



# HD1750FX

## HIGH VOLTAGE NPN POWER TRANSISTOR FOR HIGH DEFINITION AND NEW SUPER-SLIM CRT DISPLAYS

- STATE-OF-THE-ART TECHNOLOGY: DIFFUSED COLLECTOR "ENHANCED GENERATION" EHVS1
- WIDER RANGE OF OPTIMUM DRIVE CONDITIONS
- LESS SENSITIVE TO OPERATING TEMPERATURE VARIATION
- FULLY INSULATED POWER PACKAGE U.L. COMPLIANT

### APPLICATIONS

- HORIZONTAL DEFLECTION OUTPUT FOR DIGITAL TV, HDTV AND HIGH-END MONITORS

### DESCRIPTION

The device is manufactured using Diffused Collector in Planar technology adopting "Enhance High Voltage Structure" (EHVS1) developed to fit High-Definition CRT displays.

The new HD product series show improved silicon efficiency bringing updated performance to the Horizontal Deflection stage.

Figure 1: Package

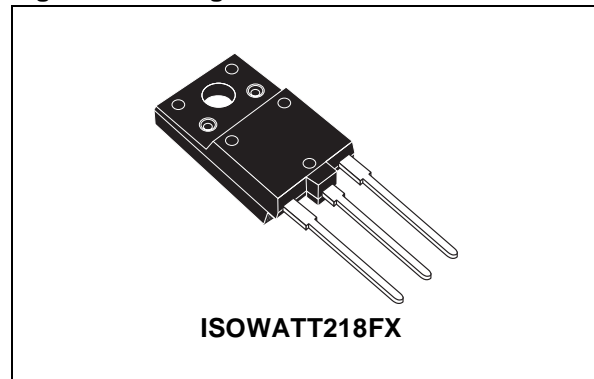


Figure 2: Internal Schematic Diagram

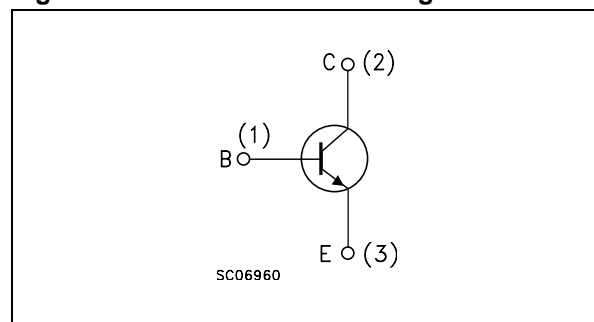


Table 1: Order Codes

Part Number	Marking	Package	Packaging
HD1750FX	HD1750FX	ISOWATT218FX	TUBE

**HD1750FX****Table 2: Absolute Maximum Ratings**

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	1700	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	800	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	10	V
$I_C$	Collector Current	24	A
$I_{CM}$	Collector Peak Current ( $t_p < 5\text{ms}$ )	36	A
$I_B$	Base Current	12	A
$I_{BM}$	Base Peak Current ( $t_p < 5\text{ms}$ )	18	A
$P_{tot}$	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	75	W
$V_{ins}$	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**

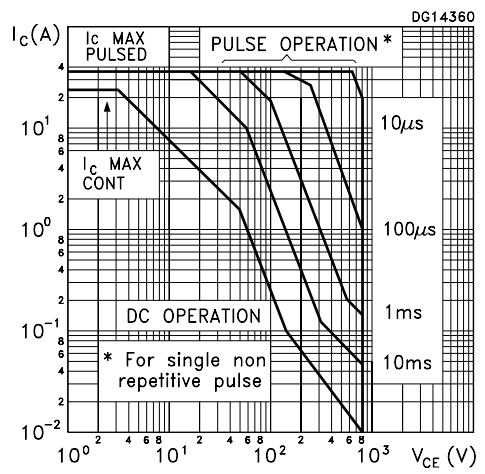
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.67	$^\circ\text{C/W}$
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**Table 4: Electrical Characteristics ( $T_{case} = 25\text{ }^\circ\text{C}$  unless otherwise specified)**

