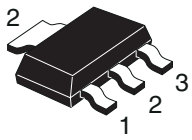
STN878

Medium current, high performance, low voltage NPN transistor

Features

- Very low Collector to Emitter saturation voltage
- D.C. Current gain, h_{FE} >100
- 5A continuous collector current
- SOT-223 plastic package for surface mounting circuits
- Available in tape & reel packing



SOT-223

Applications

- Power management in portable equipment
- Voltage regulation in bias supply circuits
- Switching regulator in battery charger applications
- Heavy load driver

Description

The device is manufactured in low voltage PNP planar technology with “base island” layout. the resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

Figure 1. Internal schematic diagram

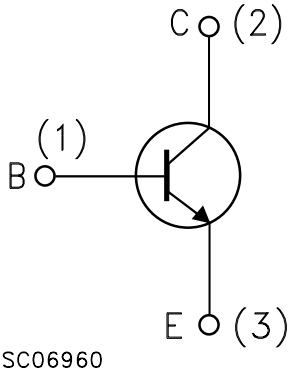


Table 1. Device summary

Order code	Marking	Package	Packaging
STN878	N878	SOT-223	Tape & reel

Contents

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	45	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	30	V
V_{EBO}	Emitter-base voltage (I_C = 0)	6	V
I_C	Collector current	5	A
I_{CM}	Collector peak current (t_P < 5ms)	10	A
P_{tot}	Total dissipation at T_{amb} = 25°C	1.6	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}amb}$	Thermal resistance junction-amb(1)	max	78	°C/W

1. Device mounted on PCB area of 1 cm^2.

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E =0)	V_{CB} = 30 V V_{CB} = 30 V; T_C = 100 °C			10 100	µA µA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} = 6 V			10	µA
$V_{(BR)CEO}$ (1)	Collector-emitter breakdown voltage (I_B =0)	I_C = 10 mA	30			V
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E =0)	I_C = 100 µA	45			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C =0)	I_E = 100 µA	6			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 5 mA I_C = 2 A I_B = 50 mA I_C = 5 A I_B = 0.25 A I_C = 6 A I_B = 0.25 A I_C = 8 A I_B = 0.4 A I_C = 10 A I_B = 0.5 A		 0.7 1 1.2	0.15 0.35 0.7	V V V V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 2 A I_B = 50 mA I_C = 6 A I_B = 0.25 A		 1.2	1.1	V V
h_{FE} (1)	DC current gain	I_C = 10 mA V_{CE} = 1 V I_C = 500 mA V_{CE} = 1 V I_C = 5 A V_{CE} = 1 V I_C = 5 A V_{CE} = 1 V T_c = 100 °C I_C = 8 A V_{CE} = 1 V I_C = 10 A V_{CE} = 1 V	120 100 70	200 200 100 100 55 35	300	
t_d t_r t_s t_f	Resistive load Delay time Rise time Storage time Fall time	I_C = 3 A V_{CC} = 20 V I_{B1} = -I_{B2} = 60 mA see *Figure 8*		180 160 250 80	220 210 300 100	ns ns ns ns

