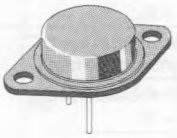
SGS-THOMSON MICROELECTRONICS

BUX24

NPN SILICON TRANSISTOR

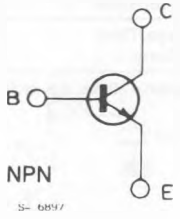
DESCRIPTION

High speed, high current, high power NPN transistor intended for use in switching and amplifier applications.



TO-3

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage (I_E = 0)	450	V
V_{CER}	Collector-emitter Voltage	440	V
V_{CEX}	Collector-emitter Voltage	450	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	400	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	7	V
I_C	Collector Current	20	A
I_{CM}	Collector Peak Current (t_p < 10ms)	30	A
I_B	Base Current	4	A
P_{tot}	Total Dissipation at T_c < 25°C	350	W
T_{stg}	Storage Temperature	– 65 to 200	°C
T_j	Max. Operating Junction Temperature	200	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resitance Junction-case	Max	0.5	°C/W

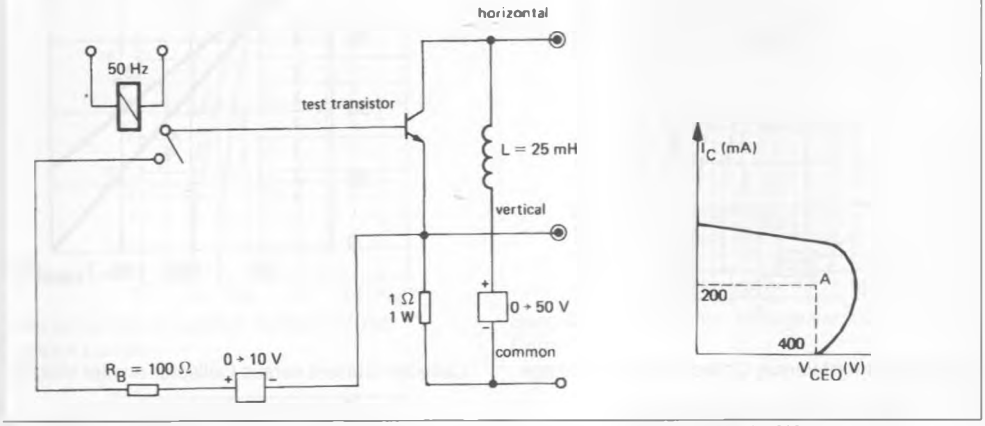
ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEX}	Collector Cutoff Current	V_{CE} = 450V V_{BE} = – 1.5V V_{CE} = 450V V_{BE} = – 1.5V T_c = 125°C			3 12	mA mA
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 320V			3	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5V			1	mA
$V_{CEO(sus)}$*	Collector Emitter Sustaining Voltage	I_C = 200mA L = 25mH	400			V
V_{EBO}	Emitter-base Voltage (I_C = 0)	I_E = 50mA	7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 6A I_B = 1.2A I_C = 12A I_B = 2.4A		0.15 0.3	0.6 1	V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 12A I_B = 2.4A		1	1.5	V
h_{FE}*	DC Current Gain	I_C = 6A V_{CE} = 4V I_C = 12A V_{CE} = 4V	15 8		60	
$I_{S/B}$	Second Breakdown Collector Current	V_{CE} = 140V t = 1s V_{CE} = 19V t = 1s	0.15 18			A A
f_T	Transition Frequency	I_C = 2A V_{CE} = 15V f = 10MHz	8			MHz
t_{on}	Turn-on Time	I_C = 12A I_B = 3.2A		0.6	1.6	µs
t_s t_f	Storage Time Fall Time	I_C = 12A I_{B1} = - I_{B2} = 3.2A		1.5 0.6	3 1.4	µs µs

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

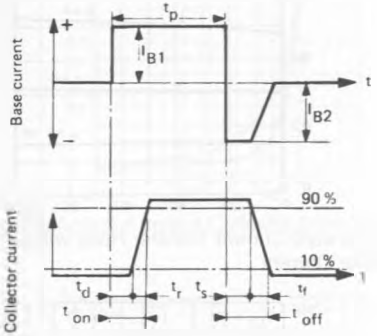
TEST CIRCUIT ($V_{CEO\ (sus)}$)

Figure 1.

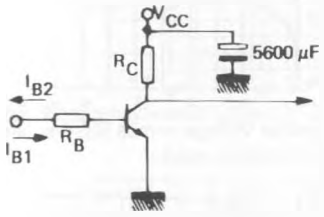


Note : The sustaining voltage V_{CEO} is acceptable when the trace falls to the right and above point "A".

SWITCHING TIMES TEST CIRCUITS (and oscillograms)

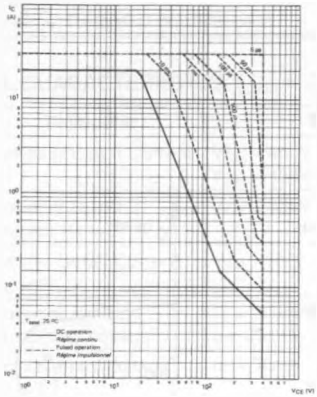


I_{B1} and I_{B2} mesured with Tektronix probe P 6021 and Amplifier type 134

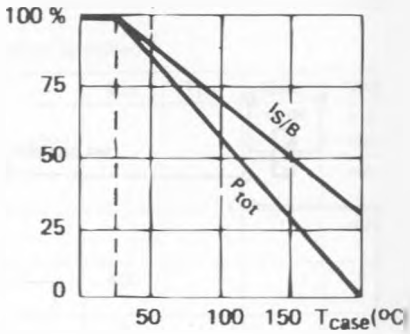


R_C – R_B : non inductive resistances
t_p : Pulse width = 10 µs
Forme factor < 1 %
Rise and fall time < 10 ns.

