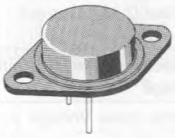
SGS-THOMSON MICROELECTRONICS

BUX41N

HIGH CURRENT, HIGH SPEED, HIGH POWER TRANSISTOR

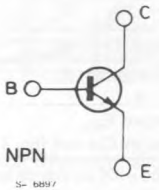
DESCRIPTION

The BUX41N is a silicon multiepitaxial planar NPN transistor in Jedec TO-3 metal case, intented for use in switching and linear applications in military and industrial equipment.



TO-3

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage (I_E = 0)	220	V
V_{CEX}	Collector-emitter Voltage (V_{BE} = – 1.5 V)	220	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	160	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	7	V
I_C	Collector Current	18	A
I_{CM}	Collector Peak Current (t_p = 10 ms)	25	A
I_B	Base Current	3.6	A
P_{tot}	Total Power Dissipation at $T_{case} \leq 25$ °C	120	W
T_{stg}	Storage Temperature	– 65 to 200	°C
T_j	Junction Temperature	200	°C

THERMAL DATA

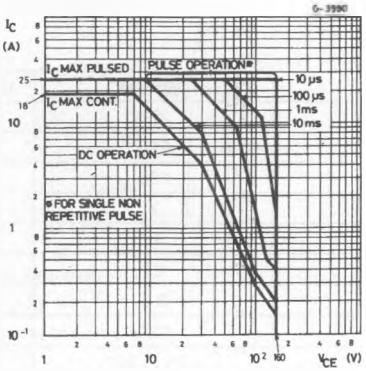
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	1.46	°C/W

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

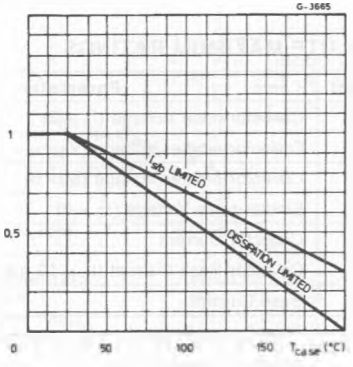
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEO}	Collector Cutoff Current (I_B = 0)	V_{CE} = 130 V			1	mA
I_{CEX}	Collector Cutoff Current	V_{CE} = 220 V V_{BE} = − 1.5 V			1	mA
		T_{case} = 125 °C V_{CE} = 220 V V_{BE} = − 1.5 V			5	mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5 V			1	mA
$V_{CEO(sus)}$*	Collector-emitter Sustaining Voltage	I_C = 200 mA	160			V
V_{EBO}	Emitter-base Voltage (I_C = 0)	I_E = 50 mA	7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 8 A I_B = 0.8 A		0.5	1.2	V
		I_C = 12 A I_B = 1.5 A		0.75	1.6	V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 12 A I_B = 1.5 A		1.5	2	V
h_{FE}*	DC Current Gain	I_C = 8 A V_{CE} = 4 V	15		45	
		I_C = 12 A V_{CE} = 4 V	8			
$I_{s/b}$	Second Breakdown Collector Current	V_{CE} = 30 V t = 1 s	4			A
		V_{CE} = 100 V t = 1 s	0.27			A
f_T	Transition Frequency	I_C = 1 A V_{CE} = 15 V f = 10 MHz	8			MHz
t_{on}	Turn-on Time (fig. 2)	I_C = 12 A I_{B1} = 1.5 A V_{CC} = 30 V		0.35	1.3	µs
t_s	Storage Time (fig. 2)	I_C = 12 A I_{B1} = − I_{B2} = 1.5 A V_{CC} = 30 V		0.85	1.5	µs
t_f	Fall Time (fig. 2)			0.14	0.8	µs
	Clamped $E_{s/b}$ Collector Current (fig. 1)	V_{clamp} = 160 V L = 500 µH	12			A

* Pulsed : pulse duration = 300 µs, duty cycle ≤ 2 %.

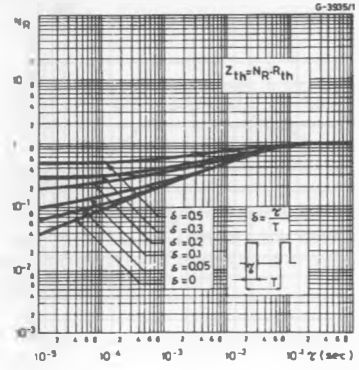
Safe Operating Areas.



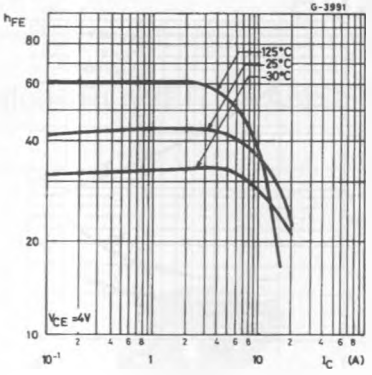
Derating Curves.



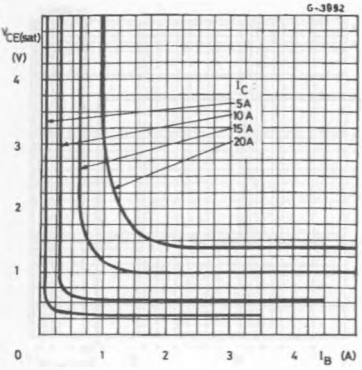
Thermal Transient Response.



