STI13005-H
STU13005

High voltage fast-switching NPN power transistor

Features

- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

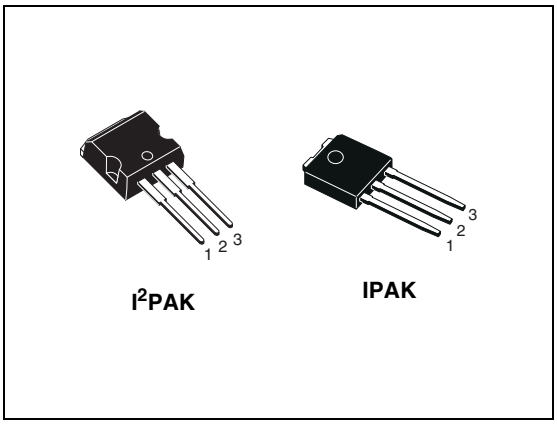
Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies

Description

These devices are high voltage fast-switching NPN power transistors, manufactured using high voltage multi-epitaxial planar technology for high switching speeds.

They employ a cellular emitter structure with planar edge termination to enhance switching speeds, while maintaining a wide RBSOA.



I^2PAK IPAK

Figure 1. Internal schematic diagram

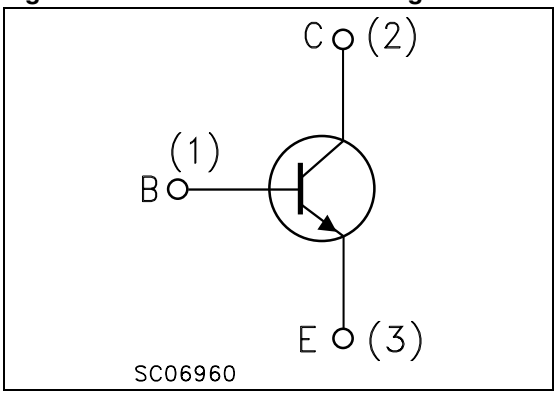


Table 1. Device summary

Order codes	Marking	Package	Packaging
STI13005-H STU13005	I13005 U13005	I²PAK IPAK	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value		Unit
		I^2PAK	IPAK	
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	4		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 $T_c \leq 25$ °C	75	30	W
T_{STG}	Storage temperature	- 65 to 150	- 65 to 150	°C
T_J	Max. operating junction temperature	150	150	°C

Table 3. Thermal data

Symbol	Parameter	Value		Unit
		I^2PAK	IPAK	
$R_{thj\text{-}case}$	Thermal resistance junction-case max	1.7	4.2	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-amb max	62.5	100	°C/W

2 Electrical characteristics

T_{case} = 25 °C unless otherwise specified.

Table 4. Electrical characteristics

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_C=125 °C			1 5	mA mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB}= 9 V			1	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 1 A I_B = 0.2 A I_C = 2 A I_B = 0.5 A I_C = 4 A I_B = 1 A			0.5 0.6 1	V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 1 A I_B = 0.2 A I_C = 2 A I_B = 0.5 A			1.2 1.6	V V
h_{FE} (1)	DC current gain	I_C = 1 A V_{CE} = 5 V I_C = 2 A V_{CE} = 5 V	16 8		32 40	
 t_s t_f	Resistive load Storage time Fall time	I_C = 2 A V_{CC} = 125 A I_{B1}= - I_{B2}=0.4 A t_p = 30 µs		 2.2 0.2		 µs µs

