BUL804

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

APPLICATIONS

- DEDICATED FOR PFC SOLUTION IN HALF-BRIDGE VOLTAGE FED TOPOLOGY
- ELECTRONIC BALLAST FOR FLUORESCENT LIGHTING

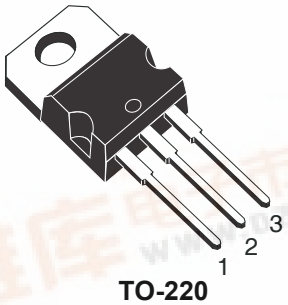
DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

The device is designed for use as PFC in high frequency ballast half Bridge voltage fed topology.

Figure 1: Package



TO-220

Figure 2: Internal Schematic Diagram

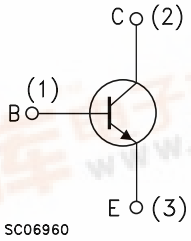


Table 1: Order Codes

Part Number	Marking	Package	Packaging
BUL804	BUL804	TO-220	Tube

Table 2: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	800	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	450	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	8	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current (t_p < 5ms)	8	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current (t_p < 5ms)	4	A
P_{tot}	Total Dissipation at T_C = 25 °C	70	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_J	Max. Operating Junction Temperature	150	°C

Table 3: Thermal Data

$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	1.78	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

Table 4: 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} = -1.5 V)	V_{CE} = 800 V				100	µA
		V_{CE} = 800 V	T_j = 125 °C			500	µA
V_{EBO}	Emitter-Base Voltage (I_C = 0)	I_E = 10 mA		8			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA	L = 25 mH	450			V
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 450 V				250	µA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 1 A	I_B = 0.2 A			0.8	V
		I_C = 2.5 A	I_B = 0.5 A			1.2	V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 1 A	I_B = 0.2 A			1.2	V
		I_C = 2.5 A	I_B = 0.5 A			1.3	V
h_{FE}	DC Current Gain	I_C = 10 mA	V_{CE} = 5 V	10			
		I_C = 2 A	V_{CE} = 5 V	10		20	
	RESISTIVE LOAD	V_{CC} = 300 V	I_C = 2 A				
t_s	Storage Time	I_{B1} = 0.4 A	I_{B2} = -0.4 A	1.8		2.6	µs
t_f	Fall Time	T_p = 30 µs	(see figure 11)		0.1	0.25	µs
	INDUCTIVE LOAD	I_C = 2 A	I_{B1} = 0.4 A				
t_s	Storage Time	$V_{BE(off)}$ = -5 V	R_{BB} = 0 Ω		0.6	1	µs
t_f	Fall Time	V_{clamp} = 360 V	(see figure 10)		0.1	0.2	µs

