

## NPN power Darlington transistor

### Features

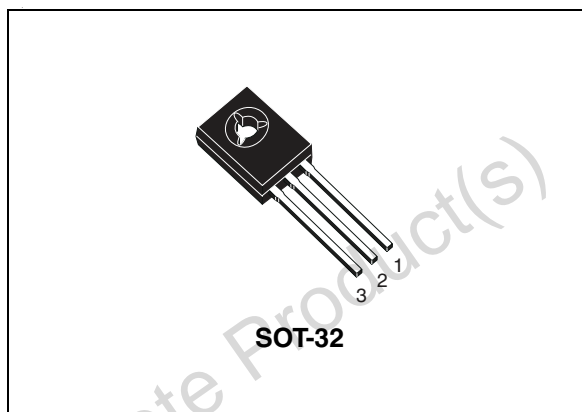
- Good  $h_{FE}$  linearity
- High  $f_T$  frequency
- Monolithic Darlington configuration with integrated antiparallel collector-emitter diode

### Application

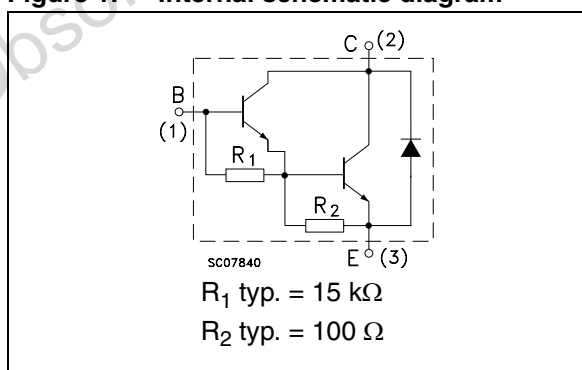
- Linear and switching industrial equipment

### Description

The device is manufactured in planar technology with "base island" layout and monolithic Darlington configuration.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
MJE802	MJE802	SOT-32	Tube

# 1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	80	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )		
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	4	A
$I_{CM}$	Collector peak current	8	A
$I_B$	Base current	0.1	A
$P_{TOT}$	Total dissipation at $T_{case} = 25\text{ °C}$	40	W
$T_{STG}$	Storage temperature	-65 to 150	°C
$T_J$	Max. operating junction temperature	150	°C

## 2 Electrical characteristics

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

**Table 3. Electrical characteristics**

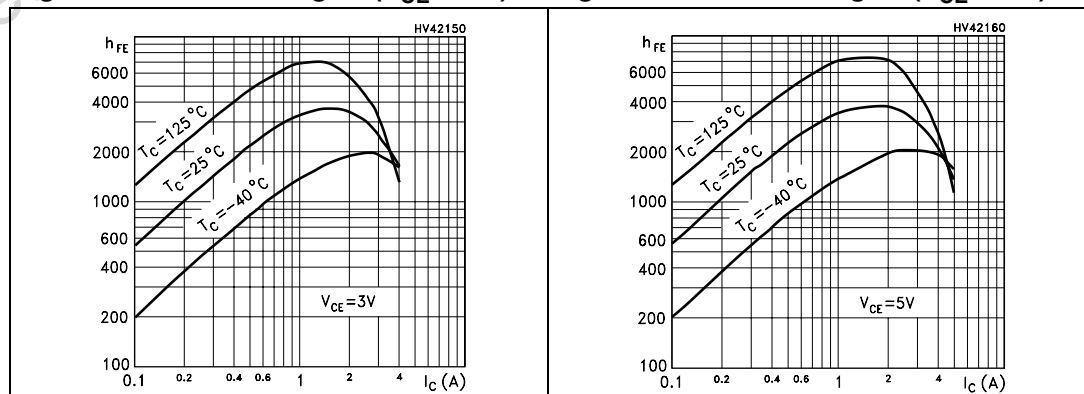
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector cut-off current ( $I_E = 0$ )	$V_{CB} = 80\text{ V}$ $V_{CB} = 80\text{ V}, T_C = 125\text{ °C}$		-	0.1 0.5	mA
$I_{CEO}$	Collector cut-off current ( $I_B = 0$ )	$V_{CE} = 80\text{ V}$		-	0.1	mA
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$		-	2	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = 50\text{ mA}$	80	-		V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 1.5\text{ A}$ $I_B = 30\text{ mA}$		-	2.5	V
		$I_C = 4\text{ A}$ $I_B = 40\text{ mA}$		-	3	
$V_{BE(on)}$	Base-emitter on voltage	$I_C = 1.5\text{ A}$ $V_{CE} = 3\text{ V}$		-	2.5	V
		$I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$			3	
$h_{FE}^{(1)}$	DC current gain	$I_C = 1.5\text{ A}$ $V_{CE} = 3\text{ V}$	750	-		
		$I_C = 4\text{ A}$ $V_{CE} = 3\text{ V}$	100	-		
$h_{fe}$	Small signal current gain	$I_C = 1.5\text{ A}$ $V_{CE} = 3\text{ V}$ $f = 1\text{ MHz}$	1	-		

