



BUL129D

High voltage fast-switching
NPN power transistor

Features

- Integrated antiparallel collector-emitter diode
- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

Applications

- Electronic transformer for halogen lamp

Description

The device is manufactured using high voltage multi-epitaxial planar technology for high switching speeds while maintaining the wide RBSOA. The device is designed for use in electronic transformer for halogen lamp.

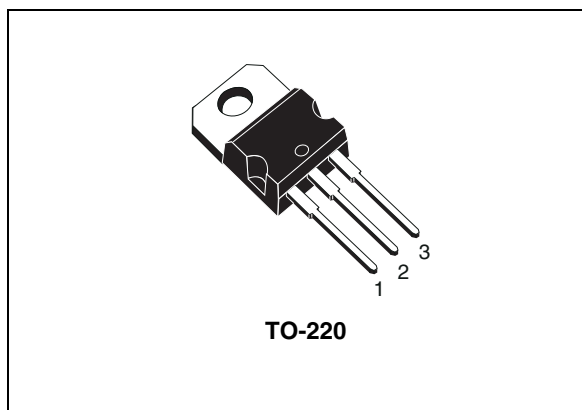


Figure 1. Internal schematic diagram

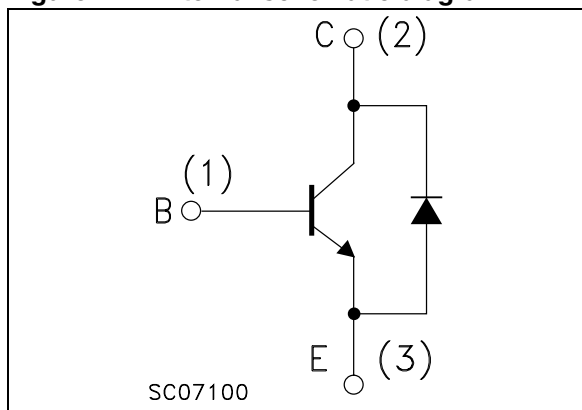


Table 1. Device summary

Order code	Marking	Package	Packaging
BUL129D	BUL129D	TO-220	Tube

Contents

1 **Electrical ratings** 3

2 **Electrical characteristics** 4

 2.1 Electrical characteristics (curves) 5

3 **Test circuit** 7

4 **Package mechanical data** 8

5 **Revision history** 10

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	800	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	450	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	9	V
I_C	Collector current	4	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	8	A
I_B	Base current	2	A
I_{BM}	Base peak current ($t_P < 5$ ms)	4	A
P_{tot}	Total dissipation at $T_C = 25$ °C	65	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Max value	Unit
$R_{thj-case}$	Thermal resistance junction - case	1.92	°C/W
$R_{thj-amb}$	Thermal resistance junction - ambient	62.5	°C/W

2 Electrical characteristics

($T_{\text{case}} = 25\text{ °C}$ unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 800\text{ V}$ $V_{\text{CE}} = 800\text{ V}$ $T_{\text{C}} = 125\text{ °C}$			100 500	μA μA
V_{EBO}	Emitter base voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 10\text{ mA}$	9			V
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 10\text{ mA}$	450			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$ $I_{\text{C}} = 2.5\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$ $I_{\text{C}} = 4\text{ A}$ $I_{\text{B}} = 1\text{ A}$		0.7	0.7 1 1.5 V	V V V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$ $I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.5\text{ A}$			1.1 1.2 1.3	V V V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 10\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 4.5\text{ A}$ $V_{\text{CE}} = 10\text{ V}$	10 4			
t_{s}	Inductive load Storage time	$I_{\text{C}} = 2\text{ A}$ $V_{\text{clamp}} = 300\text{ V}$ $I_{\text{B1}} = 0.4\text{ A}$ $V_{\text{BE(off)}} = -5\text{ V}$		0.75	1.6	μs
t_{f}	Fall time	$R_{\text{BB}} = 0$		0.1	0.2	μs
V_{F}	Diode forward voltage	$I_{\text{F}} = 2\text{ A}$			1.5	V

