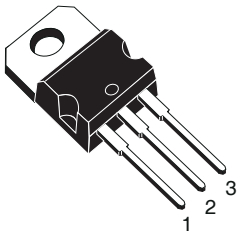
BUL7216

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



TO-220

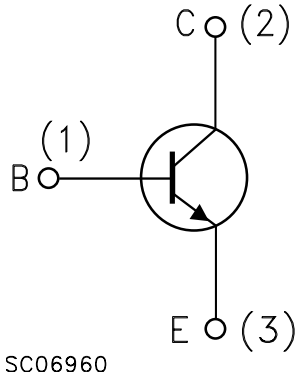
Applications

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING (277V PUSH-PULL AND 347V HALF BRIDGE TOPOLOGIES)

Description

The BUL7216 is a new device manufactured using Diffused Collector technology to enhance switching speeds and tight h_{FE} while maintaining the wide RBSOA.

Internal Schematic Diagram



Order Codes

Part Number	Marking	Package	Packing
BUL7216	BUL7216	TO-220	TUBE

1 Absolute Maximum Ratings

Table 1. Absolute Maximum Rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	1600	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	700	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	12	V
I_C	Collector Current	3	A
I_{CM}	Collector Peak Current (t_P < 5ms)	6	A
I_B	Base Current	1	A
I_{BM}	Base Peak Current (t_P < 5ms)	1.5	A
P_{tot}	Total dissipation at T_c = 25°C	80	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_J	Max. Operating Junction Temperature	150	°C

Table 2. Thermal Data

Symbol	Parameter		Value	Unit
$R_{thJ\text{-}case}$	Thermal Resistance Junction-Case	Max	1.56	°C/W

2 Electrical Characteristics

Table 3. Electrical Characteristics (T_{CASE} = 25°C; unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 1600 V V_{CE} = 1600 V T_C = 125°C			0.1 0.5	mA mA
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 680 V			0.1	mA
I_{CBO}	Collector Cut-off Current (I_E = 0)	V_{CB} = 1600 V V_{CB} = 1600 V T_C = 125°C			0.1 0.5	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 12 V			1	mA
$V_{(BR)CEO}$ *Note: 1*	Collector-Emitter Breakdown Voltage (I_B = 0)	I_C = 1 mA L = 125 mH	700			V
$V_{(BR)EBO}$ *Note: 1*	Emitter-Base Breakdown Voltage (I_C = 0)	I_E = 1 mA	12			V
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage (V_{BE} = 0)	I_C = 0.1 mA	1600			V
$V_{CE(sat)}$ *Note: 1*	Collector-Emitter Saturation Voltage	I_C = 0.25 A I_B = 25 mA I_C = 0.5 A I_B = 50 mA I_C = 0.8 A I_B = 80 mA			1 1.5 3	V V V
$V_{BE(sat)}$ *Note: 1*	Base-Emitter Saturation Voltage	I_C = 0.5A I_B = 100 mA I_C = 1A I_B = 100 mA I_C = 2A I_B = 400 mA			1 1.1 1.2	V V V
h_{FE} *Note: 1*	DC Current Gain	I_C = 0.5 A V_{CE} = 1 V I_C = 0.5 A V_{CE} = 3 V I_C = 2 A V_{CE} = 5 V I_C = 1 A V_{CE} = 10 V	7 16 4 19		18 35 11	
t_s t_f	RESISTIVE LOAD Storage Time Fall Time	I_C = 0.5 A V_{CC} = 125 V I_{B1} = 50 mA I_{B2} = -0.5 A P.W. = 300 µs D.C. = 2 % (see figure 9)			0.9 0.35	µs µs
t_d t_r	RESISTIVE LOAD Delay Time Rise Time	I_C = 0.5 A V_{CC} = 125 V I_{B1} = 50 mA I_{B2} = -0.5 A P.W. = 300 µs D.C. = 2 % (see figure 9)			0.3 1.1	µs µs
$E_{a/r}$	Repetitive Avalanche Energy	L = 2 mH C = 1.8 nF $V_{BE(off)}$ = -5 V (see figure 8)	8			mJ

