SGS-THOMSON MICROELECTRONICS

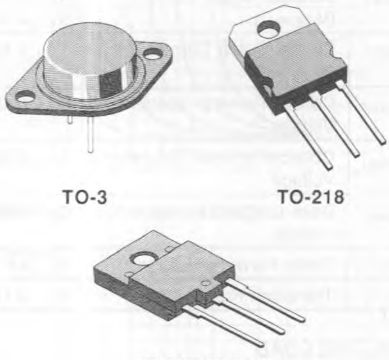
BU208D/508D/508DFI

HORIZONTAL TVC DEFLECTION

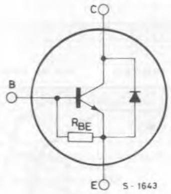
- HIGH VOLTAGE
- HIGH POWER
- HIGH SWITCHING SPEED
- GOOD STABILITY

CONSUMER

- TV COLOR HORIZONTAL DEFLECTION



INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

The BU208D, BU508D and BU508DFI are silicon multiepitaxial mesa NPN transistors.

They are mounted respectively in Jedec TO-3 metal case, in TO-218 plastic case and ISOWATT218 fully isolated package.

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	8			A
I_{CM}	Collector Peak Current	15			A
		TO-3	TO-218	ISOWATT218	
P_{tot}	Total Power Dissipation at T_C = 25 °C	150	125	60	W
T_{stg}	Storage Temperature	– 65 to 175	– 65 to 150	– 65 to 150	°C
T_j	Max. Operating Junction Temperature	175	150	150	°C

THERMAL DATA

		TO-3	TO-218	ISOWATT218	
$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	1	1	2.08	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

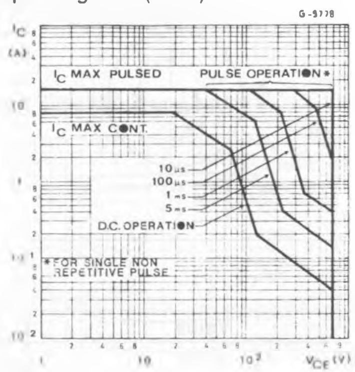
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	$V_{CE} = V_{CES}$ T_C = 125°C $V_{CE} = V_{CES}$			1 2	mA mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5V			300	mA
$V_{CEO(sus)}$*	Collector-emitter Sustaining Voltage	I_C = 100mA	700			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 4.5A I_B = 2A			1	V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 4.5A I_B = 2A			1.3	V
V_F	Diode Forward Voltage	I_F = 4A			2	V
f_T	Transition Frequency	I_C = 0.1A V_{CE} = 5V f = 5MHz		7		MHz

INDUCTIVE LOAD

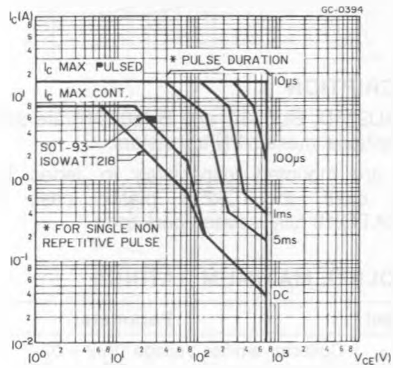
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
t_s	Storage Time	I_c = 4.5A h_{FE} = 2.5 V_{CC} = 140V		7		μs
t_f	Fall Time	L_C = 0.9mH L_B = 3μH		0.55		μs

* Pulsed : Pulse duration = 300μs, duty cycle = 1.5%.

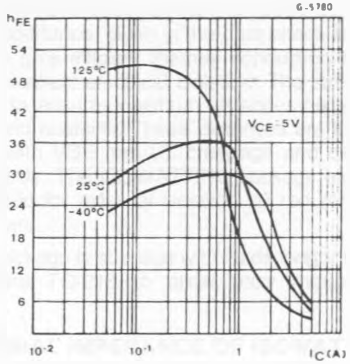
Safe Operating Area (TO-3).



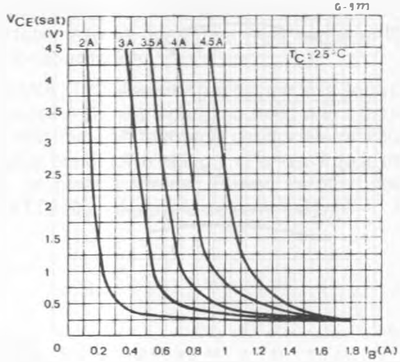
Safe Operating Area (TO-218/ISOWATT218).



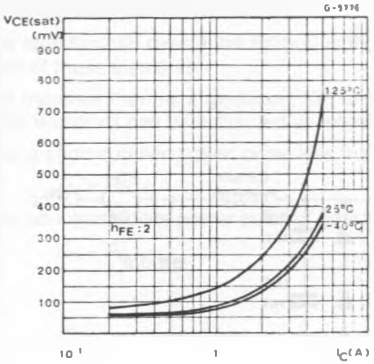
DC Current Gain.



