



# ST2310FX

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- n NEW SERIES, ENHANCED PERFORMANCE
- n FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- n HIGH VOLTAGE CAPABILITY ( 1500 V)
- n HIGH SWITCHING SPEED
- n TIGHTER  $h_{fe}$  CONTROL
- n IMPROVED RUGGEDNESS

### APPLICATION

- n HORIZONTAL DEFLECTION FOR MONITORS 17 " AND HIGH END TVs

### DESCRIPTION

The device is manufactured using Diffused Collector technology for more stable operation Vs base drive circuit variations resulting in very low worst case dissipation.

Figure 1: Package

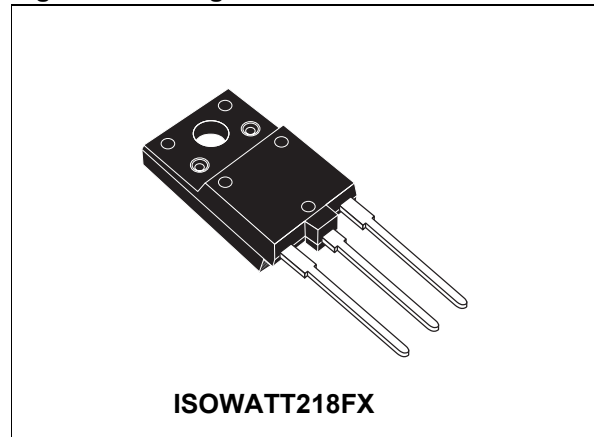


Figure 2: Internal Schematic Diagram

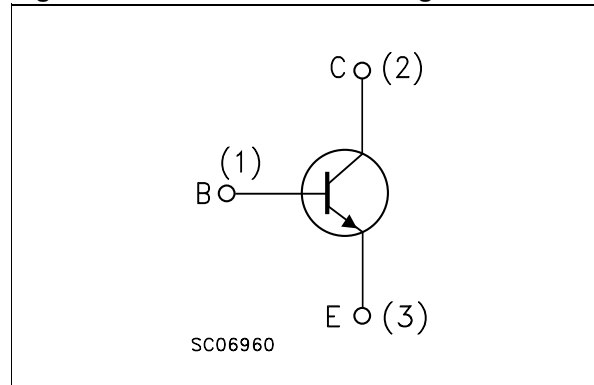


Table 1: Order Code

Part Number	Marking	Package	Packaging
ST2310FX	2310FX	ISOWATT218FX	TUBE

**Table 2: Absolute Maximum Ratings**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	1500	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	600	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	12	A
$I_{CM}$	Collector Peak Current ( $t_p < 5ms$ )	25	A
$I_B$	Base Current	7	A
$P_{tot}$	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	65	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	$^\circ\text{C}$

**Table 3: Thermal Data**

Symbol	Parameter	Unit
$R_{thj-case}$	Thermal Resistance Junction-Case Max	1.9 $^\circ\text{C/W}$

**Table 4: Electrical Characteristics ( $T_{case} = 25\text{ }^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 1500\text{ V}$			1	mA
		$V_{CE} = 1500\text{ V}$ $T_J = 125\text{ }^\circ\text{C}$			2	mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 7\text{ V}$			1	mA
$V_{CE(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 100\text{ mA}$ $L = 25\text{ mH}$	600			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 7\text{ A}$ $I_B = 1.75\text{ A}$			3	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 7\text{ A}$ $I_B = 1.75\text{ A}$			1.1	V
$h_{FE}^*$	DC Current Gain	$I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$		25		
		$I_C = 7\text{ A}$ $V_{CE} = 1\text{ V}$		5.5		
		$I_C = 7\text{ A}$ $V_{CE} = 5\text{ V}$	6.5		9.5	
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 6\text{ A}$ $f_h = 64\text{ KHz}$				
		$I_{B(on)} = 1\text{ A}$ $V_{BE(off)} = -2.5\text{ V}$ $L_{BB(off)} = 1.3\text{ }\mu\text{H}$ (see figure 14)		2.3 0.16	3 0.35	$\mu\text{s}$ $\mu\text{s}$

\* Pulsed: Pulsed duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$ .

