

## Low voltage power Darlington transistor

### Features

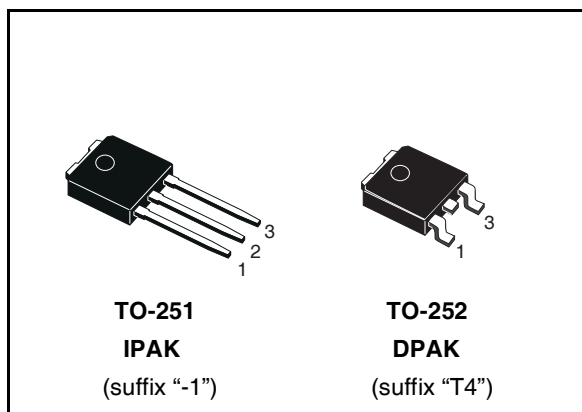
- Low base drive requirements
- Integrated antiparallel collector-emitter diode
- Through hole TO-251 (IPAK) power package in tube (suffix "-1")
- Surface mounting TO-252 (DPAK) power package in tape & reel (suffix "T4")

### Applications

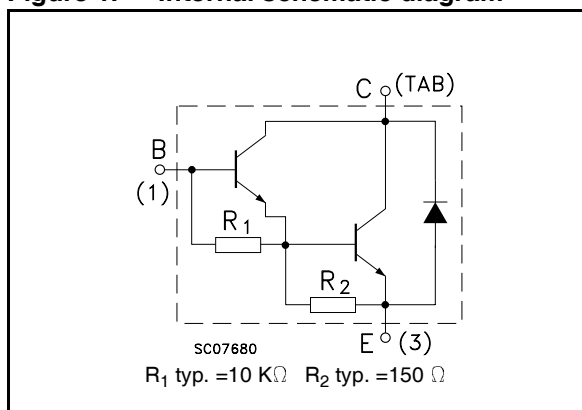
- General purpose switching and amplifier

### Description

The device is manufactured using Epitaxial-base technology for high performance. PNP type is MJD127.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
MJD122T4	MJD122	TO-252 (DPAK)	Tape & reel
MJD122-1	MJD122	TO-251 (IPAK)	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	100	V
$V_{CEO}$	Collector-base voltage ( $I_B = 0$ )	100	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	8	A
$I_{CM}$	Collector peak current	16	A
$I_B$	Base current	0.12	A
$P_{TOT}$	Total dissipation at $T_{case} = 25^\circ\text{C}$	20	W
	Total dissipation at $T_{amb} = 25^\circ\text{C}$	1.75	W
$T_{stg}$	Storage temperature	-65 to 150	$^\circ\text{C}$
$T_J$	Max. operating junction temperature	150	$^\circ\text{C}$

## 2 Electrical characteristics

( $T_{case} = 25^{\circ}C$  unless otherwise specified)

**Table 3. Electrical characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector cut-off current ( $I_E = 0$ )	$V_{CB} = 100\text{ V}$			10	$\mu A$
$I_{CEO}$	Collector cut-off current ( $I_B = 0$ )	$V_{CE} = 50\text{ V}$			10	$\mu A$
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			2	mA
$V_{CEO(sus)}^{(1)}$	Collector-emitter sustaining voltage ( $I_B = 0$ )	$I_C = 30\text{ mA}$	100			V
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = 4\text{ A}$ $I_B = 16\text{ mA}$ $I_C = 8\text{ A}$ $I_B = 80\text{ mA}$			2 4	V V
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = 8\text{ A}$ $I_B = 80\text{ mA}$			4.5	V
$V_{BE(on)}^{(1)}$	Base-emitter on voltage	$I_C = 4\text{ A}$ $V_{CE} = 4\text{ V}$			2.8	V
$h_{FE}$	DC current gain	$I_C = 4\text{ A}$ $V_{CE} = 4\text{ V}$ $I_C = 8\text{ A}$ $V_{CE} = 4\text{ V}$	1000 100		12000	

