



## BU505

### High Voltage NPN Multiepitaxial Fast-Switching Transistor

#### Features

- HIGH VOLTAGE CAPABILITY
- VERY HIGH SWITCHING SPEED
- HIGH RUGGEDNESS

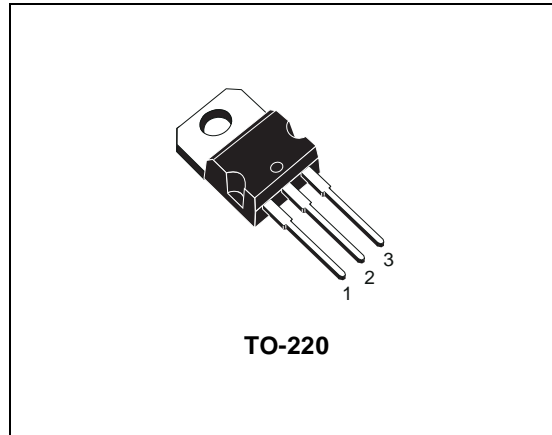
#### Applications

- ELECTRONIC BALLASTS FOR  
FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

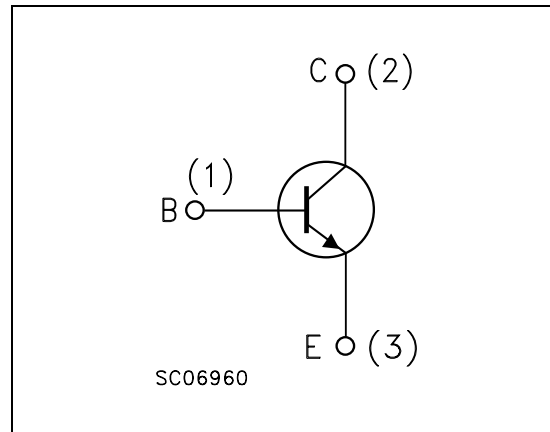
#### Description

The BU505 is a High Voltage NPN fastswitching transistor designed to be used in lighting application, like electronic ballast for fluorescent lamps.

It's characteristics make also ideal for power supplies.



#### Internal Schematic Diagram



#### Order Codes

Part Number	Marking	Package	Packing
BU505	BU505	TO-220	TUBE

# 1 Absolute Maximum Ratings

**Table 1. Absolute Maximum Rating**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	1500	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	700	V
$I_C$	Collector Current	2.5	A
$I_{CM}$	Collector Peak Current ( $t_p < 5\text{ms}$ )	4	A
$I_B$	Base Current	1	A
$I_{BM}$	Base Peak Current ( $t_p < 5\text{ms}$ )	2	A
$P_{TOT}$	Total dissipation at $T_C = 25^\circ\text{C}$	75	W
$T_{STG}$	Storage Temperature	-65 to 150	$^\circ\text{C}$
$T_J$	Max. Operating Junction Temperature	150	$^\circ\text{C}$

**Table 2. Thermal Data**

Symbol	Parameter	Value	Unit
$R_{thJ-case}$	Thermal Resistance Junction-Case Max	1.67	$^\circ\text{C}/\text{W}$

## 2 Electrical Characteristics

**Table 3. Electrical Characteristics** ( $T_{CASE} = 25^{\circ}C$ ; unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 1500V$			0.15	mA
		$V_{CE} = 1500V$ $T_C = 125^{\circ}C$			1	mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5V$			1	mA
$V_{CEO(sus)}$ <i>Note: 1</i>	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 10mA$ $L = 25mH$	700			V
$V_{CE(sat)}$ <i>Note: 1</i>	Collector-Emitter Saturation Voltage	$I_C = 2A$ $I_B = 0.9A$			1	V
$V_{BE(sat)}$ <i>Note: 1</i>	Base-Emitter Saturation Voltage	$I_C = 2A$ $I_B = 0.9A$			1.3	V
$I_{s/b}$	Second Breakdown Current	$V_{CE} = 120V$ $t = 220\mu s$	2			A
$t_s$ $t_f$	INDUCTIVE LOAD	$I_C = 2A$ $V_{clamp} = 250V$				
	Storage Time	$I_{B1} = 0.7A$ $V_{be(off)} = -5A$		2		$\mu s$
	Fall Time	$R_{bb} = 0$ $L = 200 \mu H$		350		ns