Figure 3: Safe Operating Area

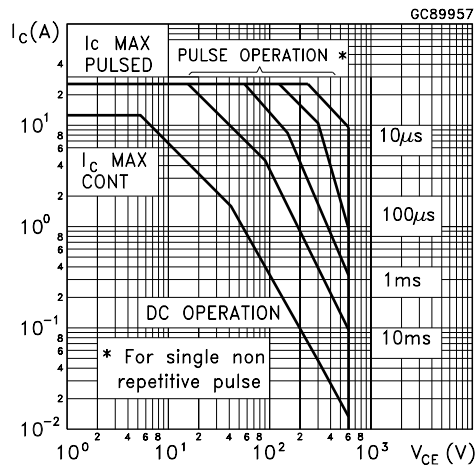


Figure 4: Derating Curve

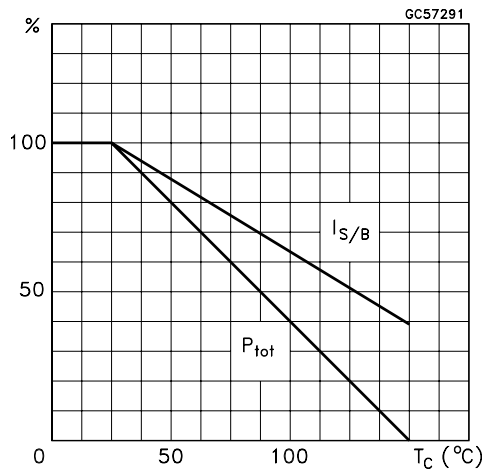


Figure 5: Collector-Emitter Saturation Voltage

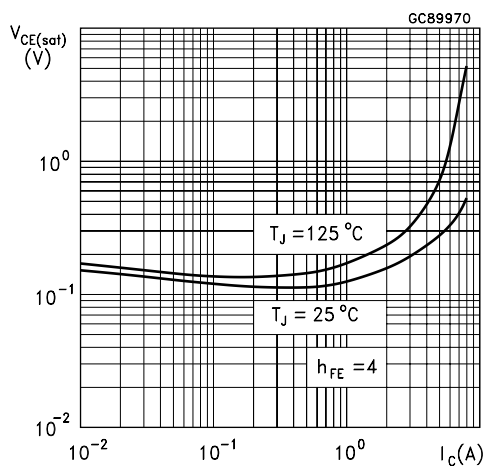


Figure 6: Thermal Impedance

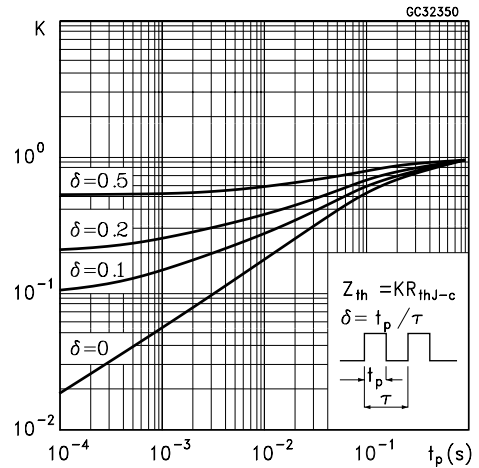


Figure 7: Output Characteristics

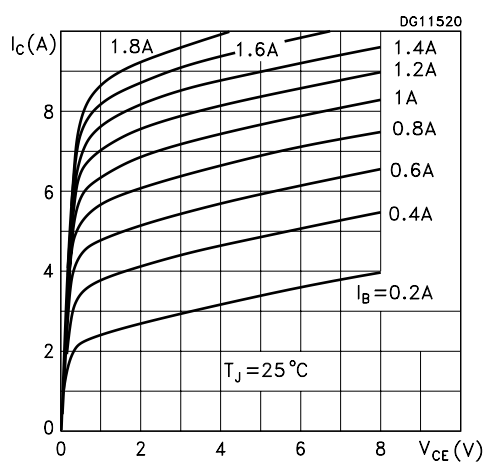


Figure 8: Base-Emitter Saturation Voltage