1. Pulsed duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

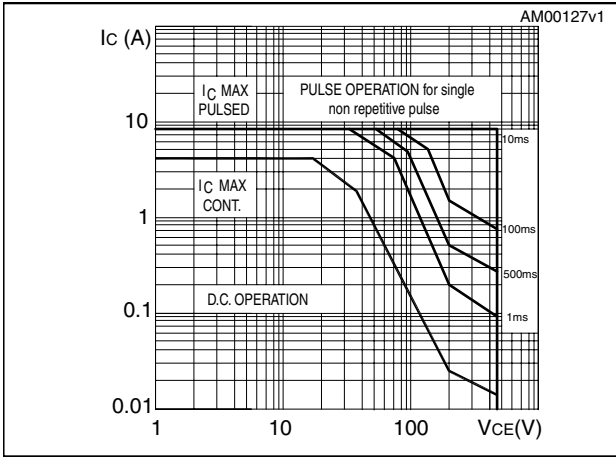


Figure 3. Derating

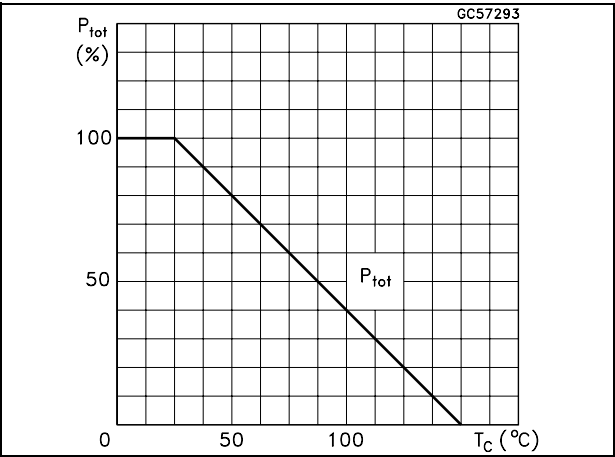


Figure 4. DC current gain (1 V)

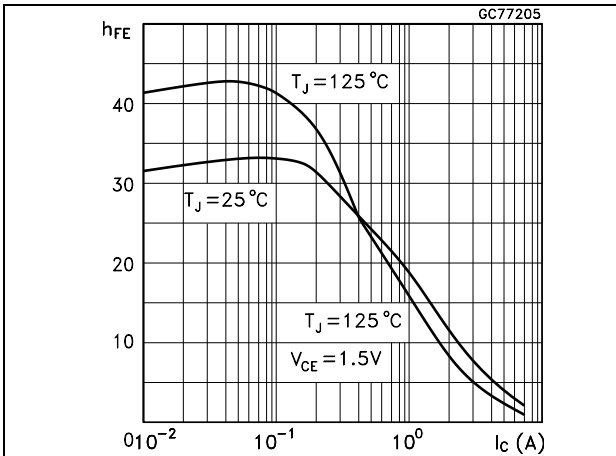


Figure 5. DC current gain (5 V)

