

HIGH POWER NPN SILICON TRANSISTOR

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

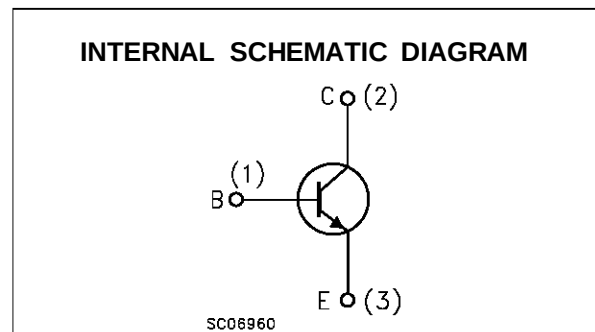
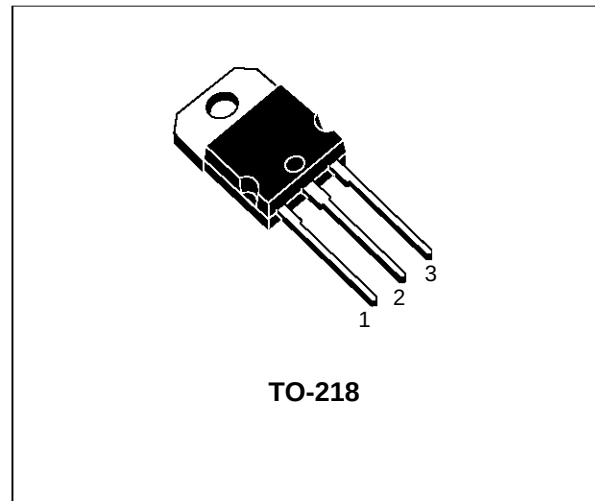
APPLICATION

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

DESCRIPTION

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

It's intended for use in high frequency and efficiency converters such as 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 $T_{case} < 25\text{ }^{\circ}C$	125	W
T_{stg}	Storage Temperature	-65 to 175	$^{\circ}C$
T_j	Max Operating Junction Temperature	175	$^{\circ}C$

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	1.2	°C/W
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ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C 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°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°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 _{EBO}	Emitter-base Voltage (I _C = 0)	I _E = 50 mA	7			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 5.5 A I _B = 0.35 A I _C = 11 A I _B = 1.1 A I _C = 5.5 A I _B = 0.35 A T _j = 100°C I _C = 11 A I _B = 1.1 A T _j = 100°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 A I _B = 1.1 A I _C = 11 A I _B = 1.1 A T _j = 100°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 V R _C = 0 I _{B1} = 1.65 A T _j = 25°C T _j = 100°C	35 30	45 40		A/μs A/μs
V _{CE(2μs)}	Collector Emitter Dynamic Voltage	V _{CC} = 100 V R _C = 9 Ω I _{B1} = 1.1 A T _j = 25°C T _j = 100°C		2 2.6	2.5 4	V V
V _{CE(4μs)}	Collector Emitter Dynamic Voltage	V _{CC} = 100 V R _C = 9 Ω I _{B1} = 1.1 A T _j = 25°C T _j = 100°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 V I _C = 15 A		0.4	1	μs
t _s	Storage Time	V _{BB} = -5 V I _{B1} = 1.8 A		0.6	1	μs
t _f	Fall Time	R _{B2} = 1.3 Ω t _p = 30μs		0.14	0.3	μs

