

HIGH POWER NPN SILICON TRANSISTOR

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

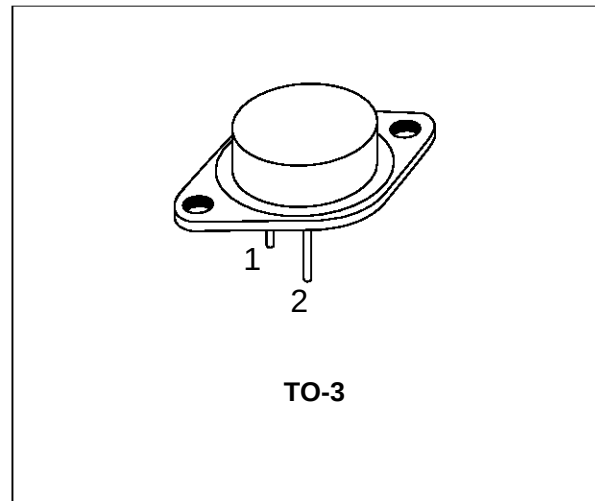
APPLICATION

- SWITCHING REGULATORS
- MOTOR CONTROL

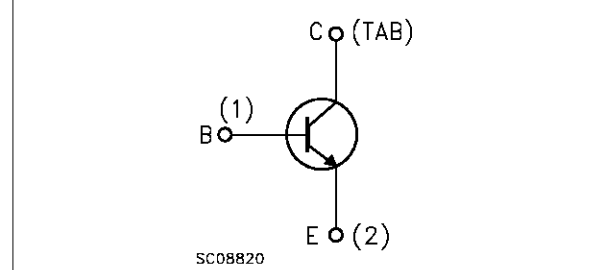
DESCRIPTION

The BUV50 is a Multiepitaxial planar NPN transistor in TO-3 metal case.

It's intended for use in high frequency and efficiency converters such as motor controllers and industrial equipment.



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 avalanche)	2	W
P_{tot}	Total Power Dissipation at $T_{case} \leq 25^\circ C$	150	W
T_{stg}	Storage Temperature	-65 to 200	°C
T_j	Max Operating Junction Temperature	150	°C

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.17	$^{\circ}C/W$
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ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current ($R_{BE} = 10\Omega$)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV} \quad T_C = 100^{\circ}C$			1 5	mA mA
I_{CEV}	Collector Cut-off Current	$V_{CE} = V_{CEV} \quad V_{BE} = -1.5V$ $V_{CE} = V_{CEV} \quad V_{BE} = -1.5V \quad T_C = 100^{\circ}C$			1 5	mA mA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 5V$			1	mA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage	$I_C = 0.2A$ $L = 25mH$	125			V
V_{EB0}	Emitter-base Voltage ($I_C = 0$)	$I_E = 50mA$	7			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 10A \quad I_B = 0.5A$		0.4	0.8	V
		$I_C = 20A \quad I_B = 2A$		0.6	0.9	V
		$I_C = 24A \quad I_B = 3A$		0.7	1.2	V
		$I_C = 10A \quad I_B = 0.5A \quad T_j = 100^{\circ}C$		0.5	0.9	V
		$I_C = 20A \quad I_B = 2A \quad T_j = 100^{\circ}C$		0.75	1.5	V
		$I_C = 24A \quad I_B = 3A \quad T_j = 100^{\circ}C$		0.9	1.8	V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 20A \quad I_B = 2A$		1.25	1.6	V
		$I_C = 24A \quad I_B = 3A$		1.35	1.7	V
		$I_C = 20A \quad I_B = 2A \quad T_j = 100^{\circ}C$		1.25	1.7	V
		$I_C = 24A \quad I_B = 3A \quad T_j = 100^{\circ}C$		1.45	1.9	V
di_C/dt^*	Rate of Rise of on-state Collector Current	$V_{CC} = 100V \quad I_{B1} = 3A$ $R_C = 0$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$	50 45	100 85		A/ μs A/ μs
$V_{CE(2\mu s)}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100V \quad I_{B1} = 2A$ $R_C = 5\Omega$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$		1.4 2.1	3 4	V V
$V_{CE(4\mu s)}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100V \quad I_{B1} = 2A$ $R_C = 5\Omega$ $T_j = 25^{\circ}C$ $T_j = 100^{\circ}C$		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}	$T_j = 25\text{ }^{\circ}\text{C}$	$I_C = 20\text{A}$ $I_B = 2\text{A}$ $V_{BB} = -5\text{V}$ $V_{CC} = 100\text{V}$ $V_{CLAMP} = 125\text{V}$ $L_C = 0.25\text{ mH}$ $R_{B2} = 1.3\Omega$		0.85	1.4	μs
	$T_j = 100\text{ }^{\circ}\text{C}$			1.2	1.7	
t_{fi}	$T_j = 25\text{ }^{\circ}\text{C}$			0.09	0.2	
	$T_j = 100\text{ }^{\circ}\text{C}$			0.17	0.3	
t_{ti}	$T_j = 25\text{ }^{\circ}\text{C}$			0.04	0.05	
	$T_j = 100\text{ }^{\circ}\text{C}$			0.07	0.1	
t_c	$T_j = 25\text{ }^{\circ}\text{C}$			0.16	0.3	
	$T_j = 100\text{ }^{\circ}\text{C}$			0.3	0.5	

