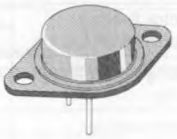
SGS-THOMSON MICROELECTRONICS

BUV18
BUV19

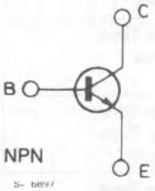
NPN HIGH CURRENT SWITCHING TRANSISTORS

- HIGH EFFICIENCY SWITCHING
- VERY LOW SATURATION VOLTAGE AT 40A
- FAST TURN-OFF AND TURN-ON



TO-3

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

High current, high speed transistors suited for low voltage applications : high efficiency converters, motor controls.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		BUV18	BUV19	
V_{CBO}	Collector-base Voltage (I_E = 0)	120	160	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	60	80	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	7	7	V
I_C	Collector Current	50	50	A
I_{CM}	Collector Peak Current (t_p < 5ms)	90	70	A
I_B	Base Current	16	12	A
I_{BM}	Base Peak Current (t_p < 5ms)	40	30	A
P_{tot}	Total Dissipation at T_c < 25°C	250		W
T_{stg}	Storage Temperature	– 65 to 200		°C
T_j	Max. Operating Junction Temperature	200		°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	max	0.7	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25°C unless otherwise specified)

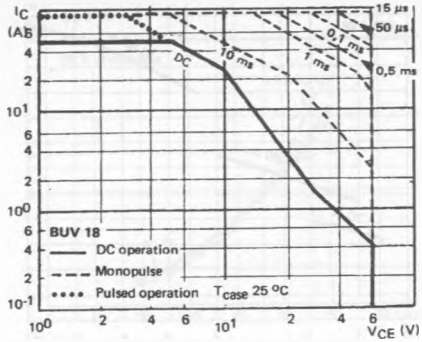
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEX}	Collector Cutoff Current	$V_{CE} = V_{CEX}$ $V_{BE} = -1.5V$ $V_{CE} = V_{CEX}$ $V_{BE} = -1.5V$ $T_c = 100°C$			1 3	mA mA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5V$			1	mA
$V_{CEO(sus)}$*	Collector Emitter Sustaining Voltage	$I_C = 0.2A$ $L = 25mH$ for **BUV18** for **BUV19**	60 80			V V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	$I_E = 50mA$	7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	$I_C = 40A$ $I_B = 4A$ for **BUV18** $I_C = 80A$ $I_B = 8A$ for **BUV18** $I_C = 30A$ $I_B = 3A$ for **BUV19** $I_C = 60A$ $I_B = 6A$ for **BUV19**			0.6 1.5 0.6 1.2	V V V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	$I_C = 80A$ $I_B = 8A$ for **BUV18** $I_C = 60A$ $I_B = 6A$ for **BUV19**			2.2 2	V V
f_T	Transition Frequency	$f = 10MHz$ $V_{CE} = 15A$ $I_C = 2A$	8			MHz

RESISTIVE LOAD

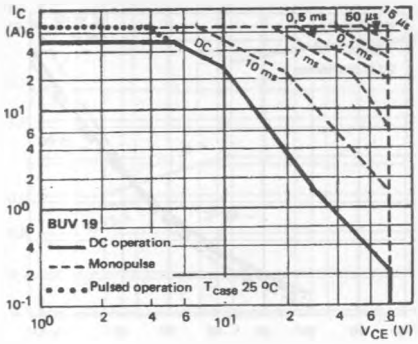
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{on} t_s t_f	Turn-on Time Storage Time Fall Time	for **BUV18** $V_{CC} = 60V$ $I_C = 80A$ $I_{B1} = -I_{B2} = 8A$		1.2 0.6 0.18	1.5 1.1 0.25	µs µs µs
t_s t_f	Storage Time Fall Time	for **BUV18** $V_{CC} = 60V$ $I_C = 80A$ $I_{B1} = -I_{B2} = 8A$ $T_c = 125°C$			1.7 0.5	µs µs
t_{on} t_s t_f	Turn-on Time Storage Time Fall Time	for **BUV19** $V_{CC} = 80V$ $I_C = 60A$ $I_{B1} = -I_{B2} = 6A$		0.9 0.6 0.17	1.3 1.1 0.25	µs µs µs
t_s t_f	Storage Time Fall Time	for **BUV19** $V_{CC} = 80V$ $I_C = 60A$ $I_{B1} = -I_{B2} = 6A$ $T_c = 125°C$			1.7 0.5	µs µs