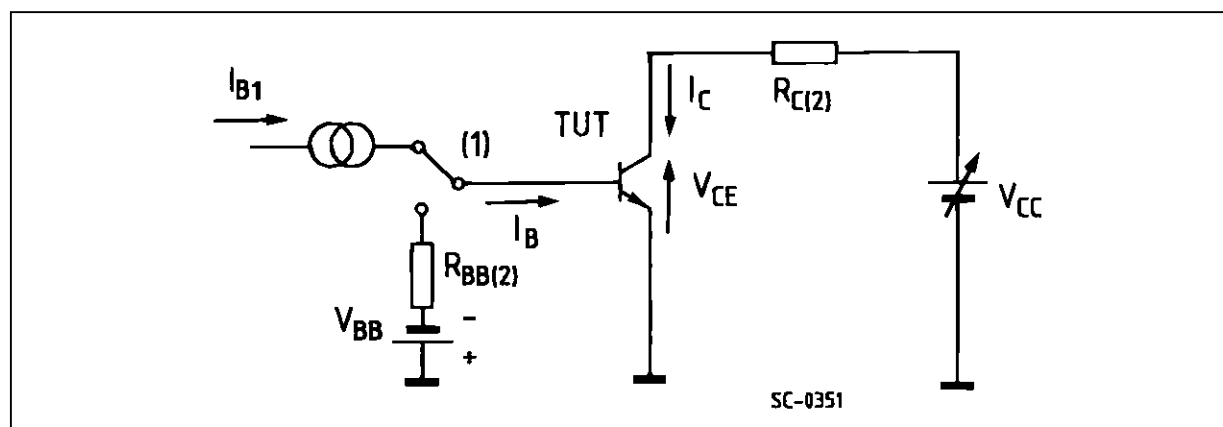
ELECTRICAL CHARACTERISTICS (continued)

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 $< 2\%$

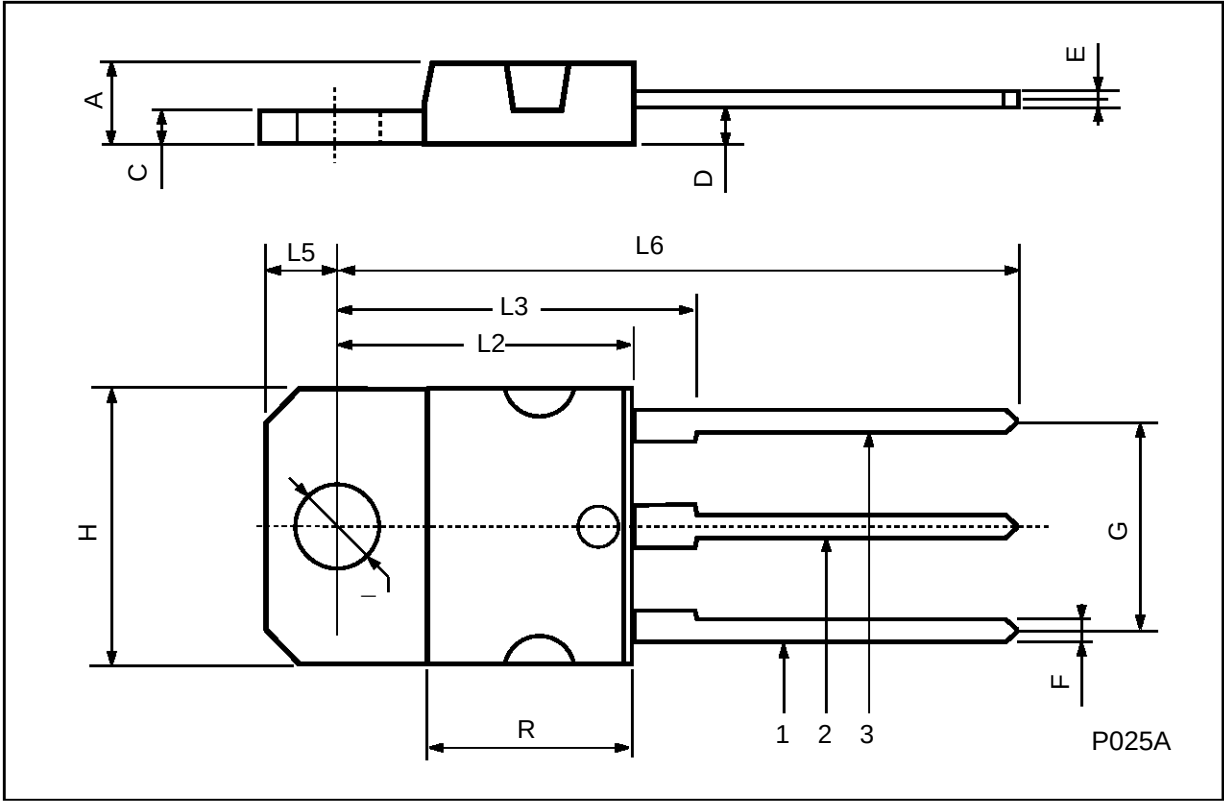
Figure 1 : Switching Times Test Circuit (resistive load).



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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