



## Complementary transistor pair in a single package

Datasheet — production data

### Features

- Low  $V_{CE(sat)}$
- Simplified circuit design
- Reduced component count
- Low spread of dynamic parameters

### Application

- Compact fluorescent lamp (CFL) 220 V mains

### Description

The STD830CP40 is a hybrid complementary pair of power bipolar transistors manufactured by using the high voltage multi-epitaxial planar technology for high switching speeds and medium voltage capability.

The STD830CP40 is housed in dual island DIP-8 package with separated terminals for higher assembly flexibility, specifically recommended to be used in a new solution for compact fluorescent lamp (CFL).

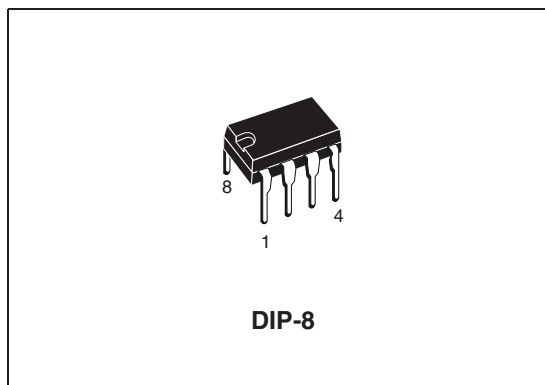


Figure 1. Internal schematic diagram

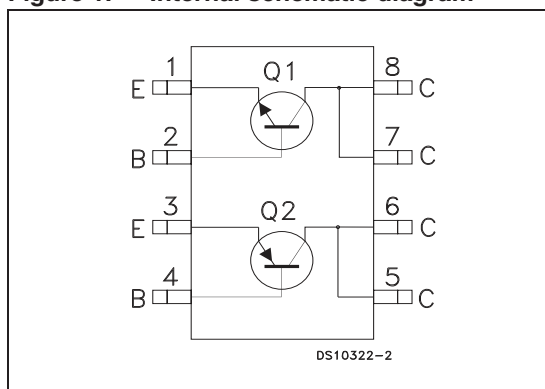


Table 1. Device summary

Order code	Marking	Package	Packing
STD830CP40	D830CP40	DIP-8	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value		Unit
		NPN	PNP	
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	700	500	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	400		V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ , $I_B = 1.5$ A, $t_p < 10$ ms)	$V_{(BR)EBO}$		V
$I_C$	Collector current	3		A
$I_{CM}$	Collector peak current ( $t_p < 5$ ms)	6		A
$I_B$	Base current	1.5		A
$I_{BM}$	Base peak current ( $t_p < 1$ ms)	3		A
$P_{TOT}$	Total dissipation at $T_{amb} = 25$ °C single transistor	3		W
$P_{TOT}$	Total dissipation at $T_{case} = 25$ °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
$R_{thJC}^{(1)}$	Thermal resistance junction-case (single transistor)	2.7	°C/W

1. When mounted on 25mm square pad of 2 oz. copper,  $t \leq 10$  sec.

*Note:* For PNP types voltage and current values are negative

## 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 ( $V_{\text{BE}} = 0$ )	For NPN: $V_{\text{CE}} = 700\text{ V}$ $V_{\text{CE}} = 700\text{ V}$ $T_{\text{C}} = 125\text{ °C}$			0.1 0.5	mA mA
		For PNP: $V_{\text{CE}} = 500\text{ V}$ $V_{\text{CE}} = 500\text{ V}$ $T_{\text{C}} = 125\text{ °C}$			0.1 0.5	mA mA
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = 10\text{ mA}$ For NPN: For PNP:	10 5		18 10	V V
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 5\text{ mA}$	400			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.7\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$			0.5	V
		$I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$			0.5	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$			1.1	V
		$I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.2\text{ A}$			1.2	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 10\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$	10			
		$I_{\text{C}} = 0.7\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	18		34	
		$I_{\text{C}} = 2\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	4			
$t_{\text{r}}$ $t_{\text{s}}$ $t_{\text{f}}$	Resistive load Rise time Storage time Fall time	$I_{\text{C}} = 0.7\text{ A}$ $V_{\text{CC}} = 250\text{ V}$ $I_{\text{B1}} = 0.14\text{ A}$ $I_{\text{B2}} = -0.14\text{ A}$ $t_{\text{p}} = 30\text{ }\mu\text{s}$				
					100	ns
					2.4	$\mu\text{s}$
$t_{\text{s}}$ $t_{\text{f}}$	Inductive load Storage time Fall time	$I_{\text{C}} = 1\text{ A}$ $I_{\text{B1}} = 0.2\text{ A}$ $V_{\text{BE(off)}} = -5\text{ V}$ $R_{\text{BB}} = 0$ $V_{\text{clamp}} = 200\text{ V}$ $L = 1\text{ mH}$				
					450	ns
					100	ns

