

### **ST1510FX**

# High voltage fast-switching NPN Power transistor

### **General features**

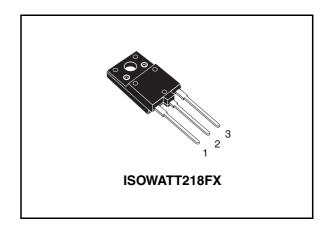
- State-of-the-art technology:
  - Diffused collector "Enhanced generation" EHVS1
- More stable performances versus operating temperature variation
- Low base-drive requirements
- Tighter h<sub>FF</sub> range at operating collector current
- Fully insulated power package U.L. compliant
- In compliance with the 2002/93/EC European directive

### **Applications**

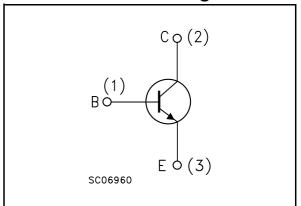
- Electronic ballast for fluorescent lighting
- Switch mode power supplies

### **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

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ST1510FX Electrical ratings

# 1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V <sub>CES</sub>	Collector-emitter voltage (V <sub>BE</sub> = 0)	1500	V
V <sub>CEO</sub>	Collector-emitter voltage (I <sub>B</sub> = 0)	750	V
V <sub>EBO</sub>	Collector-base voltage (I <sub>C</sub> = 0)	9	V
I <sub>C</sub>	Collector current 12		Α
I <sub>CM</sub>	Collector peak current (t <sub>P</sub> < 5ms)	20	Α
I <sub>B</sub>	Base current	6	Α
P <sub>TOT</sub>	Total dissipation at T <sub>c</sub> = 25°C	62	W
V <sub>isol</sub>	Insulation withstand voltage (RMS) from all three leads to external heatsink 2500		V
T <sub>stg</sub>	Storage temperature	-65 to 150	°C
T <sub>J</sub> Max. operating junction temperature 150		150	

Table 2. Thermal data

	Symbol	Parameter	Value	Unit
Ī	R <sub>thj-case</sub>	Thermal resistance junction-case max	2	°C/W

Electrical characteristics ST1510FX

# 2 Electrical characteristics

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

Table 3. Electrical characteristics

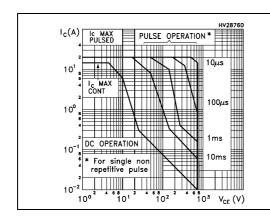
Symbol	Parameter	Test con	ditions	Min.	Тур.	Max.	Unit
I <sub>CES</sub>	Collector cut-off current (V <sub>BE</sub> =0)	V <sub>CE</sub> = 1500V V <sub>CE</sub> = 1500V	T <sub>C</sub> = 125°C			0.2 2	mA mA
I <sub>EBO</sub>	Emitter cut-off current (I <sub>C</sub> =0)	V <sub>EB</sub> = 9V				1	mA
V <sub>CEO(sus)</sub> (1)	Collector-emitter sustaining voltage (I <sub>B</sub> =0)	I <sub>C</sub> = 100mA		750			V
V <sub>CE(sat)</sub> (1)	Collector-emitter saturation voltage	I <sub>C</sub> = 6A	I <sub>B</sub> = 1.5A			2	٧
V <sub>BE(sat)</sub> (1)	Base-emitter saturation voltage	I <sub>C</sub> = 6A	I <sub>B</sub> = 1.5A			1.1	٧
h <sub>FE</sub> <sup>(1)</sup>	DC current gain	$I_C = 1A$ $I_C = 6A$ $I_C = 7A$	$V_{CE} = 5V$ $V_{CE} = 5V$ $V_{CE} = 1V$	15 6.5	28 5.5	9.5	
t <sub>s</sub>	Inductive load Storage time Fall time	$I_{C} = 6A$ $I_{B(off)} = -2.4A$ $V_{clamp} = 350V$	` '		2 0.2		μs μs

