



BUW90

HIGH POWER NPN SILICON TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH CURRENT CAPABILITY
- FAST SWITCHING SPEED
- VERY LOW SATURATION VOLTAGE AND HIGH GAIN

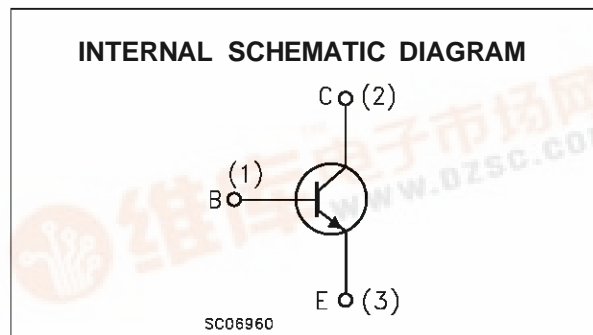
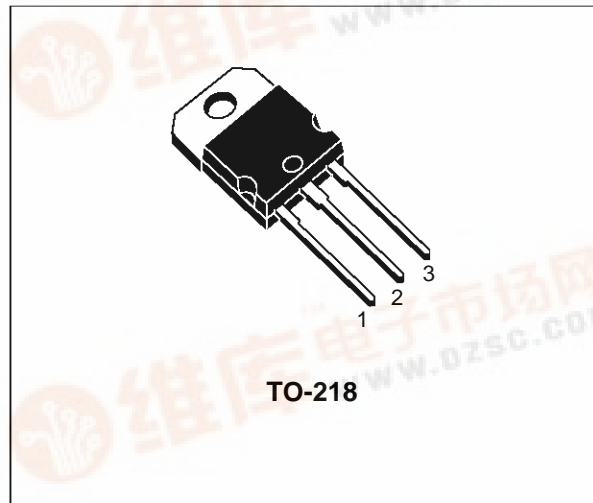
APPLICATION

- SWITCHING REGULATORS
- MOTOR CONTROL
- HIGH FREQUENCY AND EFFICENCY CONVERTERS

DESCRIPTION

The BUW90 is a Multi epitaxial planar NPN transistor in TO-218 plastic package.

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



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	20	A
I_{CM}	Collector Peak Current	30	A
I_B	Base Current	4	A
I_{BM}	Base Peak Current	6	A
P_{Base}	Reverse Bias Base Power Dissipation (B.E. junction in avalanche)	1	W
P_{tot}	Total Power Dissipation at $T_{case} < 25\text{ }^\circ\text{C}$	125	W
T_{stg}	Storage Temperature	-65 to 175	$^\circ\text{C}$
T_j	Max Operating Junction Temperature	175	$^\circ\text{C}$

BUW90

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.2	$^{\circ}\text{C}/\text{W}$
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ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current ($R_{BE} = 10\Omega$)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV} \quad T_c = 100^{\circ}\text{C}$			1 5	mA mA
I_{CEV}	Collector Cut-off Current	$V_{CE} = V_{CEV} \quad V_{BE} = -1.5\text{V}$ $V_{CE} = V_{CEV} \quad V_{BE} = -1.5\text{V} \quad T_c = 100^{\circ}\text{C}$			1 5	mA mA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 5\text{V}$			1	mA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage	$I_C = 0.2\text{A}$ $L = 25\text{mH}$	125			V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	$I_E = 50\text{mA}$	7			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 5.5\text{A} \quad I_B = 0.35\text{A}$ $I_C = 11\text{A} \quad I_B = 1.1\text{A}$ $I_C = 5.5\text{A} \quad I_B = 0.35\text{A} \quad T_j = 100^{\circ}\text{C}$ $I_C = 11\text{A} \quad I_B = 1.1\text{A} \quad T_j = 100^{\circ}\text{C}$		0.5 0.65 0.5 0.8	0.8 0.9 0.9 1.2	V V V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 11\text{A} \quad I_B = 1.1\text{A}$ $I_C = 11\text{A} \quad I_B = 1.1\text{A} \quad T_j = 100^{\circ}\text{C}$		1.3 1.35	1.6 1.7	V V
di_c/dt^*	Rated of Rise of on-state Collector Current	$V_{CC} = 100\text{V} \quad R_C = 0 \quad I_{B1} = 1.65\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$	35 30	45 40		$\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$
$V_{CE(2\mu\text{s})}$	Collector Emitter Dynamic Voltage	$V_{CC} = 100\text{V} \quad R_C = 9\Omega \quad I_{B1} = 1.1\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$		2 2.6	2.5 4	V V
$V_{CE(4\mu\text{s})}$	Collector Emitter Dynamic Voltage	$V_{CC} = 100\text{V} \quad R_C = 9\Omega \quad I_{B1} = 1.1\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$		1.1 1.6	2 2.5	V V