*Note: 1 Pulsed duration = 300  $\mu s$ , duty cycle  $\leq 1.5\%$ .*

## 2.1 Typical Characteristics

Figure 1. Safe Operating Area

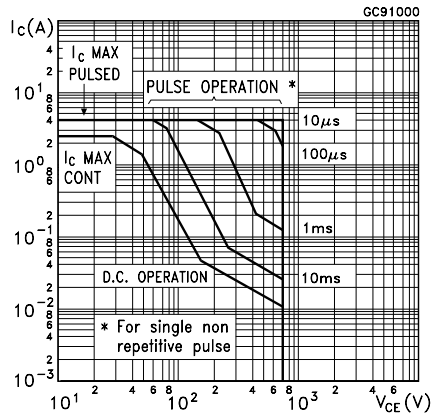


Figure 2. Derating Curve

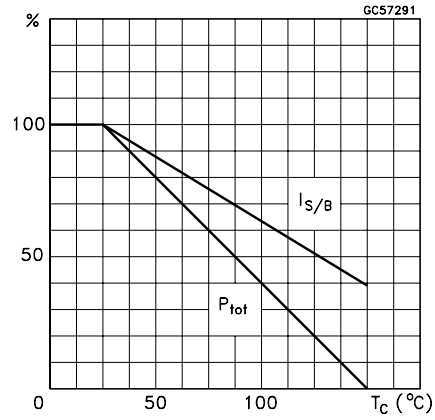


Figure 3. DC Current Gain

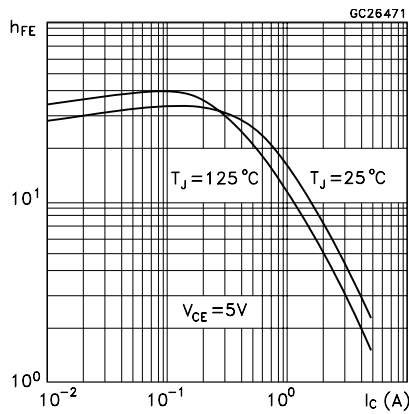


Figure 4. Collector Emitter Saturation Voltage

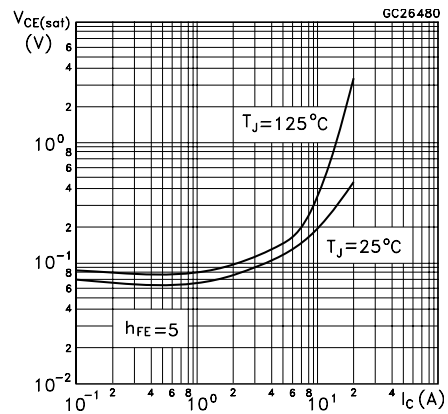


Figure 5. Base Emitter Storage Time

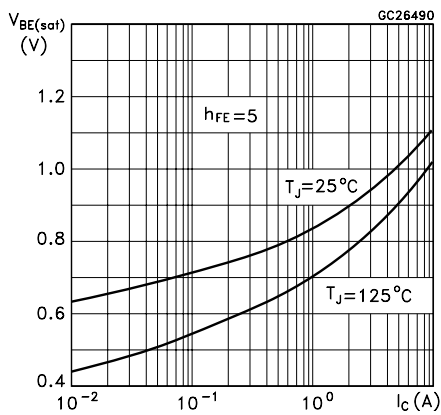


Figure 6. Inductive Fall Time

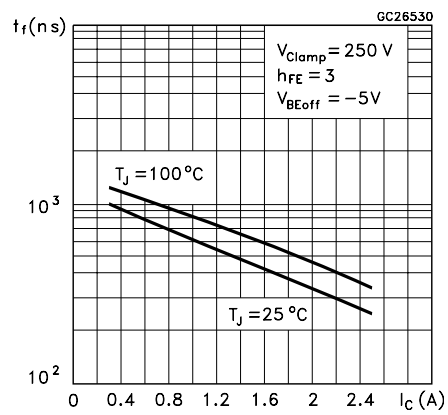


Figure 7. Inductive Storage Time

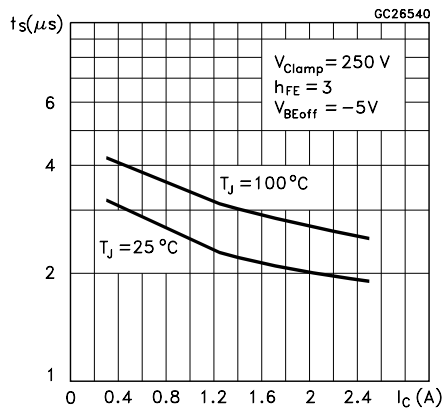
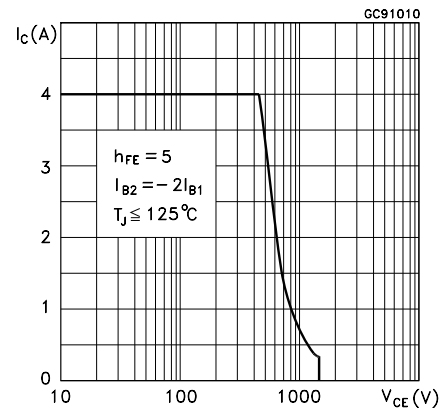