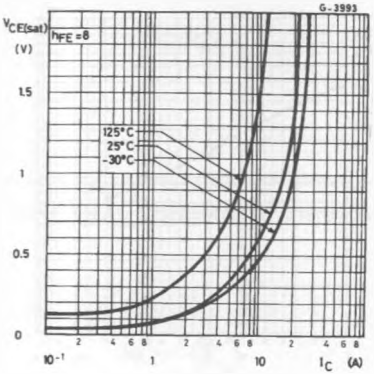
DC Current Gain.



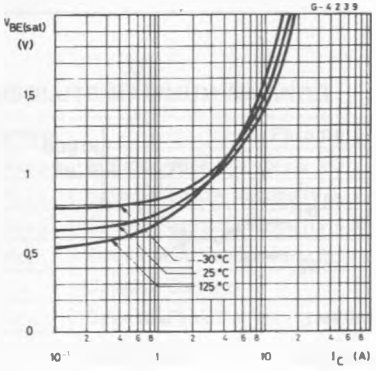
Collector-emitter Saturation Voltage.



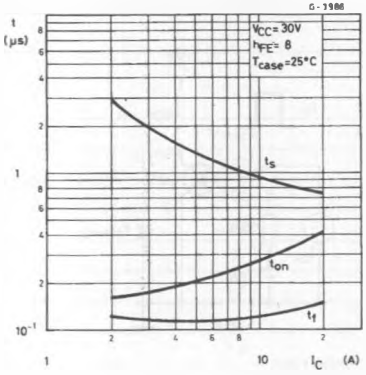
Collector-emitter Saturation Voltage.



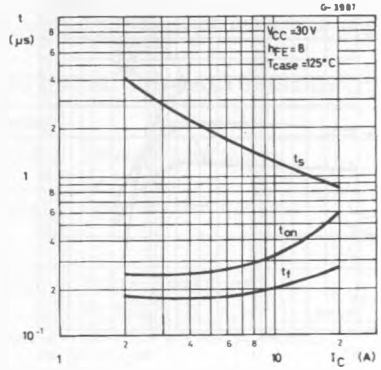
Base-emitter Saturation Voltage.



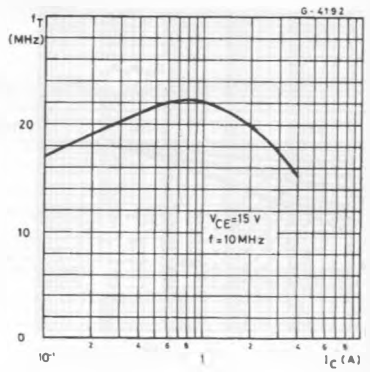
Saturated Switching Characteristics.



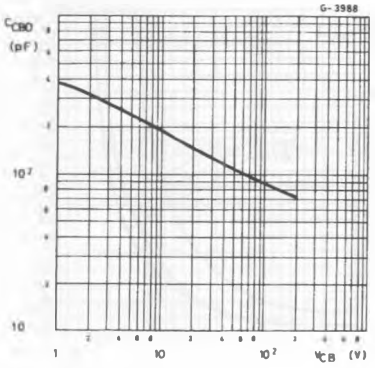
Saturated Switching Characteristics.



Transition Frequency.



Collector-base Capacitance.



Clamped Reverse Bias Safe Operating Areas.

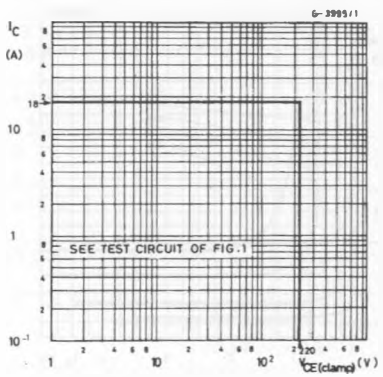
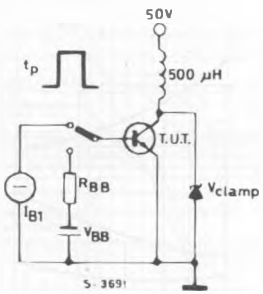
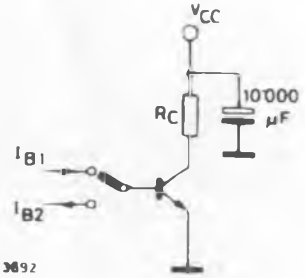


Figure 1 : Clamped $E_{s/b}$ Test Circuit.



TEST CONDITIONS :
$7\ V \geq |-V_{BB}| \geq 2\ V$
$I_C / I_B = 8$
t_p = adjusted for nominal I_C
$R_{BB} \geq V\ 1\ \Omega$

Figure 2 : Switching Times Test Circuit (resistive load).



TEST CONDITIONS :
V_{CC} = 30 V
$R_C = \frac{V_{CC} - V_{CE(sat)}}{I_C}$

INPUT PULSE
pulse width = 10 μs
t_r , $t_f \leq$ 50 ns
duty cycle = 1 %