



## BU808DFX

### HIGH VOLTAGE FAST-SWITCHING NPN POWER DARLINGTON TRANSISTOR

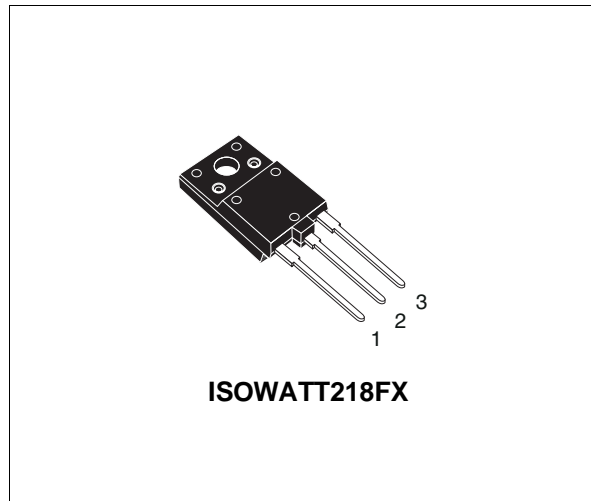
- STMicroelectronics PREFERRED SALESTYPE
- NPN MONOLITHIC DARLINGTON WITH INTEGRATED FREE-WHEELING DIODE
- HIGH VOLTAGE CAPABILITY (> 1400 V)
- HIGH DC CURRENT GAIN (TYP. 150)
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING
- LOW BASE-DRIVE REQUIREMENTS
- DEDICATED APPLICATION NOTE AN1184

#### APPLICATIONS

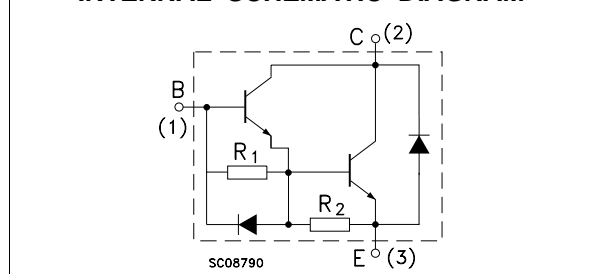
- COST EFFECTIVE SOLUTION FOR HORIZONTAL DEFLECTION IN LOW END TV UP TO 21 INCHES.

#### DESCRIPTION

The BU808DFX is a NPN transistor in monolithic Darlington configuration. It is manufactured using Multi-epitaxial Mesa technology for cost-effective high performance.



#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	1400	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	700	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	5	V
$I_C$	Collector Current	8	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	10	A
$I_B$	Base Current	3	A
$I_{BM}$	Base Peak Current ( $t_p < 5$ ms)	6	A
$P_{tot}$	Total Dissipation at $T_c = 25$ °C	62	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	°C

# BU808DFX

## THERMAL DATA

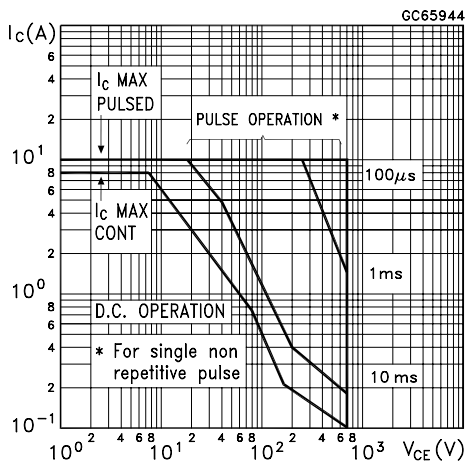
$R_{thj-case}$	Thermal Resistance Junction-case	Max	2.02	$^{\circ}C/W$
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## ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