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

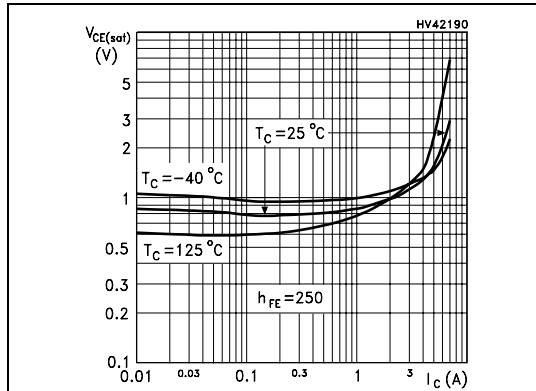
### 2.1 Typical characteristic (curves)

**Figure 2. DC current gain ( $V_{CE} = 3\text{ V}$ )**

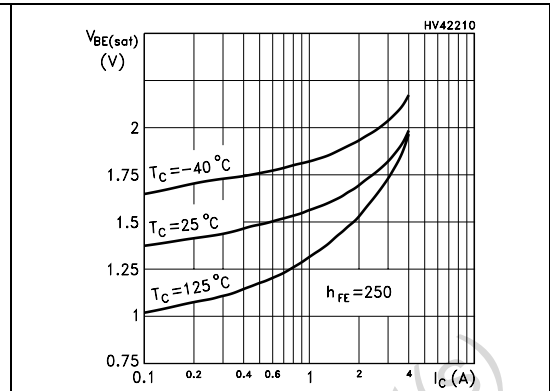
**Figure 3. DC current gain ( $V_{CE} = 5\text{ V}$ )**



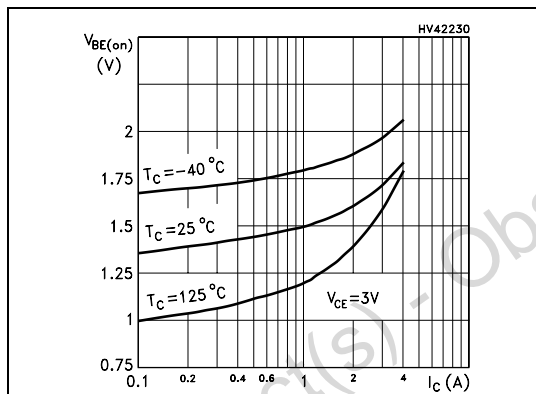
**Figure 4. Collector-emitter saturation voltage**



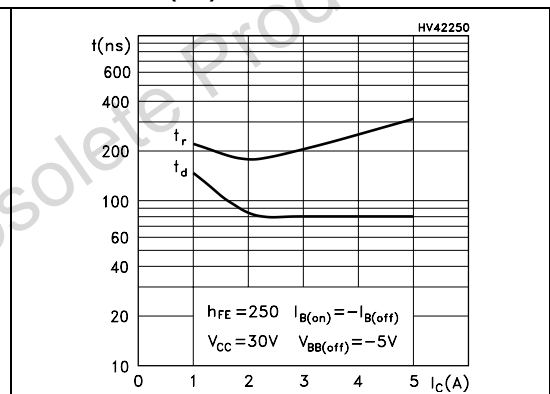
**Figure 5. Base-emitter saturation voltage**



