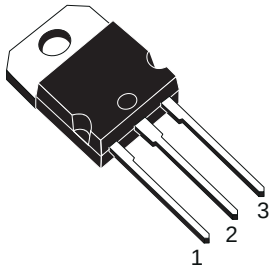
SGS-THOMSON MICROELECTRONICS

BUW50

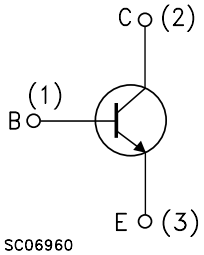
SILICON NPN SWITCHING TRANSISTOR

- 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	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 $T_{case} \leq 25\ ^oC$	150	W
T_{stg}	Storage Temperature	-65 to 175	^oC
T_j	Max Operating Junction Temperature	175	^oC

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	1	$^oC/W$

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 = 10A I_B = 0.5A T_j = 100^{o}C I_C = 20A I_B = 2A T_j = 100^{o}C		0.4 0.6 0.5 0.75	0.8 0.9 0.9 1.5	V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 20A I_B = 2A I_C = 20A I_B = 2A T_j = 100^{o}C		1.25 1.25	1.6 1.7	V V
di_c/d_t*	Rate of Rise of on-state Collector Current	V_{CC} = 160V R_C = 0 I_{B1} =3A 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 R_C = 5Ω I_{B1} =2A 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	V_{CC} = 100V R_C = 5Ω I_{B1} = 2A 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)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
	RESISTIVE LOAD						
t_r	Rise Time	V_{CC} = 100V	I_C = 24A		0.33	0.6	µs
t_s	Storage Time	V_{BB} = -5V	I_{B1} = 3A		0.75	1.2	µs
t_f	Fall Time	R_B = 0.83Ω	T_p = 30µs		0.15	0.3	µs
	INDUCTIVE LOAD						
t_s	Storage Time	V_{CC} = 100V	V_{clamp} = 125V		0.85	1.4	µs
t_f	Fall Time	I_C = 20A	I_B = 2A		0.09	0.2	µs
t_t	Tail Time in Turn-on	V_{BB} = -5V	R_B = 1.3Ω		0.04	0.05	µs
t_c	Crossover Time	L_C = 0.25mH			0.16	0.3	µs
t_s	Storage Time	VCC = 100V	V_{clamp} = 125V		1.2	1.7	µs
t_f	Fall Time	I_C = 20A	I_B = 2A		0.17	0.3	µs
t_t	Tail Time in Turn-on	V_{BB} = -5V	R_B = 1.3Ω		0.07	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		2.1		µs
t_f	Fall Time	I_C = 20A	I_B = 2A		0.7		µs
t_t	Tail Time in Turn-on	V_{BB} = 0	R_B = 4.7Ω		0.28		µs
		L_C = 0.25mH					
t_s	Storage Time	V_{CC} = 100V	V_{clamp} = 125V		3.2		µs
t_f	Fall Time	I_C = 20A	I_B = 2A		1.2		µs
t_t	Tail Time in Turn-on	V_{BB} = 0	R_B = 4.7Ω		0.55		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