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

*Note:* For PNP types voltage and current values are negative

## 2.1 Electrical characteristics (curves)

Figure 2. DC current gain NPN ( $V_{CE} = 5\text{ V}$ )

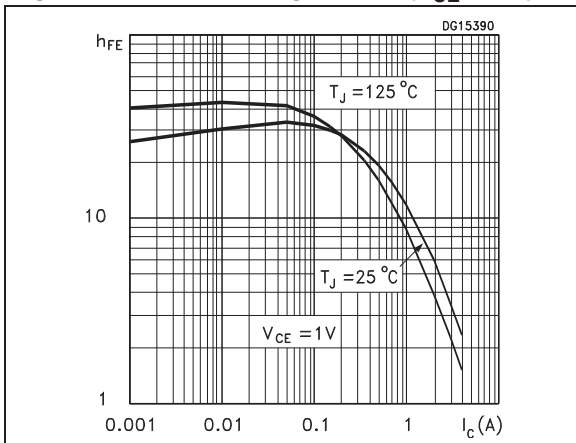


Figure 3. DC current gain PNP ( $V_{CE} = -5\text{ V}$ )

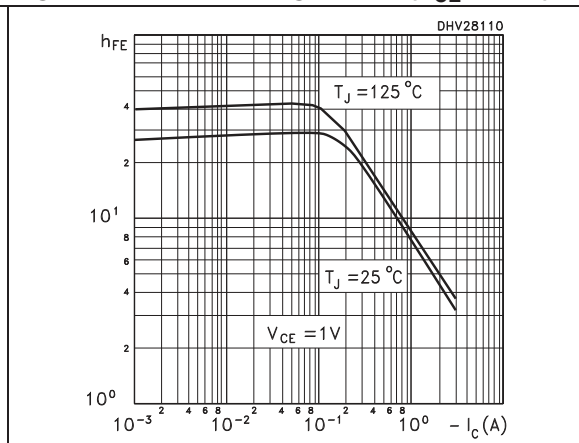


Figure 4. DC current gain NPN ( $V_{CE} = 1\text{ V}$ )

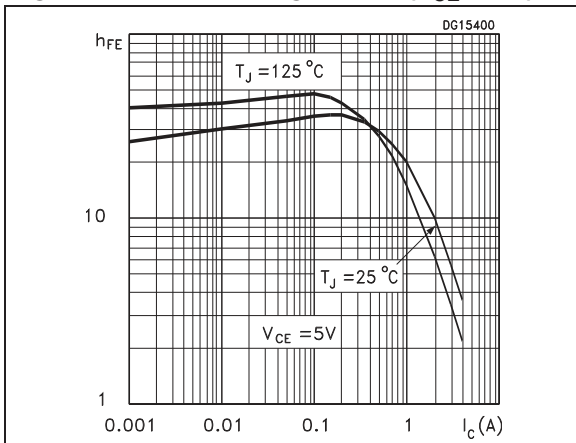


Figure 5. DC current gain PNP ( $V_{CE} = -1\text{ V}$ )