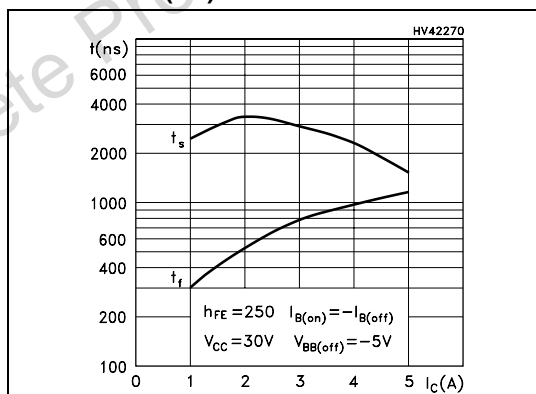
**Figure 6. Base-emitter on voltage**



**Figure 7. Resistive load switching time (on)**



**Figure 8. Resistive load switching time (off)**



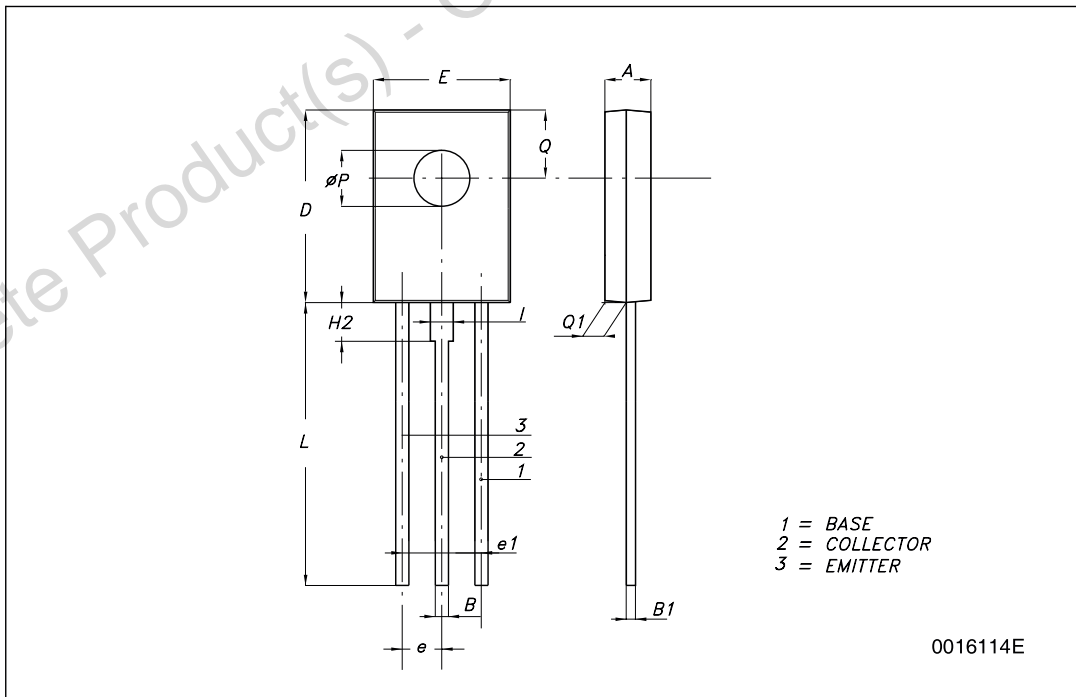
### 3 Package mechanical data

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**SOT-32 (TO-126) MECHANICAL DATA**

DIM.	mm.		
	MIN.	TYP	MAX.
A	2.4		2.9
B	0.64		0.88
B1	0.39		0.63
D	10.5		11.05
E	7.4		7.8
e	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.3		16
P	2.9		3.2
Q		3.8	
Q1	1		1.52
H2		2.15	
I		1.27	



## 4 Revision history

**Table 4. Document revision history**

Date	Revision	Changes
21-Jun-2004	3	Document migration, no content change.
28-Aug-2009	4	Modified SOT-32 mechanical data.

Obsolete Product(s) - Obsolete Product(s)

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