1. Pulse test: pulse duration = 300 µs, duty cycle ≤ 2 %.

2.1 Test circuits

Figure 2. Inductive load switching test circuit

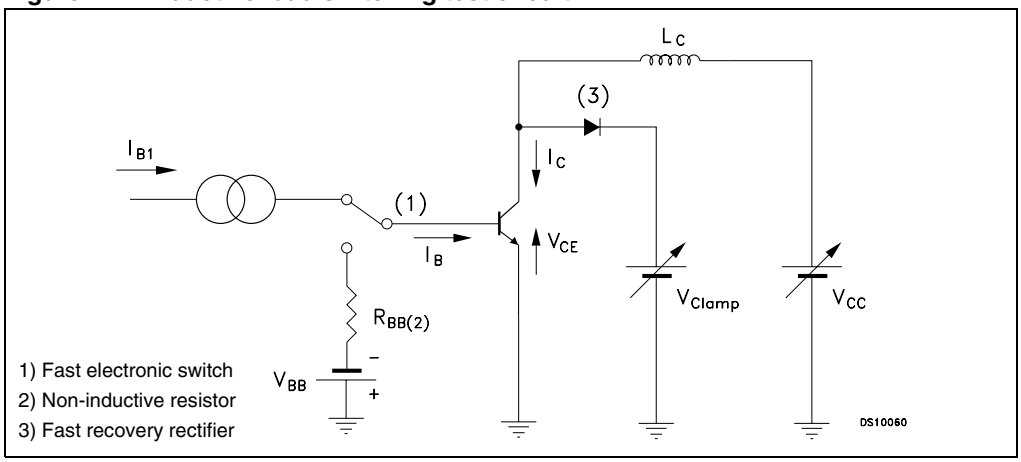
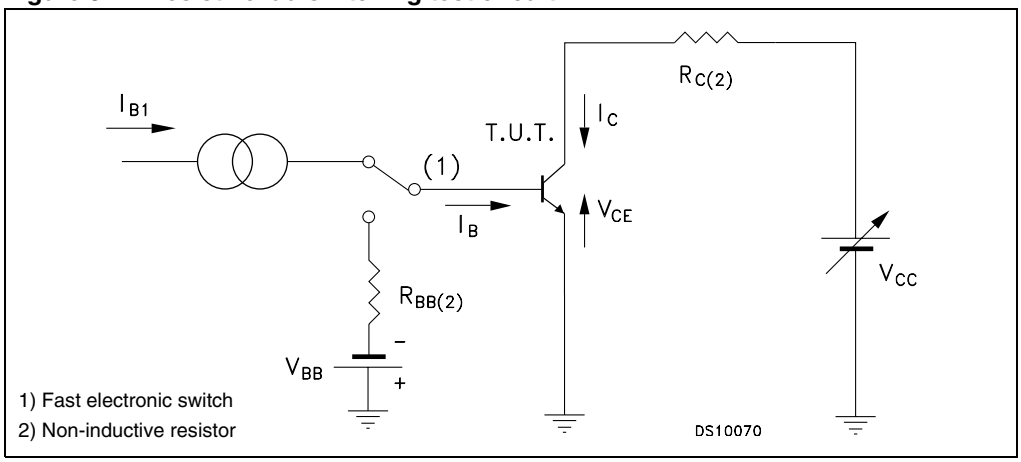


Figure 3. Resistive lad switching test circuit



2.2 Electrical characteristics (curves)

Figure 4. Safe operating area

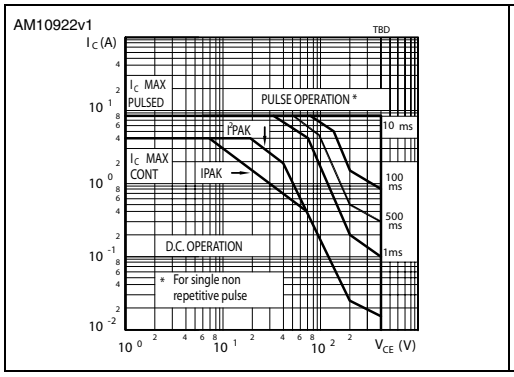


Figure 5. Derating curve

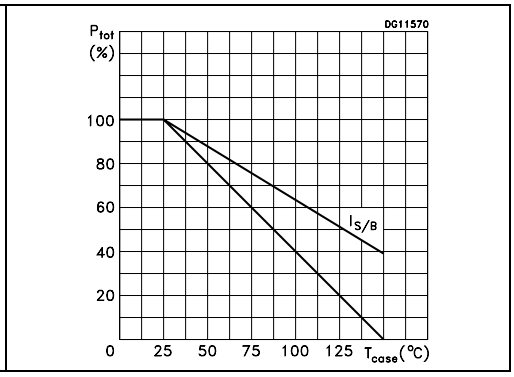


Figure 6. DC current gain (V_{CE} = 1.5 V)