Note (1) Pulsed duration = 300  $\mu s$ , duty cycle  $\leq 1.5\%$

### 2.1 Electrical characteristic (curves)

**Figure 2. Safe operating area**

**Figure 3. Derating curve**

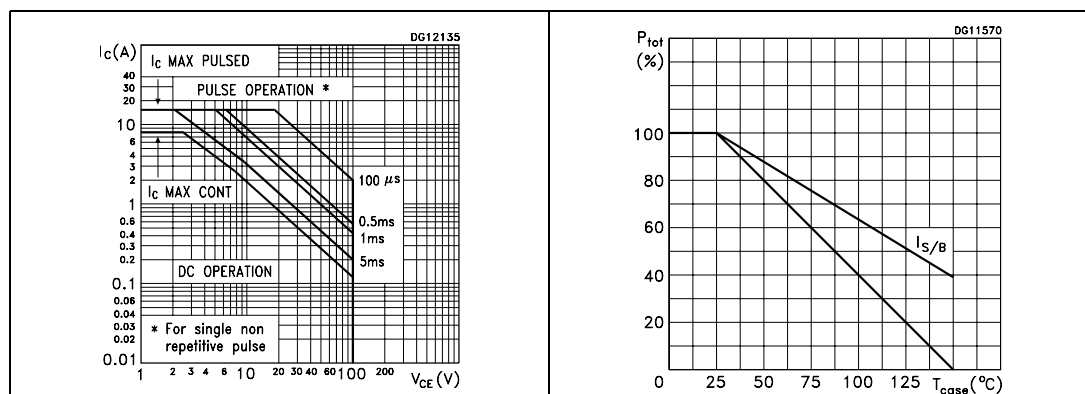


Figure 4. Collector-emitter saturation voltage

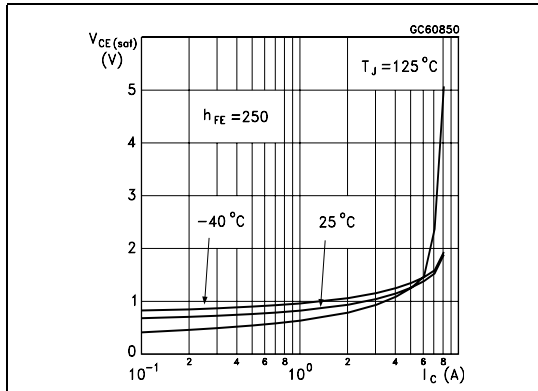


Figure 5. Base-emitter saturation voltage

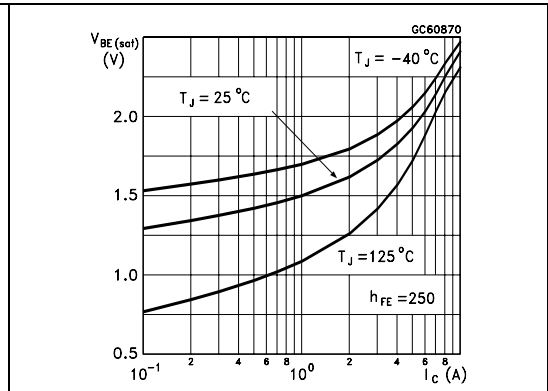


Figure 6. Base-emitter on voltage

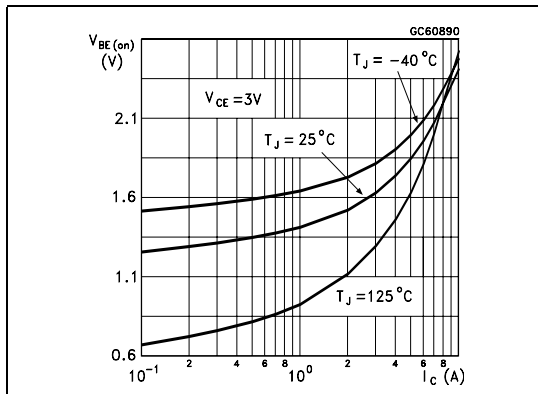


Figure 7. DC current gain

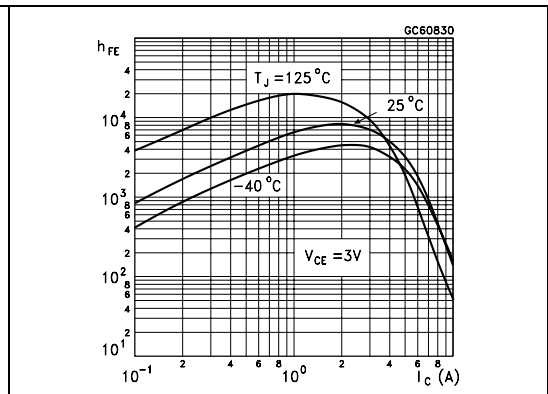


Figure 8. Resistive load switching time

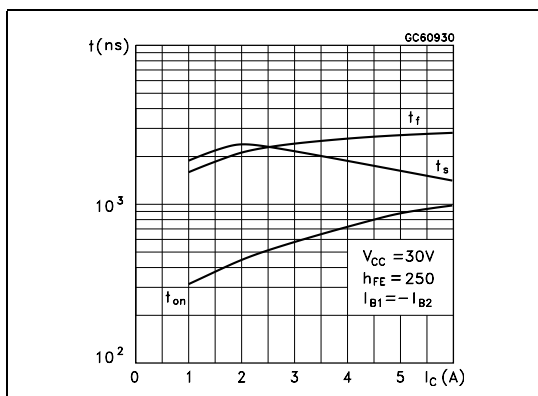
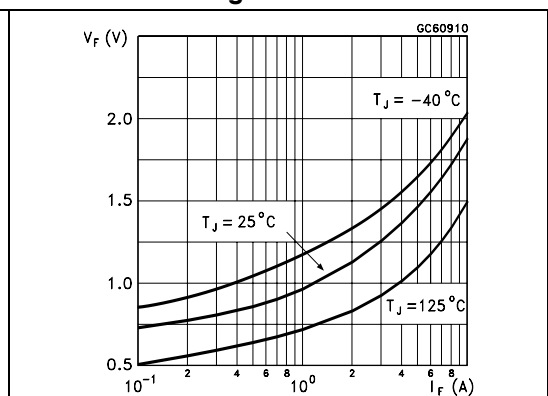


