

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERISED AT 125°C
- LOW SPREAD OF DYNAMIC PARAMETERS

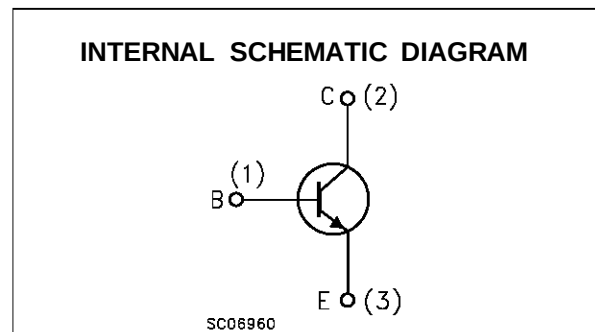
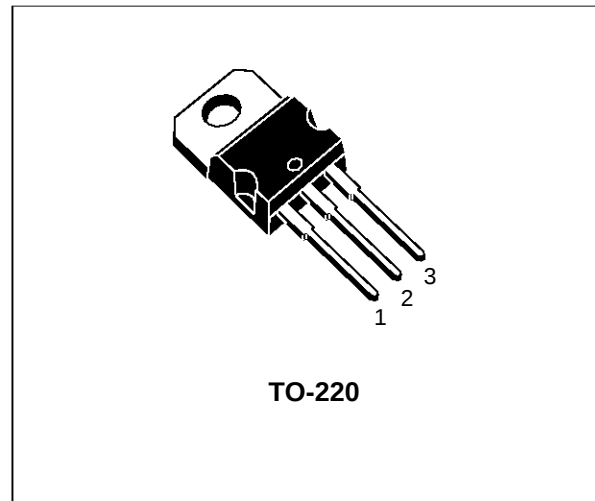
APPLICATIONS

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The BUL416 is manufactured using high voltage Multiepitaxial Mesa technology for cost-effective high performance. It uses a Hollow Emitter structure to enhance switching speeds.

The BUL series is designed for use in lighting applications and low cost switch-mode power supplies.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	1600	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	800	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	9	V
I_C	Collector Current	6	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	9	A
I_B	Base Current	5	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	8	A
P_{tot}	Total Dissipation at $T_c = 25$ °C	110	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

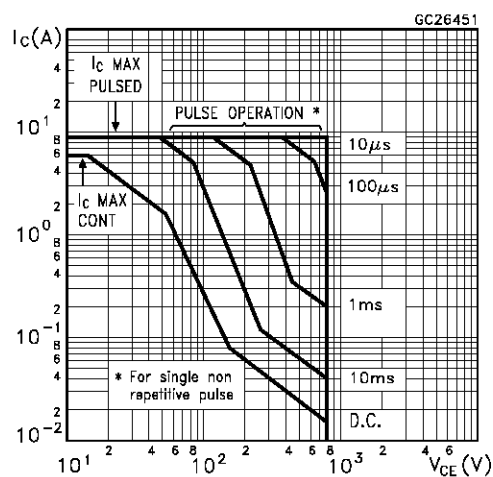
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.14	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	$^{\circ}C/W$

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

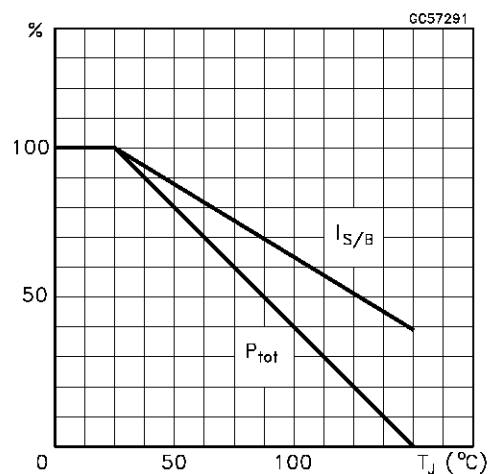
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 1600 V$ $V_{CE} = 1600 V \quad T_j = 125^{\circ}C$			100 500	μA μA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 800 V$			250	μA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 100 mA \quad L = 25 mH$	800			V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	$I_E = 10 mA$	9			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 2 A \quad I_B = 0.4 A$ $I_C = 4 A \quad I_B = 1.33 A$			1.5 3	V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 2 A \quad I_B = 0.4 A$ $I_C = 4 A \quad I_B = 1.33 A$			1.2 1.5	V V
h_{FE*}	DC Current Gain	$I_C = 0.7 A \quad V_{CE} = 5 V$ $I_C = 10 mA \quad V_{CE} = 5 V$	12 10		40	
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 3 A \quad I_{B1} = 1 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 200 V \quad L = 200 \mu H$		2.3 650		μs ns
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 3 A \quad I_{B1} = 1 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 200 V \quad L = 200 \mu H$ $T_j = 100^{\circ}C$		3 680		μs ns

