

## High voltage fast-switching NPN power transistor

### Features

- High voltage capability
- Low spread of dynamic parameters
- Very high switching speed

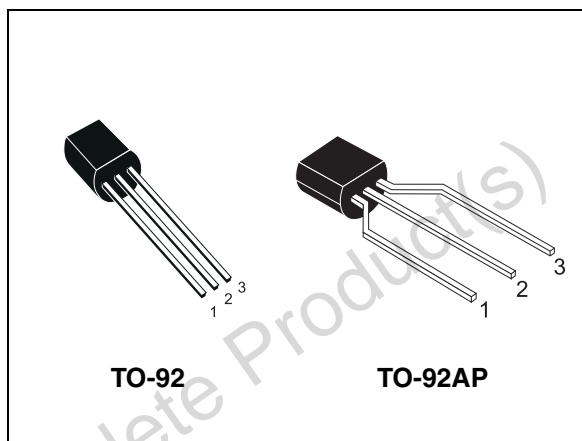
### Application

- Compact fluorescent lamps (CFLs)

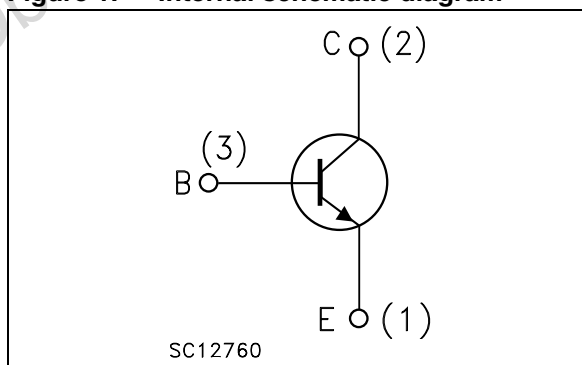
### Description

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 STL series is designed for use in compact fluorescent lamps.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order codes <sup>(1)</sup>	Marking <sup>(2)</sup>	Package	Packaging
STL72	L72 L or L72 H	TO-92	Bulk
STL72-AP	L72 L or L72 H	TO-92AP	Ammopack
STL72G-AP	L72G L or L72G H	TO-92AP	Ammopack

1. The letter "G" in the order code suffix identifies the product as ECOPACK@2 grade, please see [Section 3](#) for details.
2. Product is pre-selected in DC current gain (group L and group H). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

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	1	A
$I_{CM}$	Collector peak current ( $t_P < 5$ ms)	2	A
$I_B$	Base current	0.5	A
$I_{BM}$	Base peak current ( $t_P < 5$ ms)	1	A
$P_{TOT}$	Total dissipation at $T_C = 25$ °C	1	W
$T_{stg}$	Storage temperature	-65 to 150	°C
$T_J$	Max. operating junction temperature	150	

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Thermal resistance junction-case max	125	°C/W

## 2 Electrical characteristics

$T_C = 25\text{ °C}$ ; unless otherwise specified

**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector cut-off current ( $V_{BE} = 0$ )	$V_{CE} = 700\text{ V}$			1	mA
		$V_{CE} = 700\text{ V}$ $T_C = 125\text{ °C}$			5	mA
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 9\text{ V}$			1	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = 1\text{ mA}$	400			V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 0.2\text{ A}$ $I_B = 40\text{ mA}$		0.15	0.4	V
		$I_C = 0.4\text{ A}$ $I_B = 80\text{ mA}$		0.25	0.5	V
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 0.4\text{ A}$ $I_B = 80\text{ mA}$		0.95	1.1	V
$h_{FE}^{(2)}$	DC current gain	$I_C = 0.4\text{ A}$ $V_{CE} = 5\text{ V}$		10	16	
		Group L		15	23	
		Group H		5	15	
$t_f$	Inductive Load Fall time	$I_C = 0.25\text{ A}$ $V_{clamp} = 300\text{ V}$		0.3		$\mu\text{s}$
		$I_{B1} = -I_{B2} = 50\text{ mA}$ $L = 3\text{ mH}$ <i>Figure 9</i>				

1. Pulse test: pulse duration  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$
2. Product is pre-selected in DC current gain (group L and group H). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