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

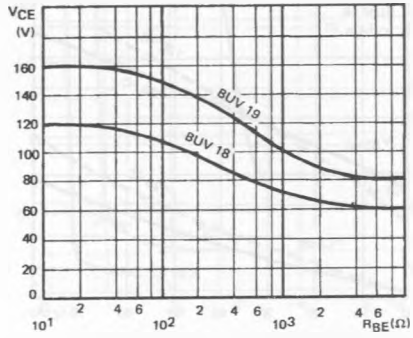
DC and AC Pulse Area.



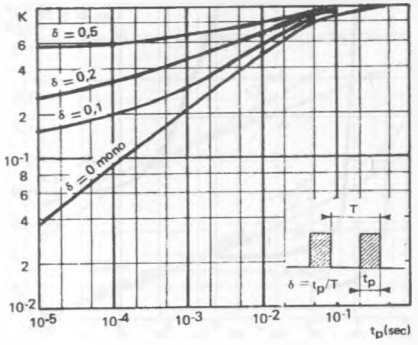
DC and AC Pulse Area.



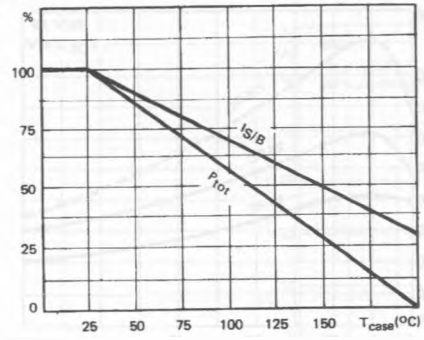
Collector-emitter Voltage vs. Base-emitter Resistance.



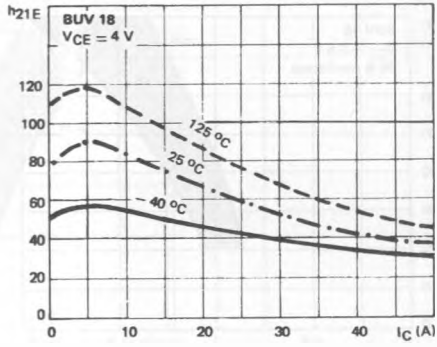
Transient Thermal Response.



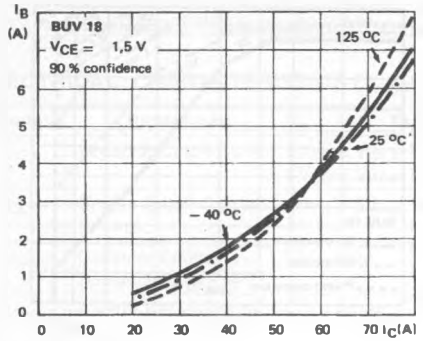
Power and $I_{S/B}$ Derating vs. Case Temperature.



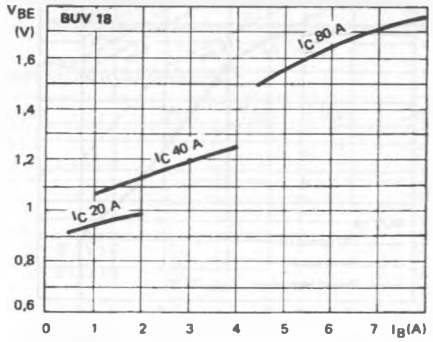
DC Current Gain.



