



# STD840DN40

## Dual NPN high voltage transistors in a single package

Datasheet — production data

### Features

- Low  $V_{CE(sat)}$
- Simplified circuit design
- Reduced component count
- Fast switching speed

### Applications

- Compact fluorescent lamp (CFL) 220 V mains
- Electronic ballast for fluorescent lighting

### Description

This device is a dual NPN high voltage power transistor manufactured using multi-epitaxial planar technology. It is housed in a dual-island DIP-8 package, with separated terminals for a high degree of mounting flexibility.

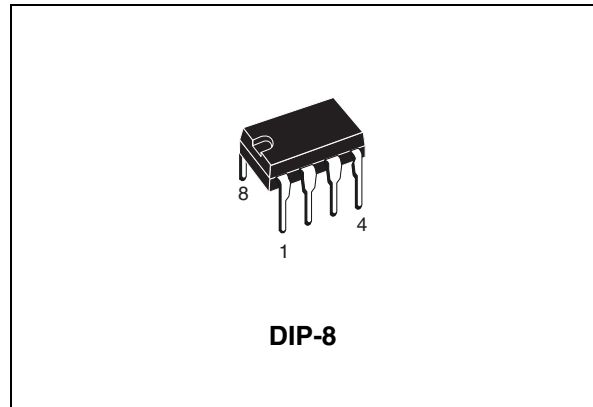


Figure 1. Internal schematic diagram

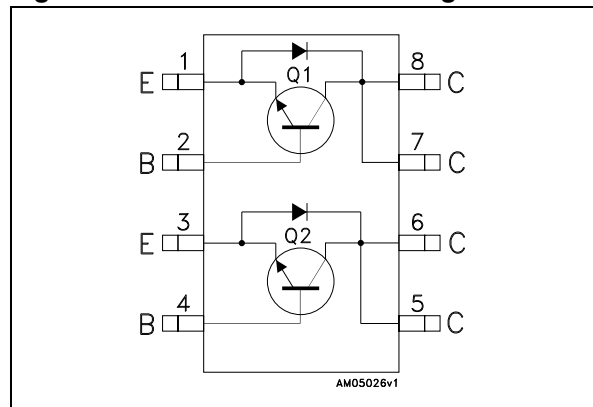


Table 1. Device summary

Order code	Marking	Package	Packaging
STD840DN40	D840DN40	DIP-8	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	700	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	400	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0, I_B = 1.5 \text{ A}, t_p < 10 \text{ ms}$ )	$V_{(BR)EBO}$	V
$I_C$	Collector current	4	A
$I_{CM}$	Collector peak current ( $t_p < 5 \text{ ms}$ )	8	A
$I_B$	Base current	1.5	A
$I_{BM}$	Base peak current ( $t_p < 5 \text{ ms}$ )	3	A
$P_{TOT}$	Total dissipation at $T_{amb} = 25 \text{ °C}$ single transistor	3	W
	Total dissipation at $T_{case} = 25 \text{ °C}$ single transistor	45	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
$R_{thJA}^{(1)}$	Thermal resistance junction-ambient (single transistor)	42	°C/W
$R_{thJC}$	Thermal resistance junction-case (single transistor)	2.7	°C/W

1. Device mounted on PCB area of 25 mm<sup>2</sup>.

## 2 Electrical characteristics

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

**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	Collector cut-off current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 700\text{ V}$			100	$\mu\text{A}$
		$V_{\text{CE}} = 700\text{ V}$ $T_{\text{c}} = 125\text{ °C}$			500	$\mu\text{A}$
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 400\text{ V}$			250	$\mu\text{A}$
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = 10\text{ mA}$	9		18	V
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 10\text{ mA}$	400			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$			0.5	V
		$I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.4\text{ A}$			1	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$			1.2	V
		$I_{\text{C}} = 2\text{ A}$ $I_{\text{B}} = 0.4\text{ A}$			1.3	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 10\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$	10			
		$I_{\text{C}} = 2\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	8		24	
$V_{\text{F}}$	Diode forward voltage	$I_{\text{F}} = 1\text{ A}$			2.5	V
$t_{\text{s}}$ $t_{\text{f}}$	Resistive load					
	Storage time	$I_{\text{C}} = 1\text{ A}$ $I_{\text{B1}} = - I_{\text{B2}} = 0.2\text{ A}$		2.5		$\mu\text{s}$
	Fall time	$V_{\text{CC}} = 125\text{ V}$ $t_{\text{p}} = 20\text{ }\mu\text{s}$		0.2		$\mu\text{s}$

