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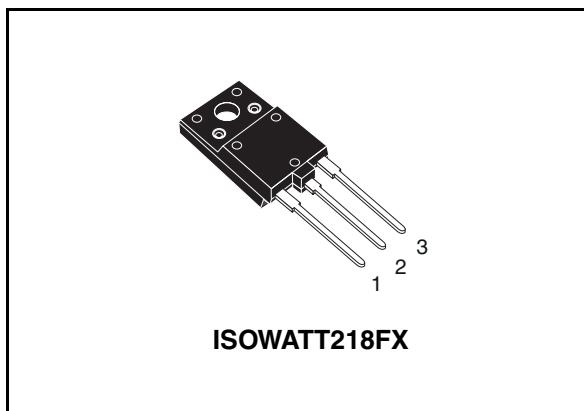


ST1510FX

High voltage fast-switching
NPN Power transistor

General features

- State-of-the-art technology:
 - Diffused collector “Enhanced generation” EHVS1
- More stable performances versus operating temperature variation
- Low base-drive requirements
- Tighter h_{FE} range at operating collector current
- Fully insulated power package U.L. compliant
- In compliance with the 2002/93/EC European directive



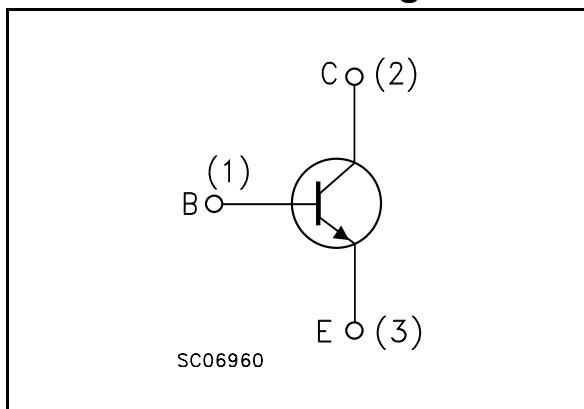
Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies

Description

The device is manufactured using Diffused Collector in Planar technology adopting new and enhanced high voltage structure 1 (E.H.V.S.1).

Internal schematic diagram



Order codes

Part number	Marking	Package	Packing
ST1510FX	1510FX	ISOWATT218FX	Tube

Contents**ST1510FX****Contents**

1	Electrical ratings	3
2	Electrical characteristics	4
2.1	Electrical characteristics (curve)	5
2.2	Test circuits	7
3	Package mechanical data	8
4	Revision history	10

ST1510FX

Electrical ratings

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	1500	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	750	V
V_{EBO}	Collector-base voltage ($I_C = 0$)	9	V
I_C	Collector current	12	A
I_{CM}	Collector peak current ($t_P < 5\text{ms}$)	20	A
I_B	Base current	6	A
P_{TOT}	Total dissipation at $T_c = 25^\circ\text{C}$	62	W
V_{isol}	Insulation withstand voltage (RMS) from all three leads to external heatsink	2500	V
T_{stg}	Storage temperature	-65 to 150	$^\circ\text{C}$
T_J	Max. operating junction temperature	150	

Table 2. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case	2	$^\circ\text{C/W}$

Electrical characteristics

ST1510FX

2 Electrical characteristics

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

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{BE} = 0$)	$V_{CE} = 1500\text{V}$ $V_{CE} = 1500\text{V} \quad T_C = 125^\circ\text{C}$			0.2 2	mA mA
I_{EBO}	Emitter cut-off current ($I_C = 0$)	$V_{EB} = 9\text{V}$			1	mA
$V_{CEO(sus)}$ ⁽¹⁾	Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 100\text{mA}$	750			V
$V_{CE(sat)}$ ⁽¹⁾	Collector-emitter saturation voltage	$I_C = 6\text{A}$ $I_B = 1.5\text{A}$			2	V
$V_{BE(sat)}$ ⁽¹⁾	Base-emitter saturation voltage	$I_C = 6\text{A}$ $I_B = 1.5\text{A}$			1.1	V
h_{FE} ⁽¹⁾	DC current gain	$I_C = 1\text{A}$ $V_{CE} = 5\text{V}$ $I_C = 6\text{A}$ $V_{CE} = 5\text{V}$ $I_C = 7\text{A}$ $V_{CE} = 1\text{V}$	15 6.5 5.5	28	9.5	
t_s t_f	Inductive load Storage time Fall time	$I_C = 6\text{A}$ $I_{B(on)} = 1.2\text{A}$ $I_{B(off)} = -2.4\text{A}$ $L = 500\mu\text{H}$ $V_{clamp} = 350\text{V}$		2 0.2		μs μs

