



BUL57 BUL57FP

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

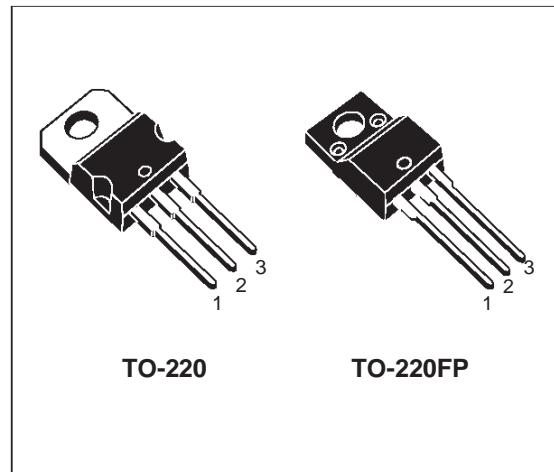
- STMicroelectronics PREFERRED SALESTYPES
- NPN TRANSISTORS
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125°C
- LARGE RBSOA
- TO-220FP FULLY ISOLATED PACKAGE (U.L. COMPLIANT)

APPLICATIONS:

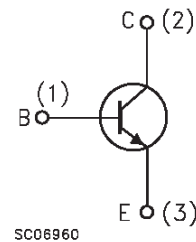
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The devices are manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. They use a Cellular Emitter structure with planar edge termination to enhance switching speeds. The devices are designed for use in lighting applications and low cost switch-mode power supplies.



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		BUL57	BUL57FP	
V _{CES}	Collector-Emitter Voltage (V _{BE} = 0)	700		V
V _{CEO}	Collector-Emitter Voltage (I _B = 0)	400		V
V _{EBO}	Emitter-Base Voltage (I _C = 0)	9		V
I _C	Collector Current	8		A
I _{CM}	Collector Peak Current (t _p < 5 ms)	16		A
I _B	Base Current	4		A
I _{BM}	Base Peak Current (t _p < 5 ms)	7		A
P _{tot}	Total Dissipation at T _c = 25 °C	85	35	W
T _{stg}	Storage Temperature	-65 to 150		°C
T _j	Max. Operating Junction Temperature	150		°C

THERMAL DATA

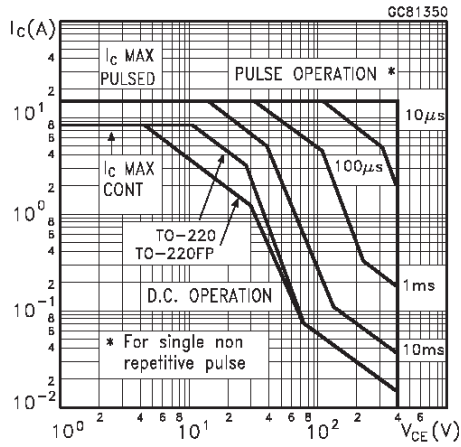
		TO-220	TO-220FP	
R _{thj-case}	Thermal Resistance Junction-Case	Max	1.47	3.5 °C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	62.5	62.5 °C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

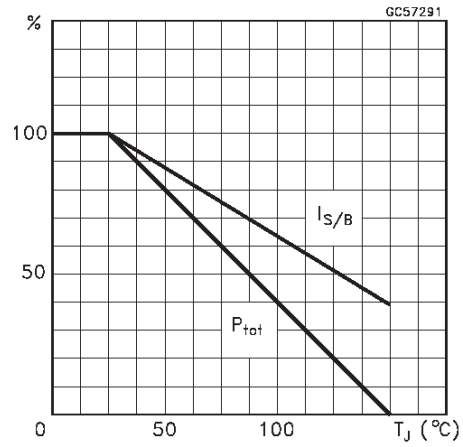
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 700 V V _{CE} = 700 V T _j = 125 °C			100 500	μA μA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{EC} = 400 V			250	μA
V _{CEO(sus)}	Collector-Emitter Sustaining Voltage	I _C = 100 mA L = 25 mH	400			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 I _B = 0.4 A I _C = 3 A I _B = 0.6 A I _C = 4 A I _B = 0.8 A I _C = 5 A I _B = 1 A I _C = 8 A I _B = 2 A		2	0.65 0.75 1.2 2	V V V V V
V _{BE(sat)*}	Base-Emitter Saturation Voltage	I _C = 2 A I _B = 0.4 A I _C = 5 A I _B = 1 A			1.2 1.6	V V
h _{FE*}	DC Current Gain	I _C = 2 A V _{CE} = 5 V I _C = 4 A V _{CE} = 5 V I _C = 10 mA V _{CE} = 5 V	15 6 8		40	
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 3 A V _{CL} = 250 V I _{B1} = 0.6 A I _{B2} = -1.2 A L = 200 μH		1.8 60	2.6 110	μs ns
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 3 A V _{CL} = 250 V I _{B1} = 0.6 A I _{B2} = -1.2 A L = 200 μH T _j = 125 °C		2.6 110		μs ns
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 3 A I _{B1} = 0.6 A V _{BE(off)} = -5 V R _{BB} = 0 Ω V _{CL} = 250 V L = 200 μH		1 54	1.6 100	μs ns
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 3 A I _{B1} = 0.6 A V _{BE(off)} = -5V R _{BB} = 0 Ω V _{CL} = 250 V L = 200 μH T _j = 125 °C		1.5 90		μs ns
t _s t _f	RESISTIVE LOAD Storage Time Fall Time	V _{CC} = 300 V I _C = 2 A I _{B1} = 0.4 A I _{B2} = -0.4 A T _p = 30 μs	3		4.2 350	ms ns