1. Pulse test: pulse duration  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## 2.1 Electrical characteristics (curves)

Figure 2. DC current gain ( $V_{CE} = 1\text{ V}$ )

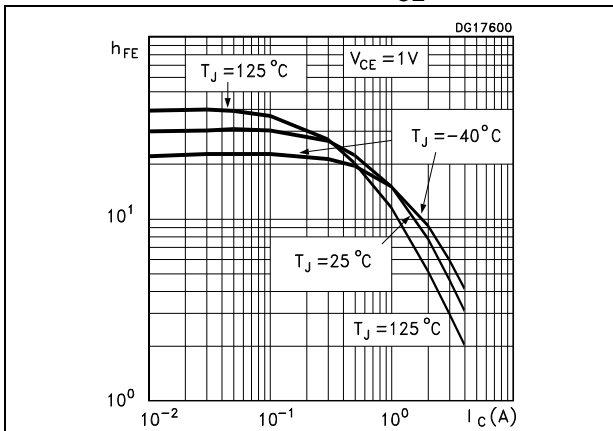


Figure 3. DC current gain ( $V_{CE} = 5\text{ V}$ )

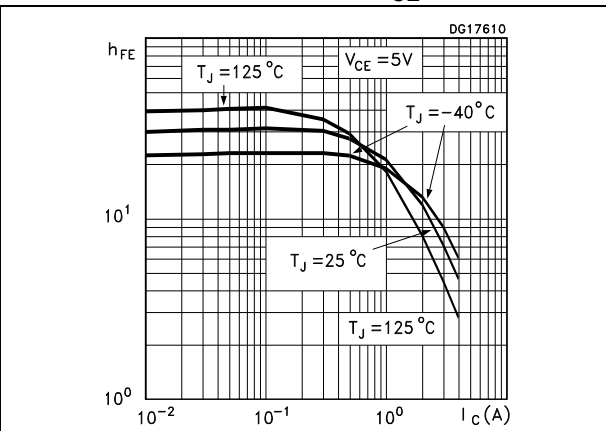


Figure 4. Collector-emitter saturation voltage Figure 5. Base-emitter saturation voltage

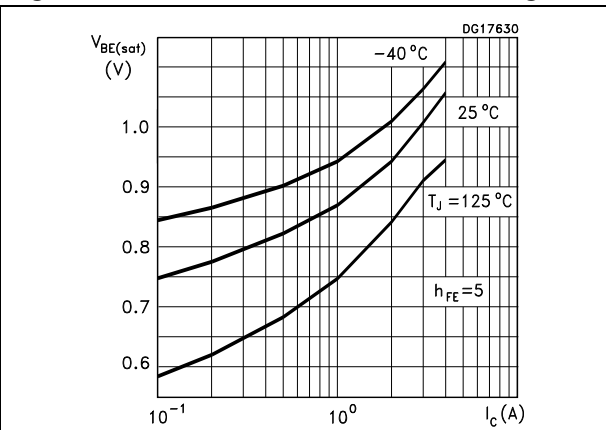
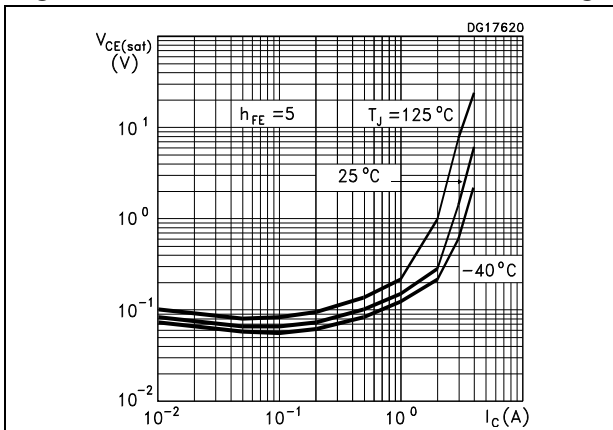