1. Pulsed: Pulse duration = 300 ms, duty cycle 1.5%

ST1510FX

Electrical characteristics

2.1 Electrical characteristics (curve)

Figure 1. Safe operating area

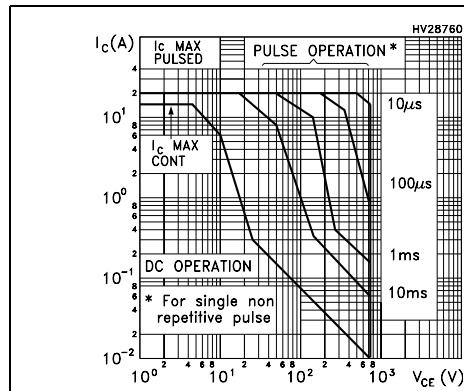


Figure 2. Derating curve

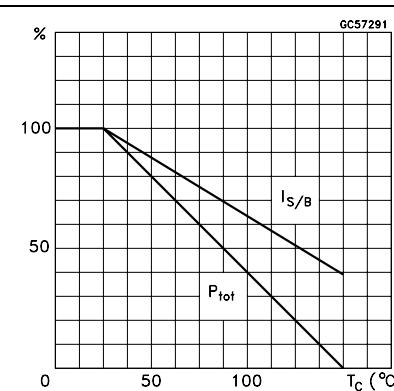


Figure 3. Output characteristics

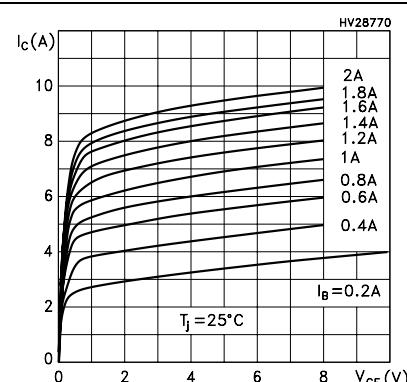


Figure 4. Reverse biased SOA

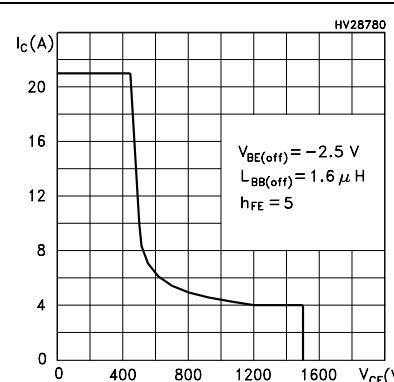


Figure 5. DC current gain @ V_{CE}=1V

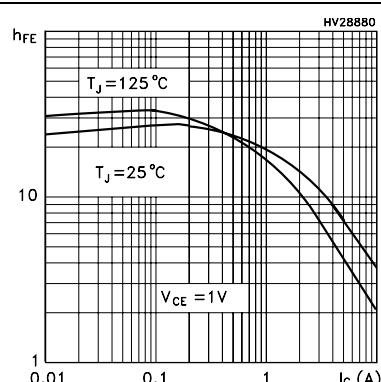
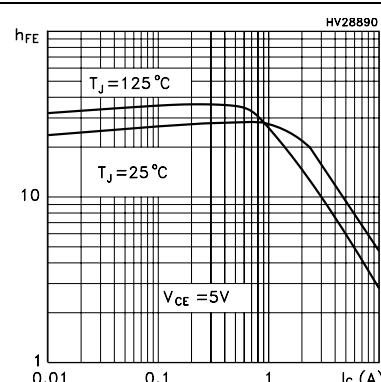