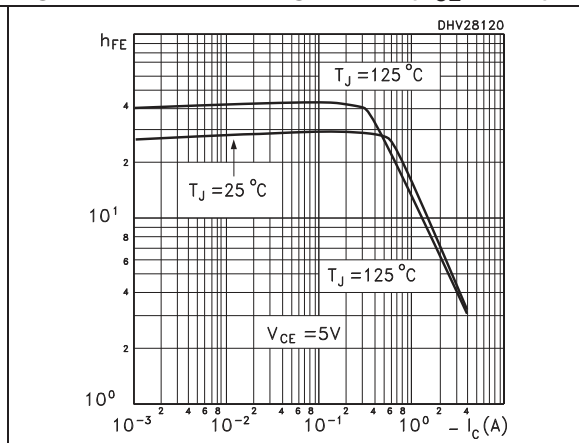


Figure 6. Derating curve

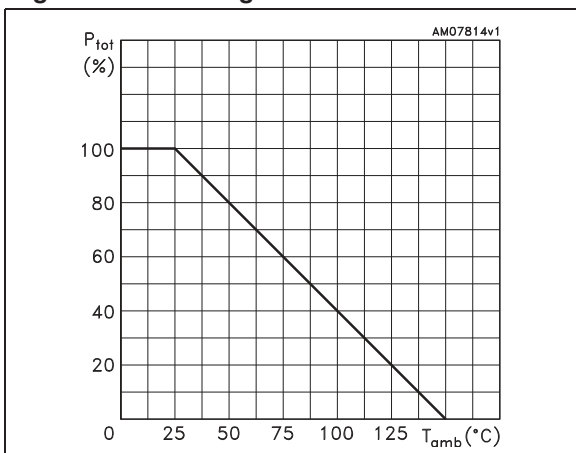


Figure 7. Collector emitter saturation voltage NPN

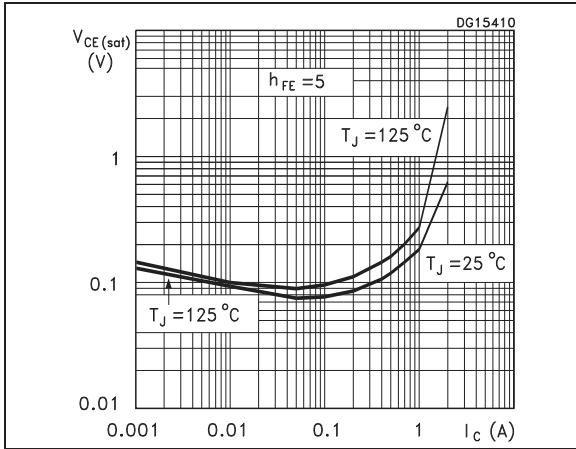


Figure 8. Collector emitter saturation voltage PNP

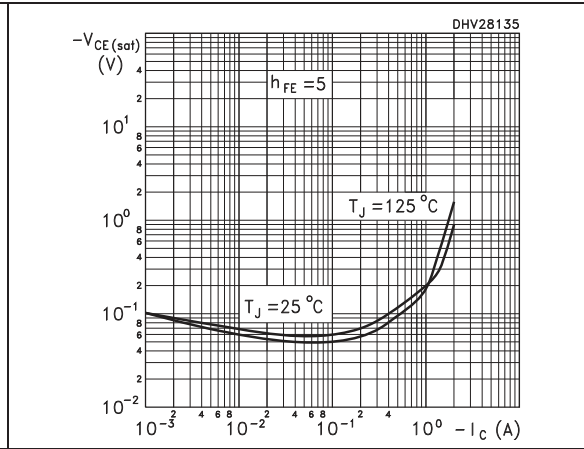


Figure 9. Base emitter saturation voltage NPN

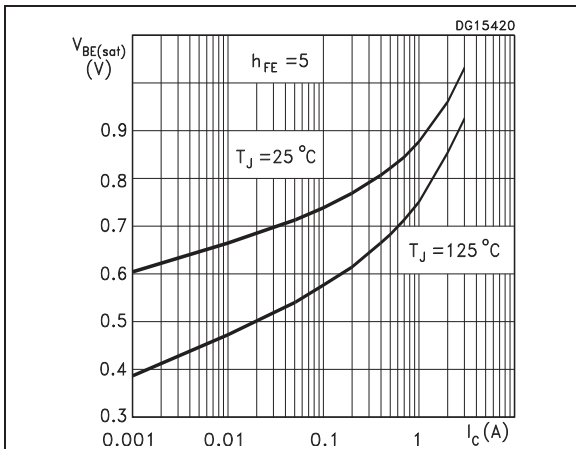


Figure 10. Base emitter saturation voltage PNP

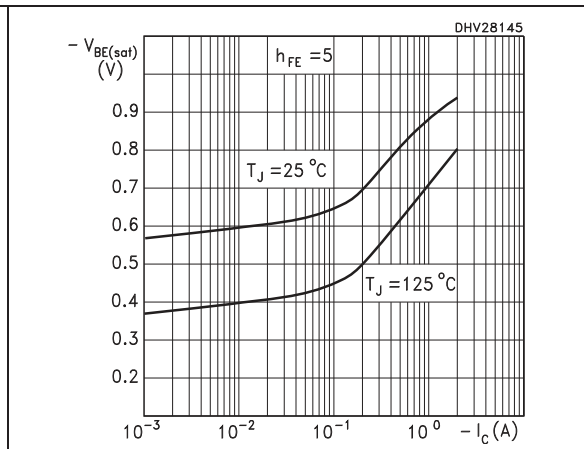