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

RESISTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_r	Rise Time	$V_{CC} = 100\text{V} \quad I_C = 15\text{A}$		0.4	1	μs
t_s	Storage Time	$V_{BB} = -5\text{V} \quad I_{B1} = 1.8\text{A}$		0.6	1	μs
t_f	Fall Time	$R_{B2} = 1.3\Omega \quad t_p = 30\mu\text{s}$		0.14	0.3	μs

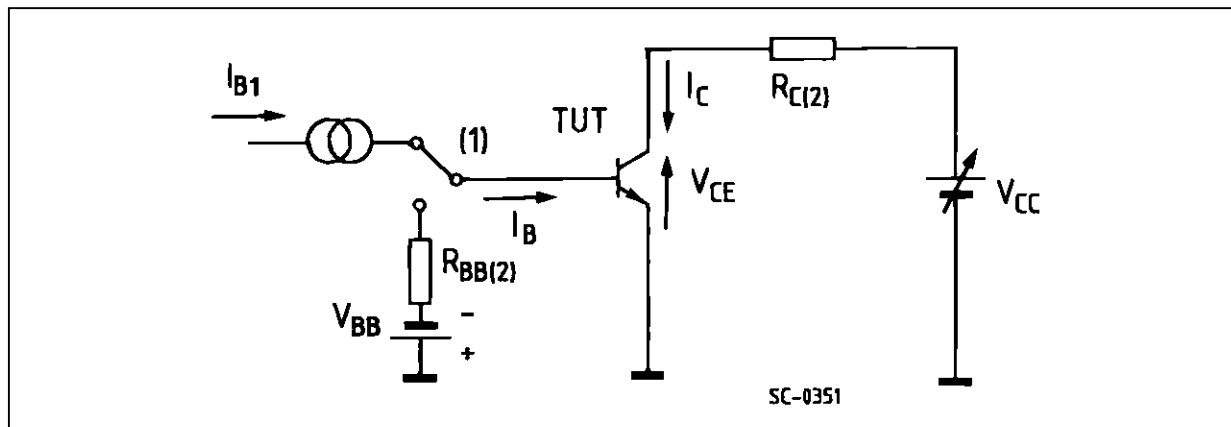
ELECTRICAL CHARACTERISTICS (continued)

INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_s	Storage Time	$V_{CC} = 100\text{ V}$ $I_C = 11\text{ A}$ $I_B = 1.1\text{ A}$		0.75	1.4	μs
t_f	Fall Time	$V_{BB} = -5\text{ V}$ $V_{\text{clamp}} = 125\text{ V}$		0.08	0.2	μs
t_t	Tail Time in Turn-on	$R_B = 2.3\ \Omega$ $L_C = 0.25\text{ mH}$		0.02	0.05	μs
t_c	Crossover Time			0.15	0.3	μs
t_s	Storage Time	$V_{CC} = 100\text{ V}$ $I_C = 11\text{ A}$ $I_B = 1.1\text{ A}$		0.95	1.7	μs
t_f	Fall Time	$V_{BB} = -5\text{ V}$ $V_{\text{clamp}} = 125\text{ V}$		0.14	0.3	μs
t_t	Tail Time in Turn-on	$R_B = 2.3\ \Omega$ $L_C = 0.25\text{ mH}$		0.04	0.1	μs
t_c	Crossover Time	$T_j = 100^\circ\text{C}$		0.3	0.5	μs
t_s	Storage Time	$V_{CC} = 100\text{ V}$ $I_C = 11\text{ A}$ $I_B = 1.1\text{ A}$		1.8		μs
t_f	Fall Time	$V_{BB} = 0$ $V_{\text{clamp}} = 125\text{ V}$		0.7		μs
t_t	Tail Time in Turn-on	$R_B = 4.7\ \Omega$ $L_C = 0.25\text{ mH}$		0.2		μs
t_s	Storage Time	$V_{CC} = 100\text{ V}$ $I_C = 11\text{ A}$ $I_B = 1.1\text{ A}$		2.5		μs
t_f	Fall Time	$V_{BB} = 0$ $V_{\text{clamp}} = 125\text{ V}$		1		μs
t_t	Tail Time in Turn-on	$R_B = 4.7\ \Omega$ $L_C = 0.25\text{ mH}$		0.4		μs
		$T_j = 100^\circ\text{C}$				

