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## HIGH VOLTAGE NPN POWER TRANSISTOR FOR HIGH DEFINITION 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

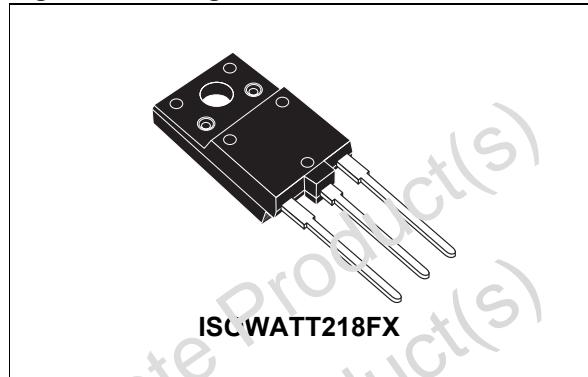
- HORIZONTAL DEFLECTION FOR LARGE  
AND FLAT SCREEN 100 Hz COLOR TVs

### DESCRIPTION

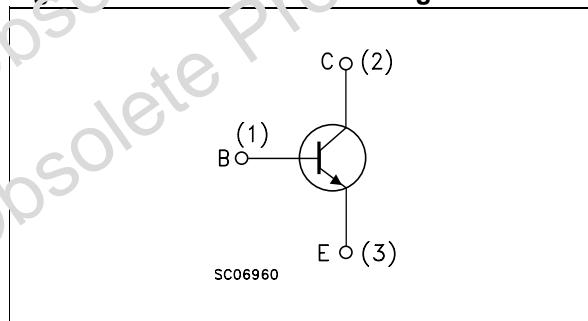
The device is manufactured using Diffused Collector in Planar technology adopting "Enhance High Voltage Structure" (EHVS1) developed to fit High-Definition CRT displays.

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:**

Part Number	Marking	Package	Packaging
HD1520FX	HD1520FX	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 ( $I_B = 0$ )	700	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	10	V
$I_C$	Collector Current	15	A
$I_{CM}$	Collector Peak Current ( $t_p < 5\text{ms}$ )	22	A
$I_B$	Base Current	8	A
$I_{BM}$	Base Peak Current ( $t_p < 5\text{ms}$ )	12	A
$P_{tot}$	Total Dissipation at $T_C = 25^\circ\text{C}$	64	W
$V_{ins}$	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	2500	V

## HD1520FX

Symbol	Parameter	Value	Unit
$T_{\text{stg}}$	Storage Temperature	-65 to 150	°C
$T_J$	Max. Operating Junction Temperature	150	°C

**Table 3: Thermal Data**

$R_{\text{thj-case}}$	Thermal Resistance Junction-Case	Max	1.95	$^{\circ}\text{C/W}$
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**Table 4: Electrical Characteristics ( $T_{\text{case}} = 25^{\circ}\text{C}$  unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	Collector Cut-off Current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 1500 \text{ V}$ $V_{\text{CE}} = 1500 \text{ V}$ $T_C = 125^{\circ}\text{C}$			0.2 2	mA mA
$I_{\text{EBO}}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{\text{EB}} = 5 \text{ V}$			10	$\mu\text{A}$
$V_{\text{CEO(sus)}}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 100 \text{ mA}$	700			V
$V_{\text{EBO}}$	Emitter-Base Voltage ( $I_C = 0$ )	$I_E = 10 \text{ mA}$	10			V
$V_{\text{CE(sat)}}^*$	Collector-Emitter Saturation Voltage	$I_C = 9 \text{ A}$ $I_B = 1.0 \text{ A}$			3	V
$V_{\text{BE(sat)}}^*$	Base-Emitter Saturation Voltage	$I_C = 9 \text{ A}$ $I_B = 1.8 \text{ A}$			1.3	V
$h_{\text{FE}}$	DC Current Gain	$I_C = 1 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$ $I_C = 9 \text{ A}$ $V_{\text{CE}} = 1 \text{ V}$ $I_C = 9 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$	5.5	26 5	9.5	
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 9 \text{ A}$ $f_h = 31250 \text{ Hz}$ $I_{\text{B(on)}} = 1.3 \text{ A}$ $I_{\text{B(off)}} = -4.2 \text{ A}$ $L_{\text{BB(on)}} = 1.9 \mu\text{H}$ $V_{\text{BE(off)}} = -2.7 \text{ V}$ $V_{\text{CE(fly)}} = 1040 \text{ V}$		3.2 220	4 300	$\mu\text{s}$ ns

