



BUL903ED

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- INTEGRATED ANTISATURATION AND PROTECTION NETWORK
- INTEGRATED ANTIPARALLEL COLLECTOR EMITTER DIODE
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- ARCING TEST SELF PROTECTED

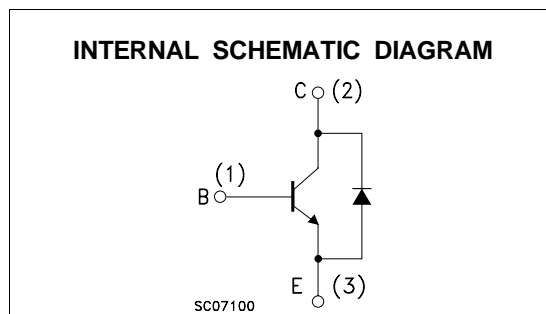
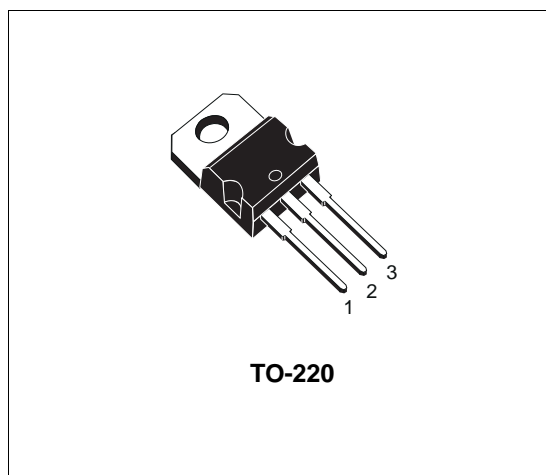
APPLICATIONS

- LAMP ELECTRONIC BALLAST FOR FLUORESCENT LIGHTING USING 277V HALF BRIDGE CURRENT-FED CONFIGURATION

DESCRIPTION

The BUL903ED is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

The device has been designed to operate without baker clamp and transil protection. This enables saving from 2 up to 10 components in the application.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	900	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	400	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	7	V
I_C	Collector Current	5	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	8	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	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

BUL903ED

THERMAL DATA

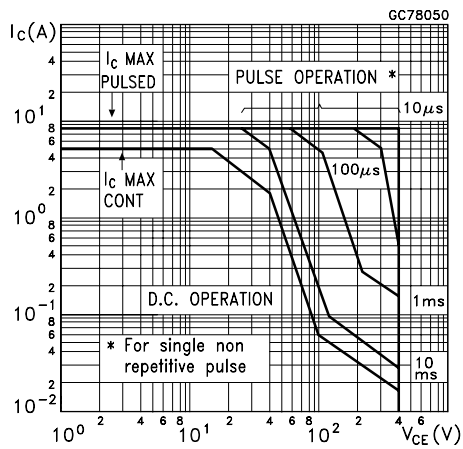
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.8	$^{\circ}\text{C}/\text{W}$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

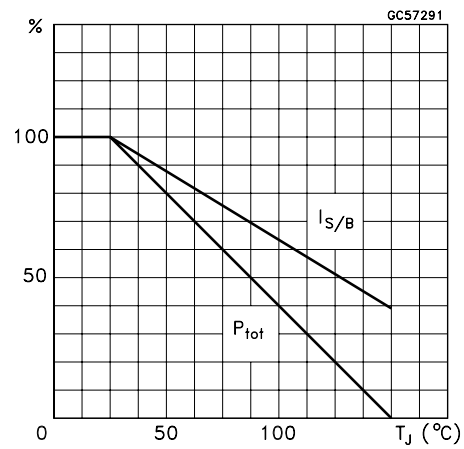
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 900\text{ V}$			1	mA
I_{EBO}	Base-Emitter Leakage Current	$V_{EB} = 7\text{ V}$			100	μA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$ $L = 25\text{ mH}$	400			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.15\text{ A}$			1.0	V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 0.1\text{ A}$ $I_B = 0.05\text{ A}$ $I_C = 0.5\text{ A}$ $I_B = 0.1\text{ A}$ $I_C = 2.0\text{ A}$ $I_B = 0.4\text{ A}$			1.0 1.1 1.2	V V V
h_{FE*}	DC Current Gain	$I_C = 5\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 0.5\text{ A}$ $V_{CE} = 3\text{ V}$	8 20			
V_F	Parallel Diode Forward Voltage	$I_F = 3\text{ A}$			1.2	V
t_d t_r t_s t_f	RESISTIVE LOAD Delay Time Rise Time Storage Time Fall Time	$V_{CC} = 125\text{ V}$ $I_C = 0.7\text{ A}$ $I_{B1} = 0.05\text{ A}$ $I_{B2} = 0.4\text{ A}$ $t_p = 300\text{ }\mu\text{s}$			0.2 1.0 0.8 0.25	μs μs μs μs
t_d t_r t_s t_f	RESISTIVE LOAD Delay Time Rise Time Storage Time Fall Time	$V_{CC} = 125\text{ V}$ $I_C = 0.5\text{ A}$ $I_{B1} = 0.045\text{ A}$ $I_{B2} = 0.5\text{ A}$ $t_p = 300\text{ }\mu\text{s}$			0.2 0.5 0.8 0.5	μs μs μs μs
T_{RR}	Diode Reverse Recovery Time	$I_F = 1\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$		300		ns
E_{sb}	Avalanche Energy	$L = 2\text{ mH}$	6			mJ