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

2.1 Typical Characteristics

Figure 1. DC Current Gain

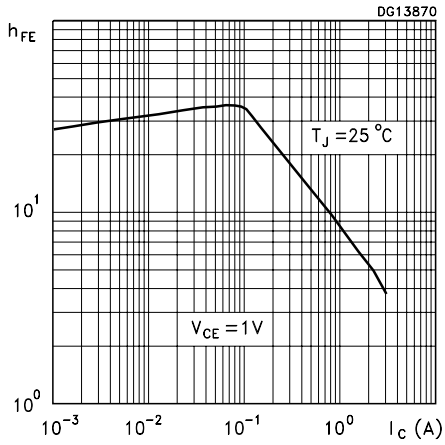


Figure 2. DC Current Gain

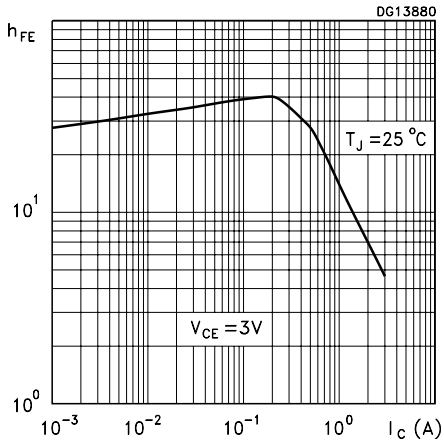


Figure 3. Collector- Emitter Saturation Voltage

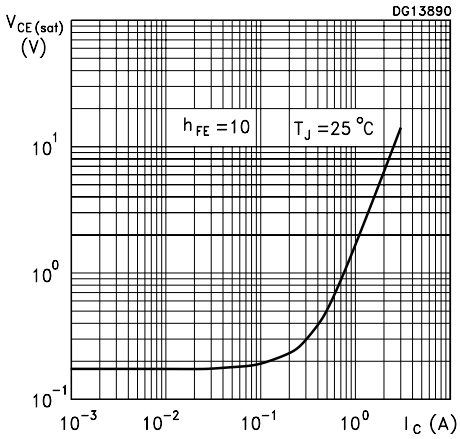


Figure 4. Base-Emitter Saturation Voltage

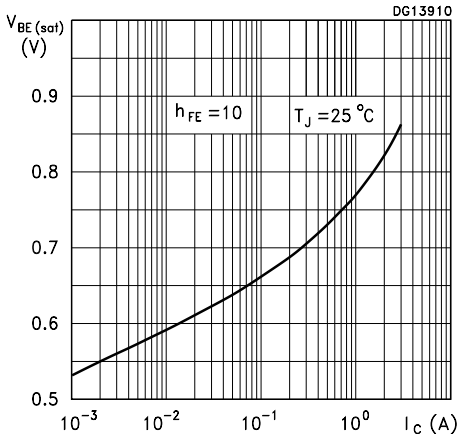


Figure 5. Resistive Load Switching Time

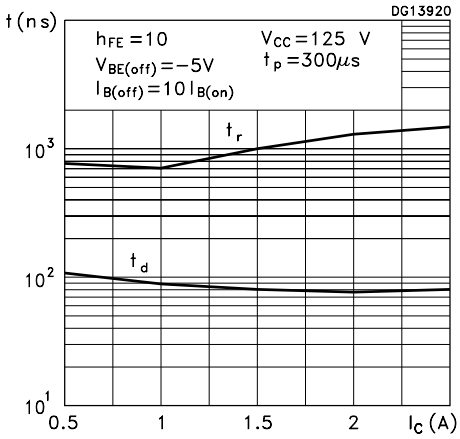


Figure 6. Resistive Load Switching Time

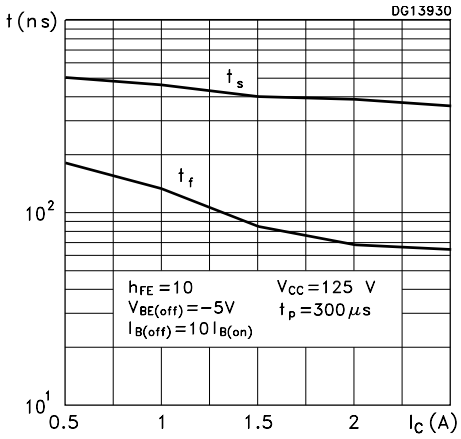
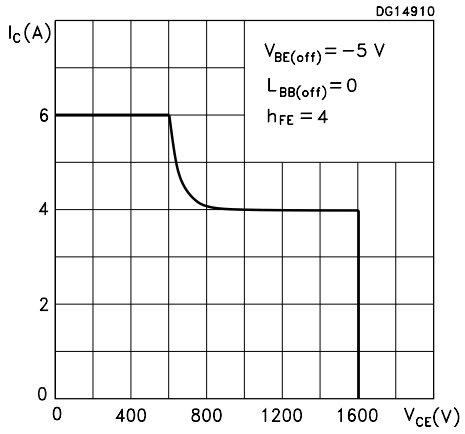