Figure 6. DC current gain @ V_{CE}=5V



Electrical characteristics

ST1510FX

Figure 7. Collector emitter saturation voltage

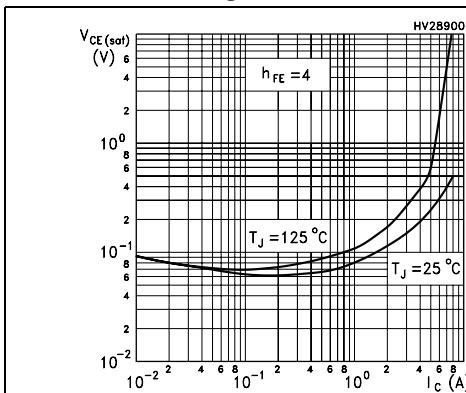
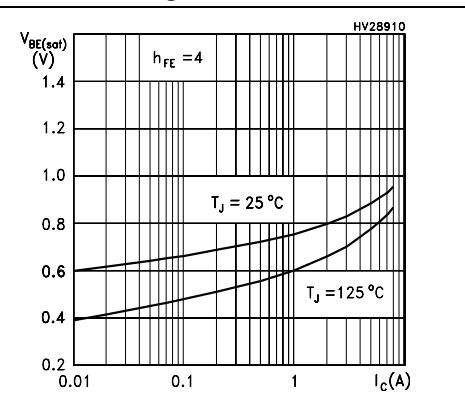


Figure 8. Base emitter saturation voltage



2.2 Test circuits

Figure 9. Power losses and inductive load switching

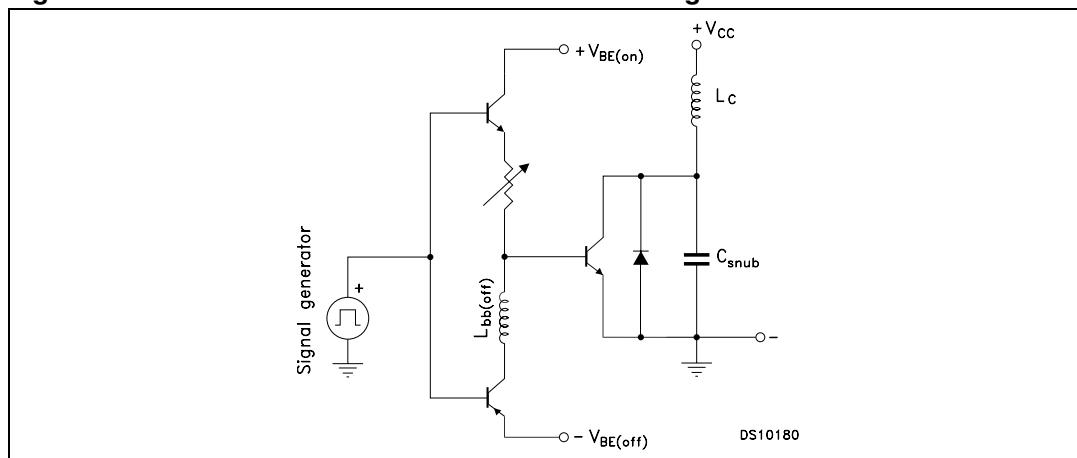
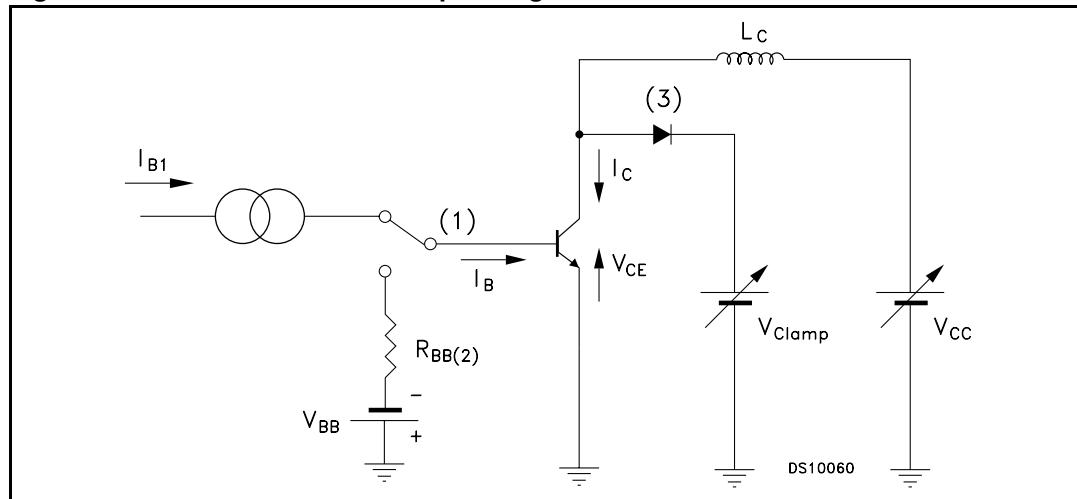