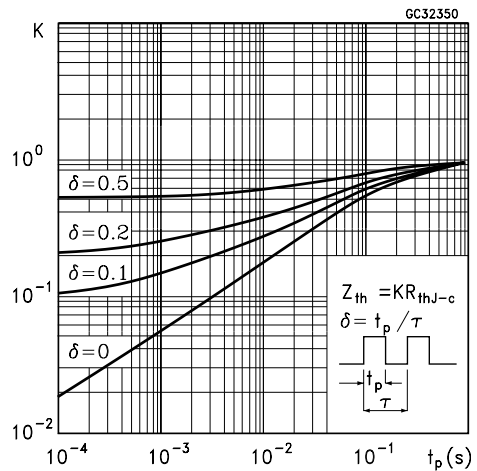
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 1400 V$			400	$\mu A$
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 5 V$			100	mA
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 5 A$ $I_B = 0.5 A$			1.6	V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 5 A$ $I_B = 0.5 A$			2.1	V
$h_{FE*}$	DC Current Gain	$I_C = 5 A$ $V_{CE} = 5 V$ $I_C = 5 A$ $V_{CE} = 5 V$ $T_j = 100^{\circ}C$	60 20		230	
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 150 V$ $I_C = 5 A$ $I_{B1} = 0.5 A$ $V_{BE(off)} = -5 V$		2.3 0.2		$\mu s$ $\mu s$
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 150 V$ $I_C = 5 A$ $I_{B1} = 0.5 A$ $V_{BE(off)} = -5 V$ $T_j = 100^{\circ}C$		2 0.8		$\mu s$ $\mu s$
$V_F$	Diode Forward Voltage	$I_F = 5 A$			3	V