Figure 6. Freewheel diode forward voltage

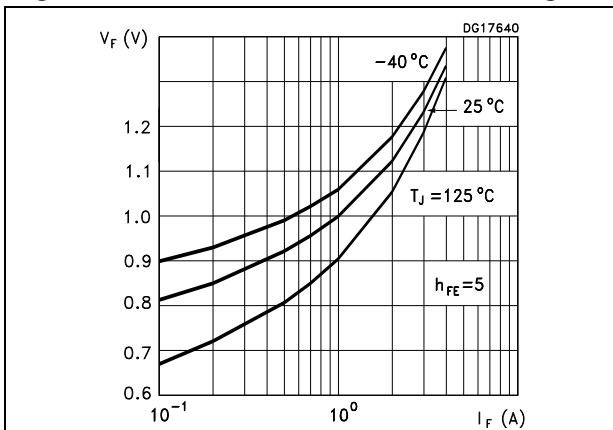
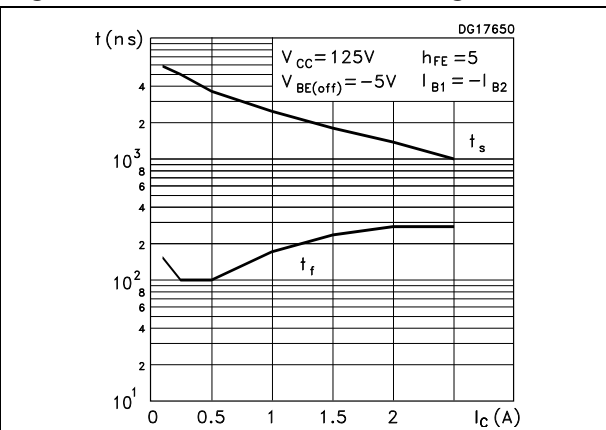
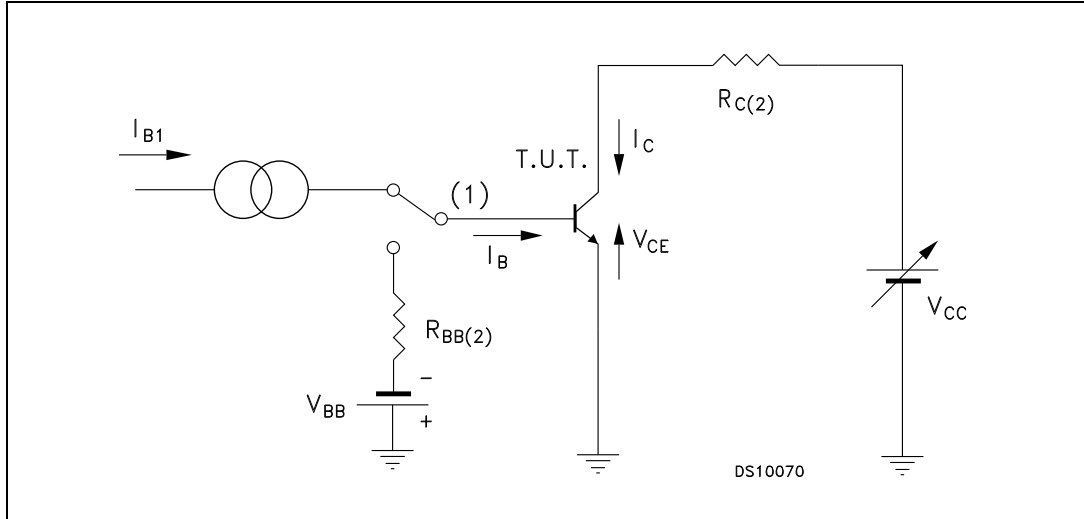


