



# ST4460FX

High voltage fast-switching  
NPN Power transistor

## General features

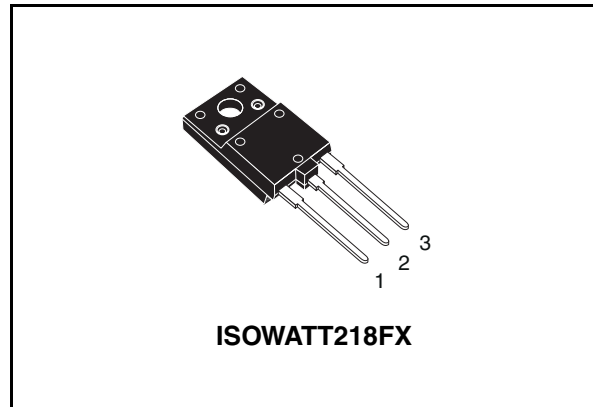
- High voltage and high current capability
- Low spread of dynamic parameters
- Low base-drive requirements
- Very high switching speed
- High ruggedness
- Fully insulated power package U.L. compliant

## Applications

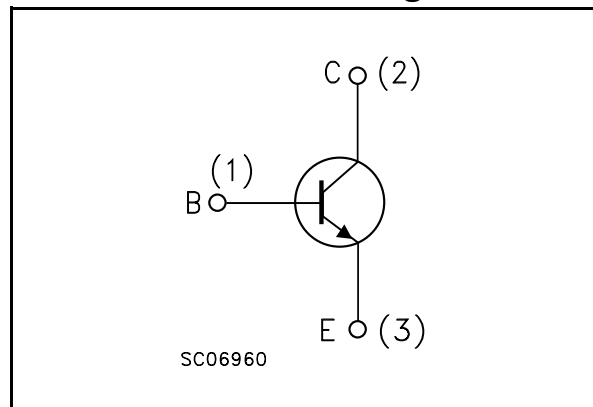
- Switch mode power supplies for CRT TV

## Description

The device is manufactured using high voltage Multi Epitaxial Mesa technology adopting Hollow Emitter structure to enhance switching performances.



## Internal schematic diagram



## Order codes

Part Number	Marking	Package	Packing
ST4460FX	4460FX	ISOWATT218FX	Tube

## Contents

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# 1 Electrical ratings

**Table 1. Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-emitter voltage ( $V_{BE} = 0$ )	1000	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	500	V
$V_{EBO}$	Collector-base voltage ( $I_C = 0$ )	9	V
$I_C$	Collector current	15	A
$I_{CM}$	Collector peak current ( $t_P < 5\text{ms}$ )	30	A
$I_B$	Base current	7	A
$P_{TOT}$	Total dissipation at $T_C = 25^\circ\text{C}$	63	W
$V_{isol}$	Insulation withstand voltage (RMS) from all three leads to external heatsink	2500	V
$T_{stg}$	Storage temperature	-65 to 150	°C
$T_J$	Max. operating junction temperature	150	

**Table 2. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case	max 2	°C/W

## 2 Electrical characteristics

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

**Table 3. Electrical characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	Collector cut-off current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 1000\text{V}$ $V_{\text{CE}} = 1000\text{V}; T_{\text{C}} = 125^{\circ}\text{C}$			100 500	$\mu\text{A}$ $\mu\text{A}$
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 500\text{V}$			250	$\mu\text{A}$
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 10\text{mA}$	500			V
$V_{\text{EBO}}$	Emitter-base voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = 10\text{mA}$	9			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 6\text{A}$ $I_{\text{B}} = 1.2\text{A}$ $I_{\text{C}} = 8\text{A}$ $I_{\text{B}} = 1.6\text{A}$ $I_{\text{C}} = 10\text{A}$ $I_{\text{B}} = 2\text{A}$			1 1.5 3	V V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 6\text{A}$ $I_{\text{B}} = 1.2\text{A}$ $I_{\text{C}} = 8\text{A}$ $I_{\text{B}} = 1.6\text{A}$			1.5 1.6	V V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 1.2\text{A}$ $V_{\text{CE}} = 5\text{V}$ $I_{\text{C}} = 6\text{A}$ $V_{\text{CE}} = 5\text{V}$	28 10		45	
$t_{\text{s}}$ $t_{\text{f}}$	Inductive load Storage time Fall time	$I_{\text{C}} = 8\text{A}$ $I_{\text{B1}} = 1.6\text{A}$ $V_{\text{BE(off)}} = -5\text{V}$ $R_{\text{BB}} = 0.4\Omega$ $V_{\text{CL}} = 350\text{V}$ $L = 200\mu\text{H}$		1.5 55	2.3 100	$\mu\text{s}$ ns
$t_{\text{s}}$ $t_{\text{f}}$	Inductive load Storage time Fall time	$I_{\text{C}} = 8\text{A}$ $I_{\text{B1}} = 1.6\text{A}$ $V_{\text{BE(off)}} = -5\text{V}$ $R_{\text{BB}} = 0.4\Omega$ $V_{\text{CL}} = 350\text{V}$ $L = 200\mu\text{H}$ $T_{\text{C}} = 100^{\circ}\text{C}$		1.9 80		$\mu\text{s}$ ns

