

## High voltage NPN power transistor

### Features

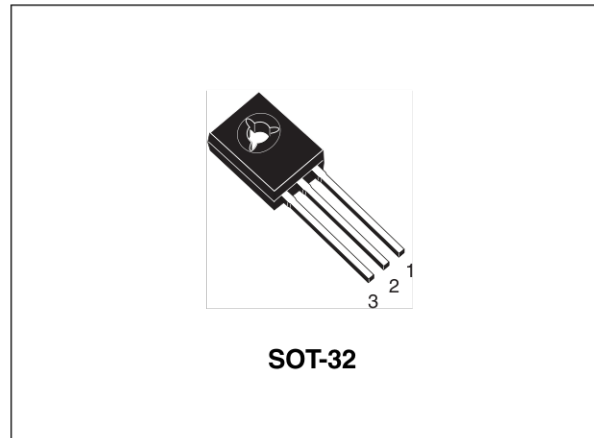
- High voltage capability (450 V  $V_{CE0}$ )
- Minimum lot-to-lot spread for reliable operation
- High DC current gain

### Applications

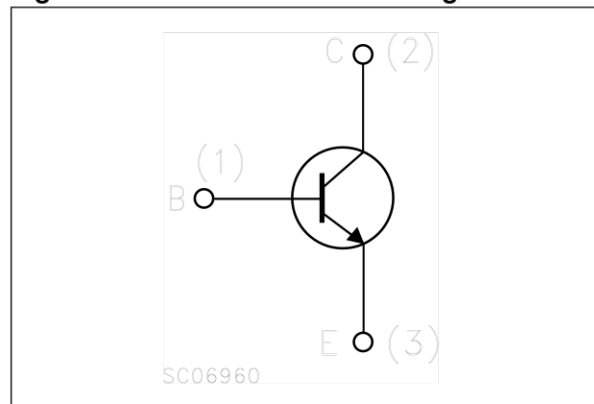
- Flyback and forward single transistor low power converters

### Description

The BUX87 is manufactured using high voltage multi-epitaxial planar technology for high switching speeds and high voltage withstand capability.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
BUX87	BUX87	SOT-32	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-emitter voltage ( $V_{BE} = 0$ )	1000	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	450	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	0.5	A
$I_{CM}$	Collector peak current ( $t_p \leq 5\text{ms}$ )	1	A
$I_B$	Base current	0.3	A
$I_{BM}$	Base peak current ( $t_p \leq 5\text{ms}$ )	0.6	A
$P_{TOT}$	Total power dissipation at $T_c = 25\text{ }^\circ\text{C}$	40	W
$T_{stg}$	Storage temperature	-65 to 150	°C
$T_J$	Max. operating junction temperature	150	

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max.	3.1	°C/W

## 2 Electrical characteristics

$T_{\text{case}} = 25\text{ }^{\circ}\text{C}$ ; unless otherwise specified.

**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	Collector cut-off current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 1000\text{ V}$ $V_{\text{CE}} = 1000\text{ V}$ $T_{\text{C}} = 125\text{ }^{\circ}\text{C}$			100 1	$\mu\text{A}$ $\text{mA}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{ V}$			1	$\text{mA}$
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 10\text{ mA}$	450			$\text{V}$
$V_{\text{EBO}}$	Emitter-base voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = 10\text{ mA}$	5			$\text{V}$
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.1\text{ A}$ $I_{\text{B}} = 10\text{ mA}$ $I_{\text{C}} = 0.2\text{ A}$ $I_{\text{B}} = 20\text{ mA}$			0.8 1	$\text{V}$ $\text{V}$
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 0.2\text{ A}$ $I_{\text{B}} = 20\text{ mA}$			1	$\text{V}$
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 50\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 40\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$	12	50		
$f_{\text{T}}$	Transition frequency	$I_{\text{C}} = 50\text{ mA}$ $V_{\text{CE}} = 10\text{ V}$ $f = 1\text{ MHz}$		20		$\text{MHz}$
$t_{\text{s}}$ $t_{\text{f}}$	Resistive load Storage time Fall time	$V_{\text{CC}} = 250\text{ V}$ $I_{\text{C}} = 200\text{ mA}$ $I_{\text{B(on)}} = 40\text{ mA}$ $I_{\text{B(off)}} = -80\text{ mA}$ $t_{\text{p}} = 20\text{ }\mu\text{s}$			4.5 0.5	$\mu\text{s}$ $\mu\text{s}$