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

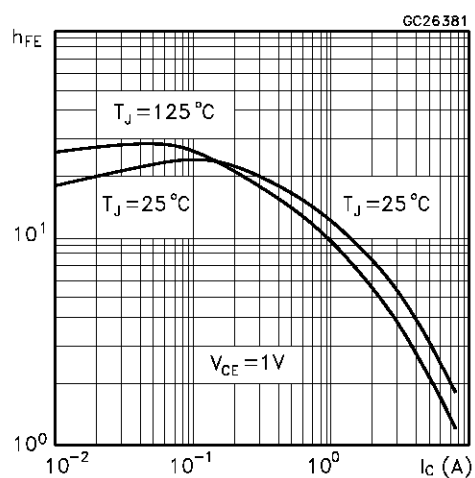
Safe Operating Areas



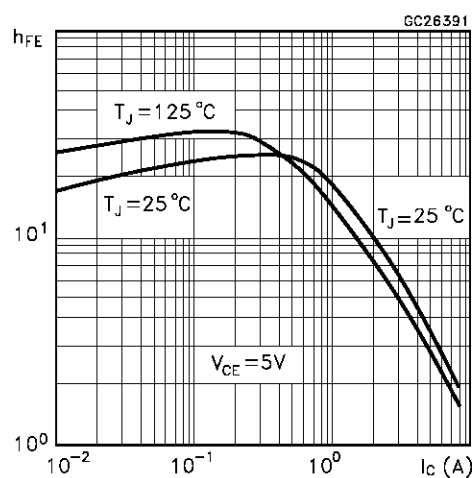
Derating Curve



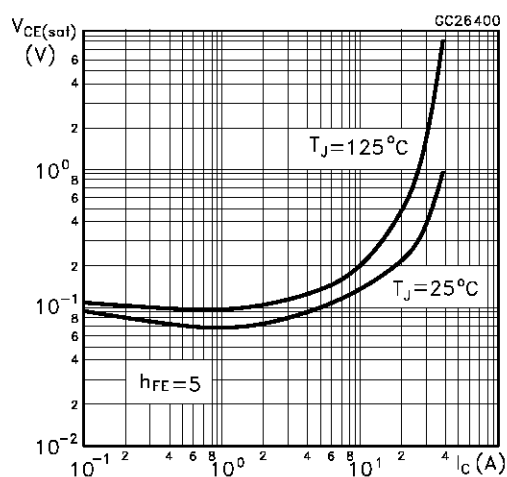
DC Current Gain



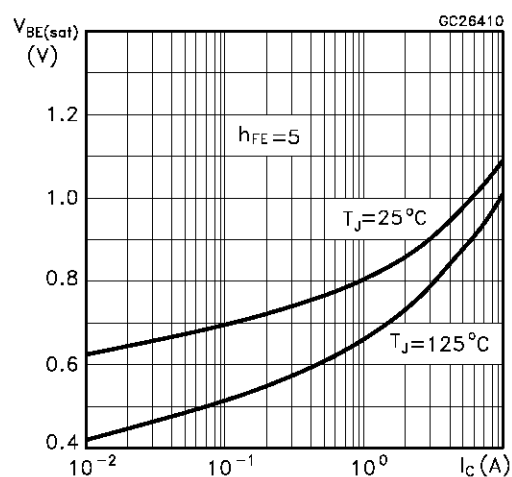
DC Current Gain



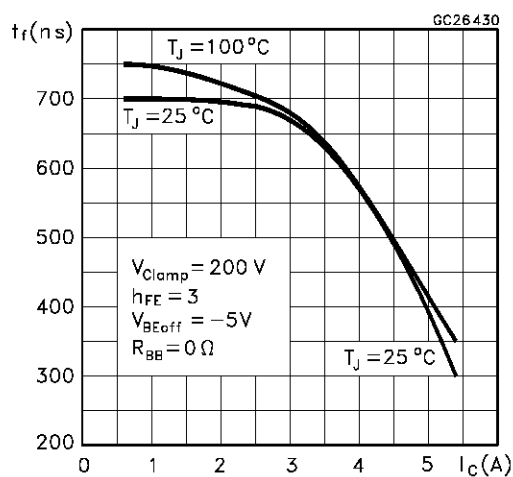
Collector Emitter Saturation Voltage



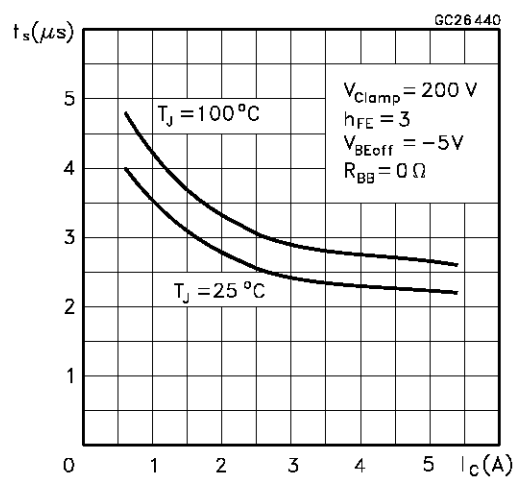
Base Emitter Saturation Voltage