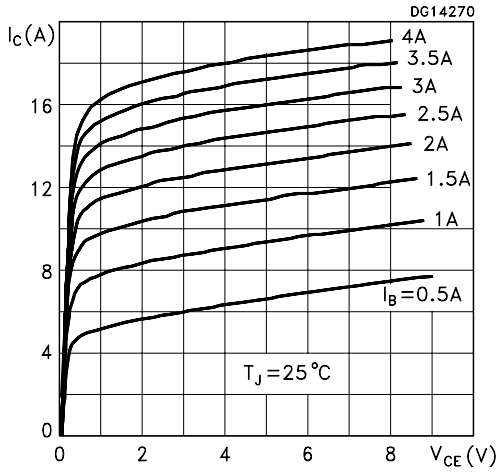
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 1700\text{ V}$ $V_{CE} = 1700\text{ V}$ $T_C = 125\text{ }^\circ\text{C}$			0.2 2	mA mA
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$			10	$\mu\text{A}$
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 10\text{ mA}$	800			V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	$I_E = 10\text{ mA}$	10			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 12\text{ A}$ $I_B = 3\text{ A}$			3	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 12\text{ A}$ $I_B = 3\text{ A}$		0.95	1.5	V
$h_{FE}$	DC Current Gain	$I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$ $I_C = 12\text{ A}$ $V_{CE} = 5\text{ V}$	6.5	30	9.5	
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 12\text{ A}$ $f_h = 31250\text{ Hz}$ $I_{B(on)} = 1.9\text{ A}$ $I_{B(off)} = -8.1\text{ A}$ $V_{CE(fly)} = 1320\text{ V}$ $V_{BE(off)} = -2.7\text{ V}$ $L_{BB(off)} = 0.8\text{ }\mu\text{H}$		3.1 350	3.8 500	$\mu\text{s}$ ns
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 6.5\text{ A}$ $f_h = 100\text{ kHz}$ $I_{B(on)} = 1.2\text{ A}$ $I_{B(off)} = -5.85\text{ A}$ $V_{CE(fly)} = 1220\text{ V}$ $V_{BE(off)} = -2.7\text{ V}$ $L_{BB(off)} = 0.25\text{ }\mu\text{H}$		1.7 180	2 250	$\mu\text{s}$ ns