Figure 11. Resistive load fall time NPN

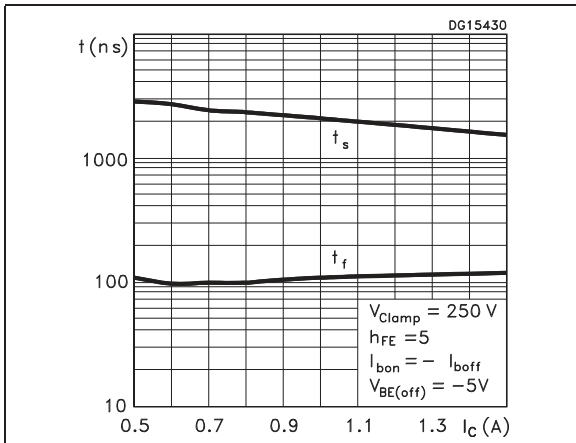


Figure 12. Resistive load fall time PNP

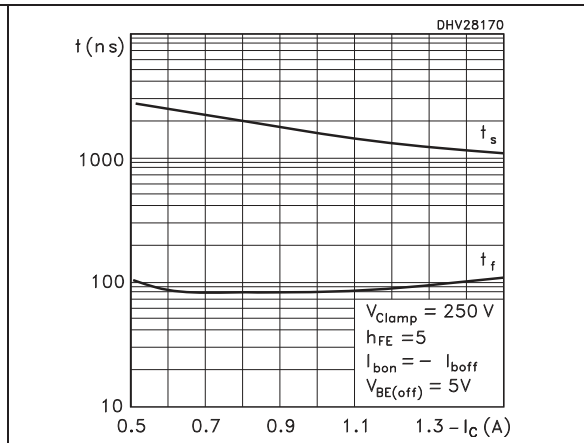


Figure 13. Resistive load storage time NPN

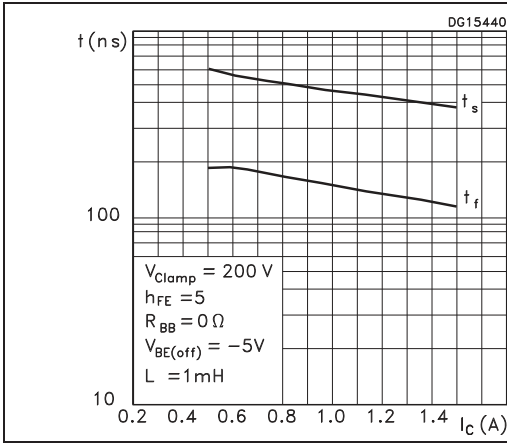


Figure 14. Resistive load storage time PNP

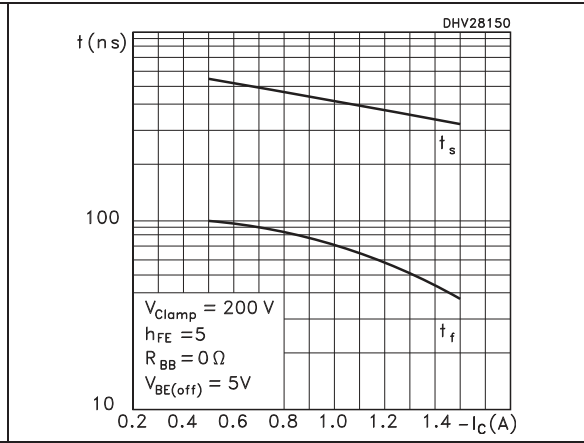


Figure 15. Reverse biased SOA (NPN)

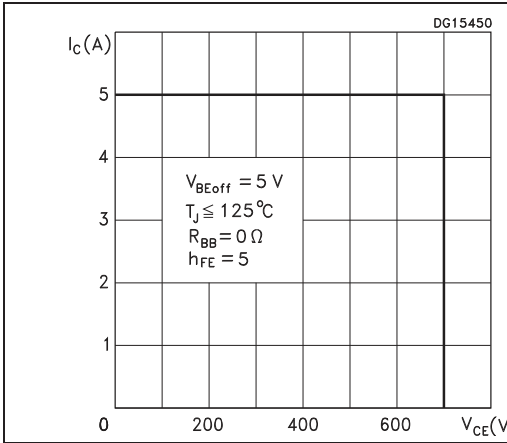
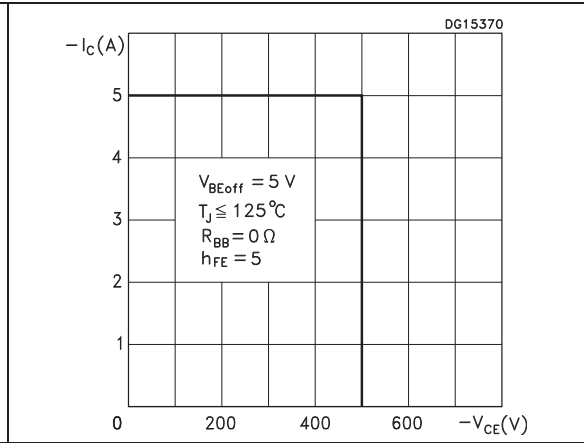