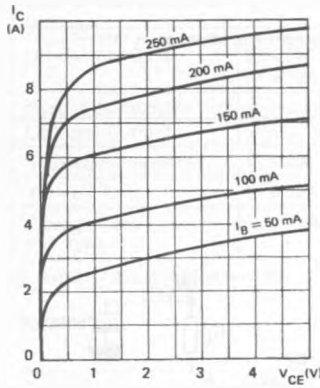
Safe Operating Area.



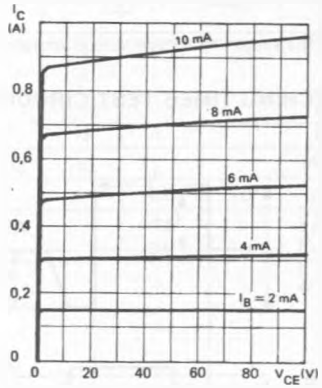
Dissipation and $I_{S/B}$ Derating.



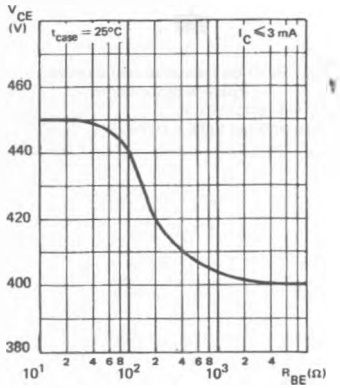
Collector Current versus Collector-emitter Voltage.



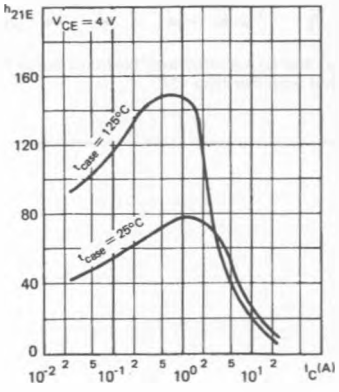
Collector Current versus Collector-emitter Voltage



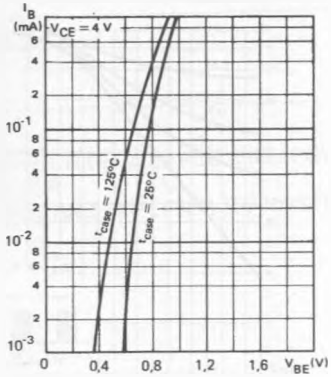
Collector Emitter Voltage versus Base-emitter Resistance (minimum value).



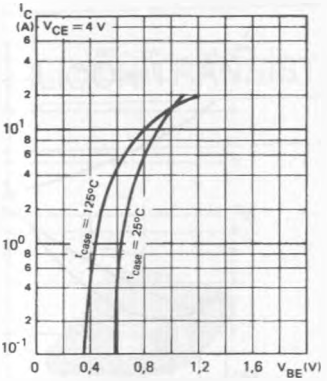
Static forward Current Transfer Ratio versus Collector Current



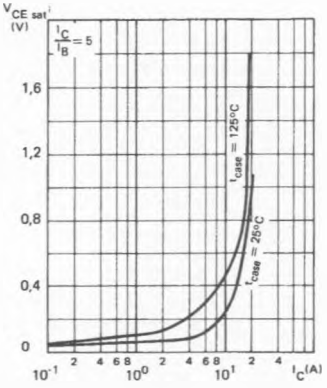
Base Current versus Base-emitter Voltage.



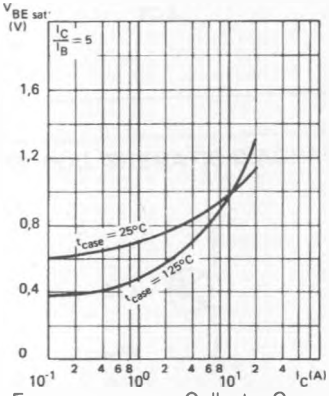
Collector Current versus Base-emitter Voltage.



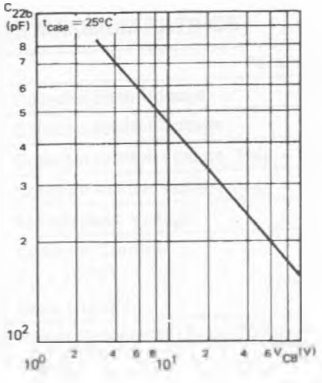
Collector-emitter Saturation Voltage versus Collector Current.



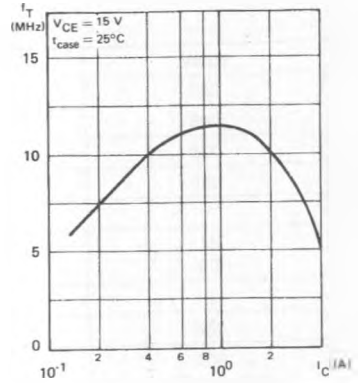
Base-emitter Saturation Voltage versus Collector Current.



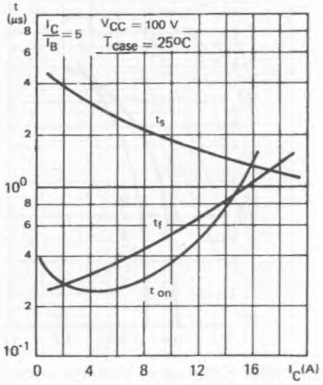
Output Capacitance versus Collector-base Voltage.



Transition Frequency versus Collector Current.



Switching Times versus Collector Current.



Transient Thermal Resistance Derating Factor under Pulses Conditions.