SGS-THOMSON MICROELECTRONICS

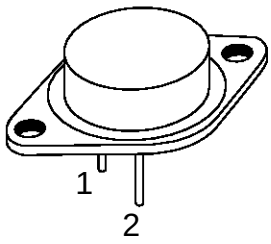
BUV50

HIGH POWER NPN SILICON TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED
- FULLY CHARACTERISED AT 125°C

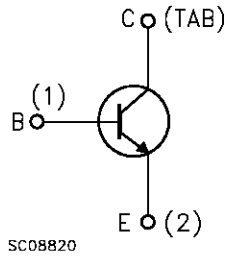
APPLICATION
- SWITCHING REGULATORS
- MOTOR CONTROL

DESCRIPTION
The BUV50 is a Multiepitaxial planar NPN transistor in TO-3 metal case.
It's intented for use in high frequency and efficiency converters such us motor controllers and industrial equipment.



TO-3

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-Emitter Voltage (V_{BE} = -1.5V)	250	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	125	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	7	V
I_C	Collector Current	25	A
I_{CM}	Collector Peak Current	50	A
I_B	Base Current	6	A
I_{BM}	Base Peak Current	12	A
P_{Base}	Reverse Bias Base Power Dissipation (B.E. junction in avalance)	2	W
P_{tot}	Total Power Dissipation at $T_{case} \leq 25$ °C	150	W
T_{stg}	Storage Temperature	-65 to 200	°C
T_j	Max Operating Junction Temperature	150	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1.17	$^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current (R_{BE} = 10Ω)	V_{CE} = V_{CEV} V_{CE} = V_{CEV} T_c = 100^{o}C			1 5	mA mA
I_{CEV}	Collector Cut-off Current	V_{CE} = V_{CEV} V_{BE} = - 1.5V V_{CE} = V_{CEV} V_{BE} = - 1.5V T_C=100^{o}C			1 5	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			1	mA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage	I_C = 0.2A L = 25 mH	125			V
V_{EB0}	Emitter-base Voltage (I_c = 0)	I_E = 50 mA	7			V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 10A I_B = 0.5A I_C = 20A I_B = 2A I_C = 24A I_B = 3A I_C = 10A I_B = 0.5A T_j = 100^{o}C I_C = 20A I_B = 2A T_j = 100^{o}C I_C = 24A I_B = 3A T_j = 100^{o}C		0.4 0.6 0.7 0.5 0.75 0.9	0.8 0.9 1.2 0.9 1.5 1.8	V V V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 20A I_B = 2A I_C = 24A I_B = 3A I_C = 20A I_B = 2A T_j = 100^{o}C I_C = 24A I_B = 3A T_j = 100^{o}C		1.25 1.35 1.25 1.45	1.6 1.7 1.7 1.9	V V V V
di_c/d_t*	Rate of Rise of on-state Collector Current	V_{CC} = 100V I_{B1} = 3A R_C =0 T_j = 25^{o}C T_j = 100^{o}C	 50 45	 100 85		 A/µs A/µs
$V_{CE(2\mu s)}$	Collector-Emitter Dynamic Voltage	V_{CC} = 100V I_{B1} = 2A R_C =5Ω T_j = 25^{o}C T_j = 100^{o}C		 1.4 2.1	 3 4	 V V
$V_{CE(4\mu s)}$	Collector-Emitter Dynamic Voltage	VCC = 100V I_{B1} = 2A R_C = 5Ω T_j = 25^{o}C T_j = 100^{o}C		 1.1 1.5	 2 2.5	 V V

∗ Pulsed: Pulse duration = 300 µs, duty cycle = 2 %

ELECTRICAL CHARACTERISTICS (continued)

TURN-OFF SWITCHING CHARACTERISTICS

On Inductive Load (with negative bias)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{si}	T_j = 25 °C	I_C = 20A I_B = 2A	V_{BB} = - 5V		0.85	1.4	µs
	T_j = 100 °C				1.2	1.7	
t_{fi}	T_j = 25 °C	V_{CC} = 100V	V_{CLAMP} = 125V		0.09	0.2	
	T_j = 100 °C				0.17	0.3	
t_{ti}	T_j = 25 °C	L_C = 0.25 mH	R_{B2} = 1.3Ω		0.04	0.05	
	T_j = 100 °C				0.07	0.1	
t_c	T_j = 25 °C				0.16	0.3	
	T_j = 100 °C				0.3	0.5	

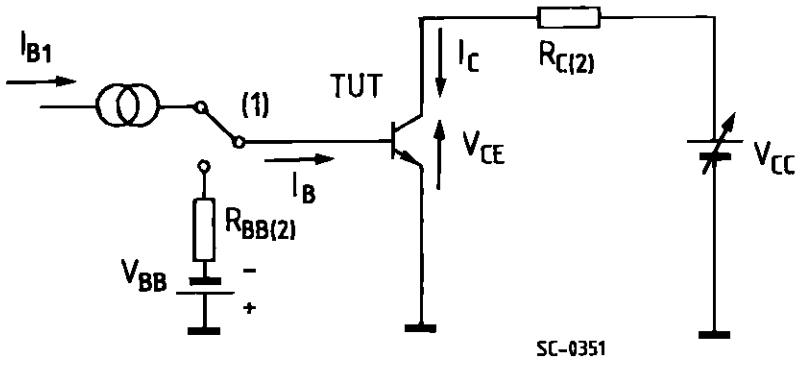
TURN-OFF SWITCHING CHARACTERISTICS

On Inductive Load (without negative bias)

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
t_{si}	T_j = 25 °C	I_C = 20A I_B = 2A	V_{BB} = 0		2.1		µs
	T_j = 100 °C				3.2		
t_{fi}	T_j = 25 °C	V_{CC} = 100V	V_{CLAMP} = 125V		0.7		
	T_j = 100 °C				1.2		
t_{ti}	T_j = 25 °C	L_C = 0.25 mH	R_{B2} = 4.7Ω		0.28		
	T_j = 100 °C				0.55		

*Pulsed : Duration = 300ms, Duty Cycle = 2 %

Figure 1 : Switching Times Test Circuit (resistive load)



(1) Fast-switching
(2) Non-Inductive resistor

TO-3 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.00		13.10	0.433		0.516
B	0.97		1.15	0.038		0.045
C	1.50		1.65	0.059		0.065
D	8.32		8.92	0.327		0.351
E	19.00		20.00	0.748		0.787
G	10.70		11.10	0.421		0.437
N	16.50		17.20	0.649		0.677
P	25.00		26.00	0.984		1.023
R	4.00		4.09	0.157		0.161
U	38.50		39.30	1.515		1.547
V	30.00		30.30	1.187		1.193