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

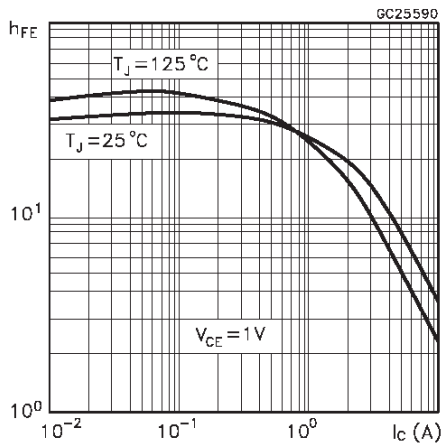
Safe Operating Areas



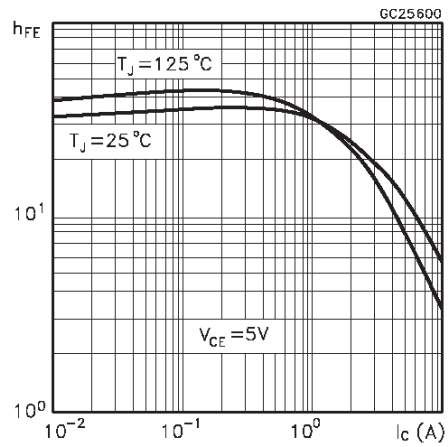
Derating Curve



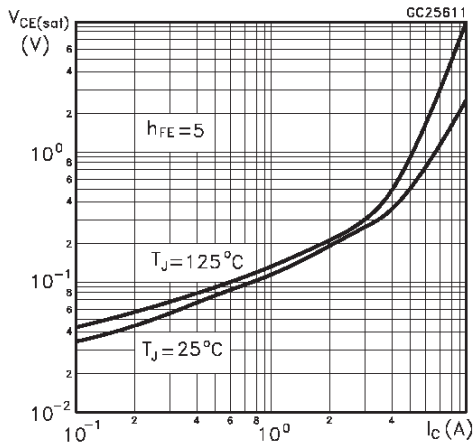
DC Current Gain



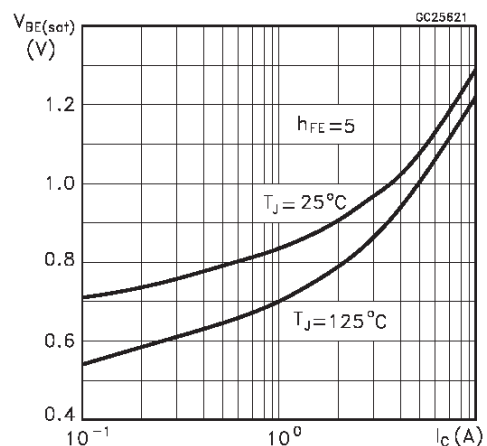
DC Current Gain



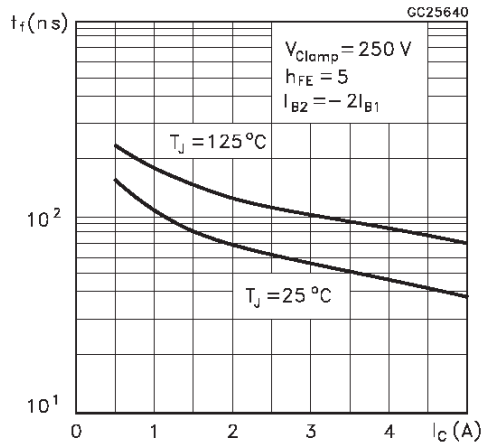
Collector Emitter Saturation Voltage



