STBV32

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

- Compact fluorescent lamps (CFLS)
- SMPS for battery charger

Description

The device is manufactured using high voltage multi epitaxial planar technology for high switching speeds and high voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.
The STBV32G and STBV32G-AP are supplied using halogen-free molding compound.

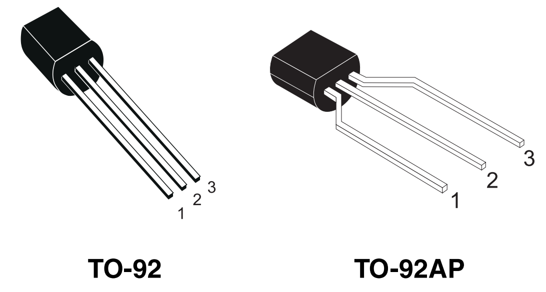


Figure 1. Internal schematic diagram

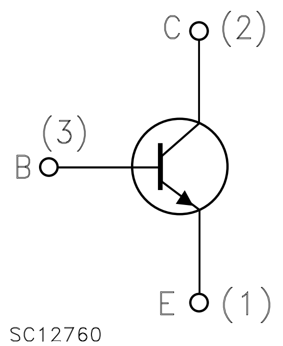


Table 1. Device summary

Order codes	Marking	Package	Packaging
STBV32	BV32	TO-92	Bulk
STBV32G	BV32G	TO-92	Bulk
STBV32-AP	BV32	TO-92AP	Ammopack
STBV32G-AP	BV32G	TO-92AP	Ammopack

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}	Collector-base voltage ($I_C = 0$, $I_B = 0.5A$, $t_P < 10$ ms)	$V_{(BR)EBO}$	V
I_C	Collector current ($f \geq 100$ Hz, duty-cycle $\leq 50\%$, $T_C = 25$ °C)	1.5	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	3	A
I_B	Base current	0.5	A
I_{BM}	Base peak current ($t_P < 5$ ms)	1.5	A
P_{TOT}	Total dissipation at $T_c = 25$ °C	1.5	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	max	83.3	°C/W

2 Electrical characteristics

(T_{case} = 25 °C; unless otherwise specified)

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 700 V V_{CE} = 700 V T_C = 125 °C			1 5	mA mA
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 10 mA	9		18	V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 100 mA I_C = 1 A I_B = 250 mA I_C = 1.5 A I_B = 500 mA			0.5 1 1.5	V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 0.5 A I_B = 100 mA I_C = 1 A I_B = 250 mA			1 1.2	V V
h_{FE}	DC current gain	I_C = 0.5 mA V_{CE} = 2 V I_C = 0.5 A V_{CE} = 2 V I_C = 1 A V_{CE} = 2 V	20 8 5		 25 25	
t_r t_s t_f	Resistive load Rise time Storage time Fall time	I_C = 1 A t_p = 25 µs I_{B1} = $-I_{B2}$ = 200 mA V_{CC} = 125 V *Figure 12.*			1 4 0.7	µs µs µs
t_s	Inductive Load Storage time	I_C = 1 A V_{clamp} = 300 V I_{B1} = 200 mA $V_{BE(off)}$ = -5 V L = 50 mH R_{BB} = 0 *Figure 13.*		0.8		µs

1. Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

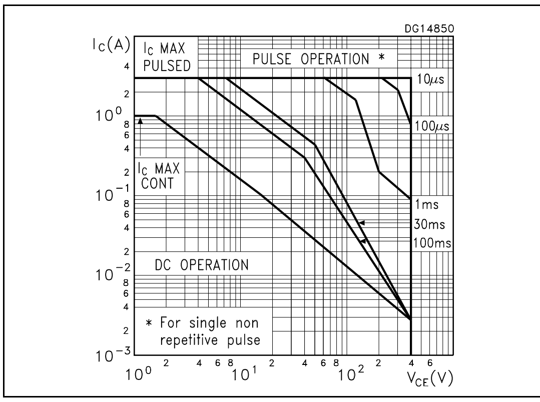


Figure 3. Derating curve

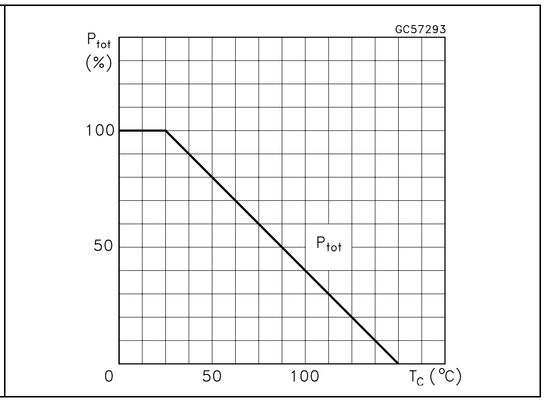


Figure 4. Output characteristics

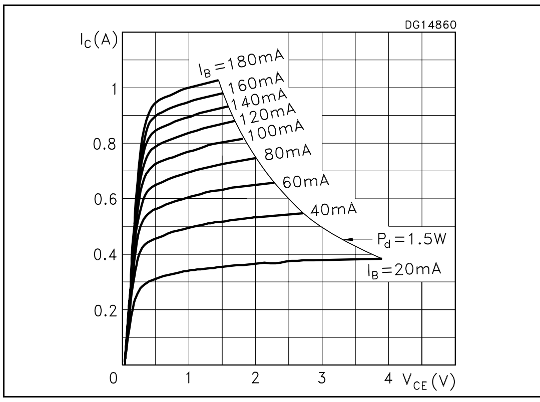


Figure 5. Reverse biased safe operating area

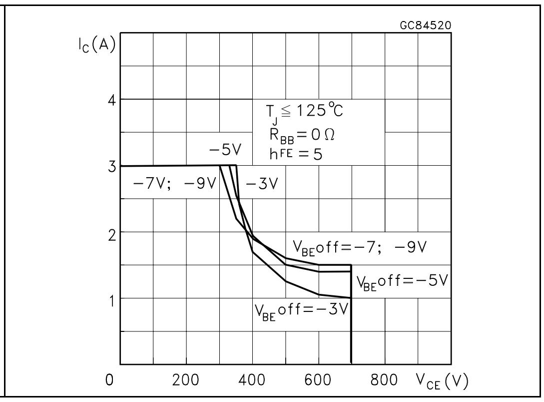


Figure 6. DC current gain

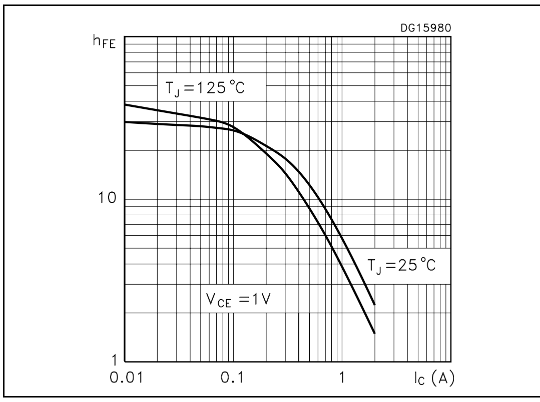