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

Figure 3: DC Current Gain

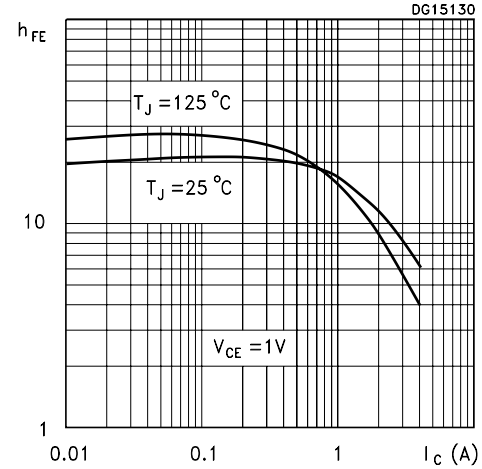


Figure 4: Collector-Emitter Saturation Voltage

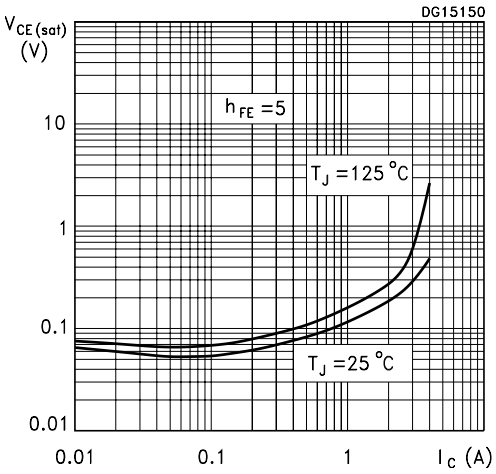


Figure 5: Inductive Load Switching Time

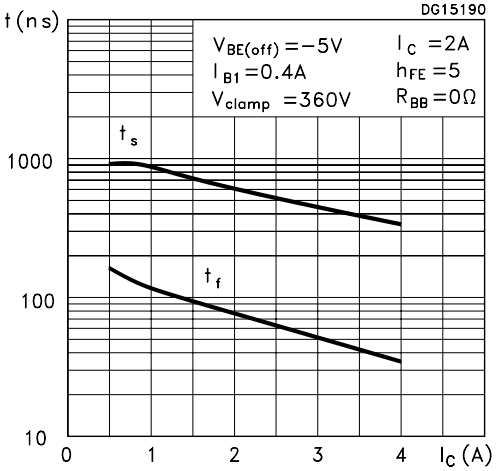


Figure 6: DC Current Gain

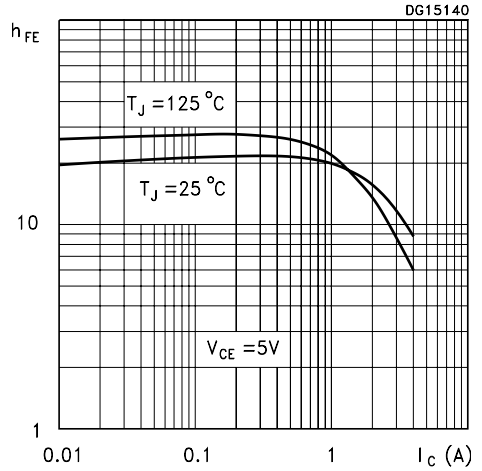


Figure 7: Base-Emitter Saturation Voltage

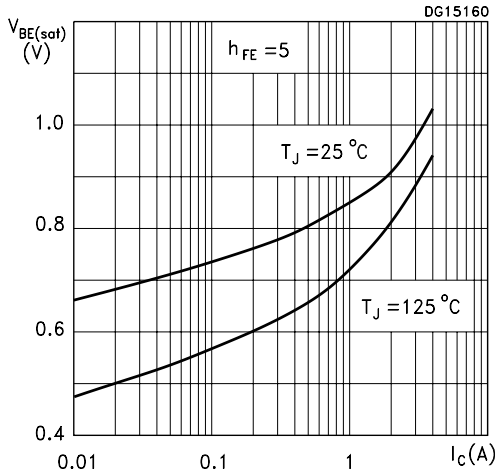


Figure 8: Resistive Load Switching Time