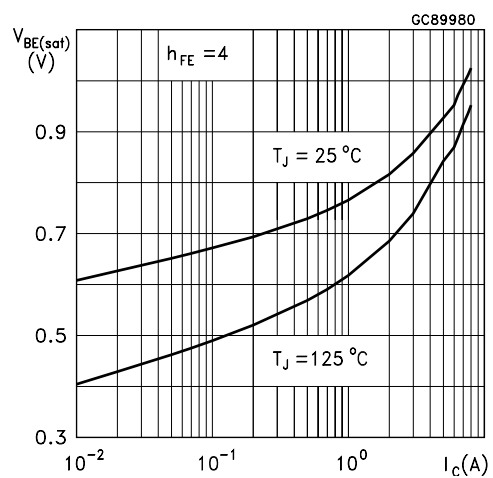


Figure 9: DC Current Gain

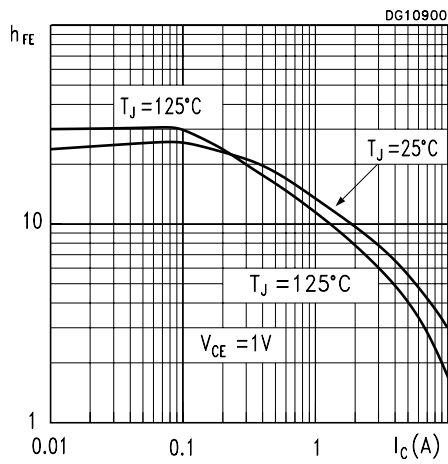


Figure 10: Power Losses

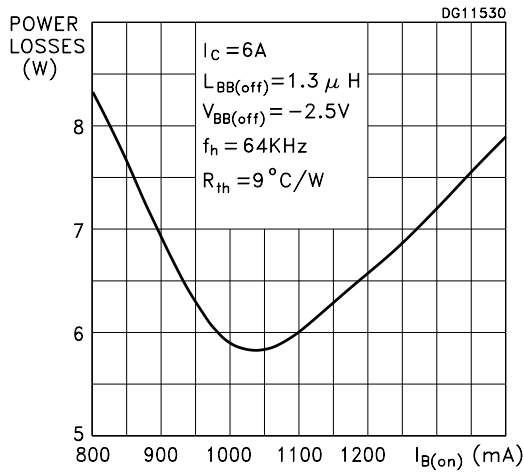


Figure 11: Reverse Biased Safe Operating Area

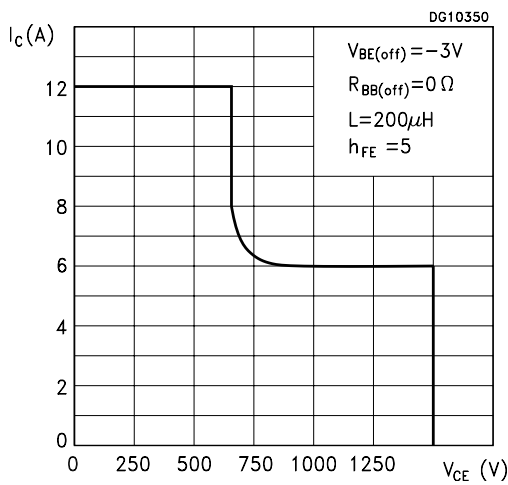


Figure 12: DC Current Gain

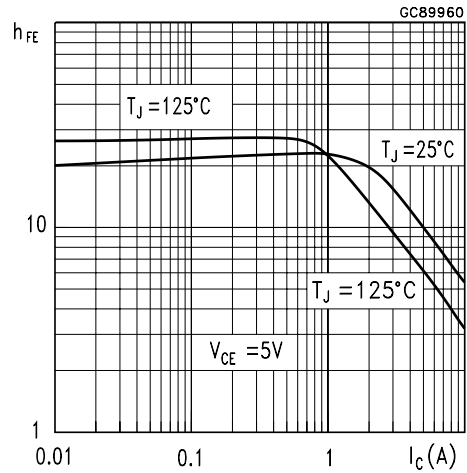


Figure 13: Switching Time Inductive Load

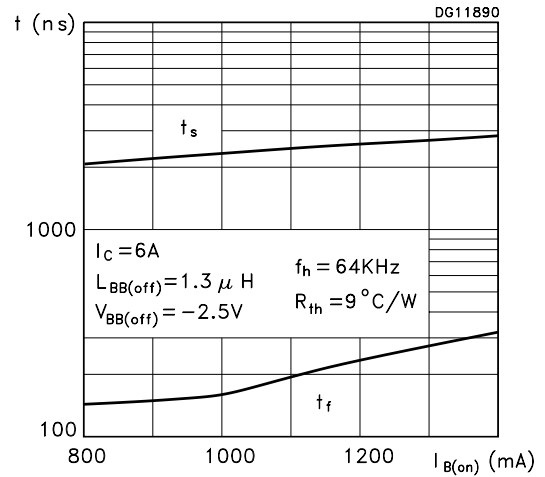