Figure 7. DC current gain

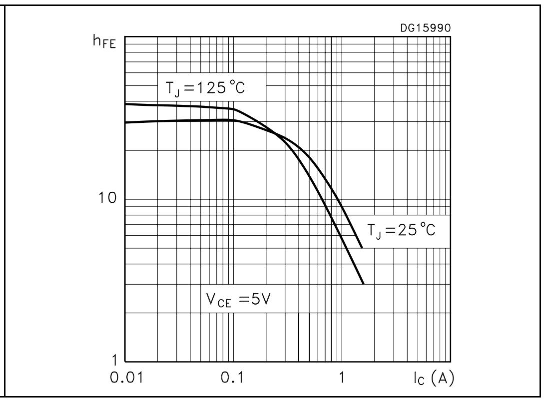


Figure 8. Collector-emitter saturation voltage

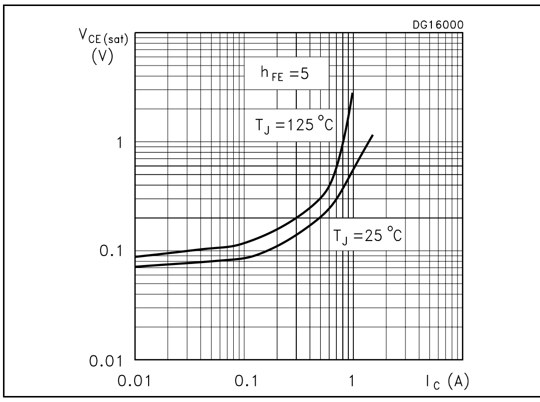


Figure 9. Base-emitter saturation voltage

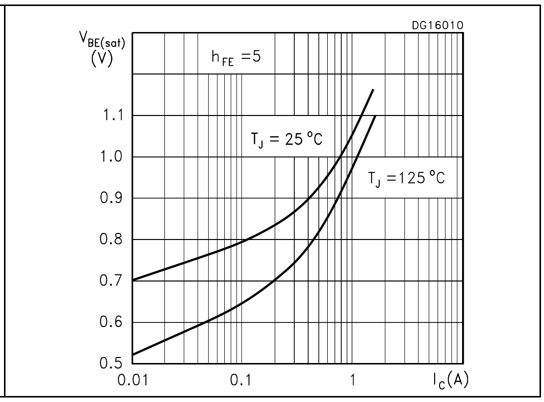


Figure 10. Inductive load switching time

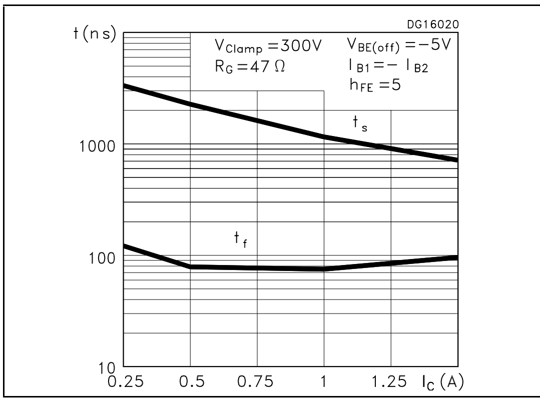
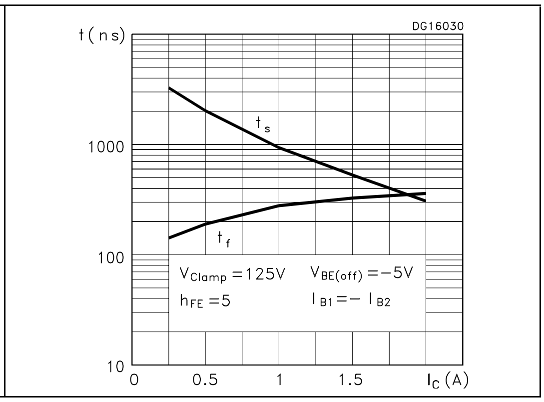