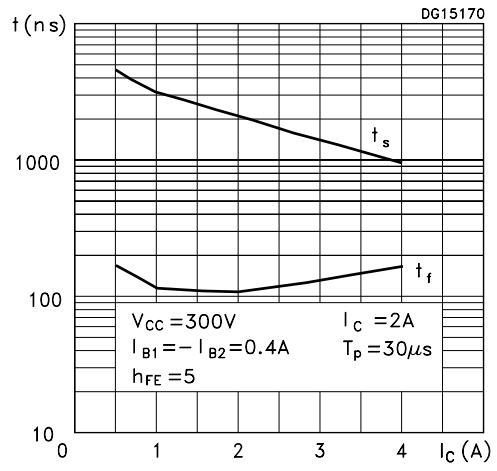


Figure 9: Reverse Biased Operating Area

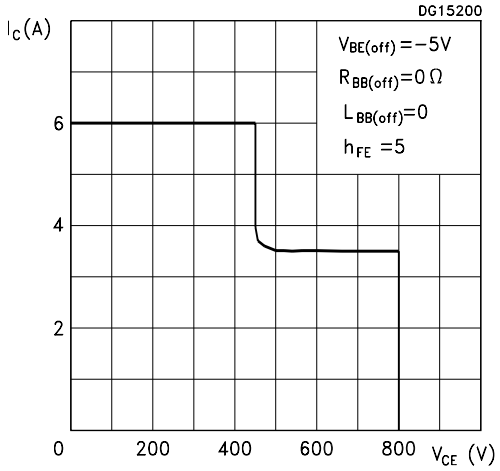


Figure 10: Inductive Load Switching Test Circuit

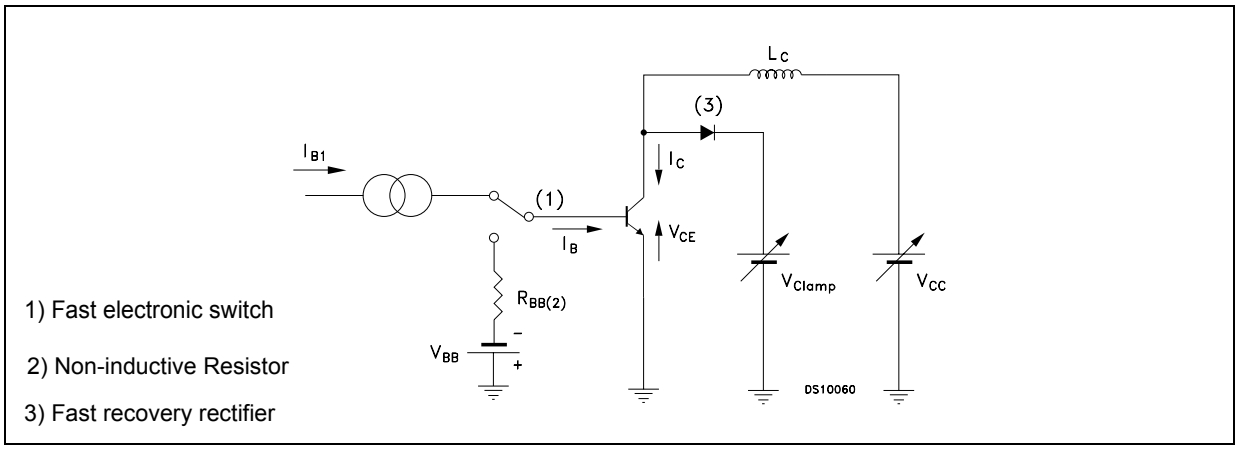
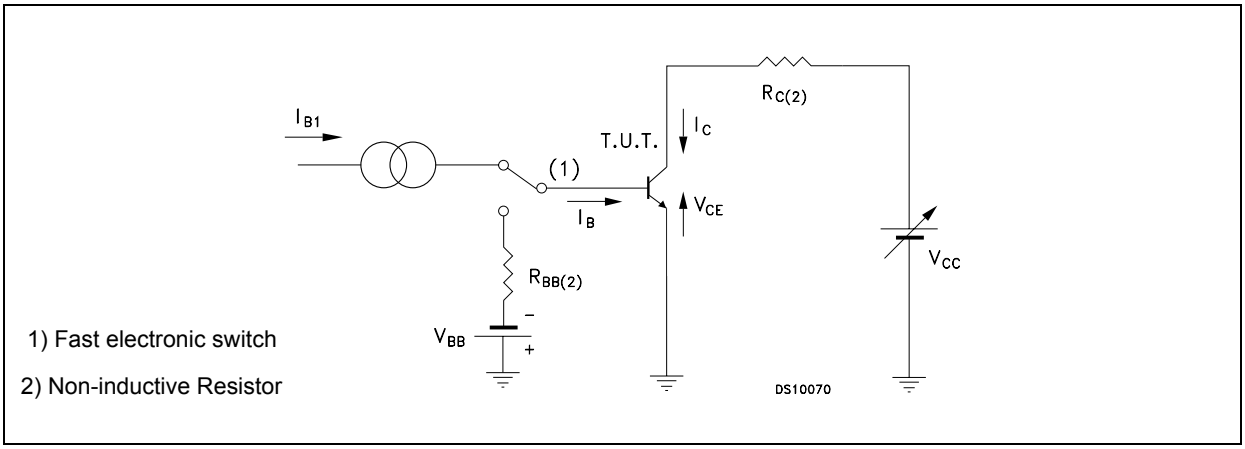


Figure 11: Restistive Load Switching Test Circuit



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

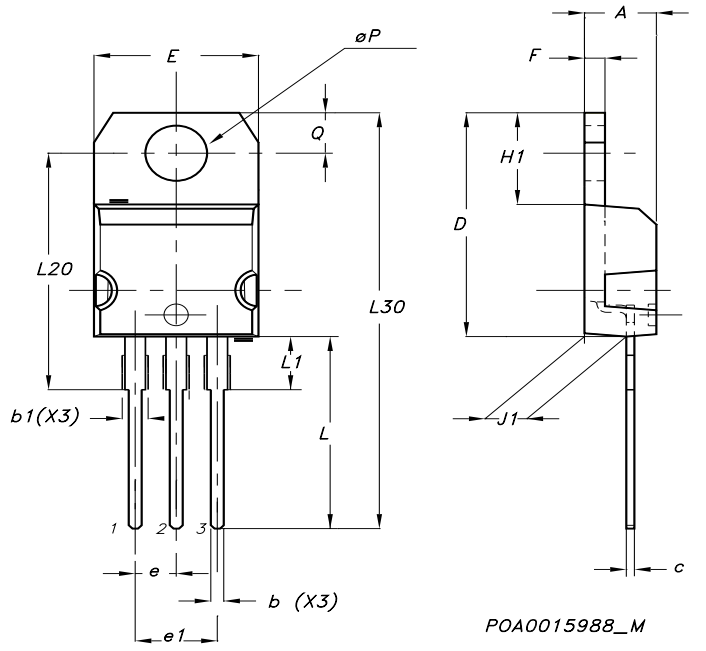


Table 5: Revision History

Release Date	Version	Change Designator
07-Jul-2005	1	First Release.