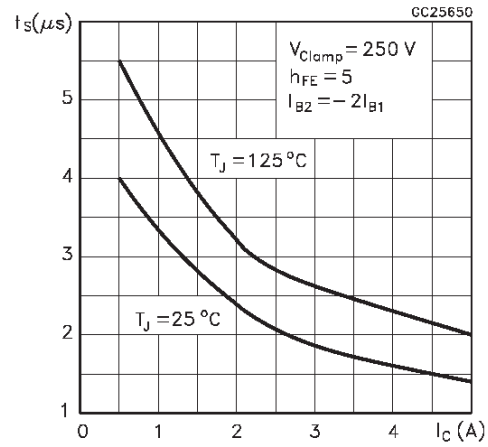
Base Emitter Saturation Voltage



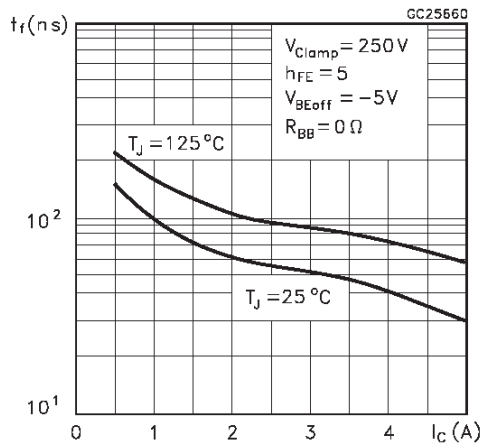
Inductive Fall Time



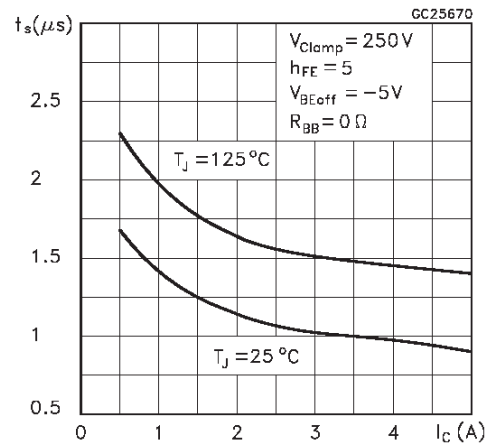
Inductive Storage Time



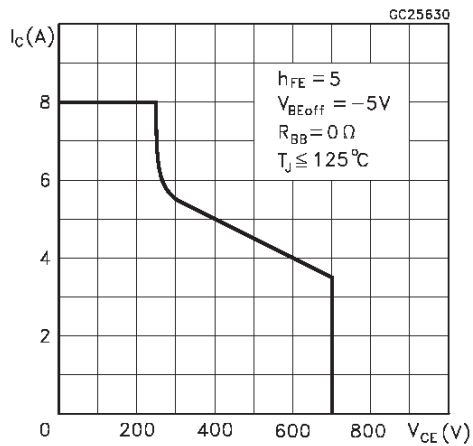
Resistive Fall Time



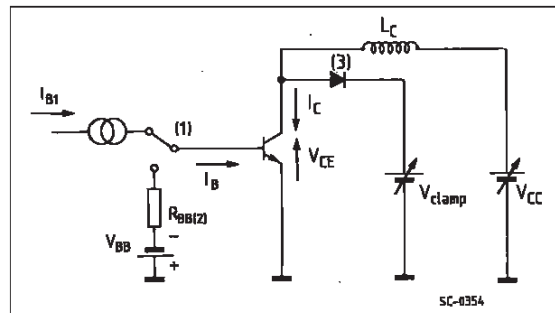
Resistive Load Storage Time



Reverse Biased SOA



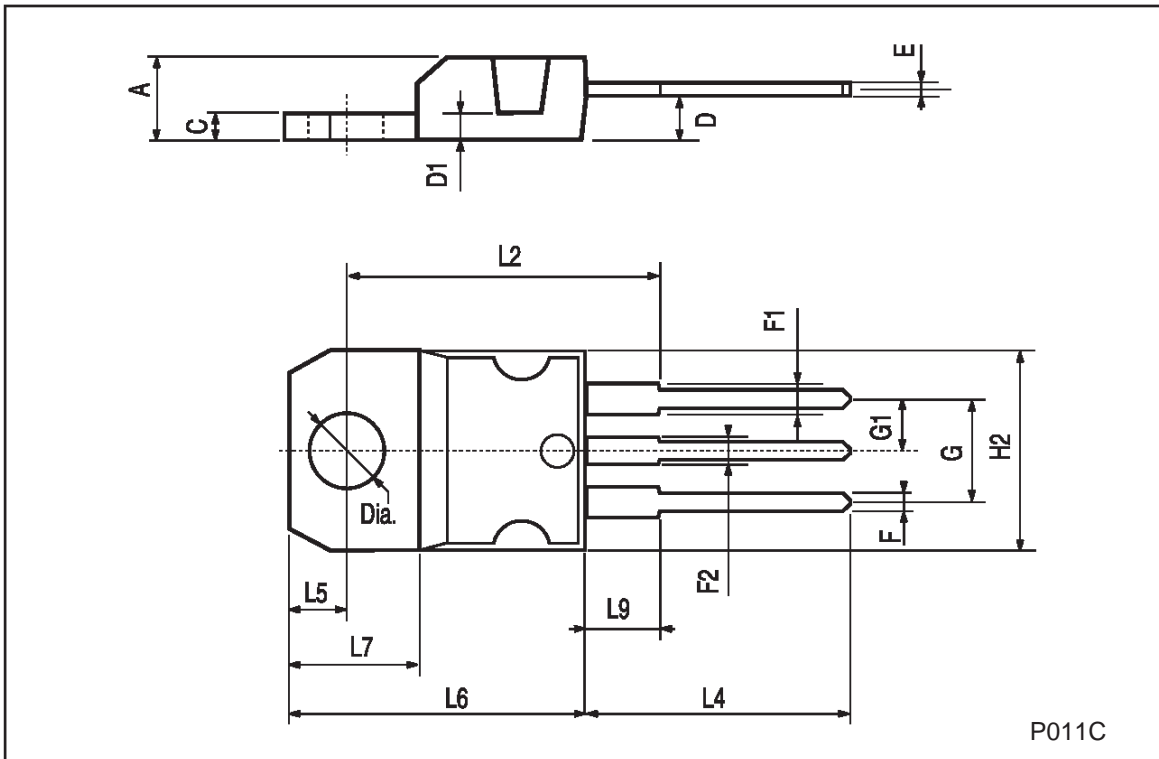
