

High voltage fast-switching NPN power transistor

Features

- High voltage capability
- Very high switching speed
- High ruggedness

Applications

- Electronic transformers for halogen lamps
- Switch mode power supplies

Description

The BUL59 is manufactured using planar technology with epitaxial collector adopting new and enhanced high voltage structure.

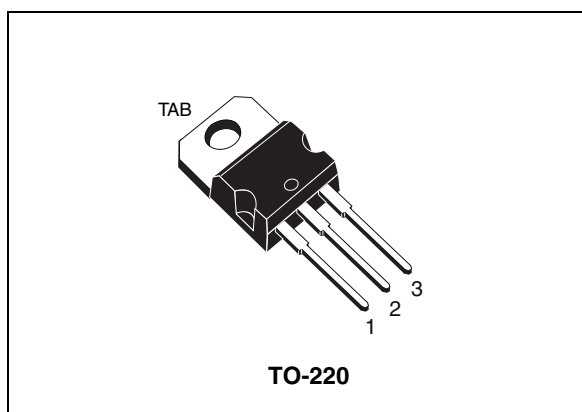


Figure 1. Internal schematic diagram

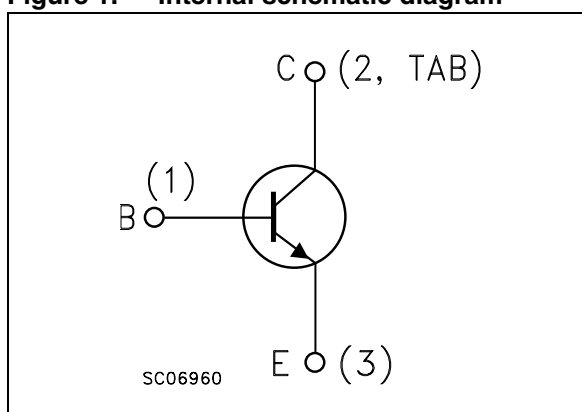


Table 1. Device summary

Order code	Marking	Package	Packaging
BUL59	BUL59	TO-220	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	850	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 ($t_P < 5$ ms)	16	A
I_B	Base current	4	A
I_{BM}	Base peak current ($t_P < 5$ ms)	8	A
P_{TOT}	Total dissipation at $T_C = 25$ °C	90	W
T_{STG}	Storage temperature	- 65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	1.39	°C/W
R_{thJA}	Thermal resistance junction-ambient max	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 ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 850\text{ V}$			200	μA
		$V_{\text{CE}} = 850\text{ V}$ $T_{\text{C}} = 125\text{ °C}$			500	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 9\text{ V}$			100	μA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 10\text{ mA}$	400			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.4\text{ A}$			0.5	V
		$I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 1\text{ A}$			1.5	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.4\text{ A}$			1.2	V
		$I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 1\text{ A}$			1.6	V
V_{CEW}	Maximum collector emitter voltage at turn off without snubber	$I_{\text{C}} = 11\text{ A}$ $I_{\text{B(on)}} = 1.83\text{ A}$ $V_{\text{BE(off)}} = -5\text{ V}$	450			V
h_{FE}	DC current gain	$I_{\text{C}} = 2\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	8		40	
		$I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	6		30	
		$I_{\text{C}} = 8\text{ A}$ $V_{\text{CE}} = 10\text{ V}$	4			
t_{s}	Inductive load Storage time	$I_{\text{C}} = 2\text{ A}$ $I_{\text{B(on)}} = 0.4\text{ A}$ $V_{\text{BE(off)}} = -5\text{ V}$ $R_{\text{BB}} = 0$		1.1		μs
t_{f}	Fall time	$V_{\text{CC}} = 250\text{ V}$ $L = 200\text{ }\mu\text{H}$		0.4		μs

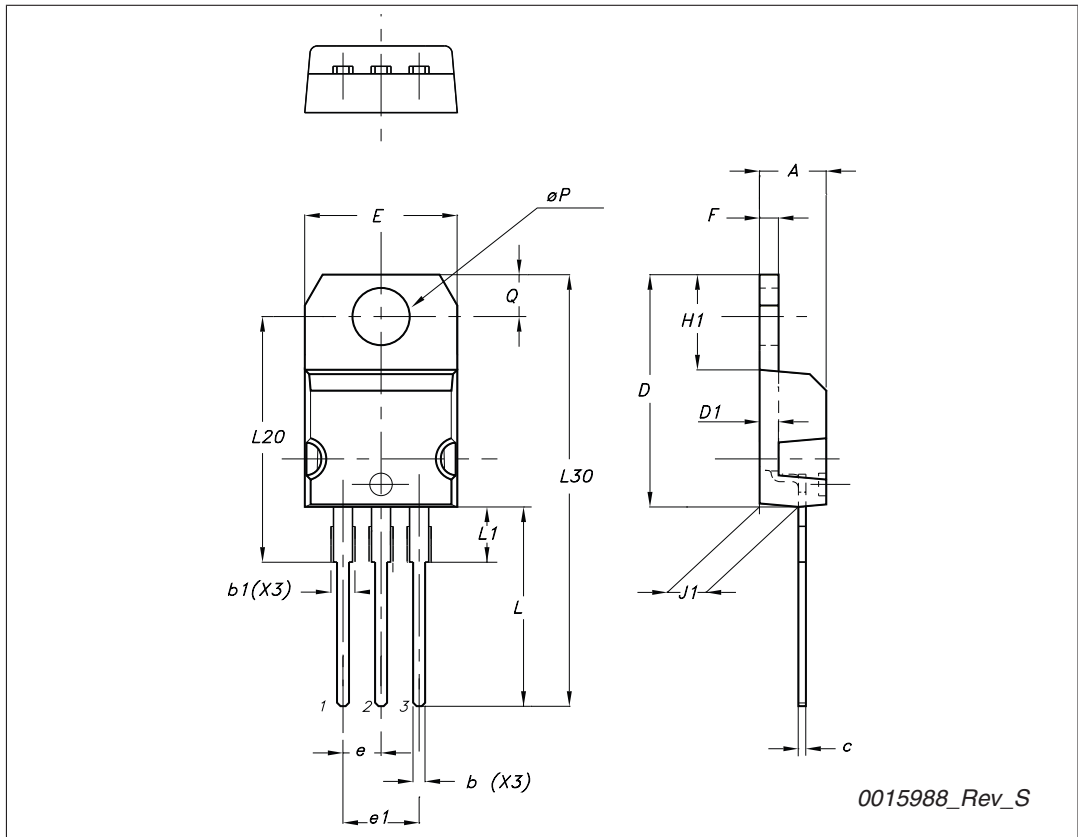
1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

3 Package mechanical data

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TO-220 type A mechanical data

Dim	mm		
	Min	Typ	Max
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		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	
∅P	3.75		3.85
Q	2.65		2.95



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Jun-2004	6	Document migration, no content change.
24-Feb-2010	7	Modified: <i>Description on page 1</i> , updated TO-220 package mechanical data.

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