1. Pulsed duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

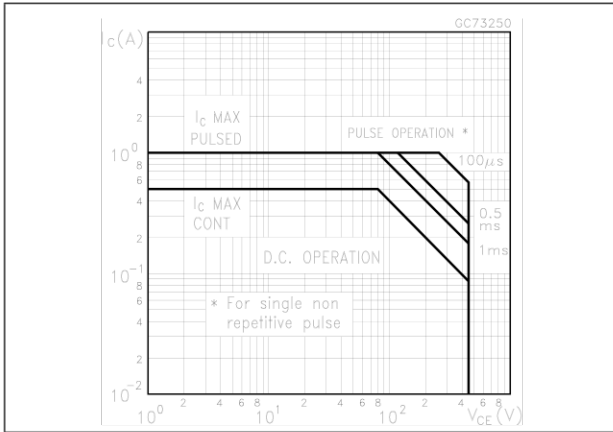


Figure 3. Derating curve

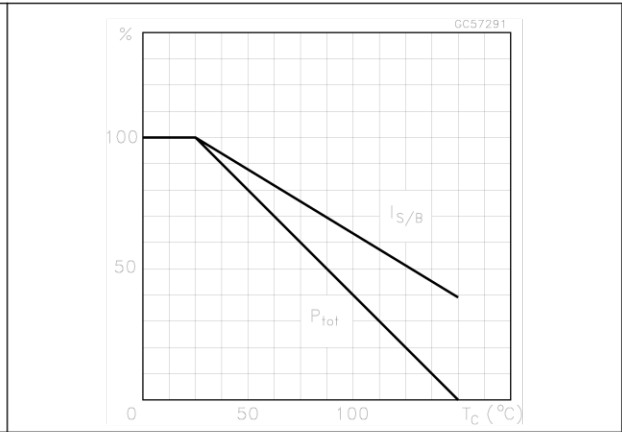


Figure 4. DC current gain

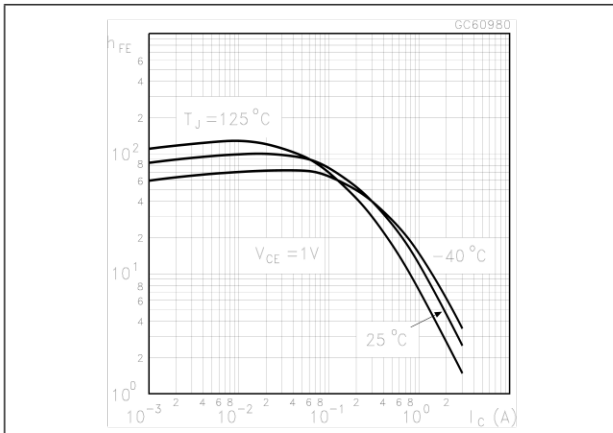


Figure 5. DC current gain

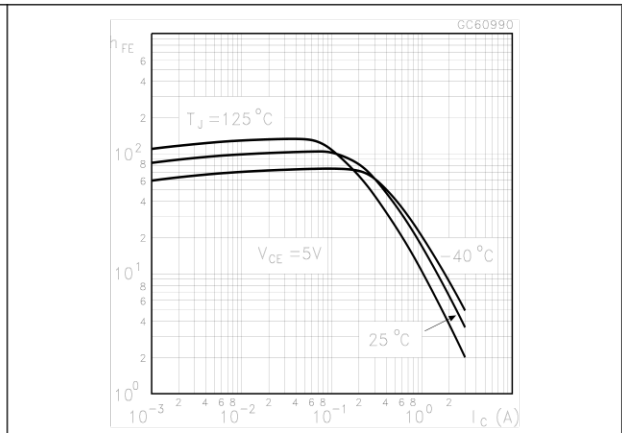


Figure 6. Collector-emitter saturation voltage Figure 7. Base-emitter saturation voltage