1. Pulsed duration = 300 ms, duty cycle ≤1.5 %

2.1 Electrical characteristics (curves)

Figure 2. DC current gain

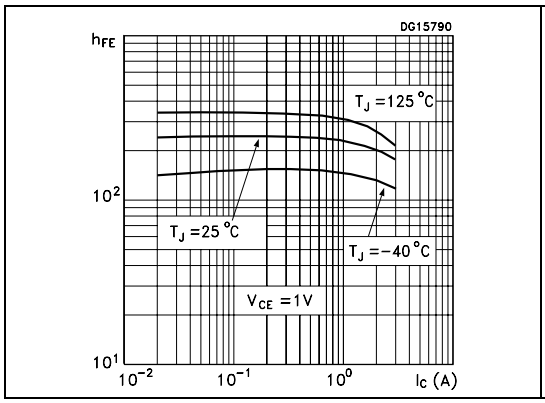


Figure 3. DC current gain

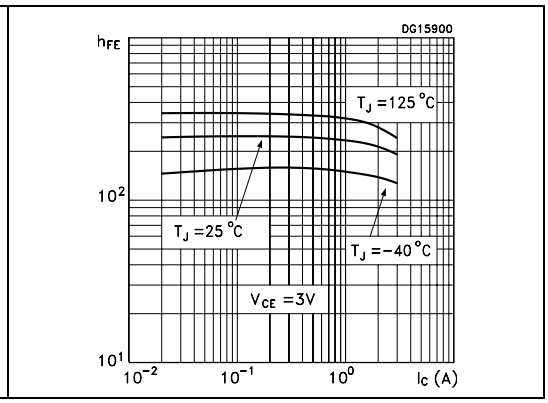


Figure 4. Collector-emitter saturation voltage

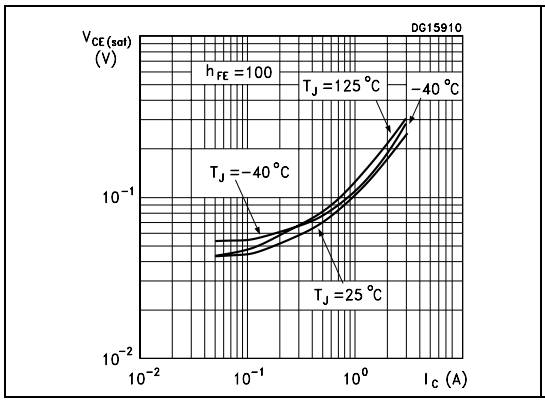


Figure 5. Base-emitter saturation voltage

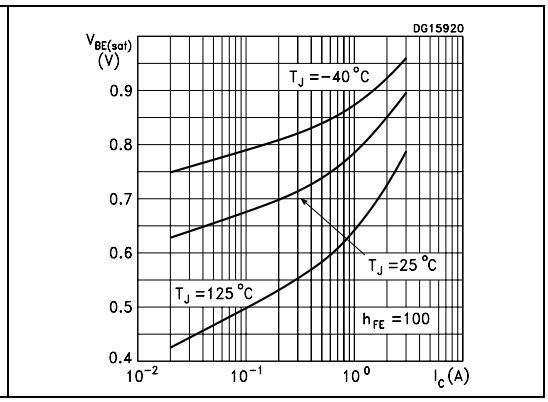


Figure 6. Switching time resistive load

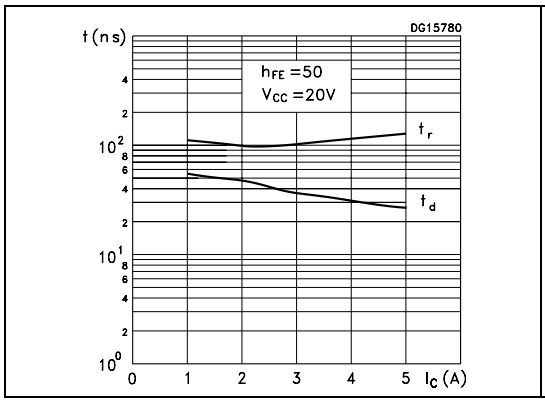
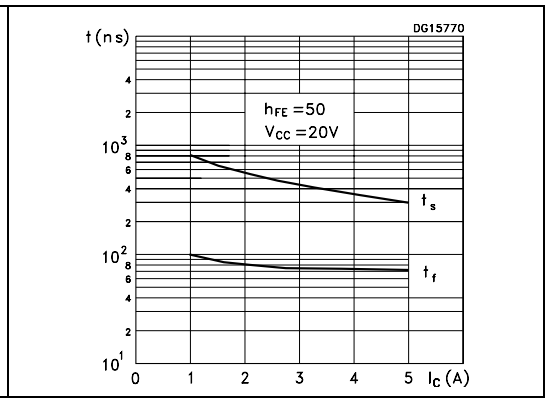
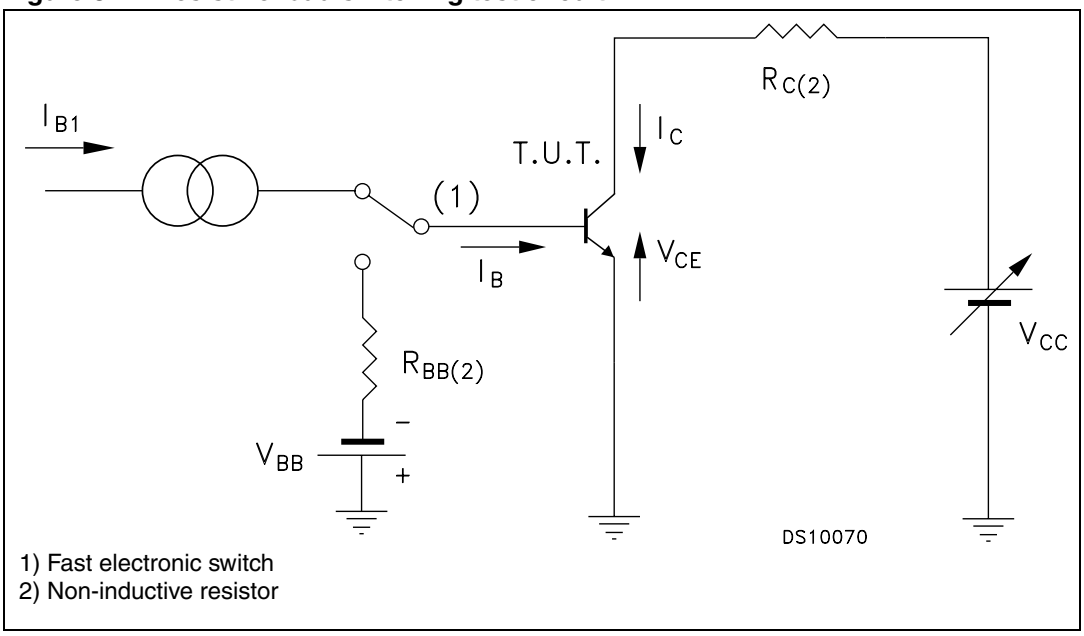


Figure 7. Switching time resistive load