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

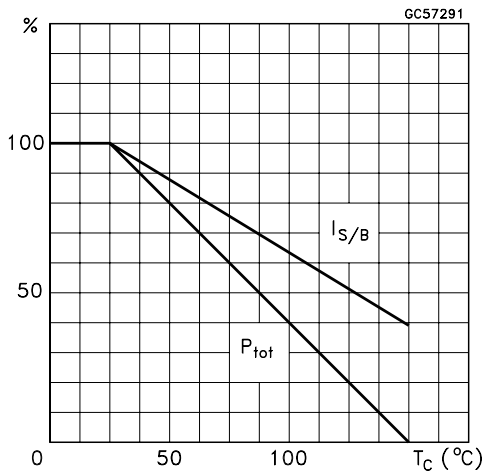
## Safe Operating Area



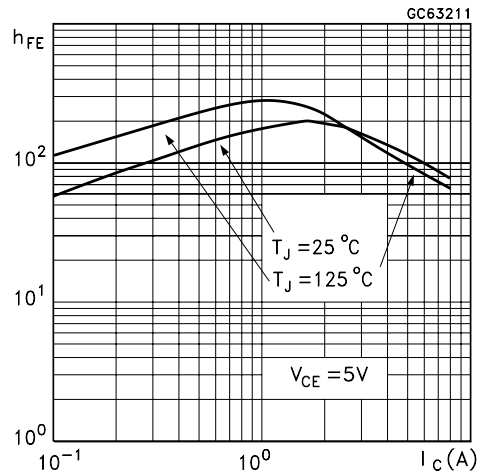
## Thermal Impedance



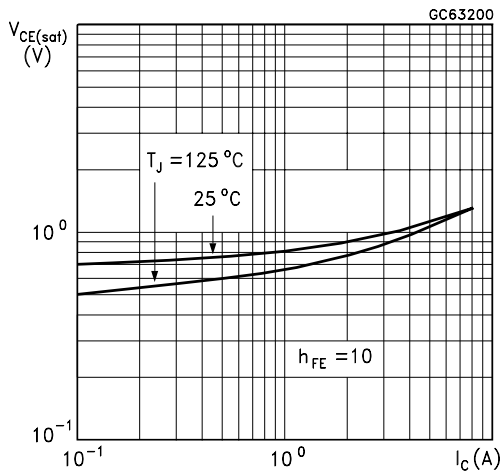
**Derating Curve**



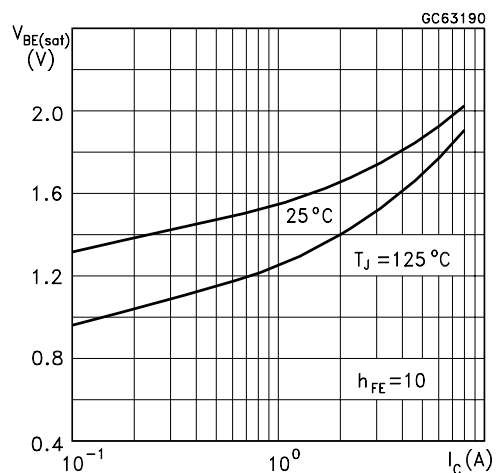
**DC Current Gain**



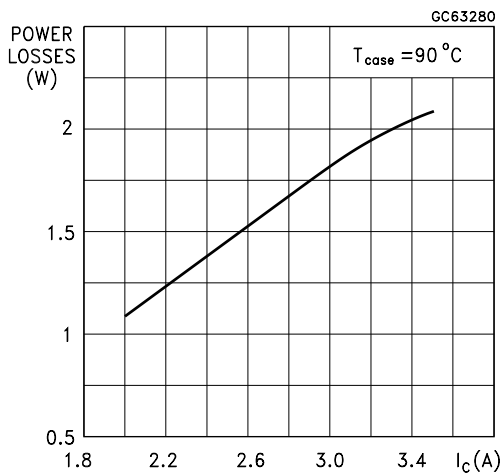
**Collector Emitter Saturation Voltage**



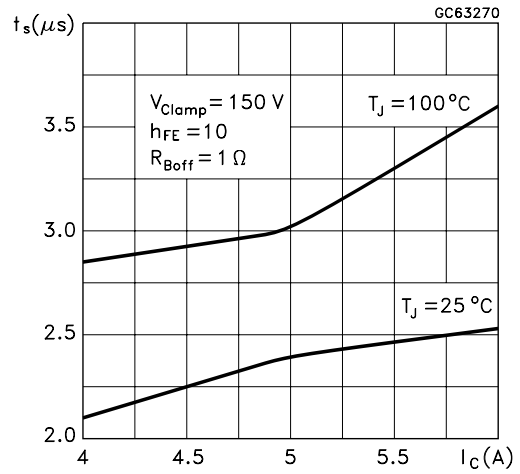
**Base Emitter Saturation Voltage**



**Power Losses at 16 KHz**

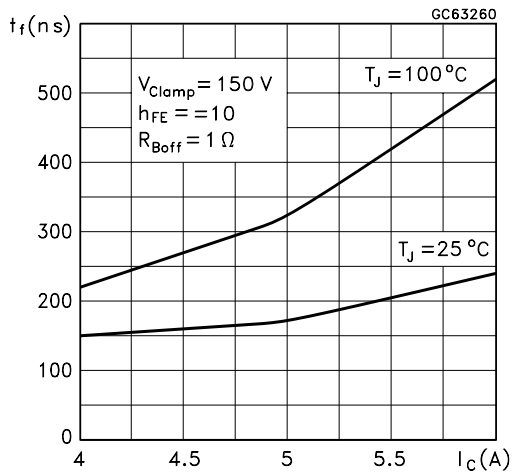


**Switching Time Inductive Load at 16KHz**



**BU808DFX**

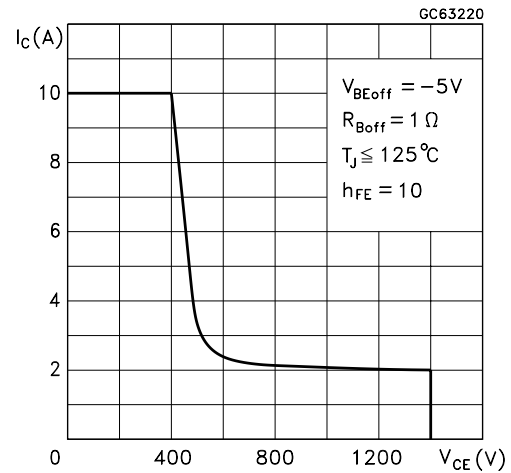
## Switching Time Inductive Load at 16KHZ

**BASE DRIVE INFORMATION**

In order to saturate the power switch and reduce conduction losses, adequate direct base current  $I_{B1}$  has to be provided for the lowest gain  $h_{FE}$  at  $100\ ^\circ\text{C}$  (line scan phase). On the other hand, negative base current  $I_{B2}$  must be provided to turn off the power transistor (retrace phase).