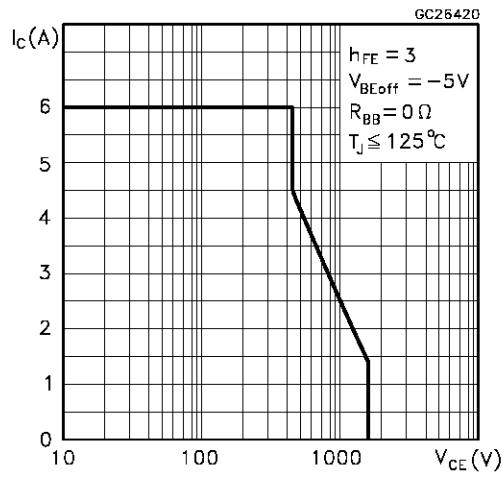
Inductive Fall Time



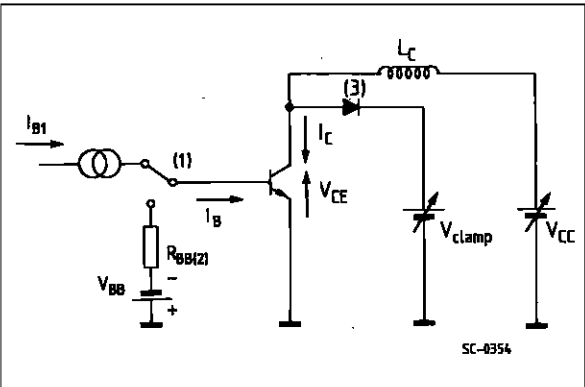
Inductive Storage Time



Reverse Biased SOA



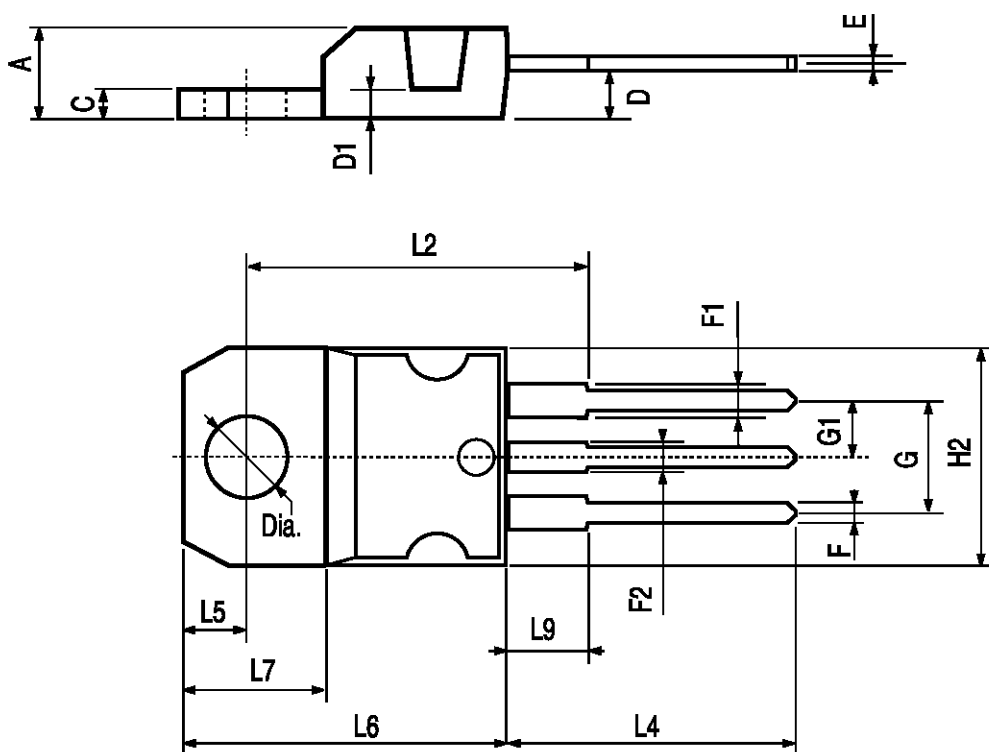
RBSOA and Inductive Load Switching Test Circuit



- (1) Fast electronic switch
- (2) Non-inductive Resistor
- (3) Fast recovery rectifier

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



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