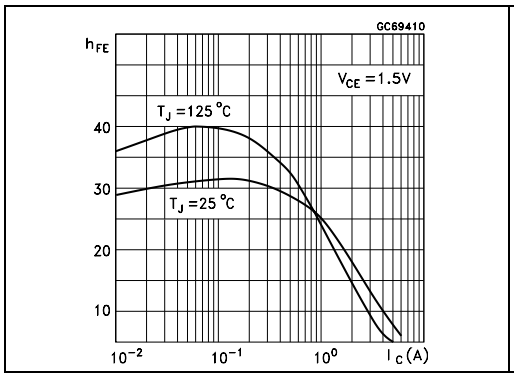


Figure 7. DC current gain (V_{CE} = 5 V)

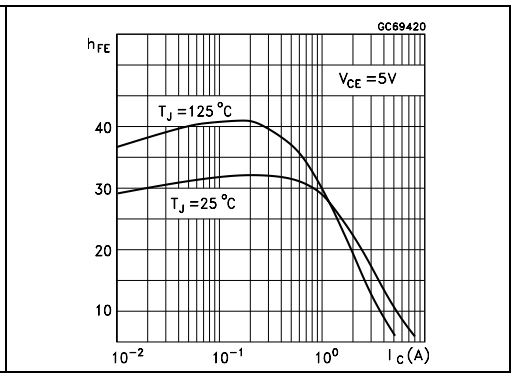


Figure 8. Collector-emitter saturation voltage

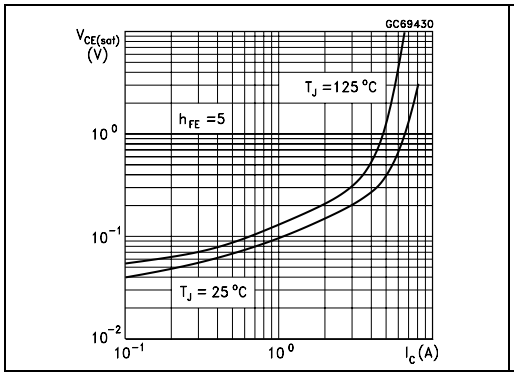


Figure 9. Base-emitter saturation voltage

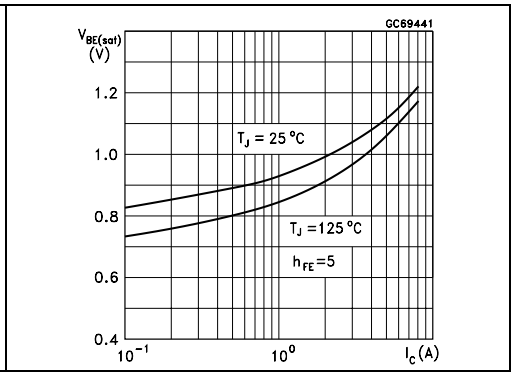


Figure 10. Inductive load fall time

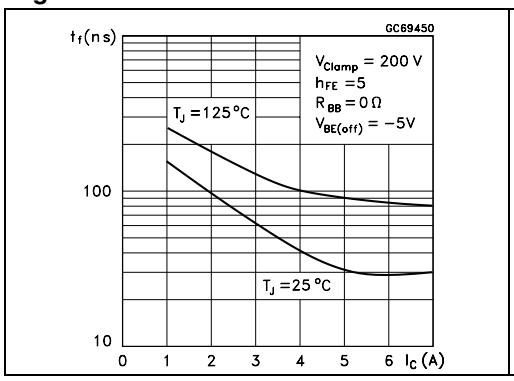


Figure 11. Inductive load storage time

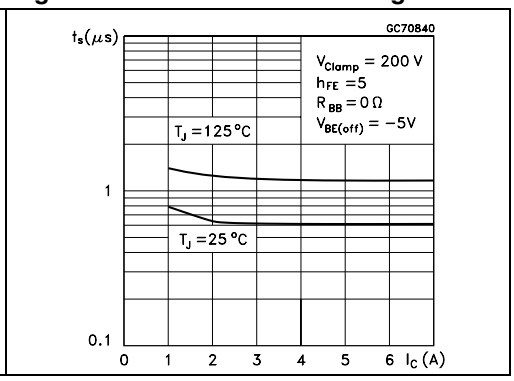


Figure 12. Resistive load fall time