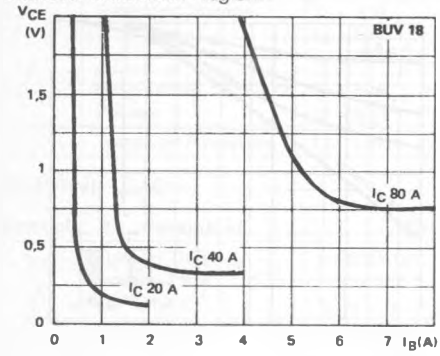
Minimum Base Current to Saturate the Transistor.



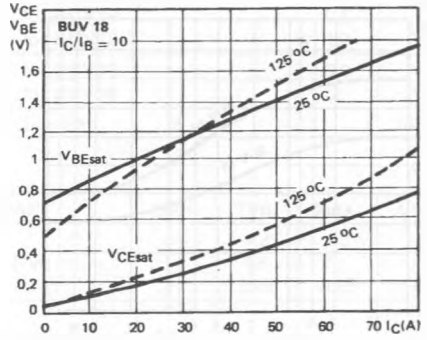
Base Characteristics.



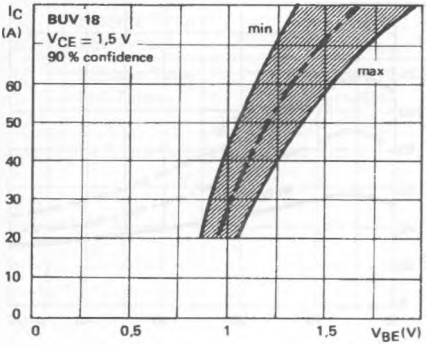
Collector Saturation Region.



Saturation Voltage.



Collector Current Spread vs Base Emitter Voltage.



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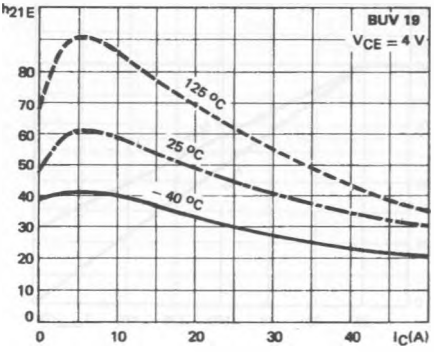

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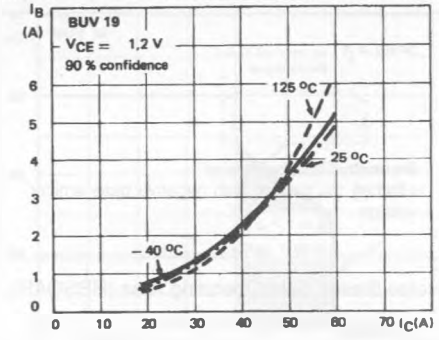

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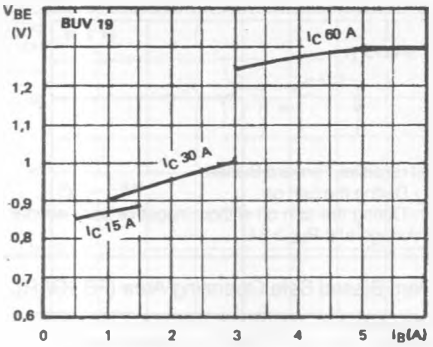

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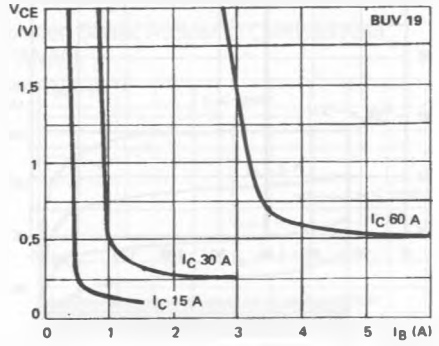