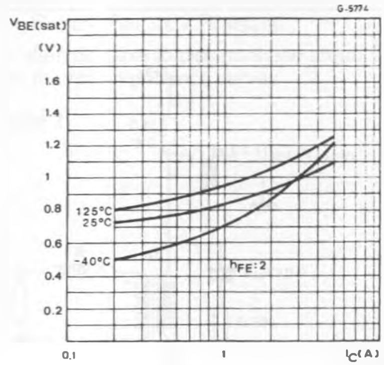
Collector Saturation Region.



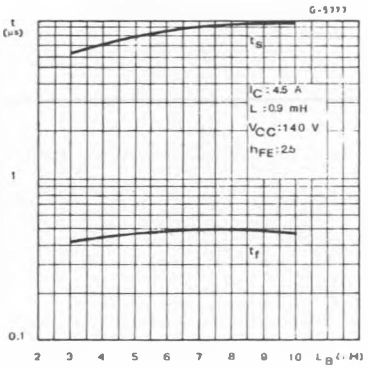
Collector-emitter Saturation Voltage.



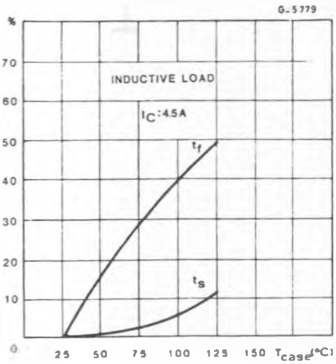
Base-emitter Saturation Voltage.



Switching Times Inductive Load (see fig. 1).



Switching Times Percentage vs. Case Temperature (see fig. 1).



DC Current Gain.

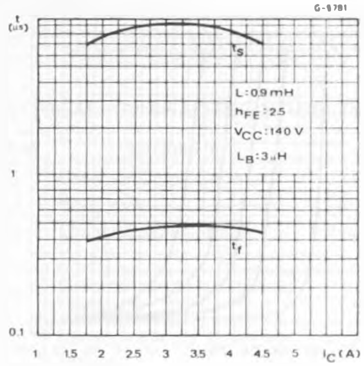
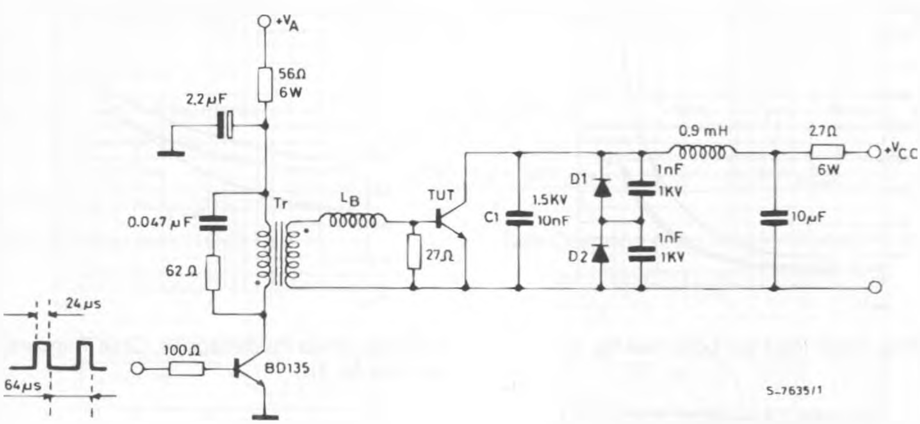


Figure 1 : Switching Times Test Circuit on Inductive Load.



ISOWATT218 PACKAGE CHARACTERISTICS AND APPLICATION

ISOWATT218 is fully isolated to 4000V dc. Its thermal impedance, given in the data sheet, is optimised to give efficient thermal conduction together with excellent electrical isolation. The structure of the case ensures optimum distances between the pins and heatsink. These distances are in agreement with VDE and UL creepage and clearance standards. The ISOWATT218 package eliminates the need for external isolation so reducing fixing hardware.

The package is supplied with leads longer than the standard TO-218 to allow easy mounting on pcbs. Accurate moulding techniques used in manufacture assures consistent heat spreader-to-heatsink capacitance.

ISOWATT220 thermal performance is equivalent to that of the standard part, mounted with a 0.1mm mica washer. The thermally conductive plastic has a higher breakdown rating and is less fragile than mica or plastic sheets. Power derating for ISOWATT218 packages is determined by :

$$P_D = \frac{T_j - T_c}{R_{th}}$$

THERMAL IMPEDANCE OF ISOWATT218 PACKAGE

Figure 2 illustrates the elements contributing to the thermal resistance of a transistor heatsink assembly, using ISOWATT218 package.

The total thermal resistance Rth(tot) is the sum of each of these elements.

The transient thermal impedance, Zth for different pulse durations can be estimated as follows :

1-for a short duration power pulse less than 1ms :

$$Z_{th} < R_{thJ\text{-}C}$$

2-for an intermediate power pulse of 5ms to 50ms :

$$Z_{th} = R_{thJ\text{-}C}$$

3-for long power pulses of the order of 500ms or greater :

$$Z_{th} = R_{thJ\text{-}C} + R_{thC\text{-}HS} + R_{thHS\text{-}amb}$$

It is often possible to discern these areas on transient thermal impedance curves.

Figure 2.