Figure 7. Reverse Bised Safe Operating Area



3 Test Circuits

Figure 8. Energy Rating Test Circuit

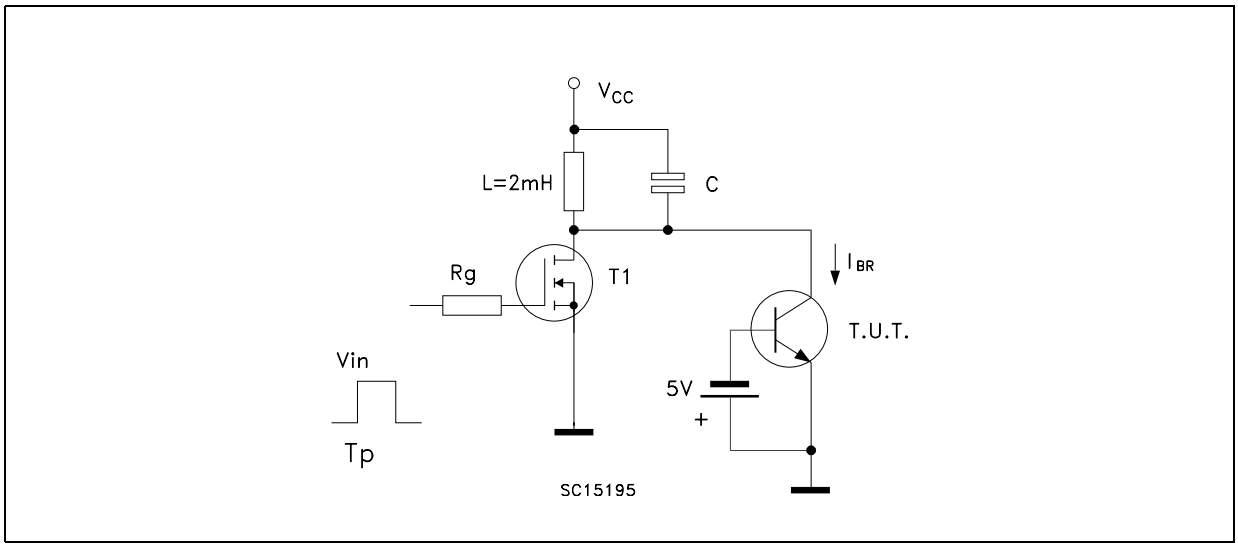
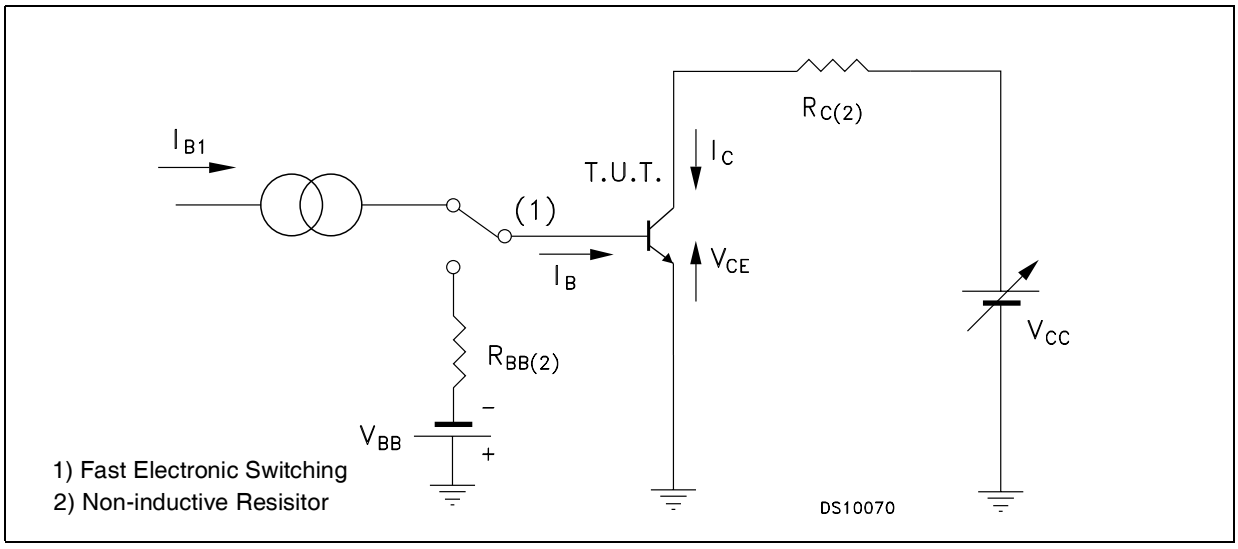


Figure 9. Resistive Load Switching Test Circuits

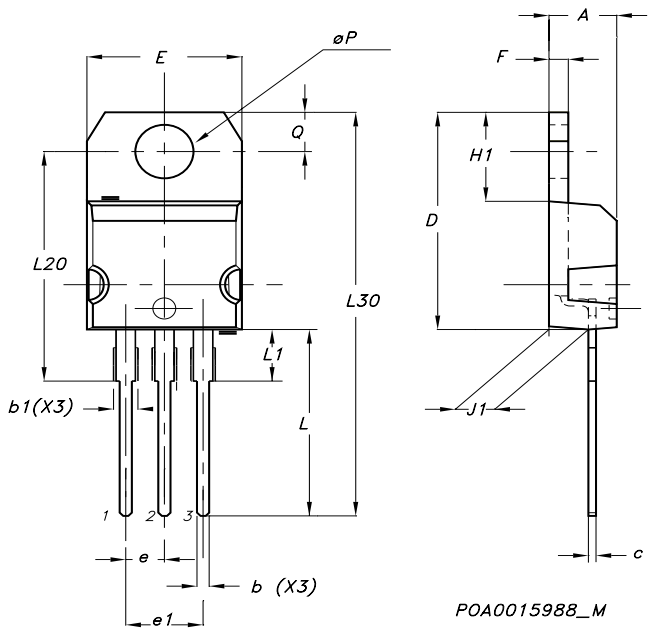


4 Package Mechanical Data

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

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
17-Jan-2006	1	Initial Relase