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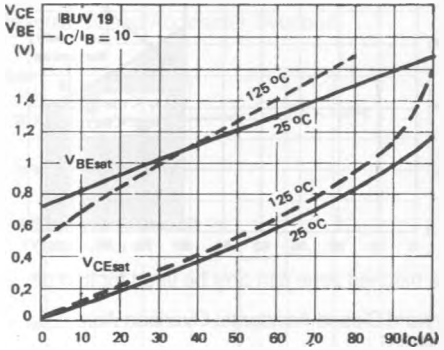
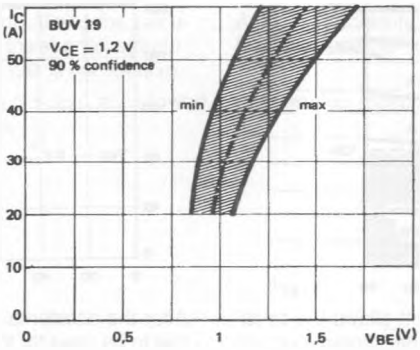
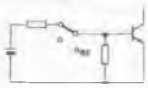


Collector Current Spread vs Base Emitter Voltage.



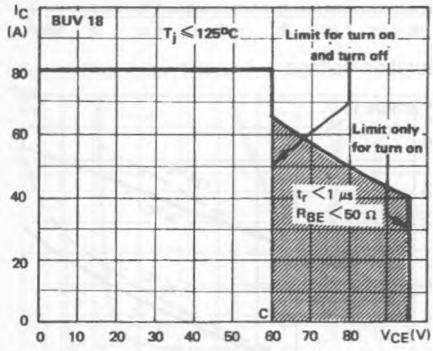
SWITCHING OPERATING AND OVERLOAD AREAS



Transistor Forward Biased
- During the turn on
- During the turn off without negative base-emitter voltage and $R_{BE} \geq 3\ \Omega$

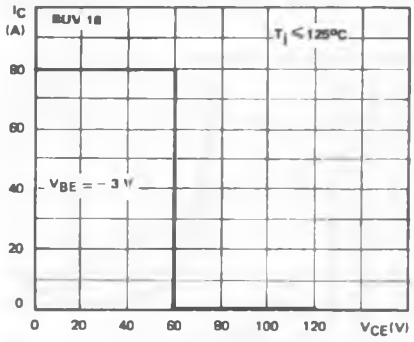
Transistor Reverse Biased
- During the turn off with negative base emitter voltage

Forward Biased Safe Operating Area (FBSOAR).

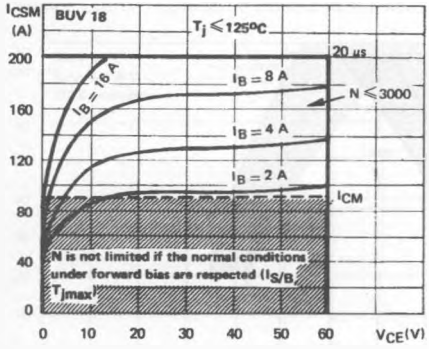


The hatched zone can only be used for turn on.

Reverse Biased Safe Operating Area (RBSOAR).

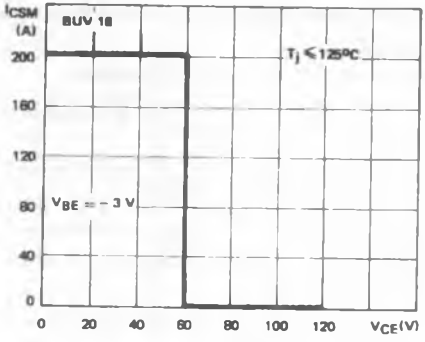


Forward Biased Accidental Overload Area (FBAOA).



The Kellog network (heavy print) allows the calculation of the maximum value of the short-circuit current for a given base current I**B** (90 % confidence).

Reverse Biased Accidental Overload Area (RBAOA).



After the accidental overload current, the RBAOA has to be used for the turn off.