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

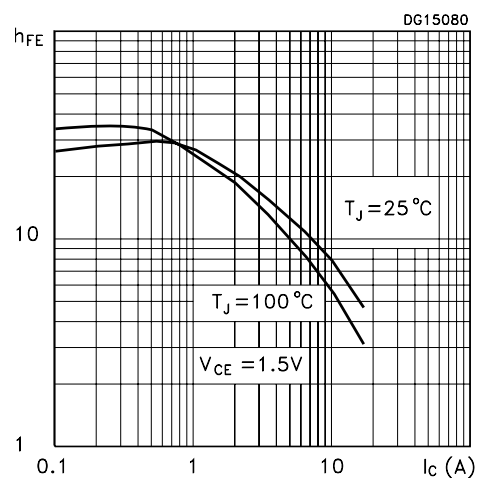
**Figure 3: Safe Operating Area**



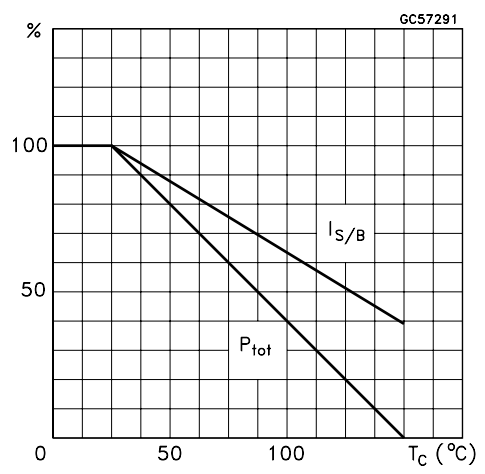
**Figure 4: Output Characteristics**



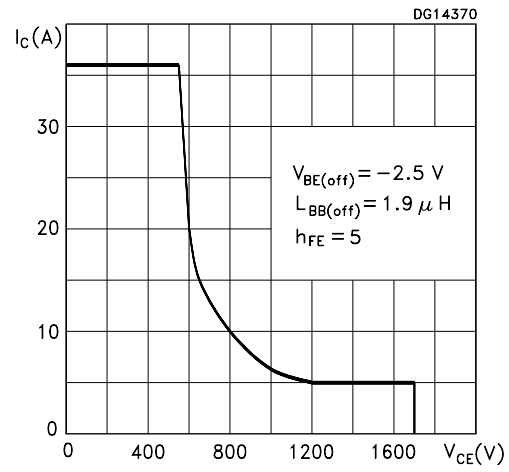
**Figure 5: DC Current Gain**



**Figure 6: Derating Curve**



**Figure 7: Reverse Biased SOA**



**Figure 8: DC Current Gain**

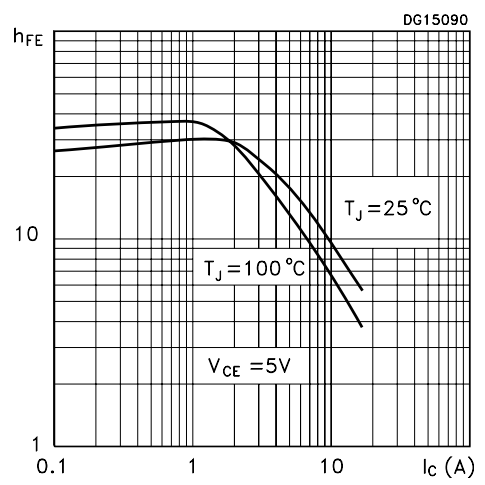


Figure 9: Collector-Emitter Saturation Voltage