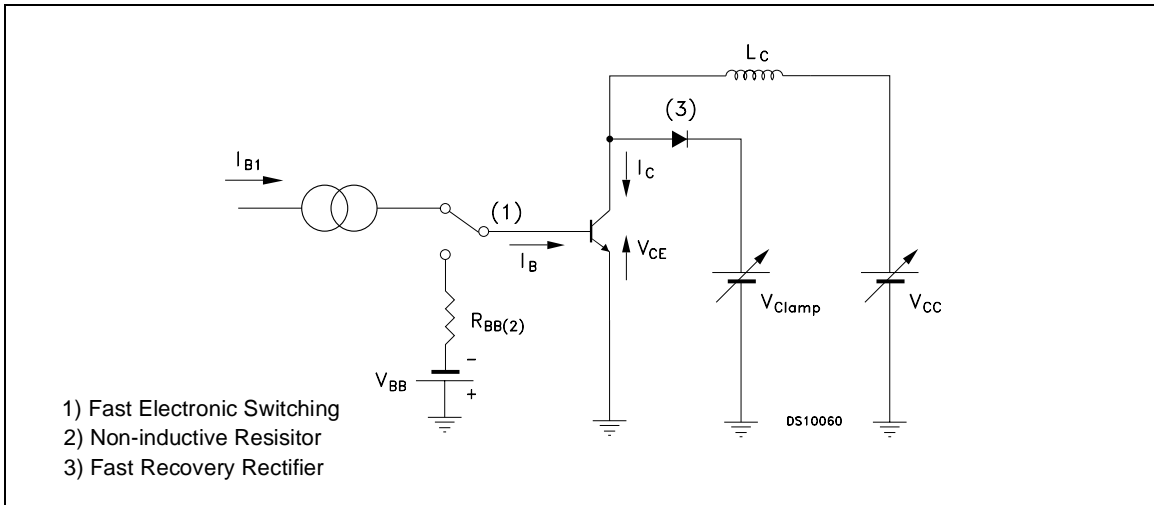


Figure 8. Reverse Biased SOA



### 3 Test Circuits

Figure 9. Inductive Load Switching Test Circuit

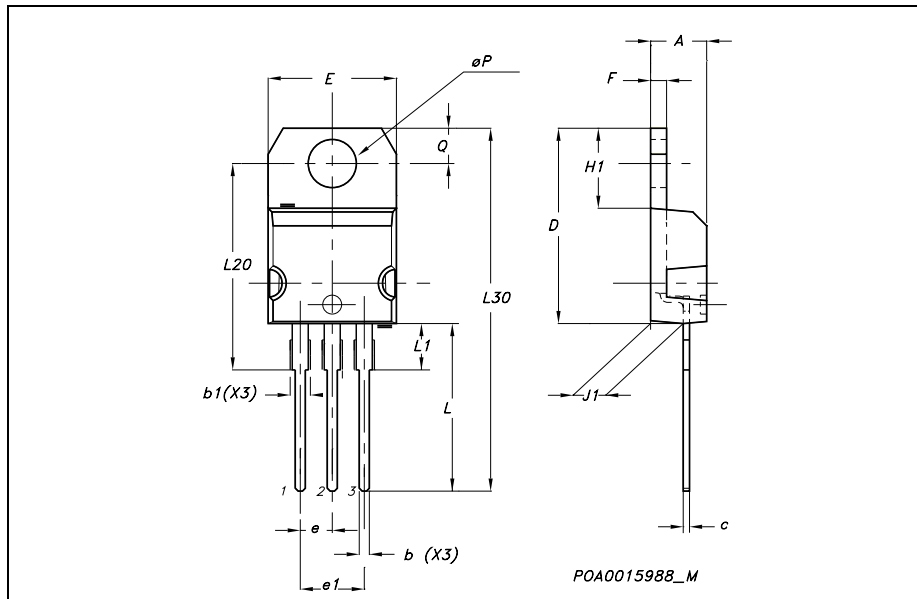


## 4 Package Mechanical Data

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](http://www.st.com)

**TO-220 MECHANICAL DATA**

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
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





## 5 Revision History

Date	Revision	Changes
05-Sep-2001	1	Initial release.
06-Jul-2005	2	Some value change in <a href="#">Table 3</a> .
25-Jul-2005	3	New Template
19-Aug-2005	4	New ECOPACK® label

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