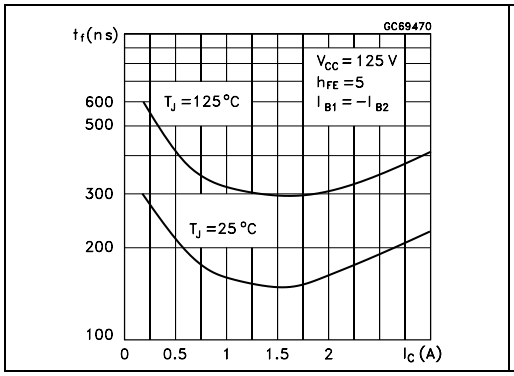


Figure 13. Resistive load storage time

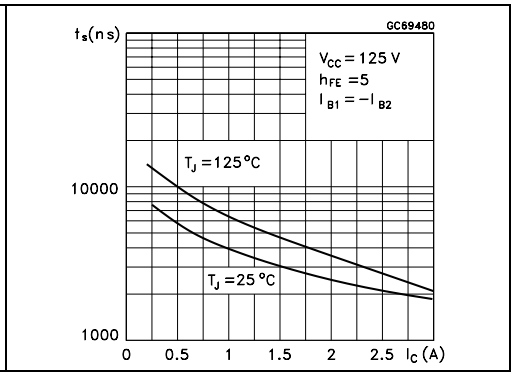
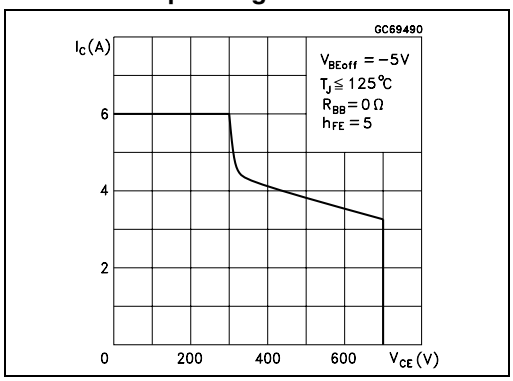


Figure 14. Reverse biased safe operating area



3 Package mechanical data

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Table 5. I²PAK (TO-262) mechanical data

DIM.	mm.		
	min.	typ	max.
A	4.40		4.60
A1	2.40		2.72
b	0.61		0.88
b1	1.14		1.70
c	0.49		0.70
c2	1.23		1.32
D	8.95		9.35
e	2.40		2.70
e1	4.95		5.15
E	10		10.40
L	13		14
L1	3.50		3.93
L2	1.27		1.40