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

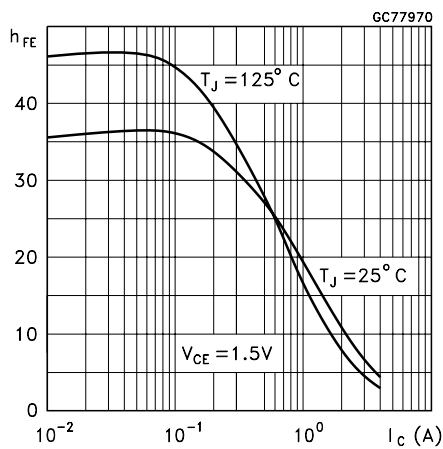
Safe Operating Areas



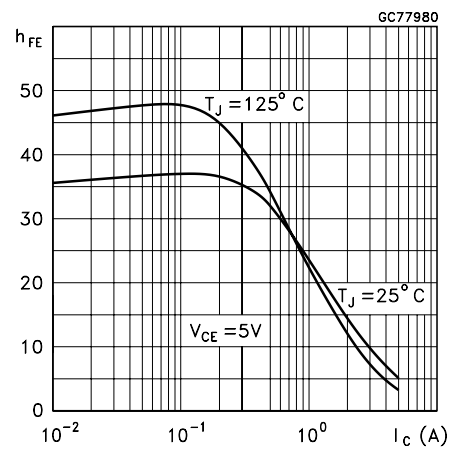
Derating Curve



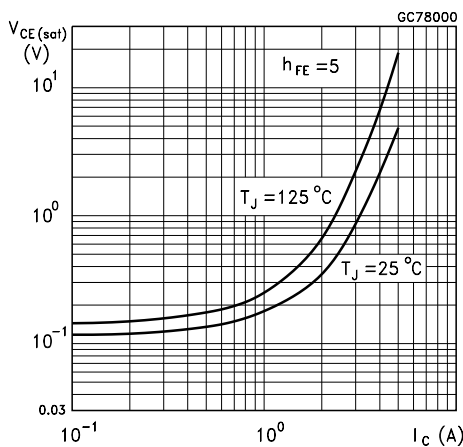
DC Current Gain



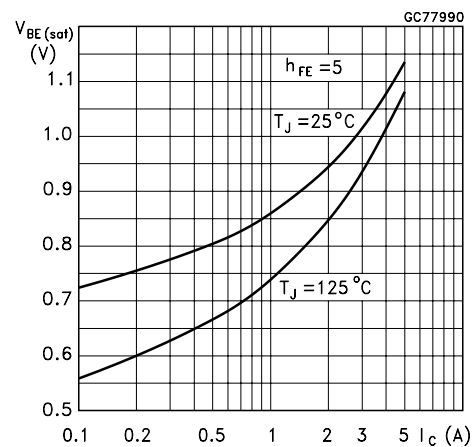
DC Current Gain



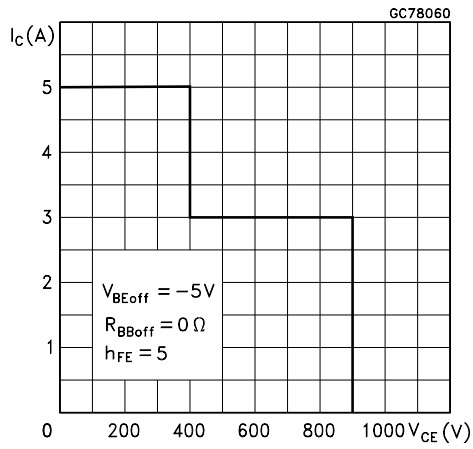
Collector Emitter Saturation Voltage