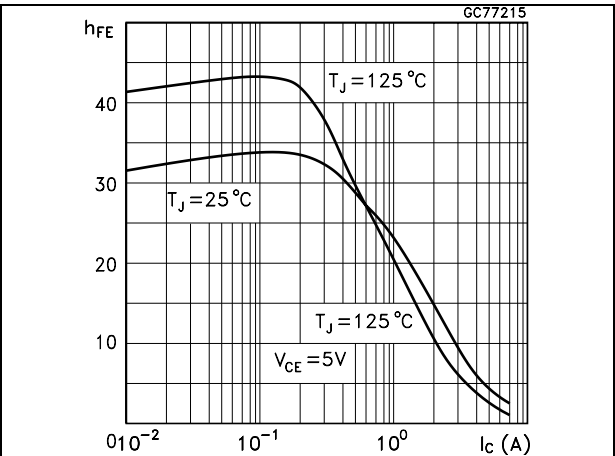


Figure 6. Collector emitter saturation voltage

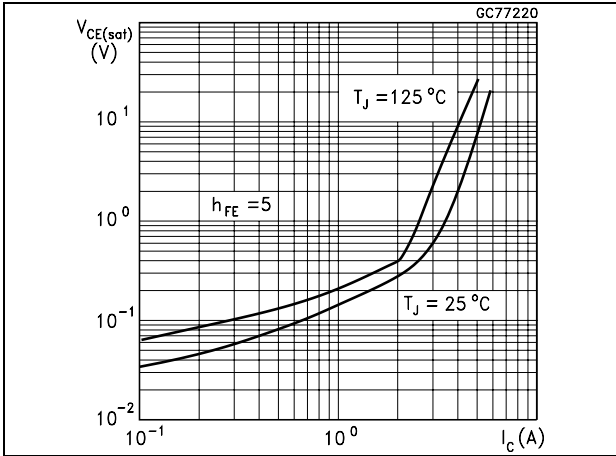


Figure 7. Base emitter saturation voltage

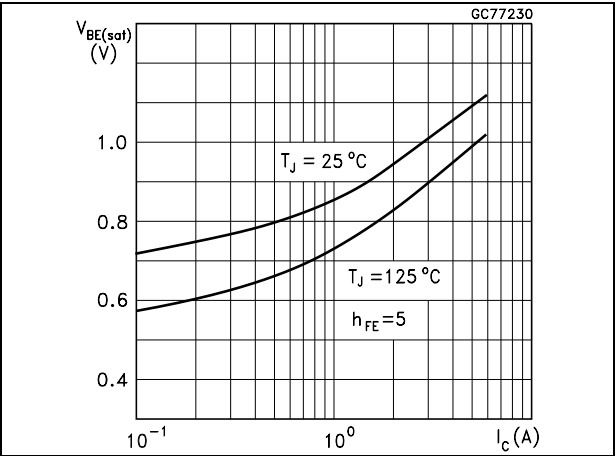


Figure 8. Inductive load fall time

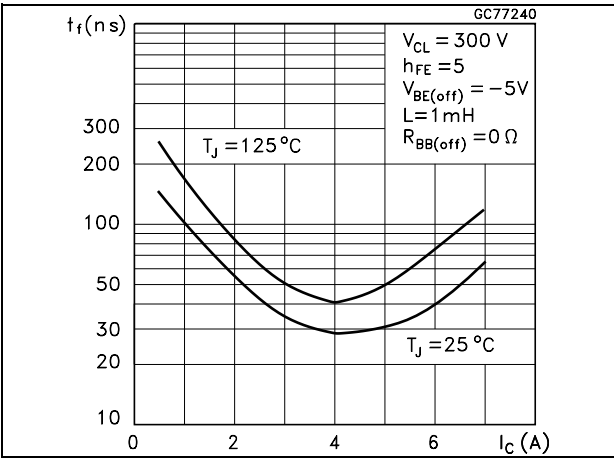


Figure 9. Inductive load storage time

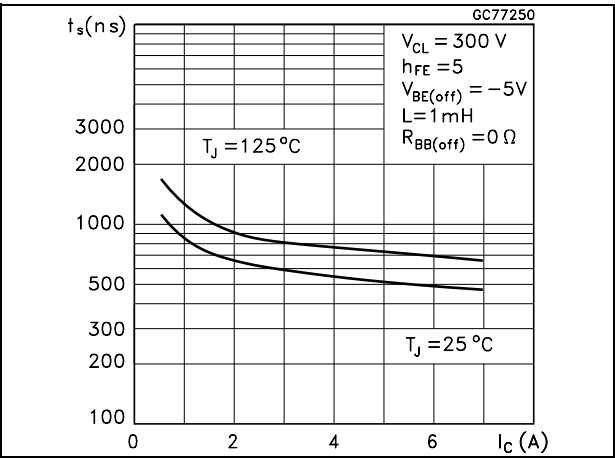
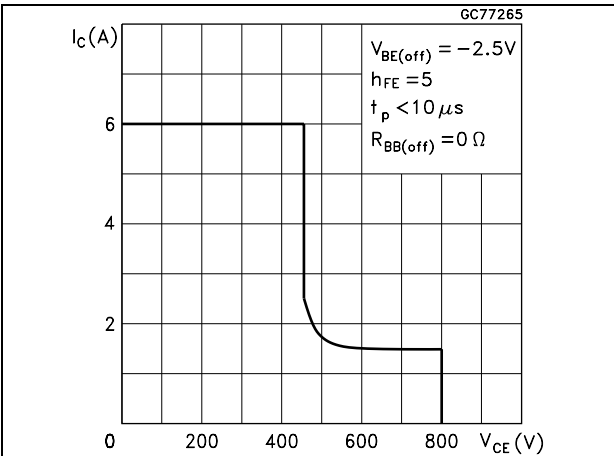
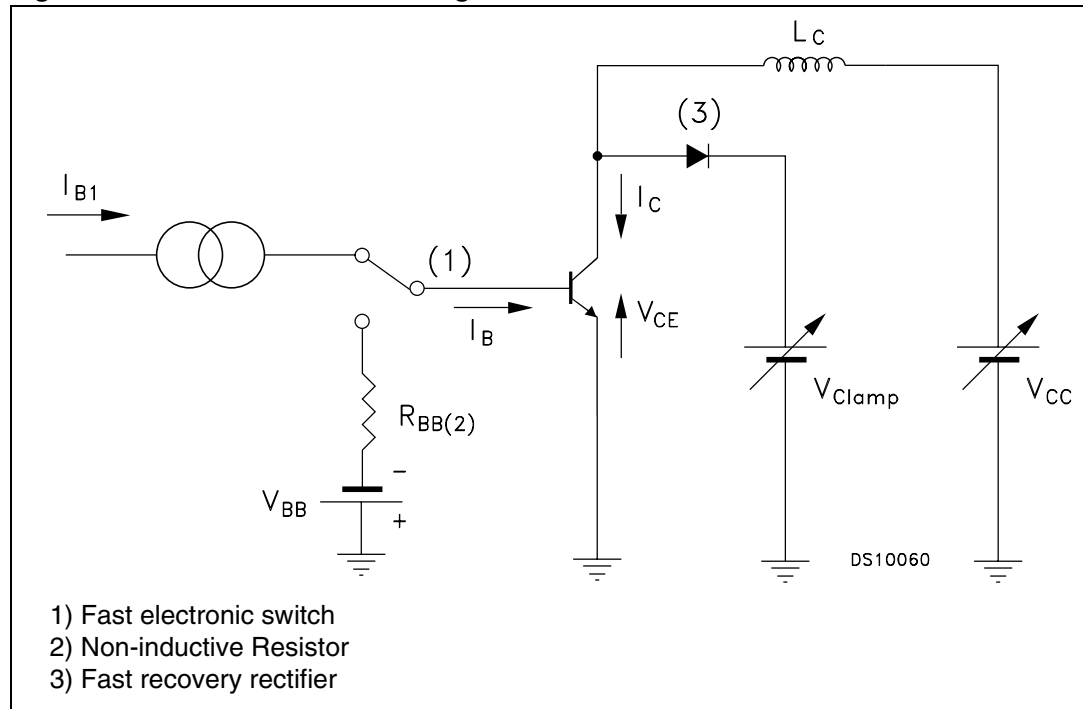


