

BUL743

High voltage fast-switching NPN power transistor

Features

- Low spread of dynamic parameters
- High voltage capability
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

Applications

- Electronic ballast for fluorescent lighting up to 256 W (8 x 32 W)
- Switch mode power supplies



The device is manufactured using the diffused collector in planar technology adopting new and enhanced high voltage structure. 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.

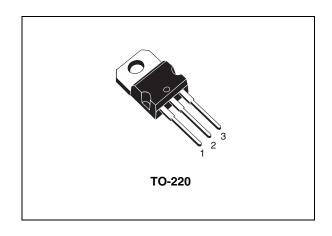


Figure 1. Internal schematic diagram

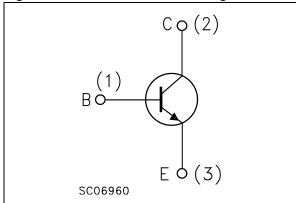


Table 1. Device summary

Order code	Marking	Package	Packaging
BUL743	BUL743	TO-220	Tube

Electrical ratings BUL743

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V _{CES}	Collector-emitter voltage (V _{BE} = 0)	1200	V
V _{CEO}	Collector-emitter voltage (I _B = 0)	500	V
V _{EBO}	Emitter-base voltage ($I_C = 0$, $I_B = 6$ A, $t_p < 10$ ms)	V _{(BR)EBO}	٧
I _C	Collector current	12	Α
I _{CM}	Collector peak current (t _P < 5 ms)	24	Α
I _B	Base current	6	Α
I _{BM}	Base peak current (t _P < 5 ms)	12	Α
P _{tot}	Total dissipation at T _c = 25 °C	100	W
T _{stg}	Storage temperature	-65 to 150	°C
TJ	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R _{thj-case}	Thermal resistance junction - case	1.25	°C/W
R _{thj-amb}	Thermal resistance junction - ambient	62.5	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CES}	Collector cut-off current (V _{BE} = 0)	V _{CE} = 1200 V		0.2	10	μΑ
I _{CEO}	Collector cut-off current $(I_B = 0)$	V _{CE} = 500 V		10	250	μΑ
V _{(BR)EBO}	Emitter base breakdown voltage $(I_C = 0)$	I _E = 1 mA	15	19	24	V
V _{CEO(sus)} (1)	Collector-emitter sustaining voltage (I _B = 0)	I _C = 50 mA	500			V
V _{CE(sat)} (1)	Collector-emitter saturation voltage	$I_C = 3 A$ $I_B = 0.6 A$ $I_C = 10 A$ $I_B = 2.5 A$		0.15 0.6	0.5 1.5	V V
V _{BE(sat)} (1)	Base-emitter saturation voltage	I _C = 10 A I _B = 2.5 A		1.1	1.5	V
h _{FE} ⁽¹⁾	DC current gain	$I_C = 0.5 \text{ A}$ $V_{CE} = 5 \text{ V}$ $I_C = 2 \text{ A}$ $V_{CE} = 3 \text{ V}$		55 34	80 45	
t _s	Resistive load Storage time Fall time	$I_C = 6 \text{ A}$ $V_{CC} = 125 \text{ V}$ $I_{B(on)} = -I_{B(off)} = 1.2 \text{ A}$ $I_p = 300 \mu \text{s}$ $V_{BE(off)} = -5 \text{ V}$		2.5 400	3.8 500	μs ns
E _{ar}	Repetitive avalanche energy	$L = 2 \text{ mH} \qquad C = 1.8 \text{ nF}$ $V_{BE(off)} = -5 \text{ V}$	3			mJ

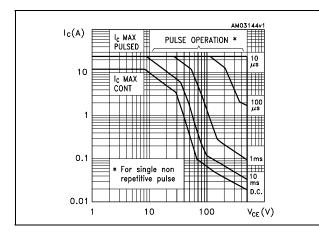
^{1.} Pulsed duration = 300 μ s, duty cycle \leq 1.5%

Electrical characteristics BUL743

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

Figure 3. Derating curve



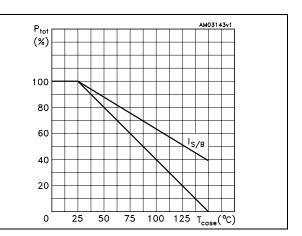
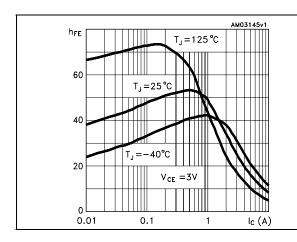


