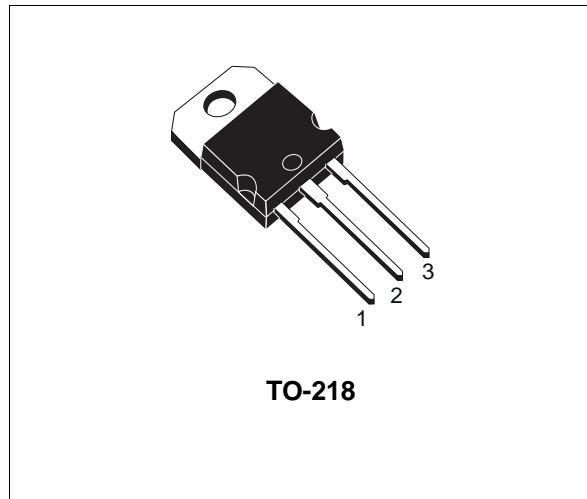
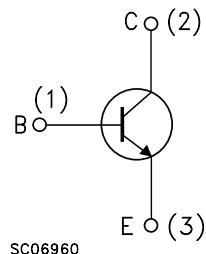


## SILICON NPN SWITCHING TRANSISTOR

- SGS-THOMSON PREFERRED SALES TYPE
- VERY LOW SATURATION VOLTAGE AND HIGH GAIN FOR REDUCED LOAD OPERATION
- TURN-ON AND TURN-OFF TAIL SPECIFICATIONS
- TURN-ON  $di/dt$  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



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 175	°C
$T_j$	Max Operating Junction Temperature	175	°C

# BUW50

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## THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	1	$^{\circ}\text{C/W}$
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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
$V_{EB0}$	Emitter-base Voltage ( $I_c = 0$ )	$I_E = 50\text{ mA}$	7			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_c = 10\text{A} \quad I_B = 0.5\text{A}$ $I_c = 20\text{A} \quad I_B = 2\text{A}$ $I_c = 10\text{A} \quad I_B = 0.5\text{A} \quad T_j = 100^{\circ}\text{C}$ $I_c = 20\text{A} \quad I_B = 2\text{A} \quad T_j = 100^{\circ}\text{C}$		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	$I_c = 20\text{A} \quad I_B = 2\text{A}$ $I_c = 20\text{A} \quad I_B = 2\text{A} \quad T_j = 100^{\circ}\text{C}$		1.25 1.25	1.6 1.7	V V
$dI_c/dt*$	Rate of Rise of on-state Collector Current	$V_{CC} = 160\text{V} \quad R_C = 0$ $I_{B1} = 3\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$	50 45	100 85		A/ $\mu\text{s}$ A/ $\mu\text{s}$
$V_{CE(2\mu\text{s})}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100\text{V} \quad R_C = 5\Omega$ $I_{B1} = 2\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$		1.4 2.1	3 4	V V
$V_{CE(4\mu\text{s})}$	Collector-Emitter Dynamic Voltage	$V_{CC} = 100\text{V} \quad R_C = 5\Omega$ $I_{B1} = 2\text{A}$ $T_j = 25^{\circ}\text{C}$ $T_j = 100^{\circ}\text{C}$		1.1 1.5	2 2.5	V V

\* Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle = 2 %

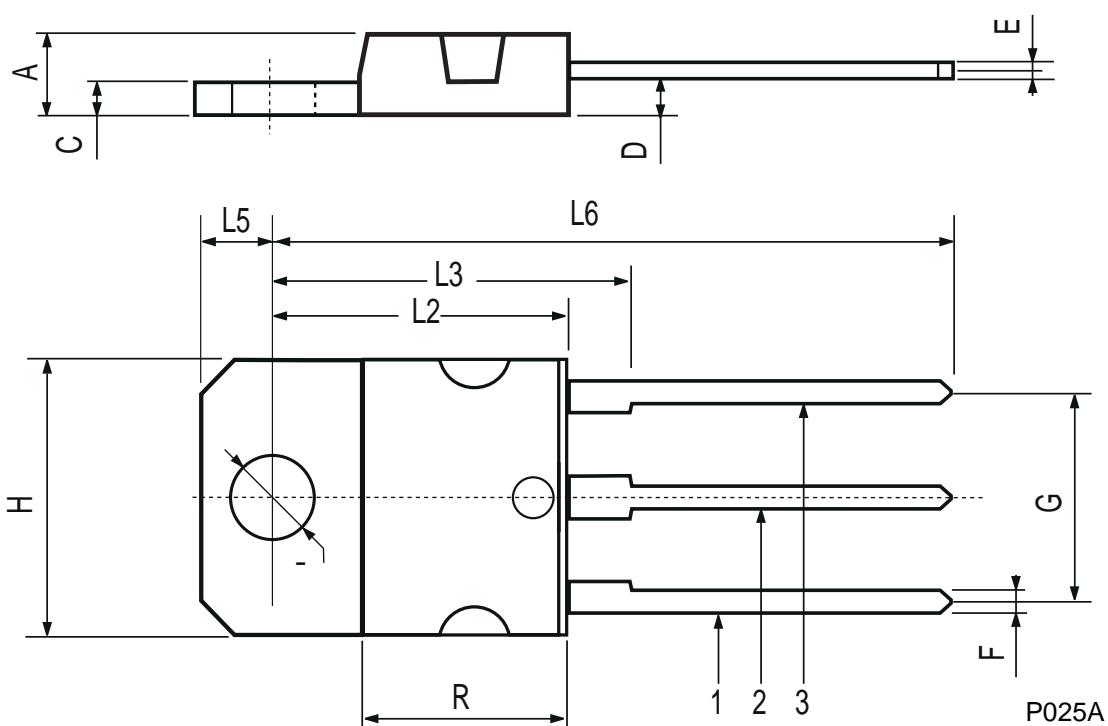
## ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_r$	<b>RESISTIVE LOAD</b>					
$t_s$	Rise Time	$V_{CC} = 100V$		0.33	0.6	$\mu s$
$t_f$	Storage Time	$V_{BB} = -5V$		0.75	1.2	$\mu s$
	Fall Time	$R_B = 0.83\Omega$		0.15	0.3	$\mu s$
$T_p$		$T_p = 30\mu s$				
$t_s$	<b>INDUCTIVE LOAD</b>					
$t_f$	Storage Time	$V_{CC} = 100V$		0.85	1.4	$\mu s$
$t_t$	Fall Time	$I_C = 20A$		0.09	0.2	$\mu s$
$t_c$	Tail Time in Turn-on	$V_{BB} = -5V$		0.04	0.05	$\mu s$
	Crossover Time	$L_C = 0.25mH$		0.16	0.3	$\mu s$
$t_s$	Storage Time	$V_{CC} = 100V$		1.2	1.7	$\mu s$
$t_f$	Fall Time	$I_C = 20A$		0.17	0.3	$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = -5V$		0.07	0.1	$\mu s$
$t_c$	Crossover Time	$L_C = 0.25mH$		0.3	0.5	$\mu s$
$t_s$	Storage Time	$V_{CC} = 100V$		2.1		$\mu s$
$t_f$	Fall Time	$I_C = 20A$		0.7		$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = 0$		0.28		$\mu s$
		$R_B = 4.7\Omega$				
$t_s$	Storage Time	$V_{CC} = 100V$		3.2		$\mu s$
$t_f$	Fall Time	$I_C = 20A$		1.2		$\mu s$
$t_t$	Tail Time in Turn-on	$V_{BB} = 0$		0.55		$\mu s$
		$R_B = 4.7\Omega$				
		$T_j = 100^\circ C$				

\* Pulsed: Pulse duration = 300  $\mu s$ , 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



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