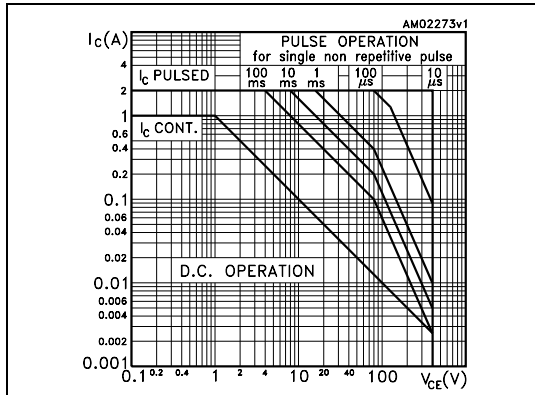


Figure 3. Derating curve

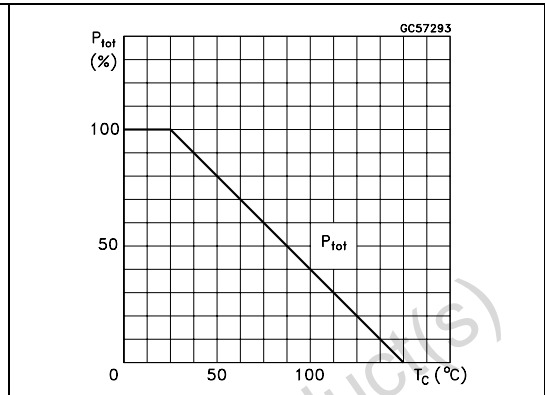


Figure 4. DC current gain ( $V_{CE} = 3$  V)

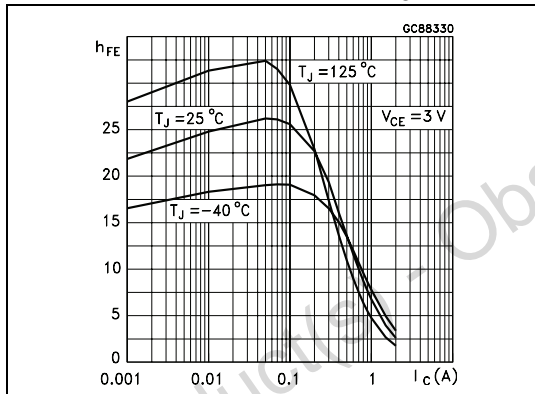


Figure 5. DC current gain ( $V_{CE} = 5$  V)

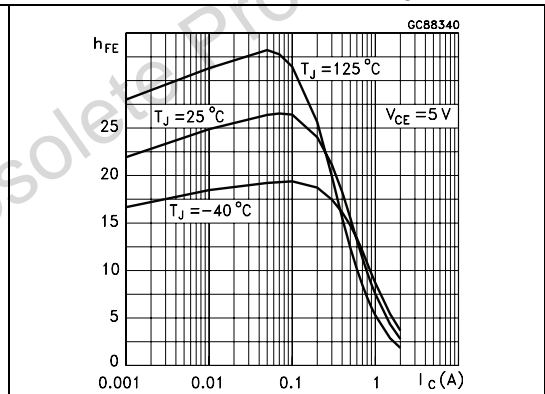


Figure 6. Collector-emitter saturation voltage

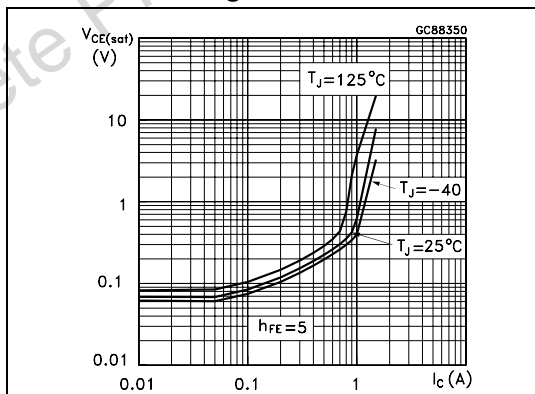


Figure 7. Base-emitter saturation voltage

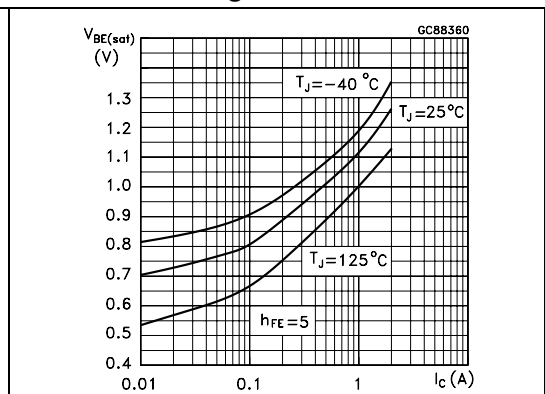
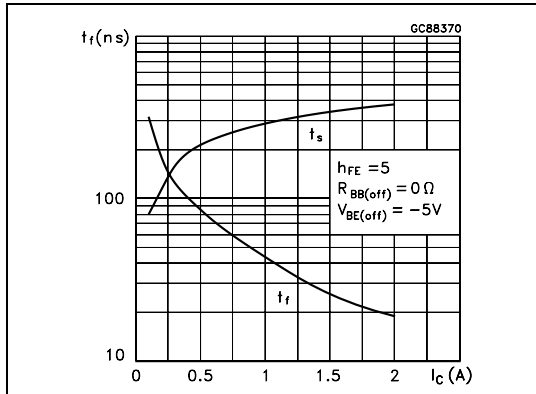
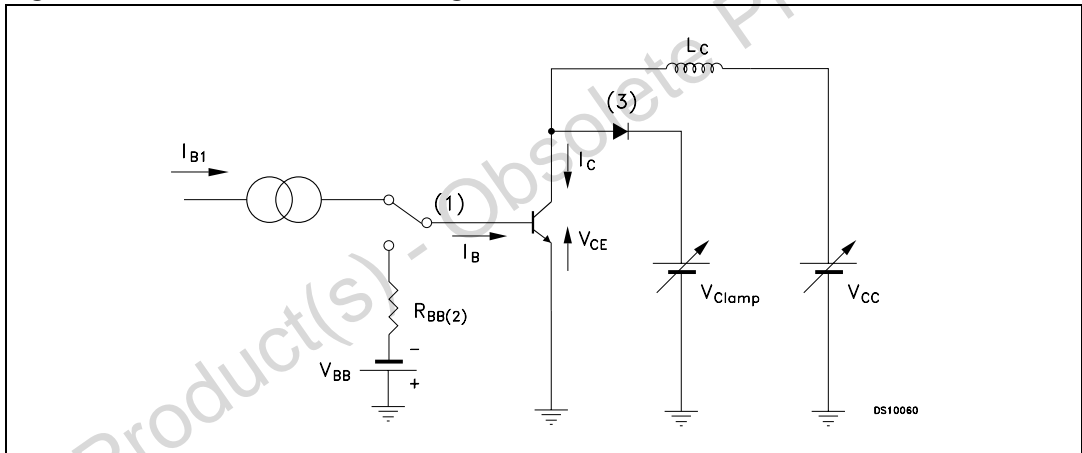