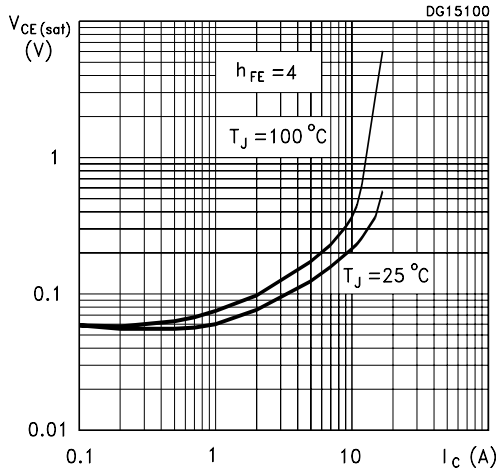


Figure 10: Power Losses

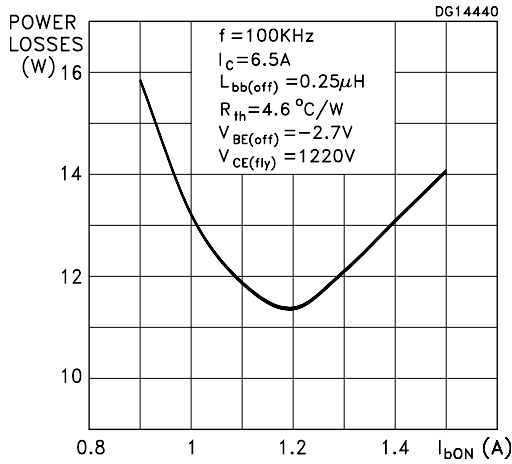


Figure 11: Inductive Load Switching Time

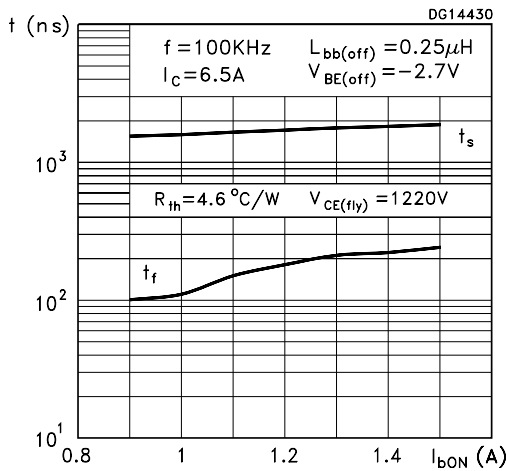


Figure 12: Base-Emitter Saturation Voltage

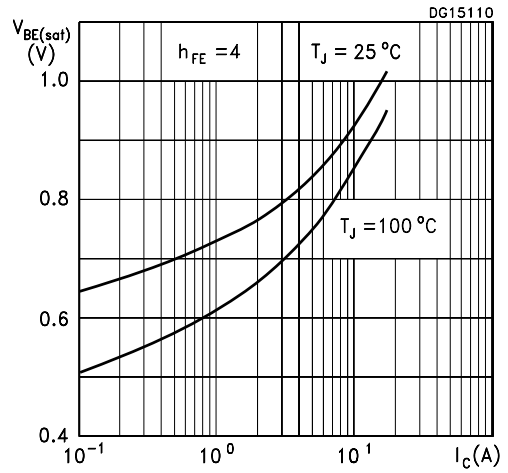


Figure 13: Power Losses

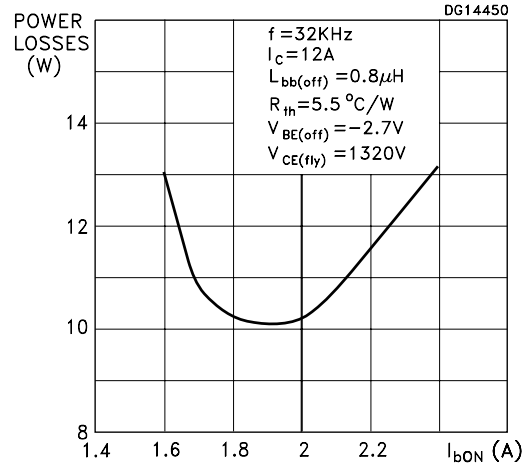


Figure 14: Inductive Load Switching Time

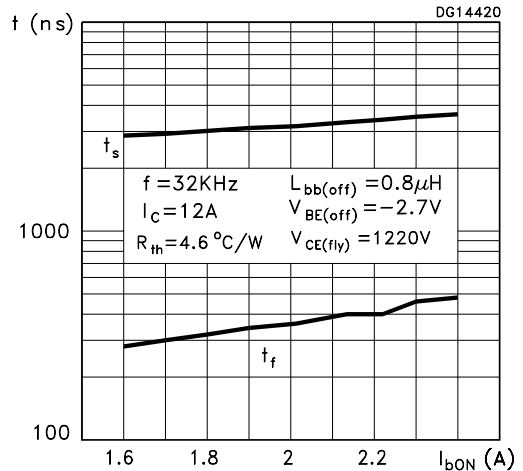


Figure 15: Power Losses and Inductive Load Switching Test Circuit