Most of the dissipation, in the deflection application, occurs at switch-off. Therefore it is essential to determine the value of  $I_{B2}$  which minimizes power losses, fall time  $t_f$  and, consequently,  $T_j$ . A new set of curves have been defined to give total power losses,  $t_s$  and  $t_f$  as a function of  $I_{B2}$  at both 16 KHz scanning frequencies for choosing the optimum negative

## Reverse Biased SOA



drive. The test circuit is illustrated in figure 1.

Inductance  $L_1$  serves to control the slope of the negative base current  $I_{B2}$  to recombine the excess carrier in the collector when base current is still present, this would avoid any tailing phenomenon in the collector current.

The values of  $L$  and  $C$  are calculated from the following equations:

$$\frac{1}{2} L (I_C)^2 = \frac{1}{2} C (V_{CEfly})^2 \quad \omega = 2\pi f = \frac{1}{\sqrt{LC}}$$

Where  $I_C$  = operating collector current,  $V_{CEfly}$  = flyback voltage,  $f$  = frequency of oscillation during retrace.

Figure 1: Inductive Load Switching Test Circuits.

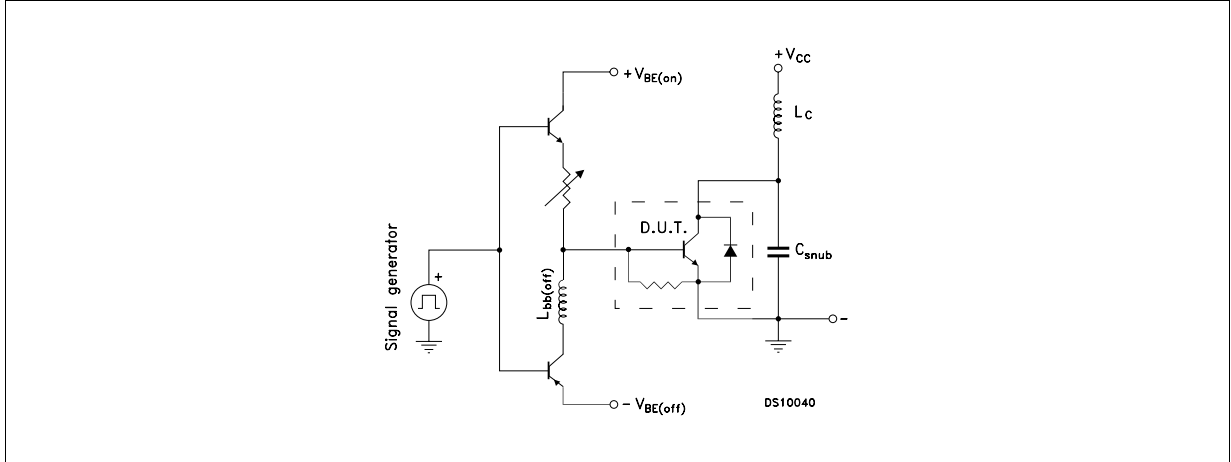
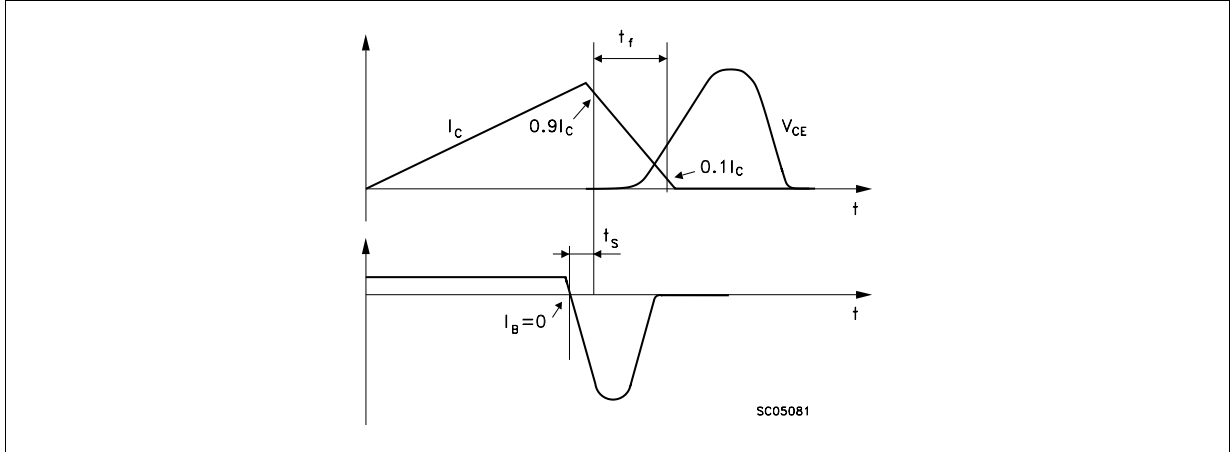
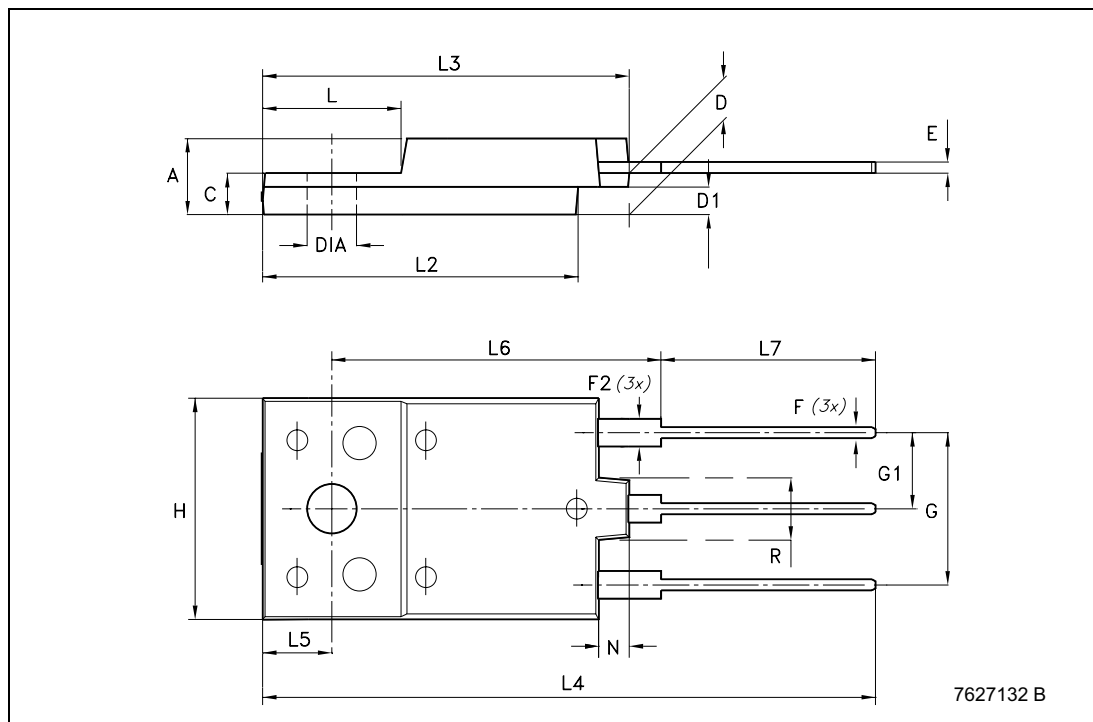


Figure 2: Switching Waveforms in a Deflection Circuit



**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



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