<sup>1.</sup> Pulsed: Pulse duration = 300 ms, duty cycle 1.5%

# 2.1 Electrical characteristics (curve)

Figure 1. Safe operating area

Figure 2. Derating curve



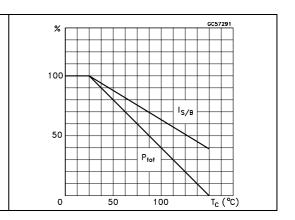
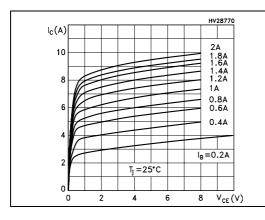


Figure 3. Output characteristics

Figure 4. Reverse biased SOA



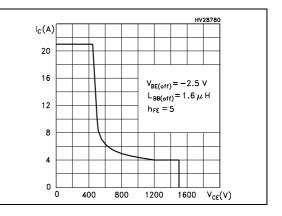
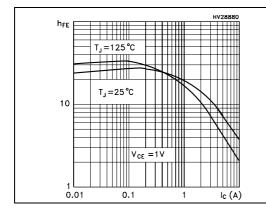
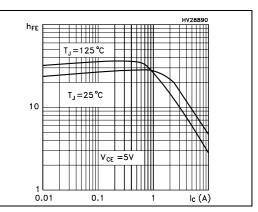


Figure 5. DC current gain @  $V_{CE}=1V$ 

Figure 6. DC current gain @ V<sub>CE</sub>=5V

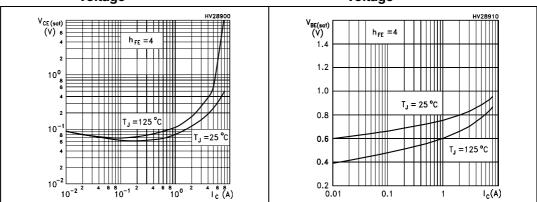




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Figure 7. Collector emitter saturation Figure 8. Base emitter saturation voltage voltage



### 2.2 Test circuits

Figure 9. Power losses and inductive load switching

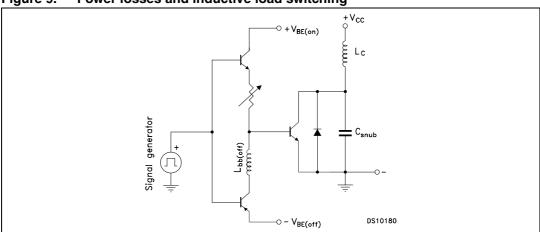
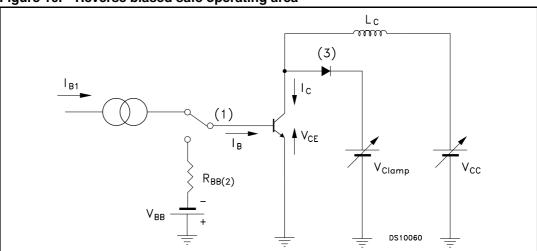


Figure 10. Reverse biased safe operating area



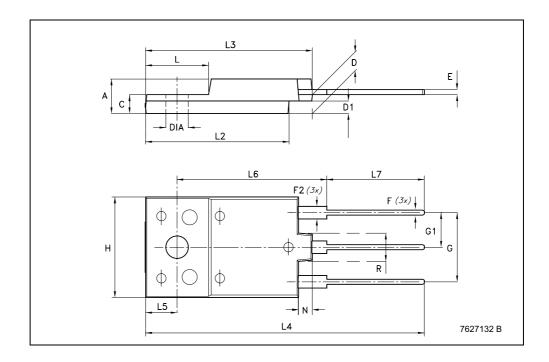
# 3 Package mechanical data

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

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#### ISOWATT218FX MECHANICAL DATA

DIM.	mm.				
DIN.	MIN.	TYP	MAX.		
A	5.30		5.70		
С	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				
Н	15.30		15.70		
L	9	9 10.20			
L2	22.80	22.80 23.20			
L3	L3 26.30 26		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 Table 1 has been change	

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