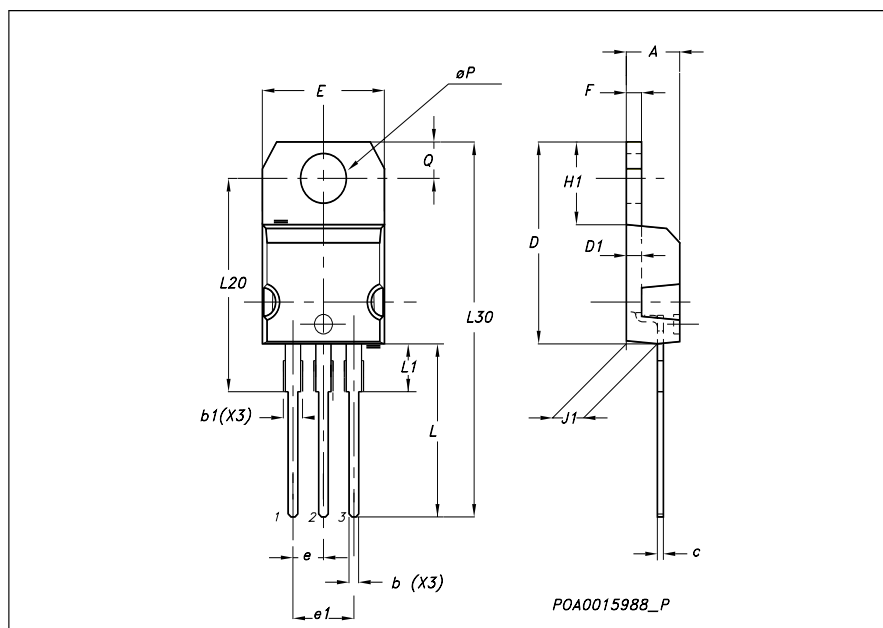


3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

TO-220 Mechanical data

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.49		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
øP	3.75		3.85
Q	2.65		2.95



4 Revision history

Table 4. Revision history

Date	Revision	Changes
11-Apr-2007	1	Initial release.

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