Figure 11. Resistive load switching time



2.2 Test circuits

Figure 12. Resistive load switching test circuit

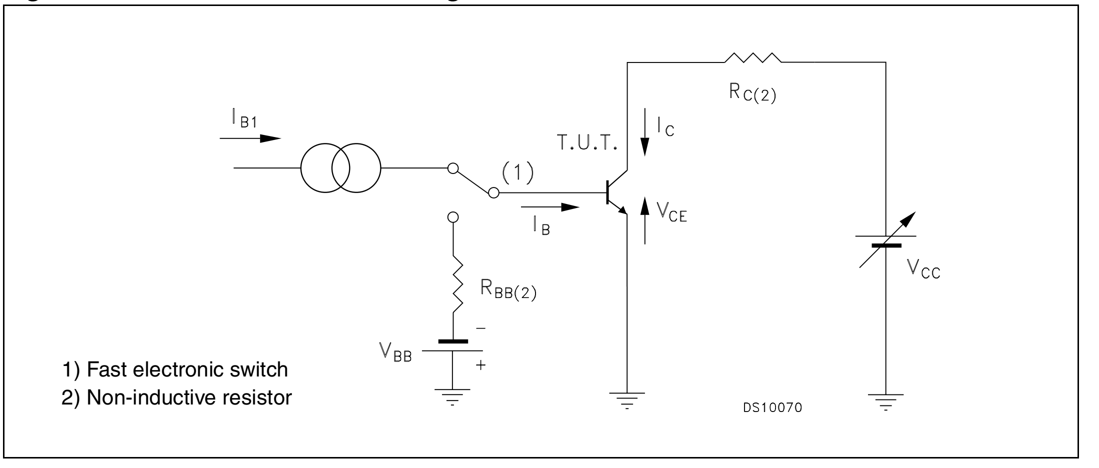
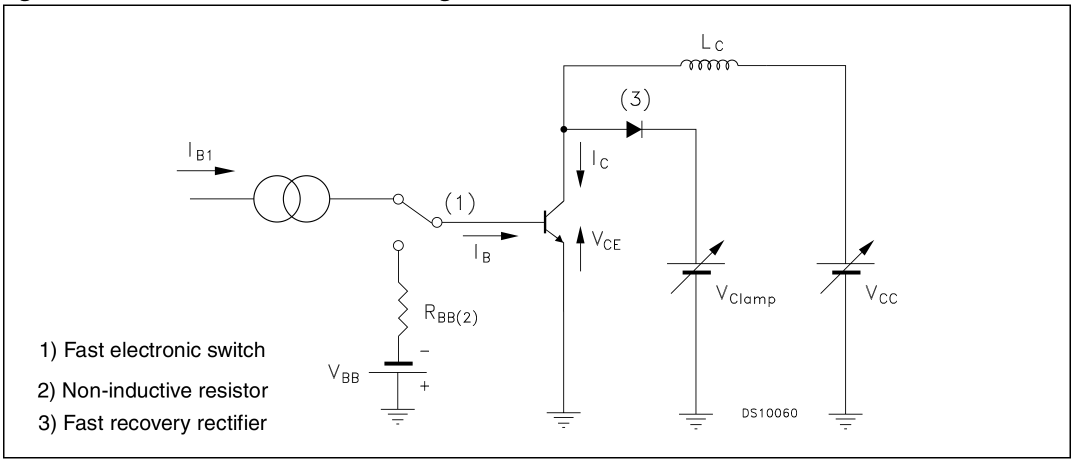