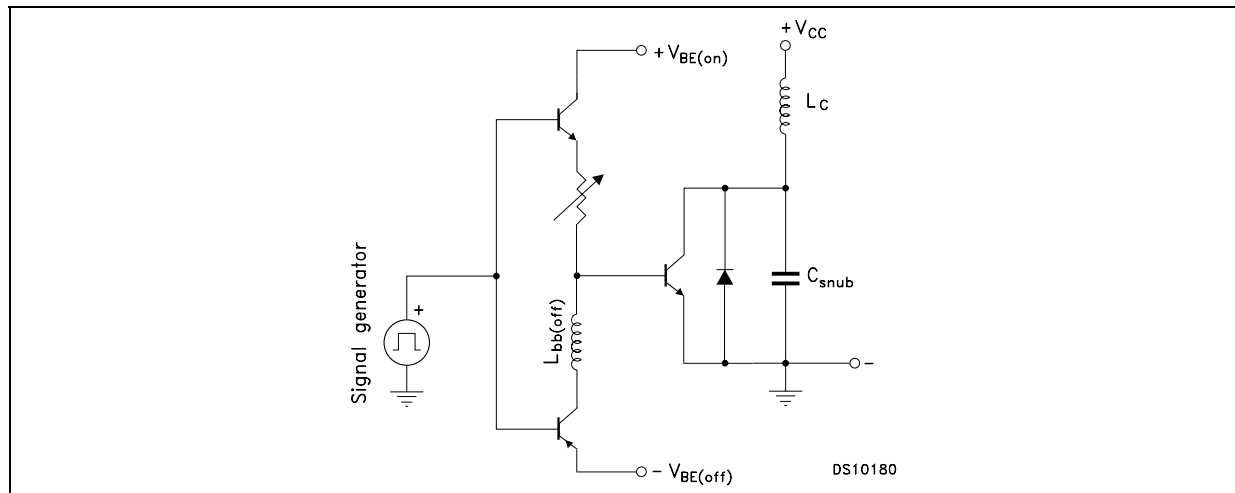
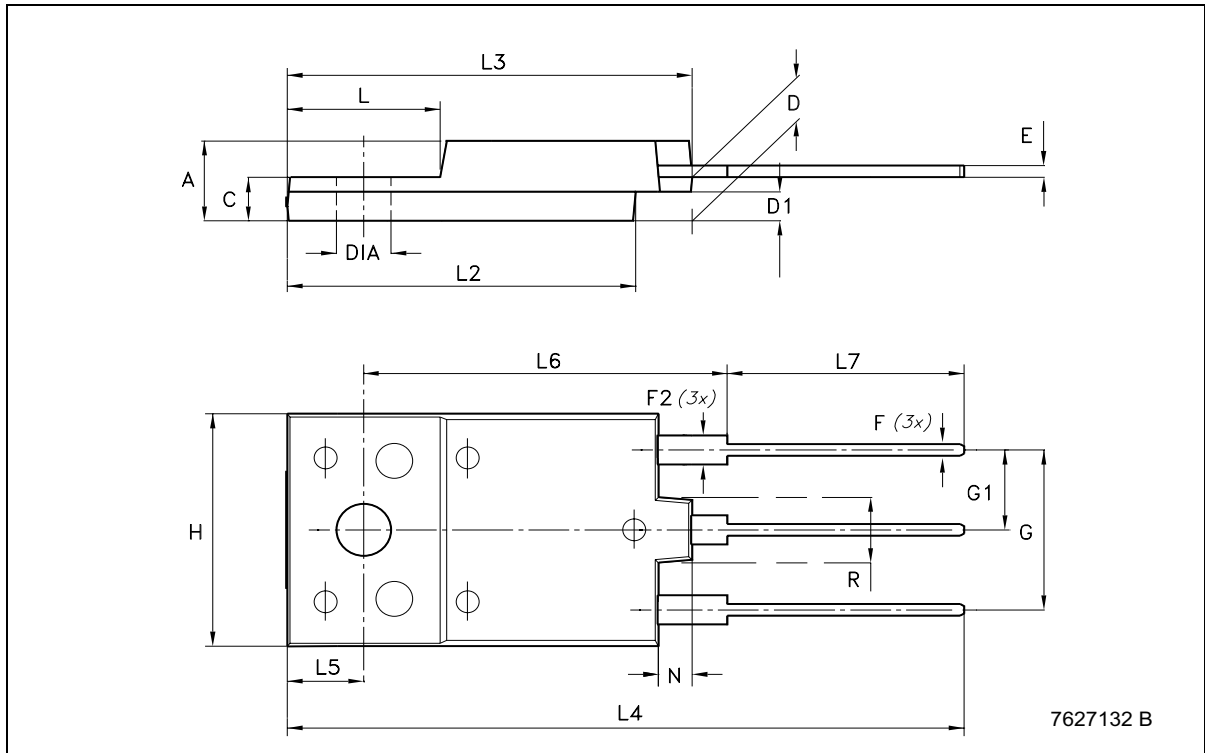


Figure 14: Inductive Load Switching test Circuit



**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



**Table 5: Revision History**

<b>Date</b>	<b>Release</b>	<b>Change Designator</b>
01-Jul-2004	1	First Release.
08-Feb-2005	2	Table 1 has been added on page 1.

## ST2310FX

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