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

Figure 3: Safe Operating Area

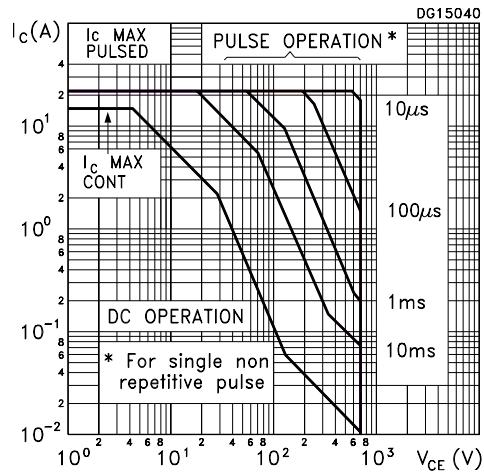


Figure 4: Output Characteristics

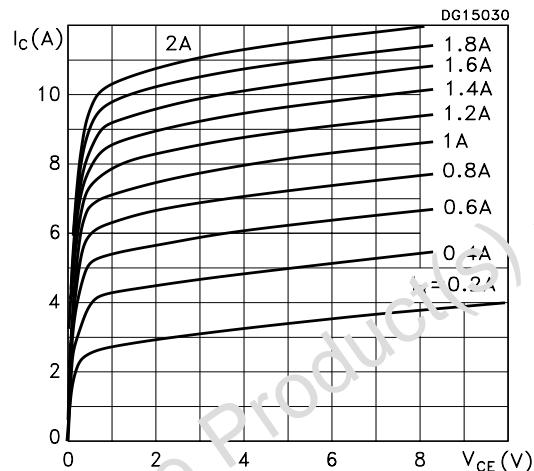


Figure 5: DC Current Gain

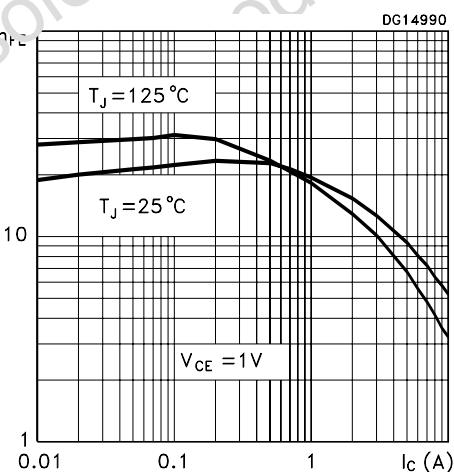


Figure 6: Derating Curve

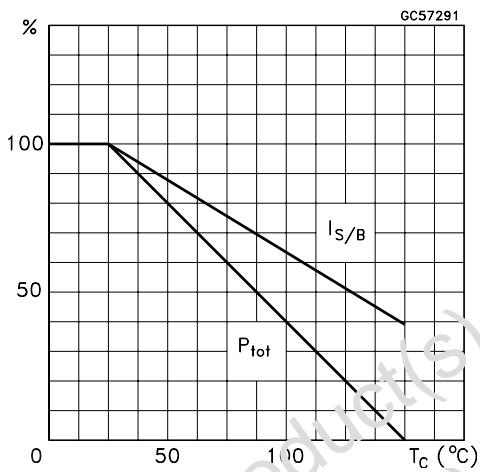