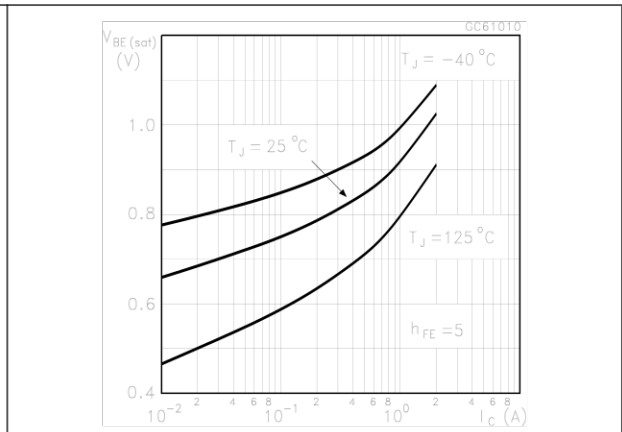
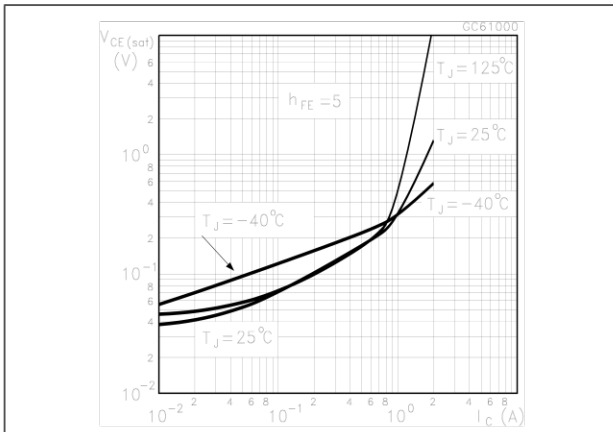
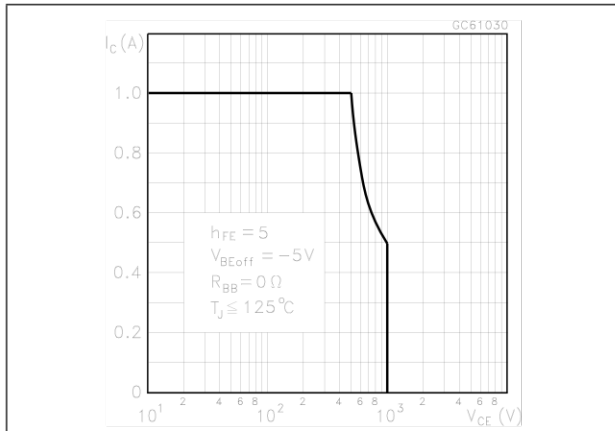


Figure 8. Reverse biased SOA

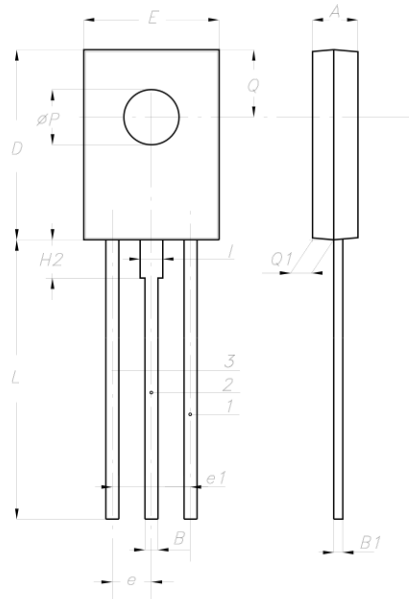


### 3 Package mechanical data

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.

**SOT-32 (TO-126) MECHANICAL DATA**

DIM.	mm.		
	MIN.	TYP	MAX.
A	2.4		2.9
B	0.64		0.88
B1	0.39		0.63
D	10.5		11.05
E	7.4		7.8
e	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.3		16
P	2.9		3.2
Q		3.8	
Q1	1		1.52
H2		2.15	
I		1.27	



0016114E

## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
21-Jun-2004	4	Document migration, no content change.
30-Apr-2009	5	Modified: <a href="#">Section 3 on page 6</a> .



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