Figure 16. Reverse biased SOA (PNP)



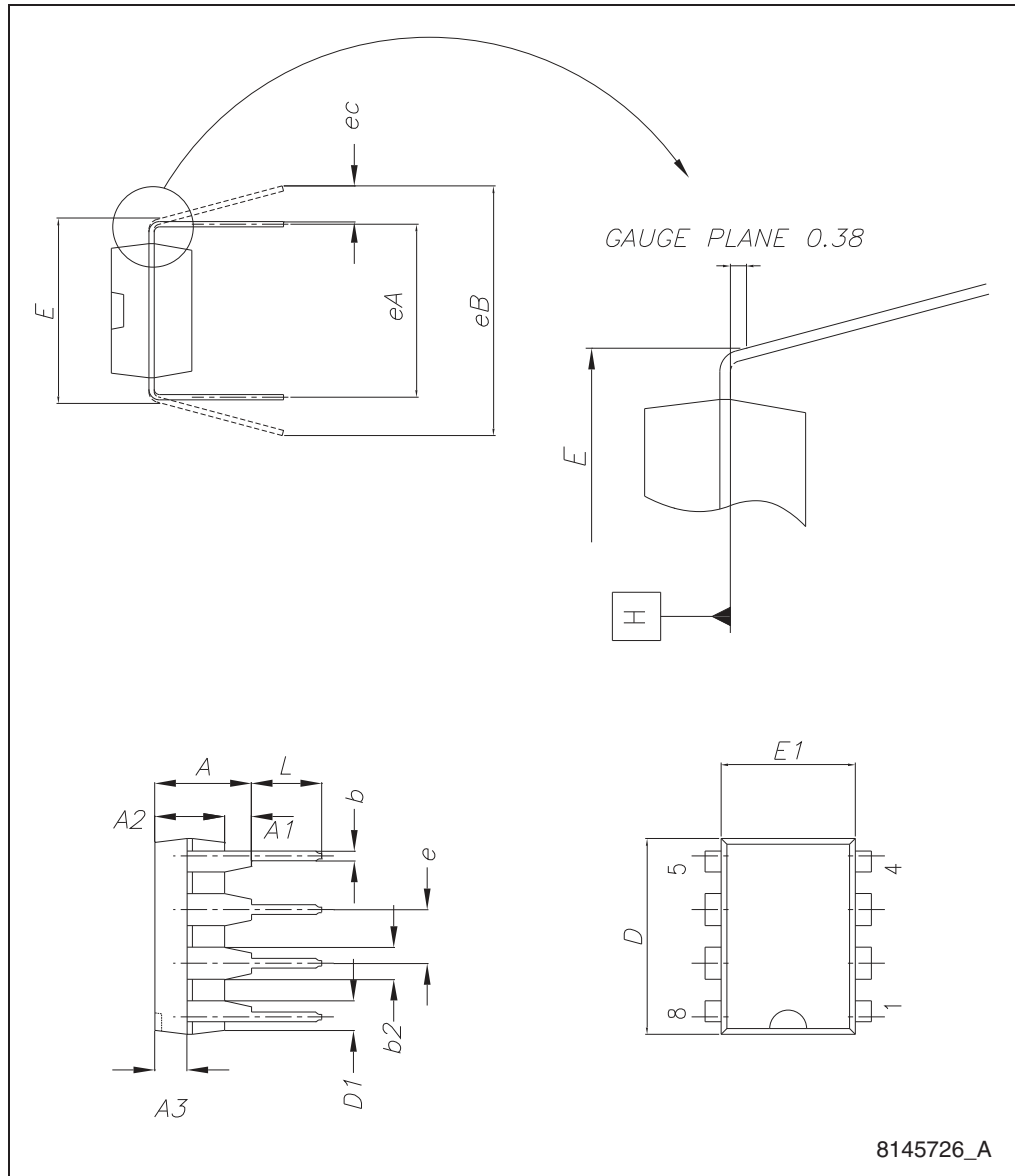
### 3 Package mechanical data

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 17. Drawing dimension DIP-8





## 4 Revision history

Table 6. Document revision history

Date	Revision	Changes
27-May-2009	1	Initial release.
29-Jun-2010	2	Modified: <i>Table 2</i> and <i>Table 3 on page 2</i> , added <i>Section 2.1: Electrical characteristics (curves)</i> .
05-Oct-2012	3	<i>Table 2</i> and <i>Table 3 on page 2</i> have been modified.

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