Figure 7. Resistive load switching time



### 3 Test circuit

Figure 8. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

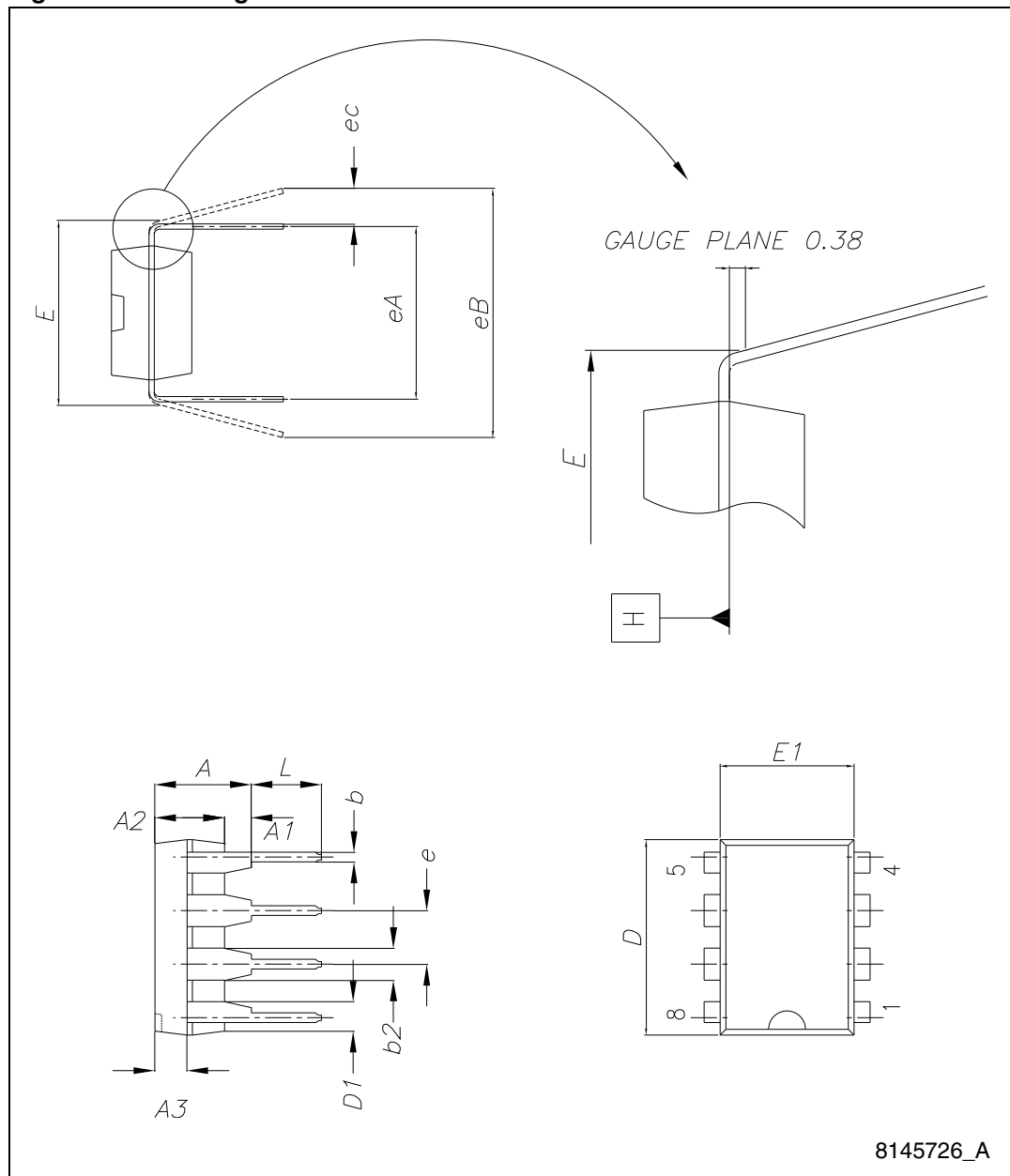
## 4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

**Table 5. DIP-8 mechanical data**

Dim.	mm.		
	Min.	Typ.	Max.
A			4.80
A1	0.50		
A2	3.10		3.50
A3	1.40		1.60
b	0.38		0.55
b1	0.38		0.51
b2	1.47		1.57
b3	0.89		1.09
c	0.21		0.35
c1	0.20		0.30
D	9.10		9.30
D1	0.13		
E	7.62		8.25
E1	6.25		6.45
e		2.54	
eA		7.62	
eB	7.62		10.90
eC	0		1.52
L	2.92		3.81

Figure 9. Drawing dimension DIP-8



## 5 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
18-Nov-2009	1	Initial release.
16-Apr-2010	2	Inserted $P_{TOT}$ and $R_{thJA}$ values <a href="#">Table 2</a> and <a href="#">Table 3 on page 2</a> .
23-Oct-2012	3	Modified $P_{TOT}$ and $R_{thJA}$ values in <a href="#">Table 2</a> and <a href="#">Table 3 on page 2</a> . Minor text changes.



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