

## NPN power Darlington transistor

### Features

- Monolithic Darlington transistor with integrated antiparallel collector-emitter diode
- Very high DC current gain

### Applications

- Electronic ignition
- AC-DC motor control
- Alternator regulator

### Description

The 2STP535FP is a planar NPN power transistor in monolithic Darlington configuration mounted in TO-220FP fully isolated package.

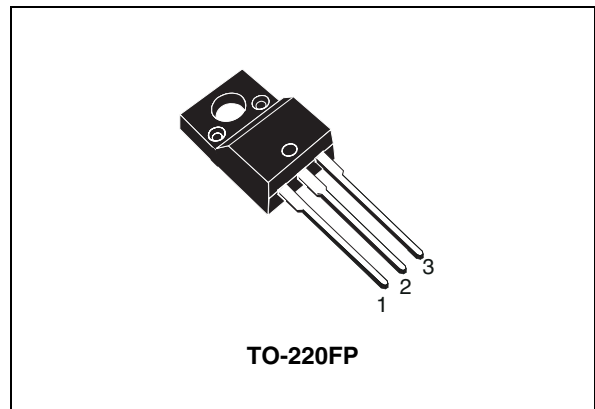


Figure 1. Internal schematic diagram

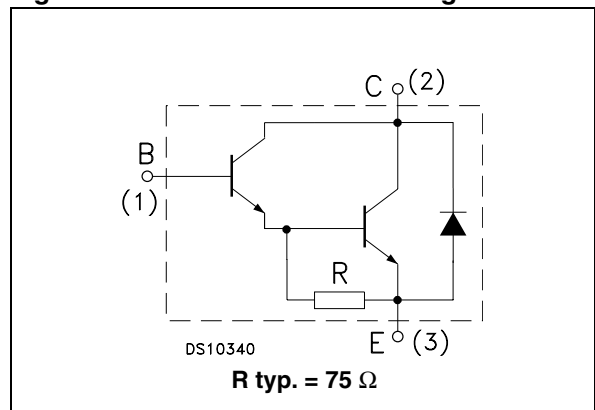


Table 1. Device summary

Order code	Marking	Package	Packaging
2STP535FP	2STP535FP	TO-220FP	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	180	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	180	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	8	A
$I_{CM}$	Collector peak current ( $t_p < 5$ ms)	15	A
$I_B$	Base current	1	A
$P_{tot}$	Total dissipation at $T_C \leq 25$ °C	37	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
$R_{thj-case}$	Thermal resistance junction-case max	3.4	°C/W

## 2 Electrical characteristics

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

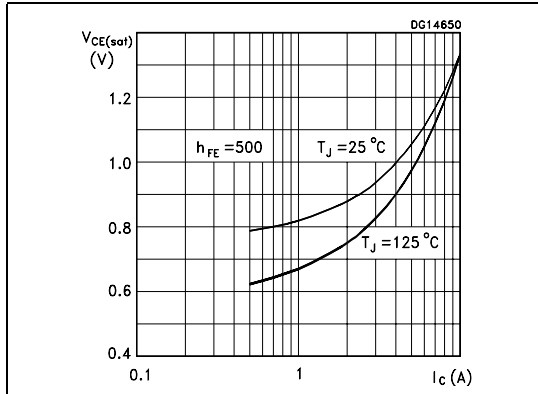
**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 180\text{ V}$			50	$\mu\text{A}$
$I_{\text{CBO}}$	Collector-base cut-off current ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 180\text{ V}$			50	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter-base cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{ V}$			100	$\mu\text{A}$
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 30\text{ mA}$	180			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 6\text{ mA}$ $I_{\text{C}} = 8\text{ A}$ $I_{\text{B}} = 80\text{ mA}$			2 2.5	V V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter (on) voltage	$I_{\text{C}} = 8\text{ A}$ $V_{\text{CE}} = 4\text{ V}$			2.8	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 3\text{ A}$ $V_{\text{CE}} = 4\text{ V}$ $I_{\text{C}} = 8\text{ A}$ $V_{\text{CE}} = 4\text{ V}$	1000 200		20000	
$V_{\text{F}}^{(1)}$	Diode forward voltage	$I_{\text{F}} = 10\text{ A}$			2.8	V