Figure 8. Switching time inductive load



## 2.2 Test circuit

Figure 9. Inductive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor
3. Fast recovery rectifier

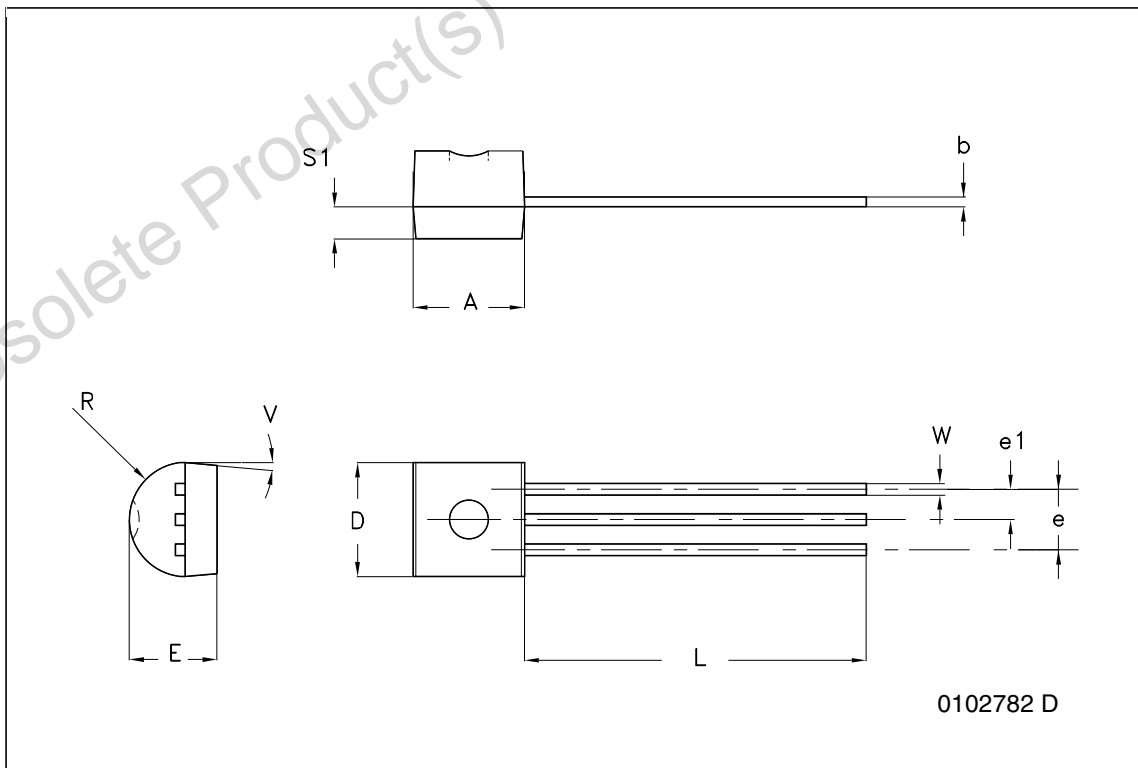
### 3 Package mechanical data

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

Obsolete Product(s) - Obsolete Product(s)

**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°	







## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
01-Apr-2005	1	Initial release.
12-Jul-2005	2	New $h_{fe}$ range values.
10-Sep-2009	3	Updated package mechanical data.

Obsolete Product(s) - Obsolete Product(s)

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