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

## 2.1 Electrical characteristics (curve)

Figure 1. Safe operating area

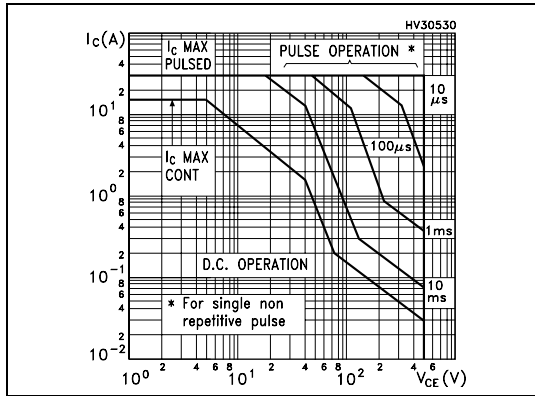


Figure 2. Derating curve

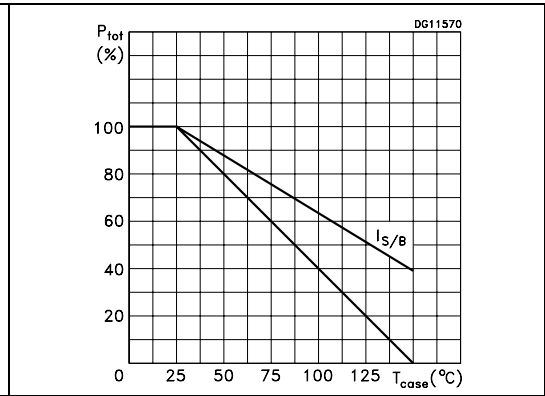


Figure 3. DC current gain

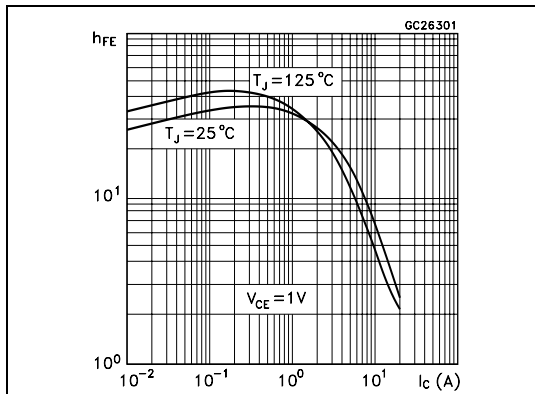


Figure 4. DC current gain

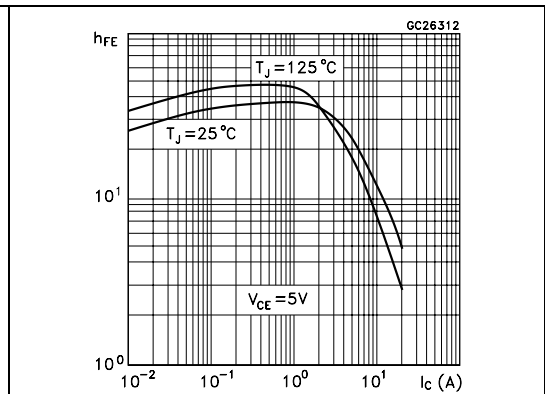