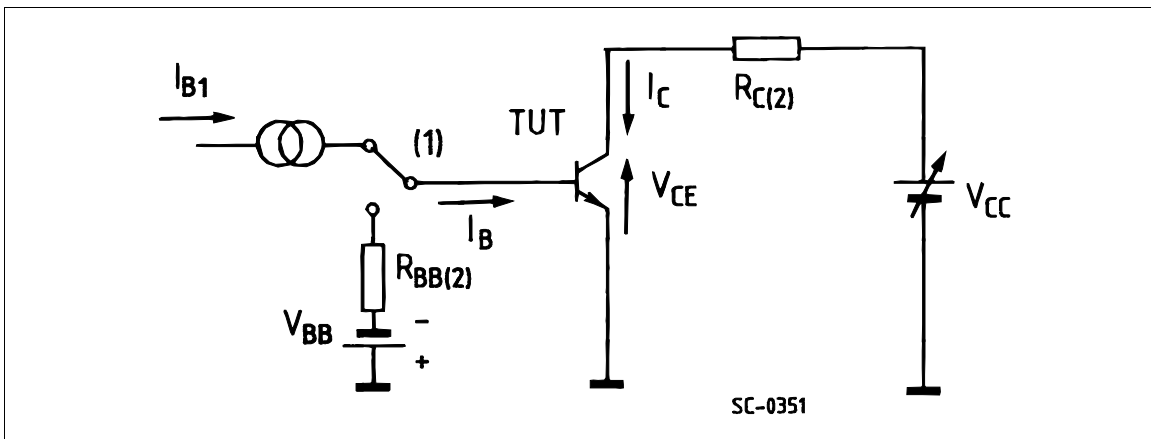
Base Emitter Saturation Voltage



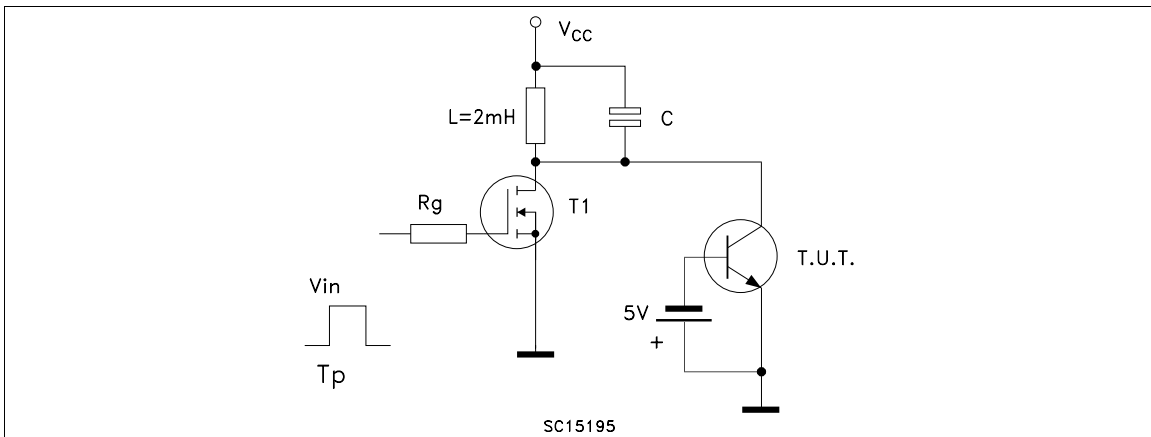
Reverse Biased SOA



Resistive Load Switching Test Circuit

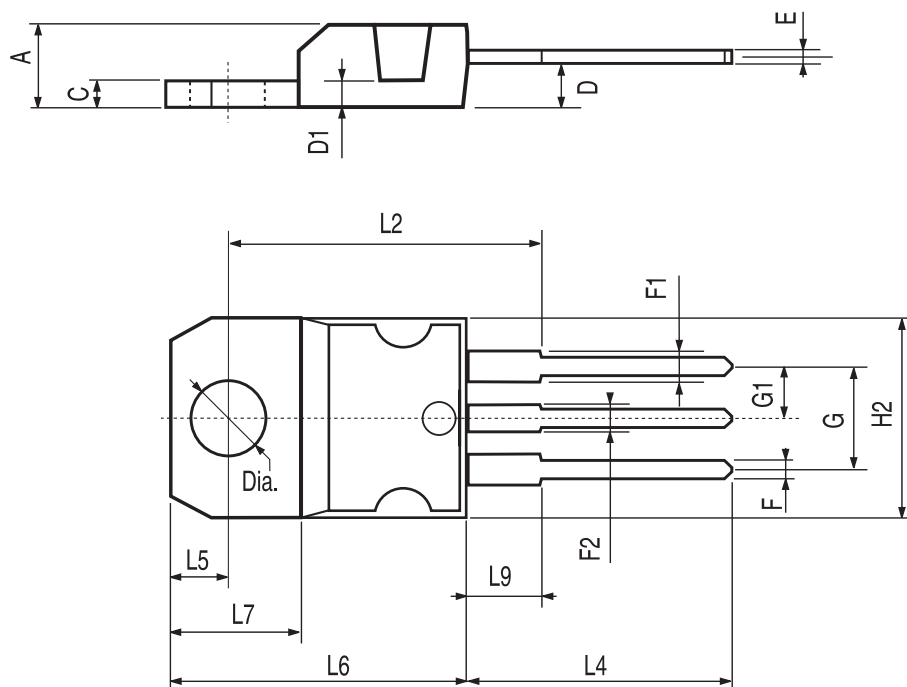


Energy Rating Test Circuit



TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



P011C

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