RBSOA and Inductive Load Switching Test Circuit



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

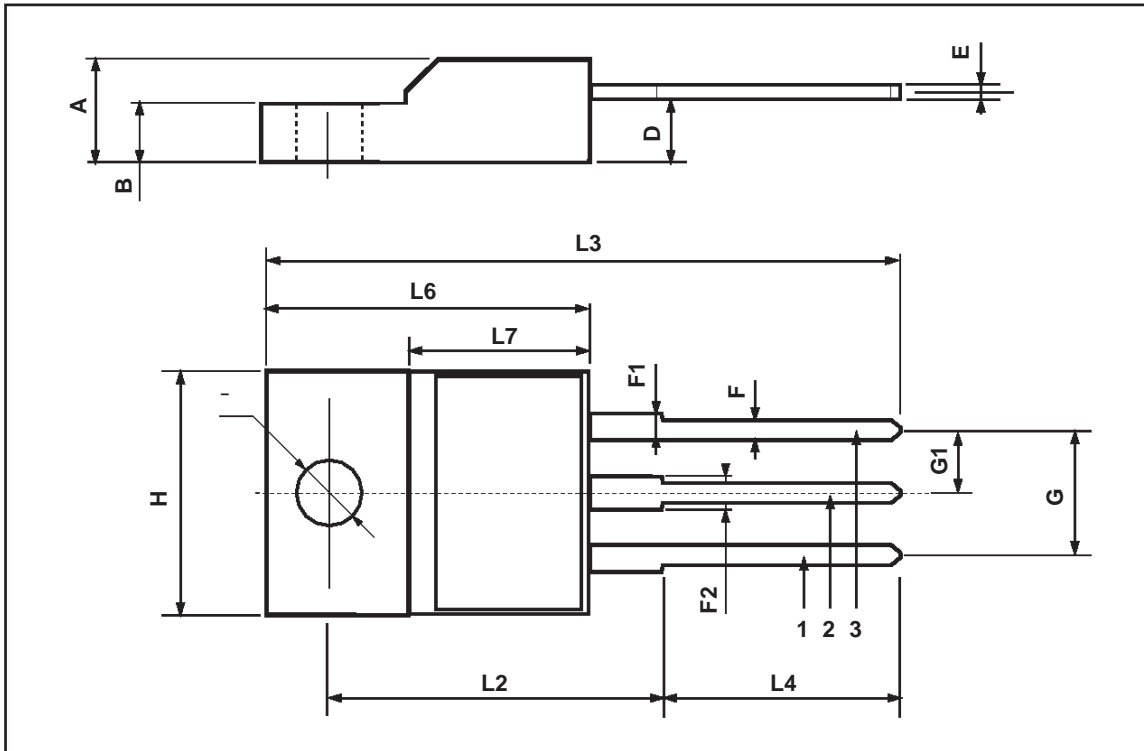
TO-220 MECHANICAL DATA

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



TO-220FP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
∅	3		3.2	0.118		0.126



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