Figure 10. Reverse biased safe operating area



3 Test circuit

Figure 11. Inductive load switching test circuit

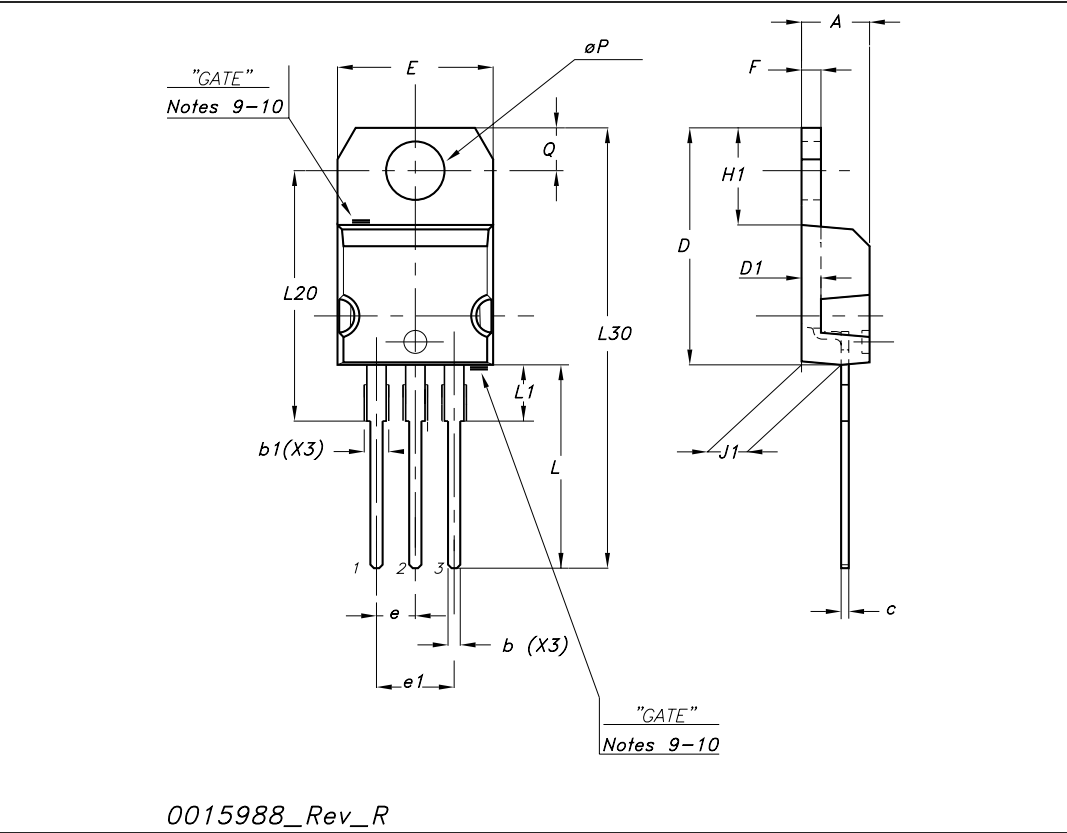


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

TO-220 mechanical data

Dim	mm			inch		
	Min	Typ	Max	Min	Typ	Max
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.14		1.70	0.044		0.066
c	0.48		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.051
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
ØP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116



5 Revision history

Table 5. Document revision history

Date	Revision	Changes
15-Jan-2009	1	Initial release

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