Figure 7: Reverse Biased SOA

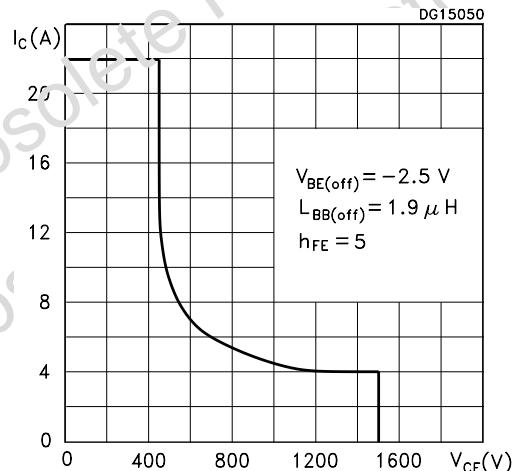


Figure 8: DC Current Gain

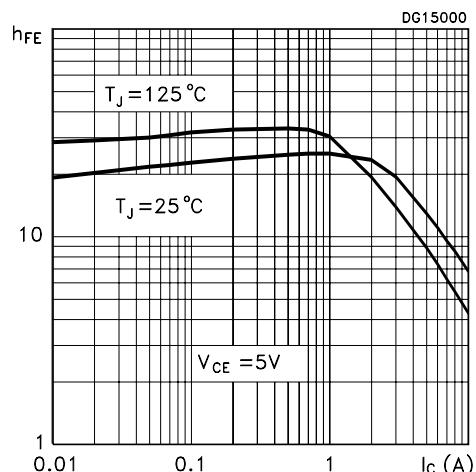


Figure 9: Collector-Emitter Saturation Voltage

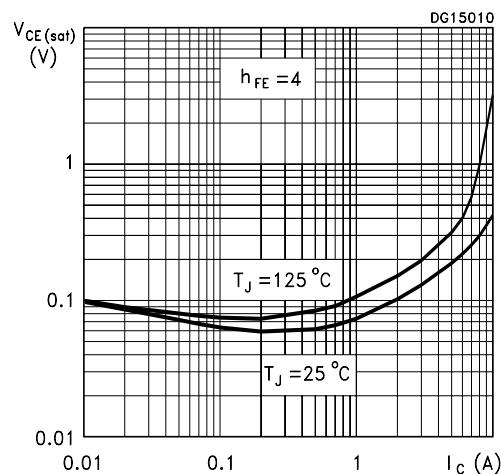


Figure 10: Power Losses

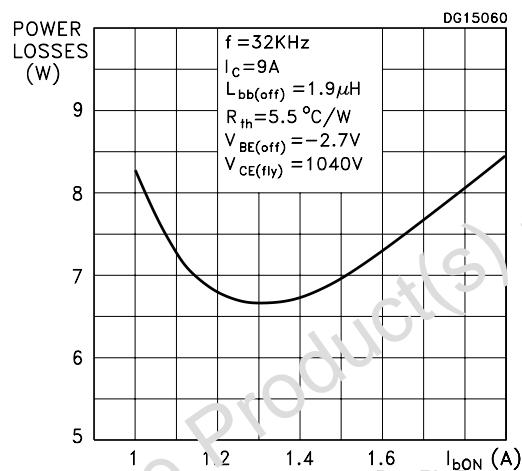


Figure 11: Base-Emitter Saturation Voltage