* Pulsed test $t_p < 300\ \mu\text{s}$ duty cycle $< 2\%$

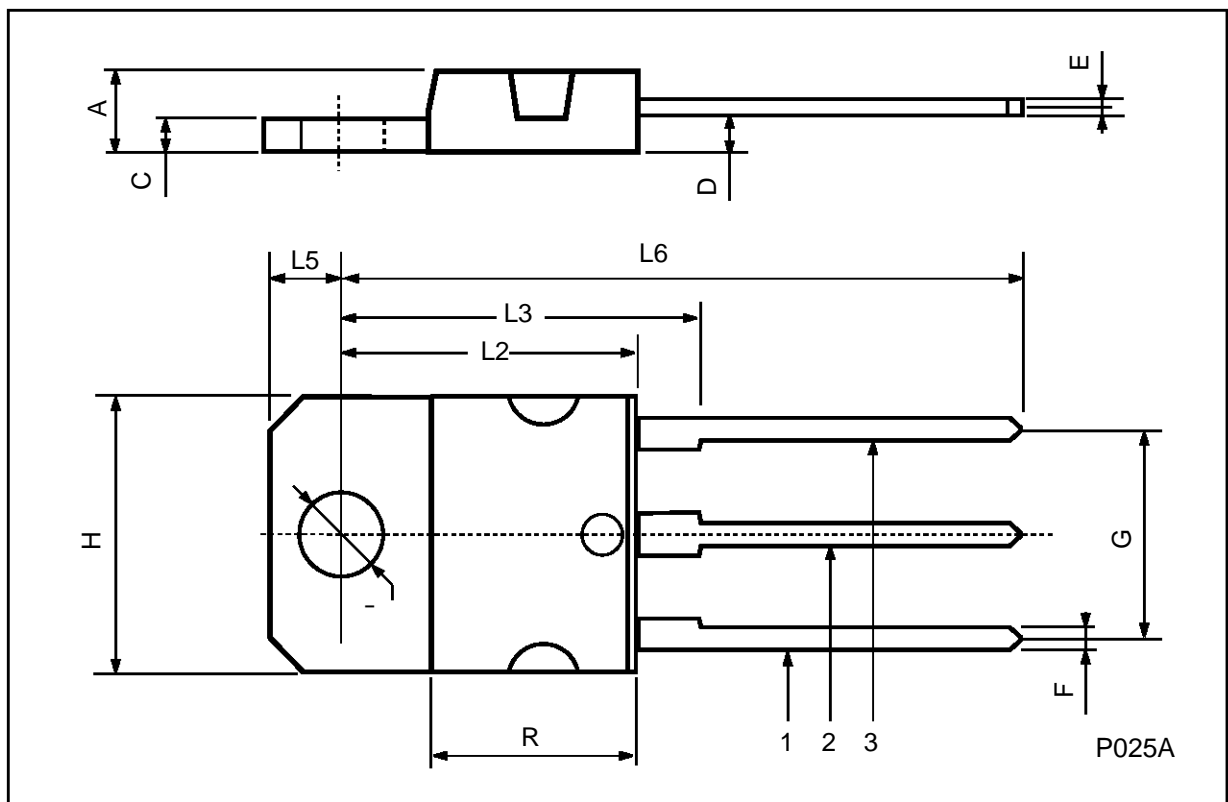
Figure 1 : Switching Times Test Circuit (resistive load).



1 Fast electronic switch 2 Non-inductive Resistor

TO-218 (SOT-93) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.7		4.9	0.185		0.193
C	1.17		1.37	0.046		0.054
D		2.5			0.098	
E	0.5		0.78	0.019		0.030
F	1.1		1.3	0.043		0.051
G	10.8		11.1	0.425		0.437
H	14.7		15.2	0.578		0.598
L2	-		16.2	-		0.637
L3		18			0.708	
L5	3.95		4.15	0.155		0.163
L6		31			1.220	
R	-		12.2	-		0.480
Ø	4		4.1	0.157		0.161



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