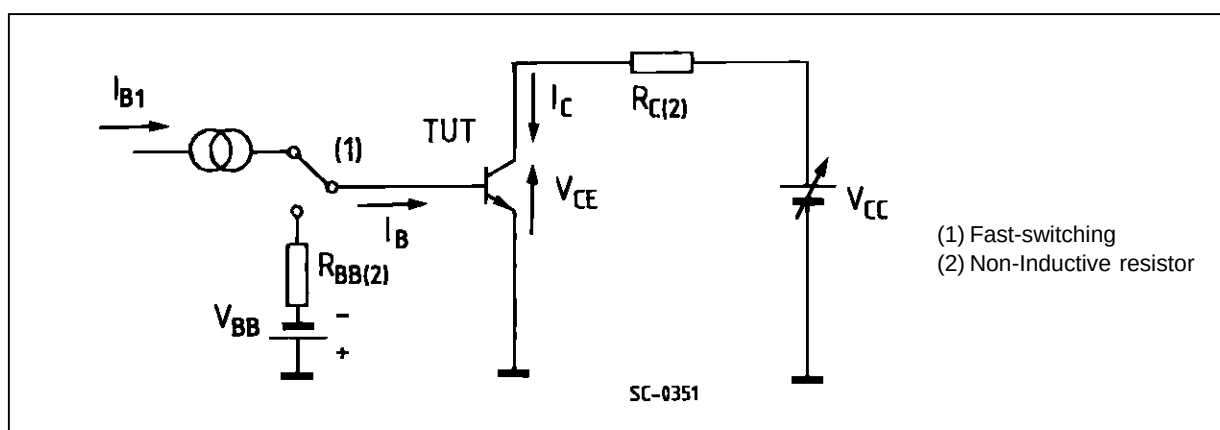
TURN-OFF SWITCHING CHARACTERISTICS

On Inductive Load (without negative bias)

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

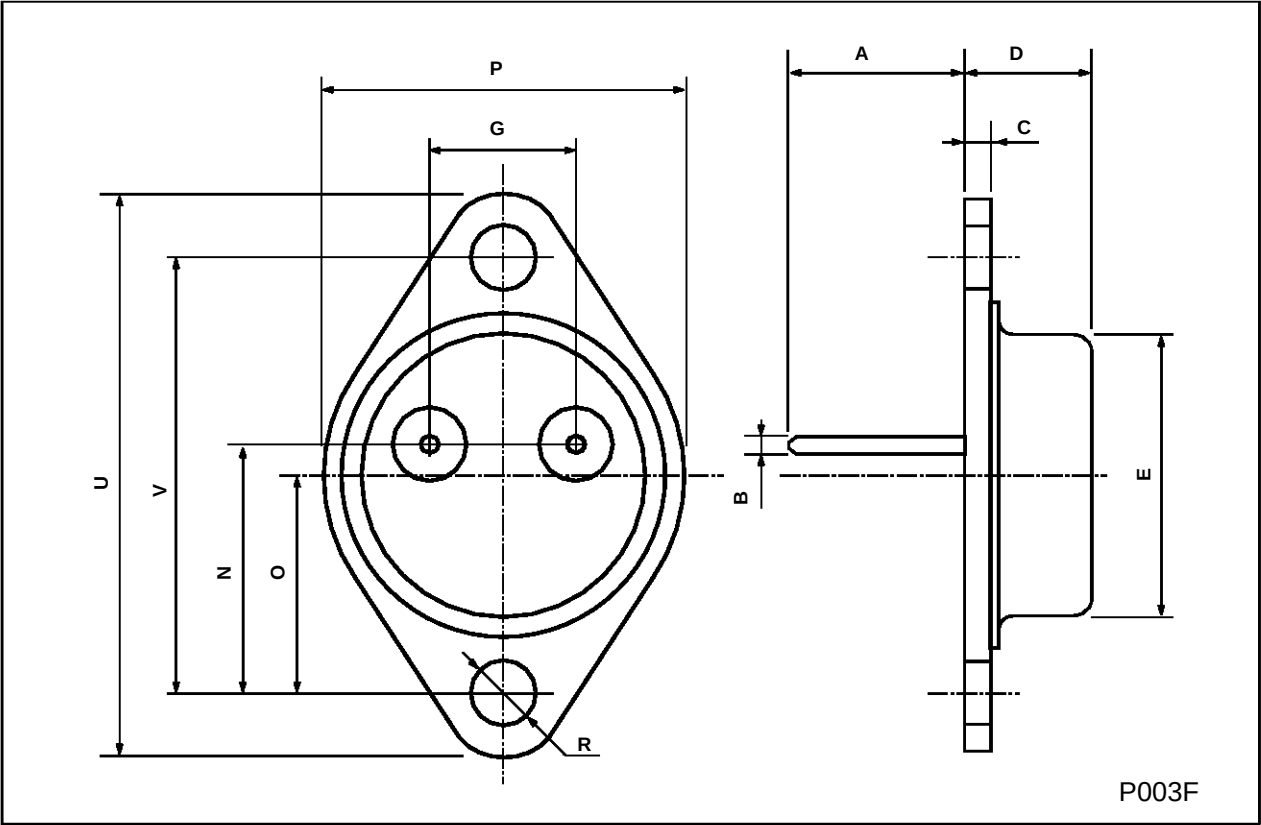
*Pulsed : Duration = 300ms, Duty Cycle = 2 %

Figure 1 : Switching Times Test Circuit (resistive load)



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



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