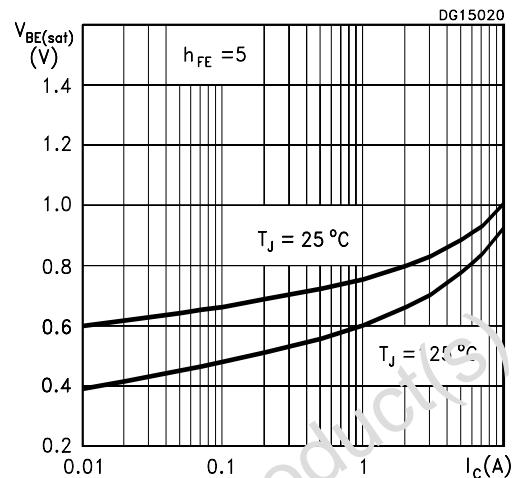


Figure 12: Inductive Load Switching Time

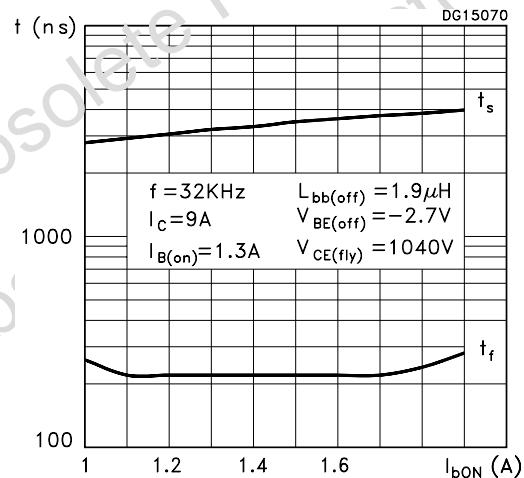


Figure 13: Power Losses and Inductive Load Switching Test Circuit

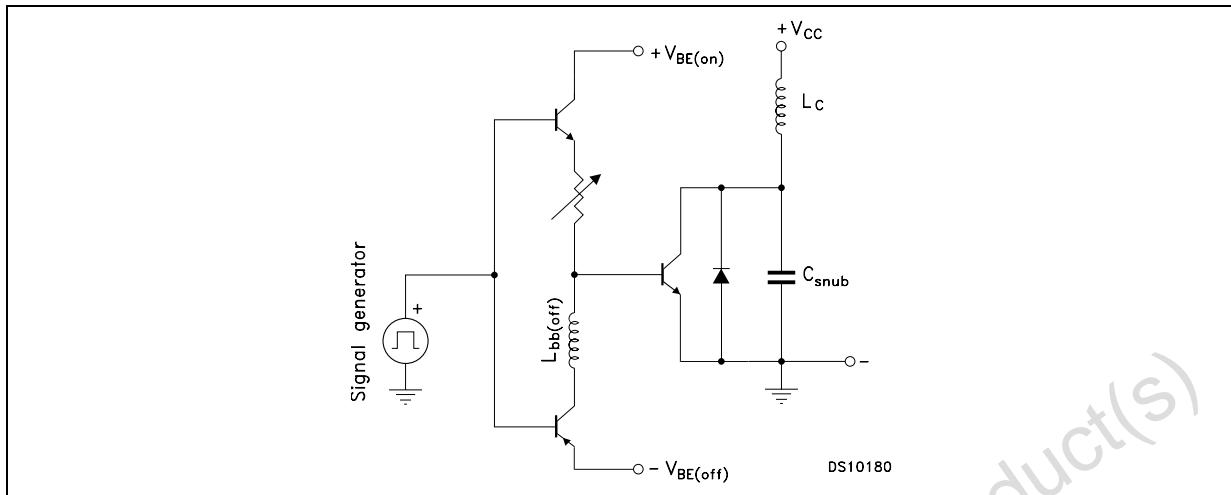
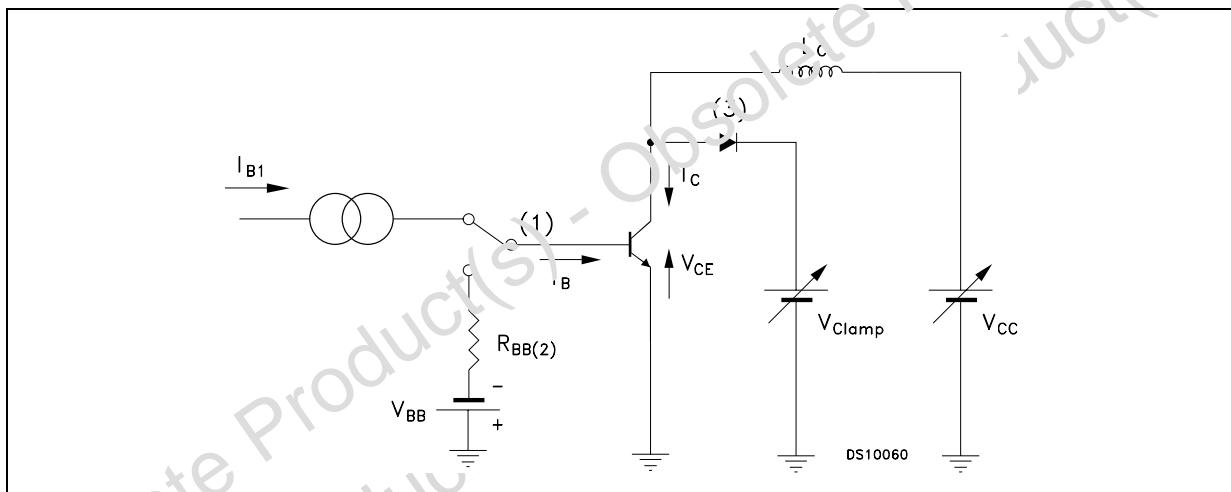
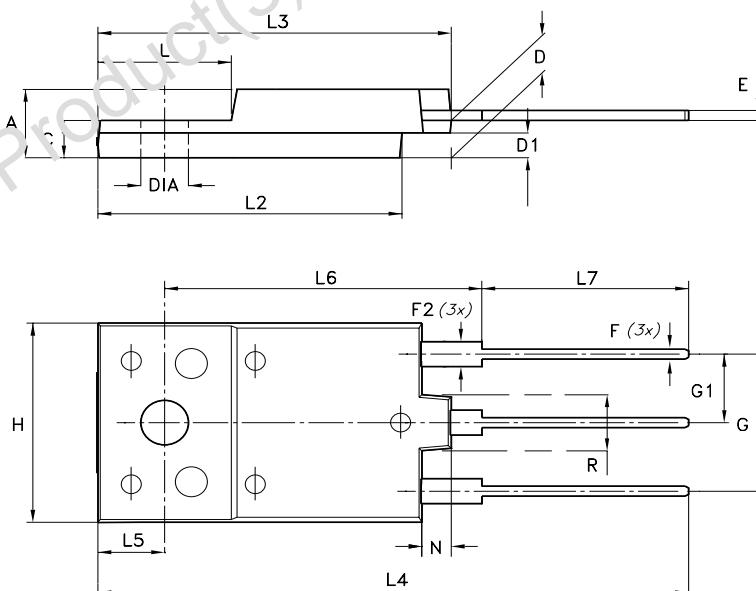