2.2 Test circuits

Figure 8. Resistive load switching test circuit



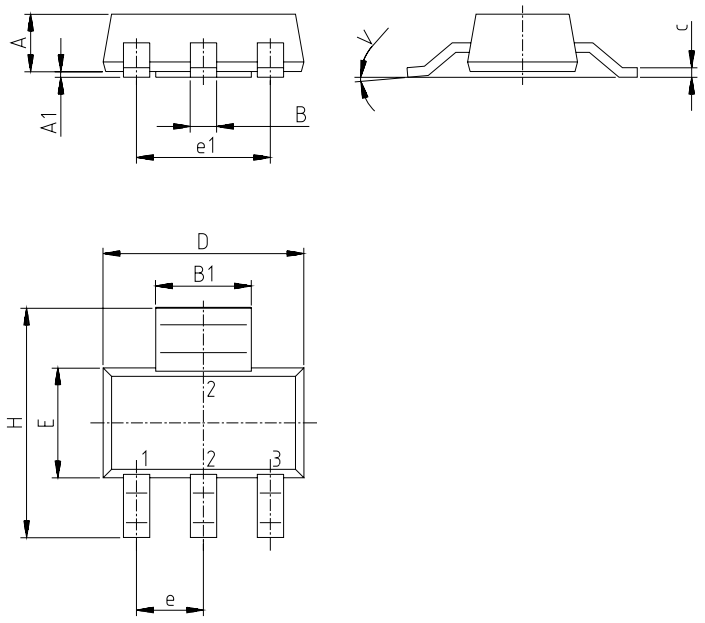
1) Fast electronic switch
2) Non-inductive resistor

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

SOT-223 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.80			0.071
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.30			0.090	
e1		4.60			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V			10^{o}			10^{o}
A1		0.02				



P008B

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
21-Aug-2007	1	Initial release.

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