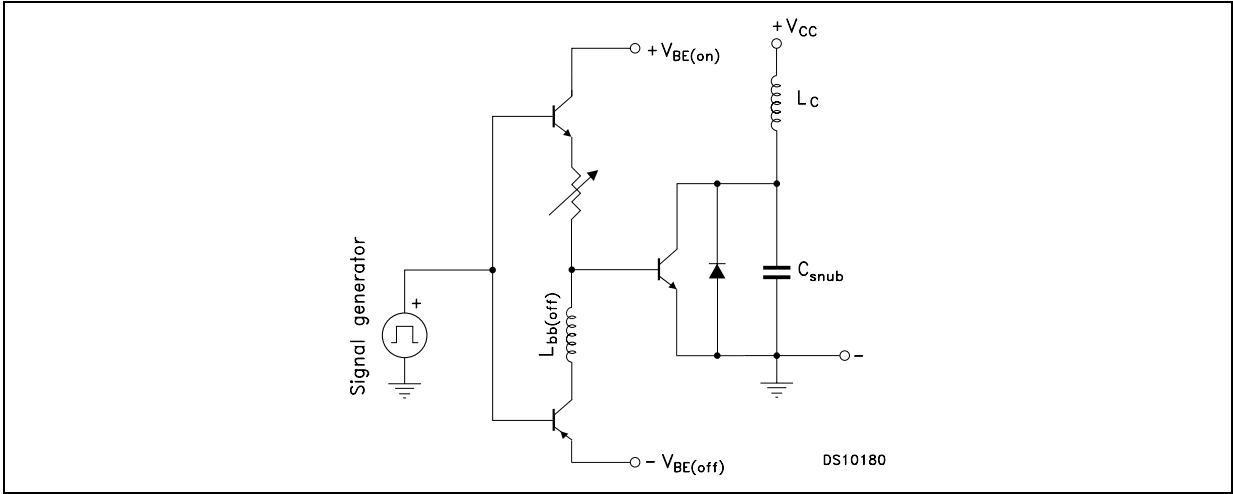
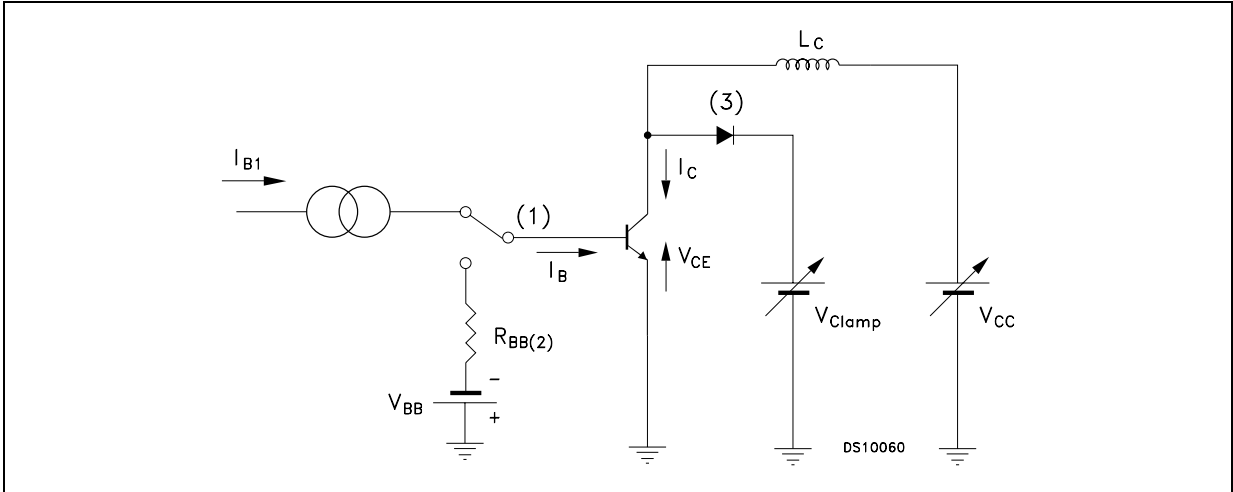
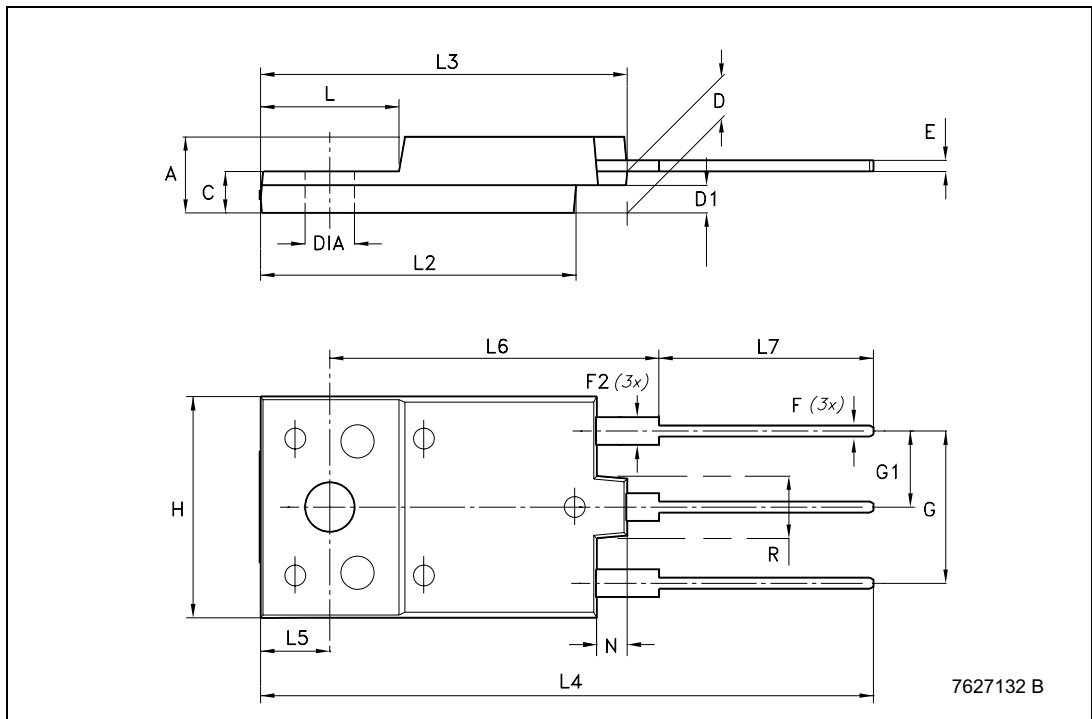


Figure 16: Reverse Biased Safe Operating Area Test Circuit



**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



**Figure 5: Revision History**

<b>Release Date</b>	<b>Version</b>	<b>Change Designator</b>
30-May-2005	1	Initial Release.
19-Dec-2005	2	New $h_{FE}$ value in table 4

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