Figure 13. Inductive load switching test circuit

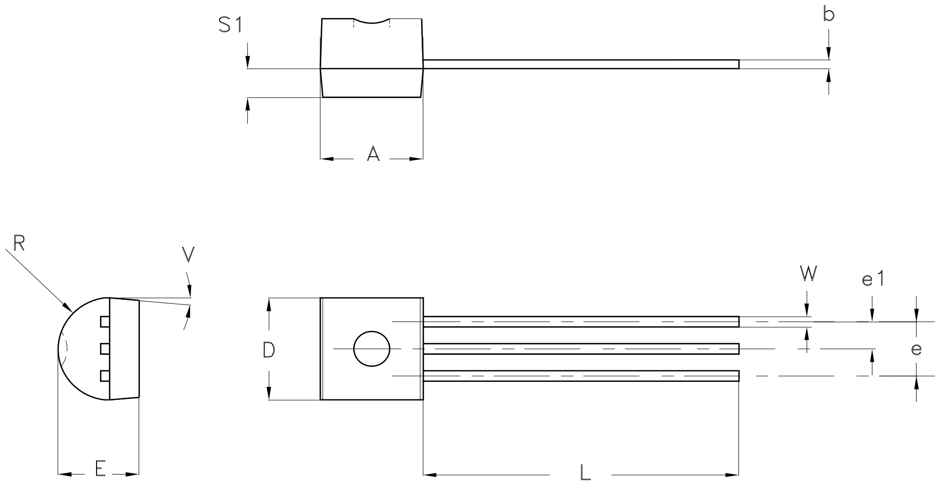


3 Package mechanical data

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

TO-92 bulk shipment mechanical data

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	



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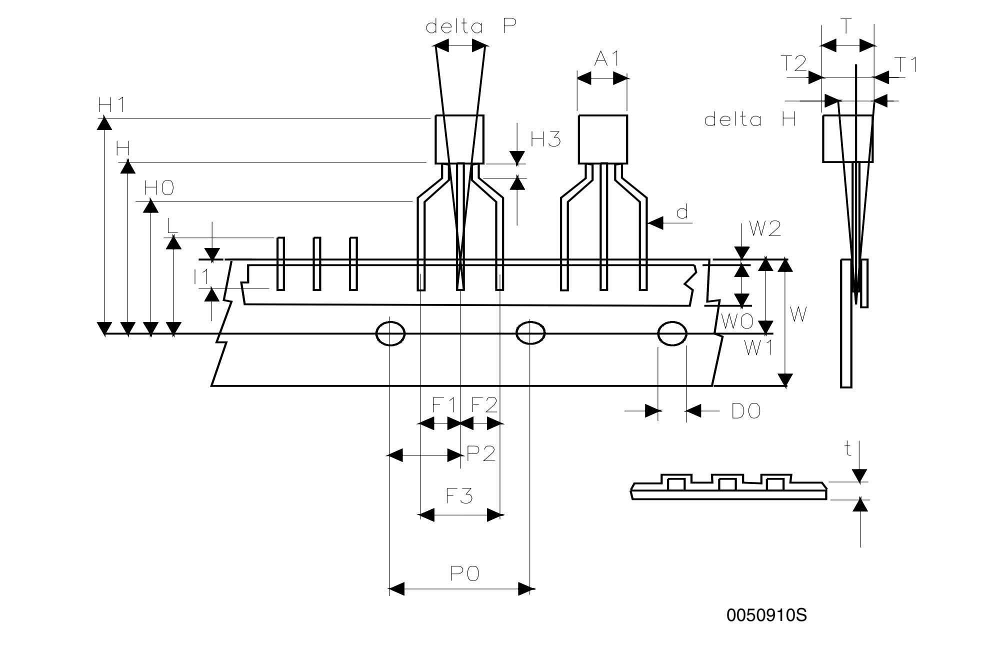
TO-92 ammopack shipment (suffix”-AP”) mechanical data

Dim.	mm		
	Min	Typ	Max
A1			4.80
T			3.80
T1			1.60
T2			2.30
d			0.48
P0	12.50	12.70	12.90
P2	5.65	6.35	7.05
F1,F2	2.44	2.54	2.94
F3	4.98	5.08	5.48
delta H	-2.00		2.00
W	17.50	18.00	19.00
W0	5.70	6.00	6.30
W1	8.50	9.00	9.25
W2			0.50
H	18.50		20.50
H3	0.5	1	1.5
H0	15.50	16.00	16.50
H1			25.00
D0	3.80	4.00	4.20
t			0.90
L			11.00
I1	3.00		
delta P	-1.00		1.00



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
02-Jul-2008	8	Added halogen-free molding compound package.