Figure 5. Collector emitter saturation voltage

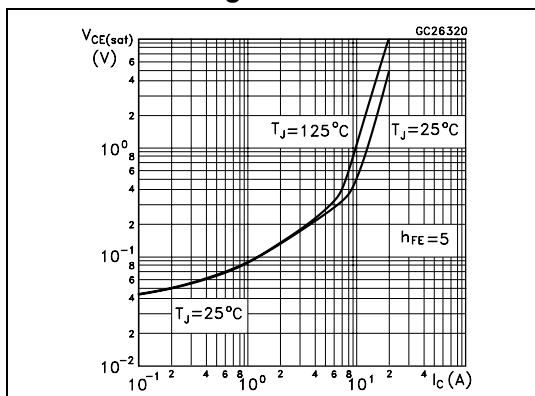


Figure 6. Base emitter saturation voltage

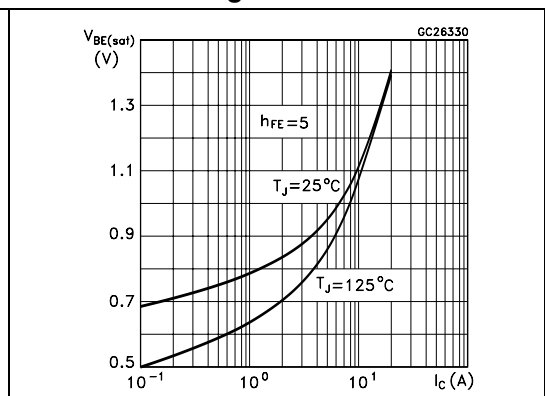


Figure 7. Inductive fall time

Figure 8. Inductive storage time

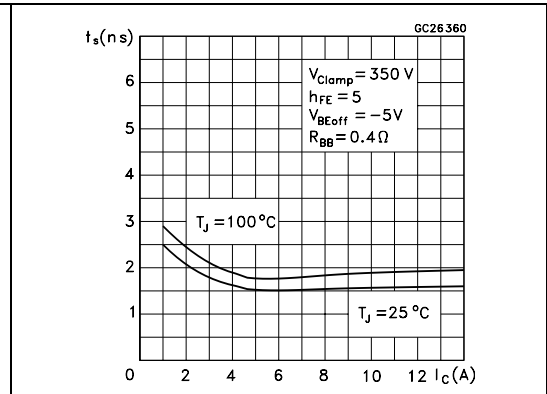
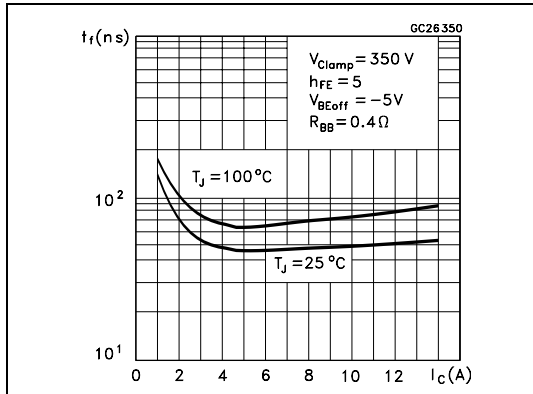
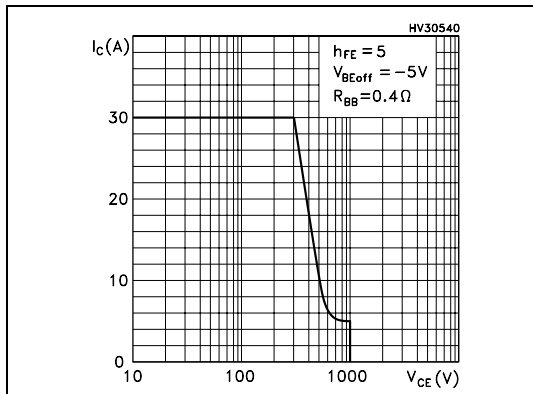