Figure 10. Reverse biased safe operating area



ST1510FX**Package mechanical data****3 Package mechanical data**

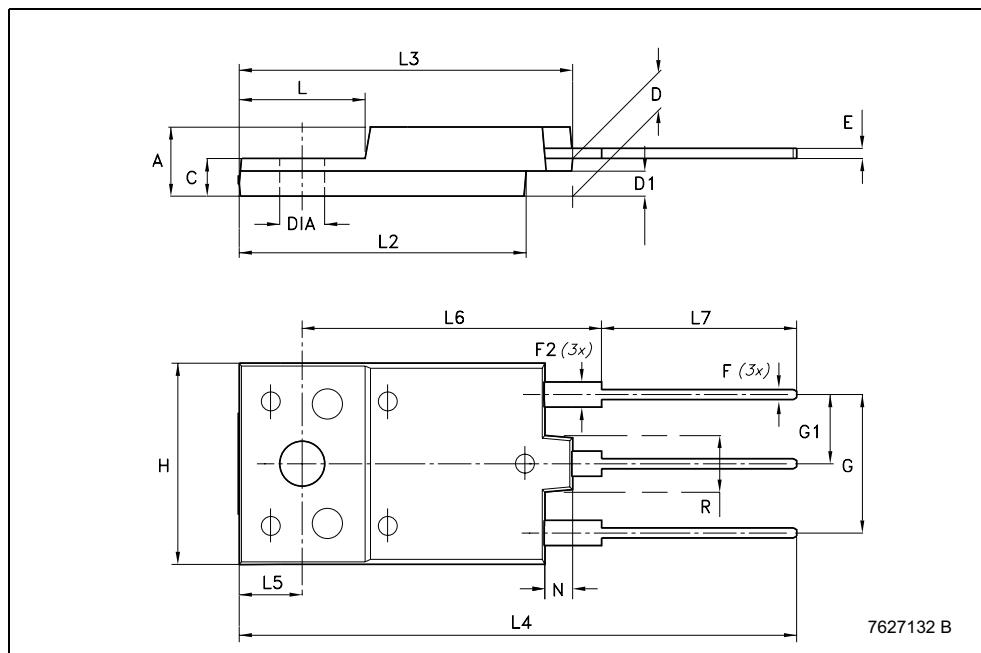
In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings 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

Package mechanical data

ST1510FX

ISOWATT218FX MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP.	MAX.
A	5.30		5.70
C	2.80		3.20
D	3.10		3.50
D1	1.80		2.20
E	0.80		1.10
F	0.65		0.95
F2	1.80		2.20
G	10.30		11.50
G1		5.45	
H	15.30		15.70
L	9		10.20
L2	22.80		23.20
L3	26.30		26.70
L4	43.20		44.40
L5	4.30		4.70
L6	24.30		24.70
L7	14.60		15
N	1.80		2.20
R	3.80		4.20
Dia	3.40		3.80



ST1510FX**Revision history****4 Revision history****Table 4. Revision history**

Date	Revision	Changes
02-Nov-2005	1	Initial release.
23-Feb-2007	2	Order code and parameters on <i>Table 1</i> has been change

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