Figure 15. I²PAK (TO-262) drawing

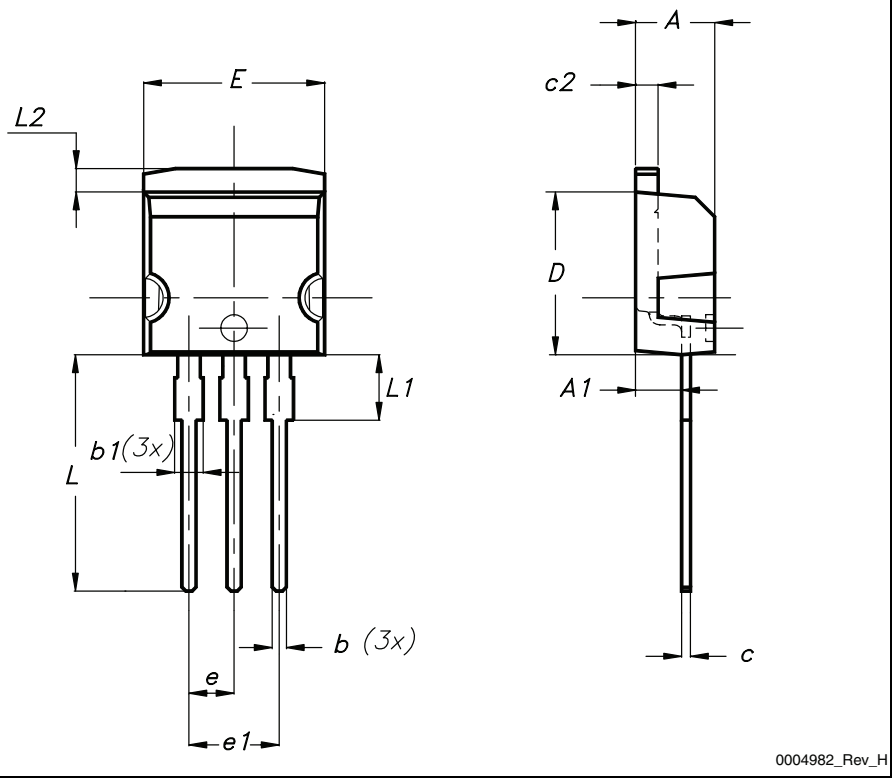
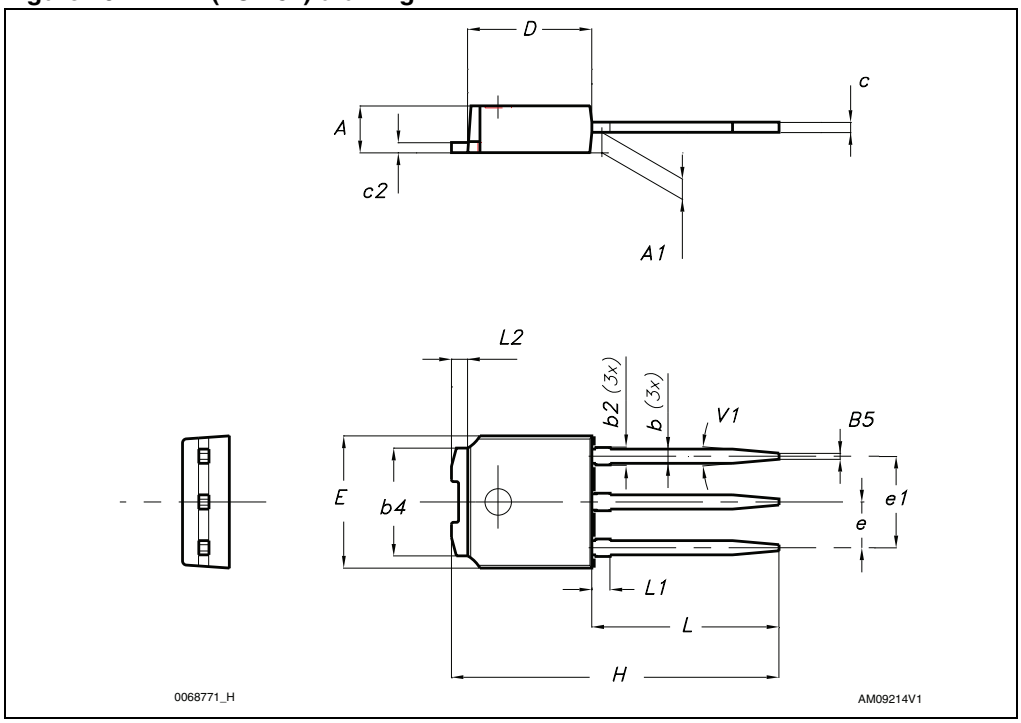


Table 6. IPAK (TO-251) mechanical data

DIM.	mm.		
	min.	typ	max.
A	2.20		2.40
A1	0.90		1.10
b	0.64		0.90
b2			0.95
b4	5.20		5.40
B5		0.3	
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
E	6.40		6.60
e		2.28	
e1	4.40		4.60
H		16.10	
L	9.00		9.40
L1	0.80		1.20
L2		0.80	1.00
V1		10 ^{o}	

Figure 16. IPAK (TO-251) drawing



4 Revision history

Table 7. Document revision history

Date	Revision	Changes
13-Dec-2011	1	First release

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