Figure 9. Reverse biased SOA



## 2.2 Test circuits

Figure 10. Power losses and inductive load switching

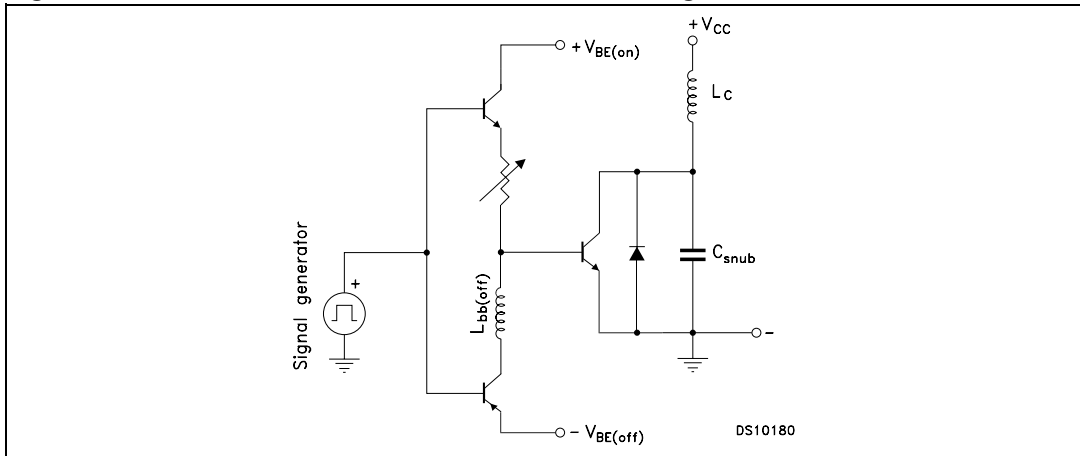
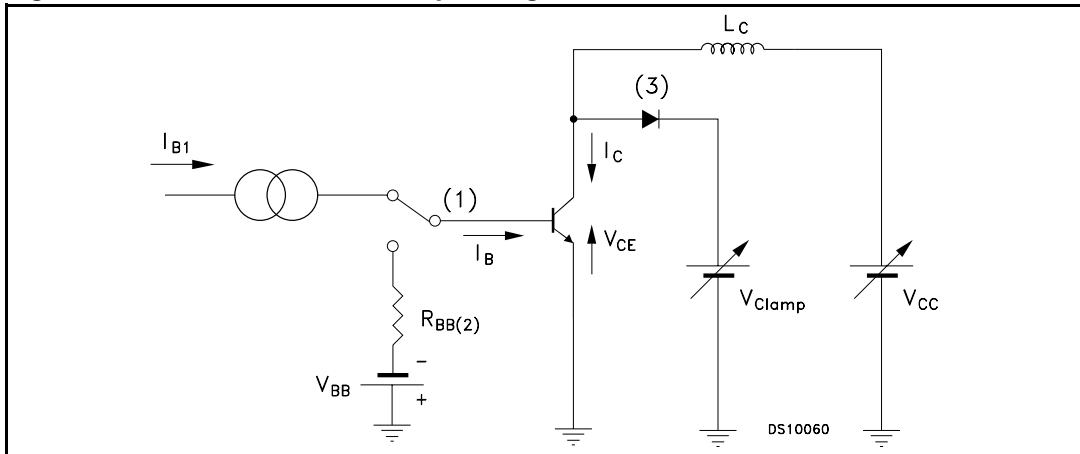


Figure 11. Reverse biased safe operating area



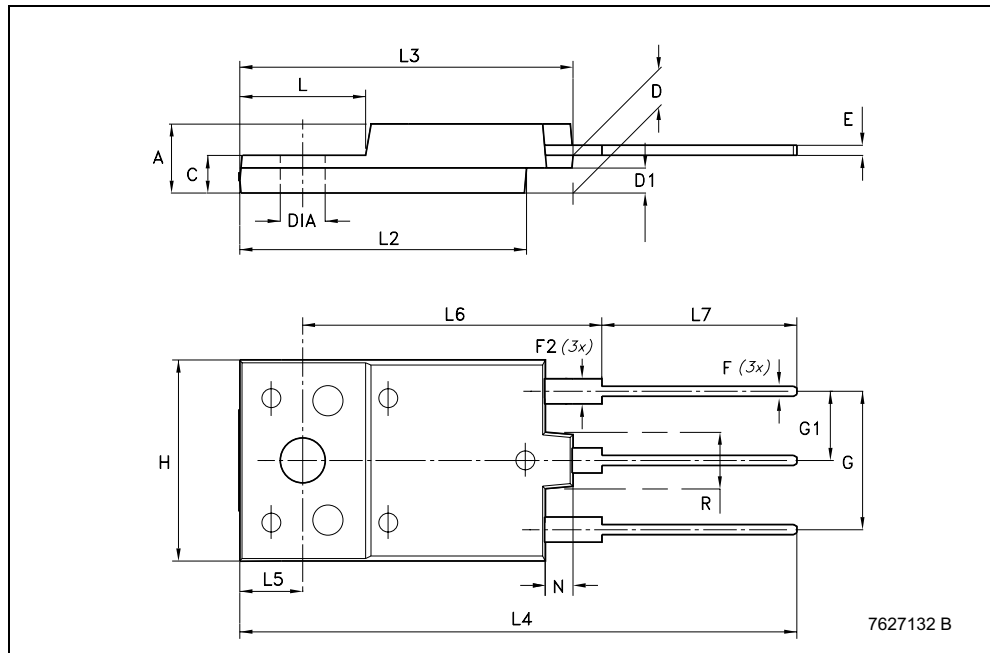
### 3 Package mechanical data

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



**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



## 4 Revision history

**Table 4. Revision history**

Date	Revision	Changes
18-Dec-2006	1	Initial release.

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