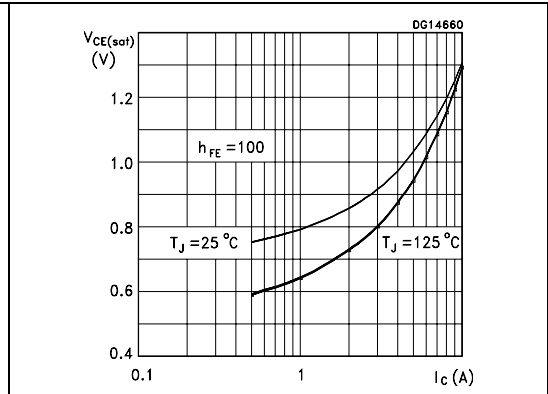
1. Pulse test: pulse duration  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

## 2.1 Electrical characteristics (curves)

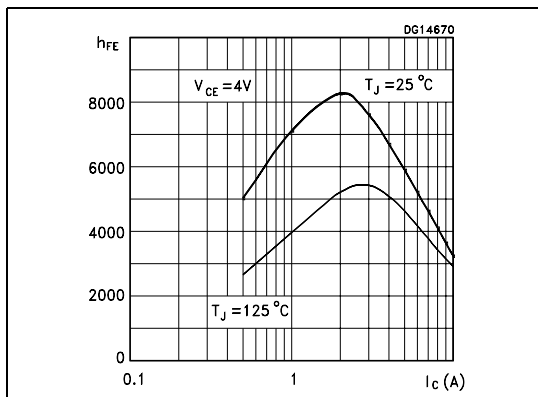
**Figure 2. Collector-emitter saturation voltage ( $h_{FE} = 500$ )**



**Figure 3. Collector-emitter saturation voltage ( $h_{FE} = 100$ )**



**Figure 4. DC current gain**

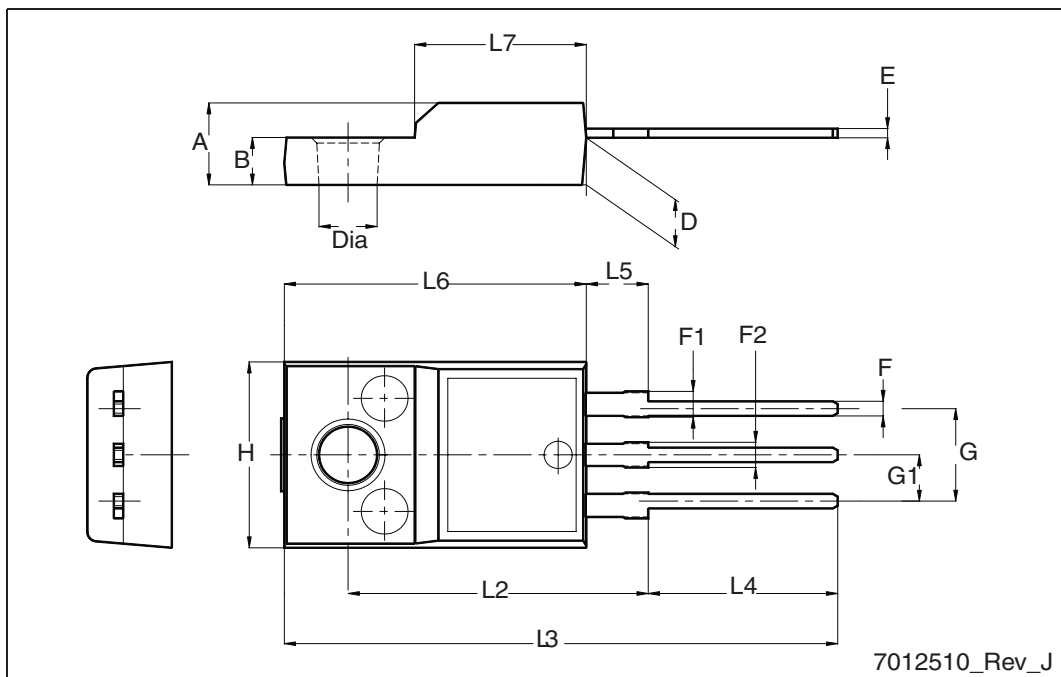


### 3 Package mechanical data

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TO-220FP mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	4.4		4.6
B	2.5		2.7
D	2.5		2.75
E	0.45		0.7
F	0.75		1
F1	1.15		1.70
F2	1.15		1.5
G	4.95		5.2
G1	2.4		2.7
H	10		10.4
L2		16	
L3	28.6		30.6
L4	9.8		10.6
L5	2.9		3.6
L6	15.9		16.4
L7	9		9.3
Dia	3		3.2



7012510\_Rev\_J

## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
17-Aug-2009	1	Initial release

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