Figure 14: Reverse Biased Safe Operating Area Test Circuit



## ISOWATT218FX MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	5.30		5.70	0.209		0.224
C	2.80		3.20	0.110		0.126
D	3.10		3.50	0.122		0.138
D1	1.80		2.20	0.071		0.087
E	0.80		1.10	0.031		0.043
F	0.65		0.95	0.026		0.037
F2	1.80		2.20	0.071		0.087
G	10.30		11.50	0.406		0.453
G1		5.45			0.215	
H	15.30		15.70	0.602		0.618
L	9.0		10.20	0.354		0.402
L2	22.80		23.20	0.898		0.913
L3	26.30		26.70	1.035		1.051
L4	43.20		44.40	1.741		1.748
L5	4.30		4.70	0.169		0.185
L6	24.30		24.70	0.957		0.972
L7	14.60		15.00	0.575		0.591
N	1.80		2.20	0.071		0.087
R	3.80		4.20	0.150		0.165
DIA	3.40		3.80	0.134		0.150



- Weight : 5.6 g (typ.)
- Maximum Torque (applied to mounting flange) Recommended: 0.55 Nm; Maximum: 1 Nm
- The side of the dissipator must be flat within 80  $\mu$ m

**Figure 5: Revision History**

Version	Release Date	Change Designator
27-May-2005	0.1	Initial Release.

Obsolete Product(s) - Obsolete Product(s)

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