

High voltage fast-switching NPN power transistor

Features

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

Applications

- Electronic ballast for fluorescent lighting
- Electronic transformer for halogen lamps



The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining a satisfactory RBSOA.

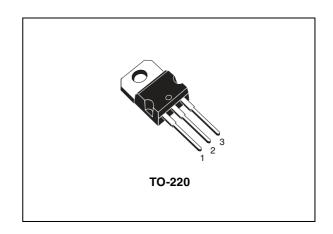


Figure 1. Internal schematic diagrams

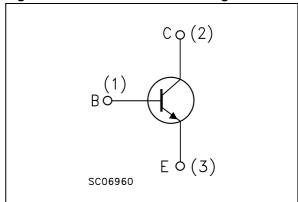


Table 1. Device summary

Order code	Marking	Package	Packaging
TR136	TR136	TO-220	Tube

Electrical ratings TR136

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V _{CES}	Collector-emitter voltage (V _{BE} = 0)	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	3	Α
I _{CM}	Collector peak current (t _P < 5ms)	6	Α
I _B	Base current	1.5	Α
I _{BM}	Base peak current (t _P < 5ms)	3	Α
P _{tot}	Total dissipation at T _c ⊴25°C	60	W
T _{stg}	Storage temperature	-65 to 150	°C
TJ	Max. operating junction temperature	150	°C

2 Electrical characteristics

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

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CEV}	Collector cut-off current (V _{BE} = -1.5V)	V _{CE} = 700 V V _{CE} = 700 V T _C = 100 °	С		1 5	mA mA
I _{EBO}	Emitter cut-off current (I _C =0)	V _{EB} = 9 V			1	mA
V _{CEO(sus)} ⁽¹⁾	Collector-emitter sustaining voltage (I _B = 0)	I _C = 10 mA	400			V
V _{CE(sat)} (1)	Collector-emitter saturation voltage	$\begin{split} I_C &= 0.5 \text{ A} & I_B &= 0.1 \text{ A} \\ I_C &= 0.6 \text{ A} & I_B &= 60 \text{ m} \\ I_C &= 2 \text{ A} & I_B &= 0.5 \end{split}$	nΑ		0.5 0.7 1	V V V
V _{BE(sat)} (1)	Base-emitter saturation voltage	$I_C = 1 A$ $I_B = 0.2$ $I_C = 2 A$ $I_B = 0.5$			1.2 1.6	V V
h _{FE}	DC current gain	$I_C = 10 \text{ mA}$ $V_{CE} = 5 \text{ N}$ $I_C = 2 \text{ A}$ $V_{CE} = 5 \text{ N}$			20	
t _s	Inductive load Storage time Fall time	$I_C = 1A$ $R_{BB} = 0$ $V_{Clamp} = 200 \text{ V}$ $L = 50 \text{ m}$ (see <i>Figure 2</i>)		0.8 0.16		μs μs

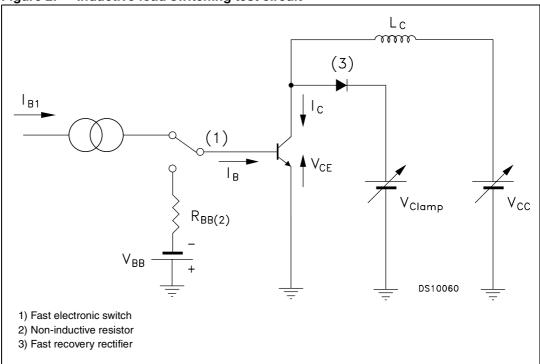
^{1.} Pulsed duration = 300 ms, duty cycle ≤ 1.5%

577

Electrical characteristics TR136

2.1 Test circuits

Figure 2. Inductive load switching test circuit



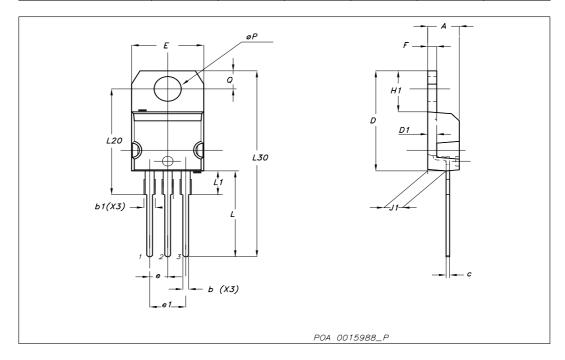
3 Package mechanical data

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

577

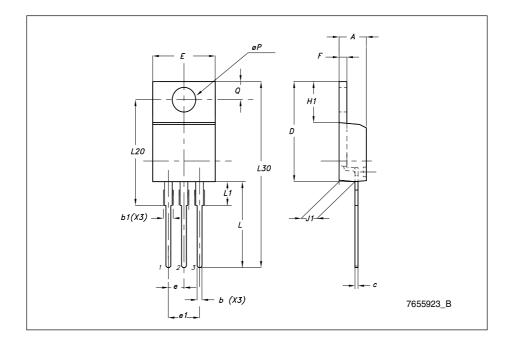
TO-220 mechanical data

Dim		mm			inch	
Dim	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	0.49		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



TO-220 type E mechanical data

DIM	mm.				
DIM.	MIN.	TYP	MAX.		
Α	4.47		4.67		
b	0.70		0.91		
b1	1.17		1.37		
С	0.31		0.53		
D	14.60		15.70		
E	9.96		10.36		
е		2.54			
e1	4.98	5.08	5.18		
F	1.17		1.37		
H1	6.10		6.80		
J1	2.52		2.82		
L	12.70		13.80		
L1	3.20		3.96		
L20	15.21		16.77		
øΡ	3.73		3.94		
Q	2.59		2.89		



Revision history TR136

4 Revision history

Table 4. Document revision history

Date	Revision	Changes
08-Oct-2007	1	Initial release
08-Feb-2008	2	Updated TO-220, type E, mechanical data

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