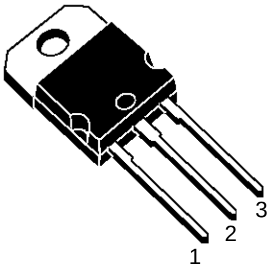
SGS-THOMSON
MICROELECTRONICS

BUW90

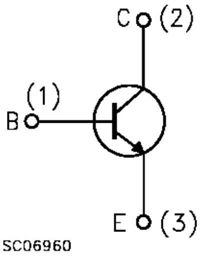
SILICON NPN SWITCHING TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- VERY LOW SATURATION VOLTAGE AND HIGH GAIN FOR REDUCED LOAD OPERATION
- TURN-ON AND TURN-OFF TAIL SPECIFICATIONS
- TURN-ON di_C/dt FOR BETTER RECTIFIER CHOICE
- SWITCHING TIMES SPECIFIED WITH AND WITHOUT NEGATIVE BASE DRIVE
- FAST SWITCHING TIMES
- LOW SWITCHING LOSSES
- LOW ON-STATE VOLTAGE DROP
- BASE CURRENT REQUIREMENTS



TO-218

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	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 °C	125	W
T_{stg}	Storage Temperature	-65 to 175	°C
T_j	Max Operating Junction Temperature	175	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1.2	$^oC/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cut-off Current ($R_{BE} = 10\Omega$)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ $T_c = 100^oC$			1 5	mA mA
I_{CEV}	Collector Cut-off Current	$V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$ $V_{CE} = V_{CEV}$ $V_{BE} = -1.5V$ $T_C=100^oC$			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	$I_C = 5.5A$ $I_B = 0.35A$ $I_C = 11A$ $I_B = 1.1A$ $I_C = 5.5A$ $I_B = 0.35A$ $T_j = 100^oC$ $I_C = 11A$ $I_B = 1.1A$ $T_j = 100^oC$		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	$I_C = 11A$ $I_B = 1.1A$ $I_C = 11A$ $I_B = 1.1A$ $T_j = 100^oC$		1.3 1.35	1.6 1.7	V V
di_c/d_t	Rate of Rise of on-state Collector Current	$V_{CC} = 100V$ $R_C = 0$ $I_{B1} = 1.65A$ $T_j = 25^oC$ $T_j = 100^oC$	 35 30	 45 40		 A/µs A/µs
$V_{CE(2\mu s)}$	Collector Emitter Dynamic Voltage	$V_{CC} = 100V$ $R_C = 9\Omega$ $I_{B1} = 1.1A$ $T_j = 25^oC$ $T_j = 100^oC$		 2 2.6	 2.5 4	 V V
$V_{CE(4\mu s)}$	Collector Emitter Dynamic Voltage	$VCC = 100V$ $R_C = 9\Omega$ $I_{B1} = 1.1A$ $T_j = 25^oC$ $T_j = 100^oC$		 1.1 1.6	 2 2.5	 V V

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

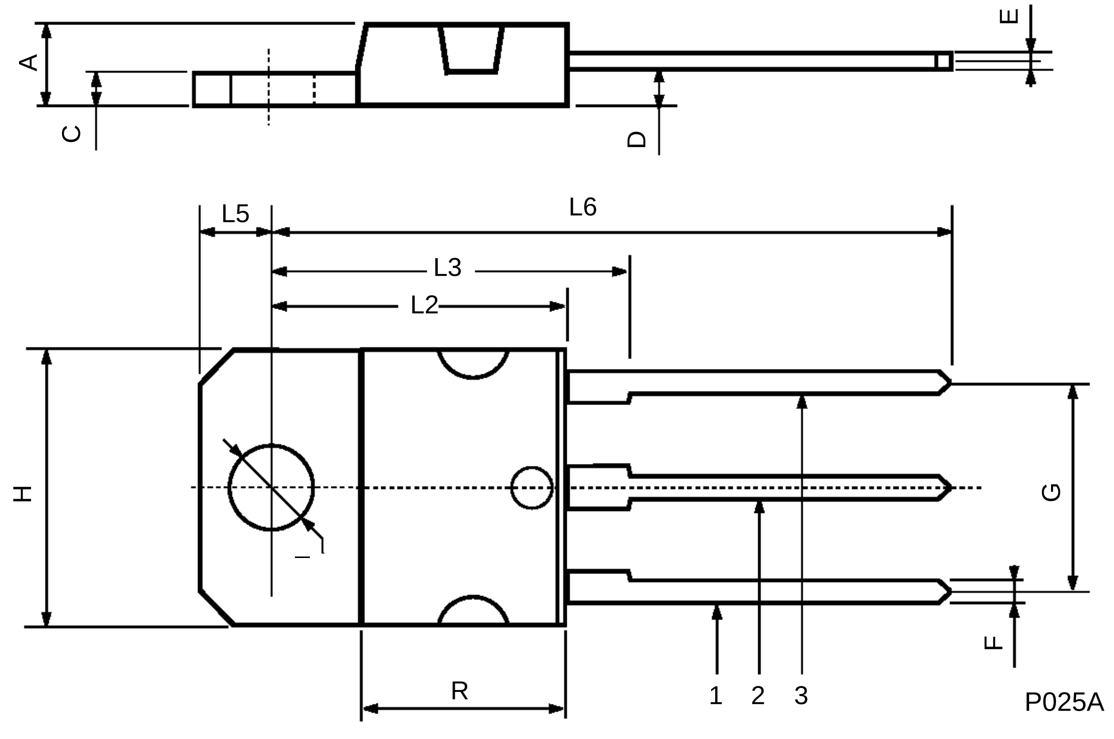
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
	RESISTIVE LOAD					
t_r	Rise Time	V_{CC} = 100V I_C = 15A		0.4	1	µs
t_s	Storage Time	V_{BB} = -5V I_{B1} = 1.8A		0.6	1	µs
t_f	Fall Time	R_B = 1.3Ω T_p = 30µs		0.14	0.3	µs
	INDUCTIVE LOAD					
t_s	Storage Time	V_{CC} = 100V V_{clamp} = 125V		0.75	1.4	µs
t_f	Fall Time	I_C = 11A I_B = 1.1A		0.08	0.2	µs
t_t	Tail Time in Turn-on	V_{BB} = -5V R_B = 2.3Ω		0.02	0.05	µs
t_c	Crossover Time	L_C = 0.25mH		0.15	0.3	µs
t_s	Storage Time	V_{CC} = 100V V_{clamp} = 125V		0.95	1.7	µs
t_f	Fall Time	I_C = 11A I_B = 1.1A		0.14	0.3	µs
t_t	Tail Time in Turn-on	V_{BB} = -5V R_B = 2.3Ω		0.04	0.1	µs
t_c	Crossover Time	L_C = 0.25mH T_j =100°C		0.3	0.5	µs
t_s	Storage Time	V_{CC} = 100V V_{clamp} = 125V		1.8		µs
t_f	Fall Time	I_C = 11A I_B = 1.1A		0.7		µs
t_t	Tail Time in Turn-on	V_{BB} = 0 R_B = 4.7Ω		0.2		µs
		L_C = 0.25mH				
t_s	Storage Time	V_{CC} = 100V V_{clamp} = 125V		2.5		µs
t_f	Fall Time	I_C = 11A I_B =1.1A		1		µs
t_t	Tail Time in Turn-on	V_{BB} = 0 R_B = 4.7Ω		0.4		µs
		L_C = 0.25mH T_j =100°C				

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

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



SGS-THOMSON Microelectronics GROUP OF COMPANIES
Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A
. . .