Figure 9. Freewheel diode forward voltage

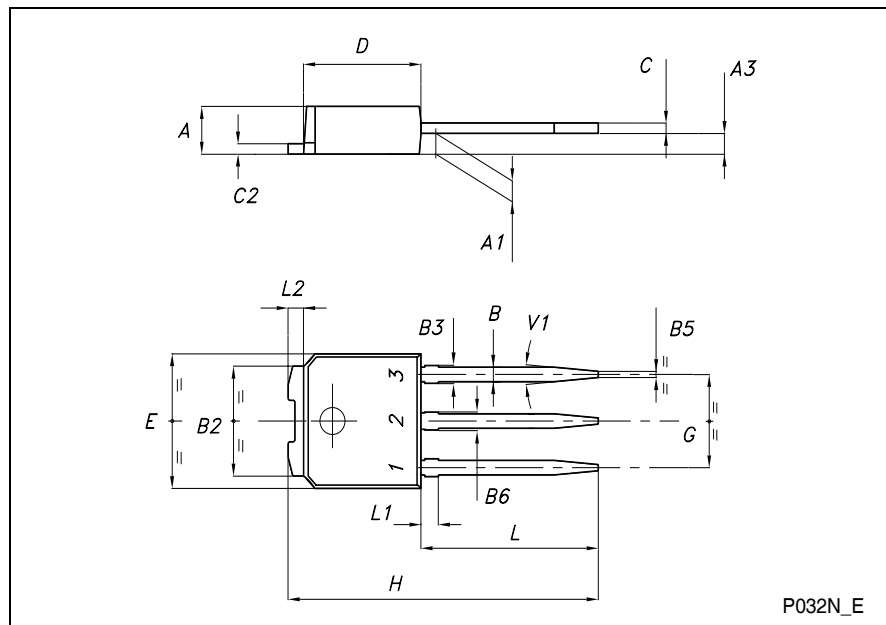


### 3 Package mechanical data

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](http://www.st.com)

TO-251 (IPAK) MECHANICAL DATA

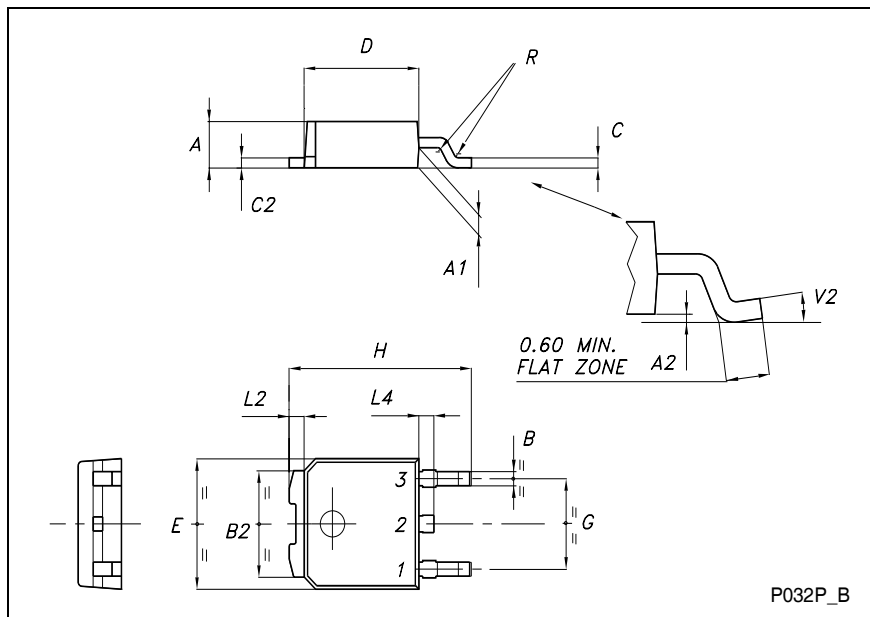
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A3	0.70		1.30	0.028		0.051
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
B3			0.85			0.033
B5		0.30			0.012	
B6			0.95			0.037
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.237		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	15.90		16.30	0.626		0.642
L	9.00		9.40	0.354		0.370
L1	0.80		1.20	0.031		0.047
L2		0.80	1.00		0.031	0.039
V1		10°			10°	



P032N\_E

**TO-252 (DPAK) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



## 4 Revision history

**Table 4. Document revision history**

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
01-Aug-2002	8	
01-Oct-2007	9	Collector current limits have been improved.
03-Oct-2007	10	Package change from SOT-32 to TO-252.



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