Figure 4. DC current gain $(V_{CE} = 3 V)$

Figure 5. DC current gain $(V_{CE} = 5 V)$



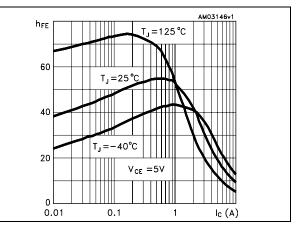
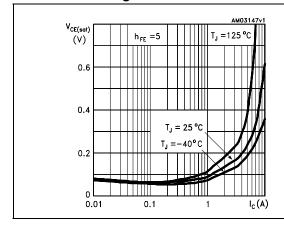


Figure 6. Collector-emitter saturation voltage

Figure 7. Base-emitter saturation voltage



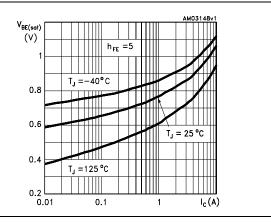


Figure 8. Output characteristics

Figure 9. Reverse biased safe operating area

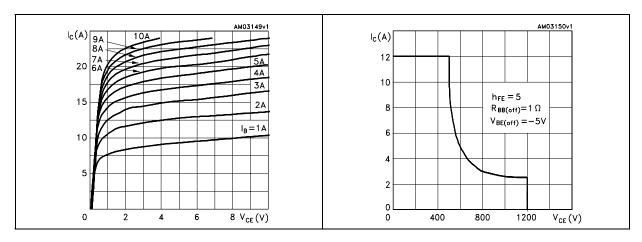
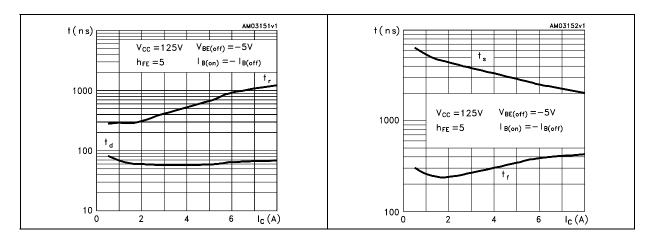


Figure 10. Resistive load switching time (on) Figure 11. Resistive load switching time (off)



Electrical characteristics BUL743

2.2 Test circuits

Figure 12. Energy rating test circuit

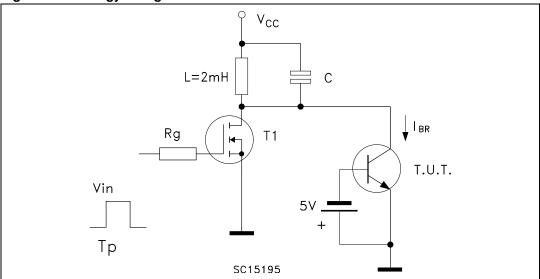
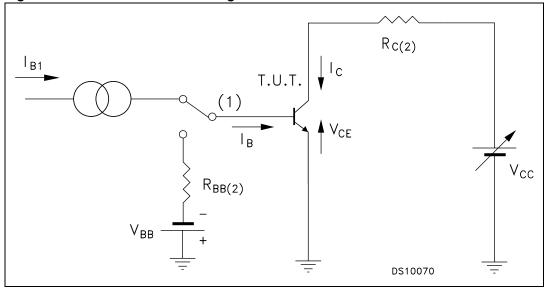


Figure 13. Resistive load switching test circuit



- 1. Fast electronic switch
- 2. Non-inductive resistor

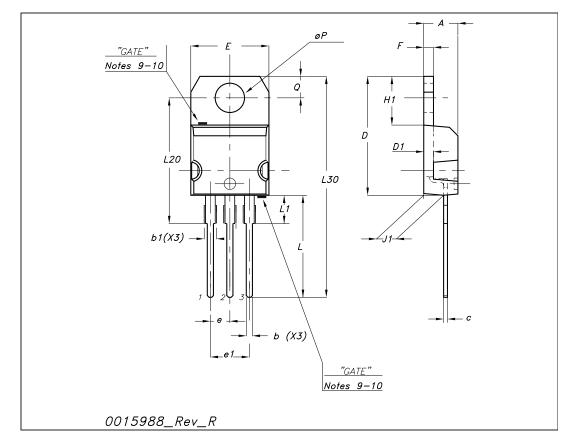
3 Package mechanical data

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	Тур	Max	Min	Тур	Max
Α	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
С	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
е	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



BUL743 Revision history

4 Revision history

Table 5. Document revision history

Date	Revision	Changes	
09-Dec-2008	1	First release	
20-Mar-2009	2	Added Section 2.1Section 2.1: Electrical characteristics (curves) or page 4	
25-May-2009	3	Document status promoted from preliminary data to datasheet	

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