High accidental surge currents ($I > I_{CM}$) are allowed if they are non repetitive and applied less than 3000 times during the component life.

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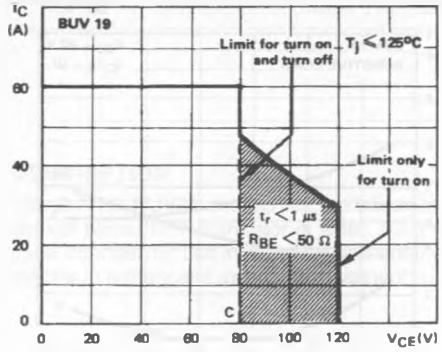

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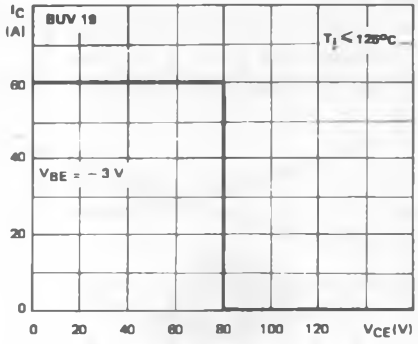

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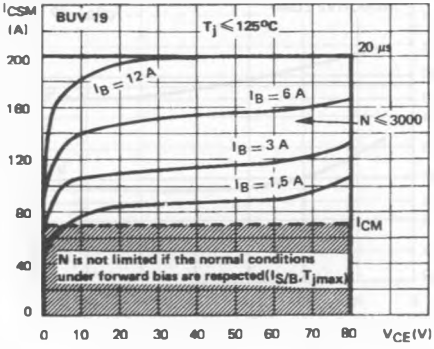

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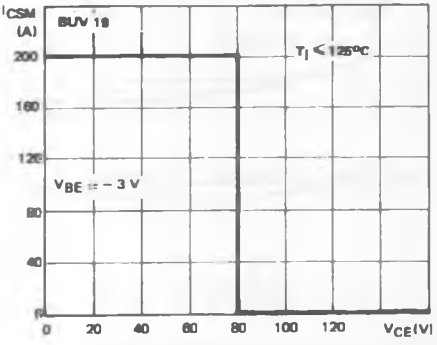
Reverse Biased Accidental Overload



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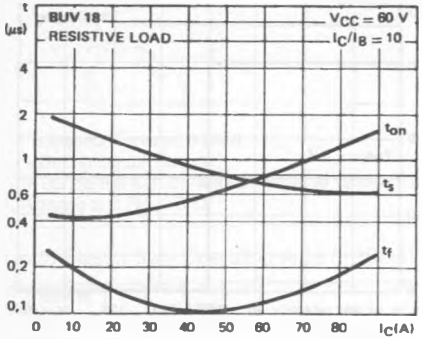
Switching Times vs Collector Current (resistive load).



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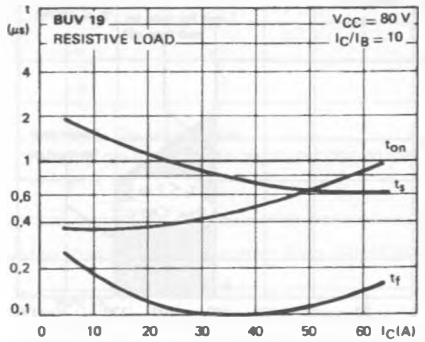
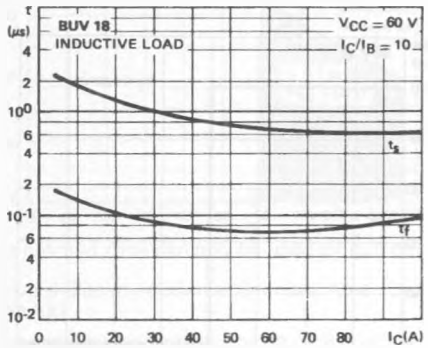


Switching Times vs Collector Current.



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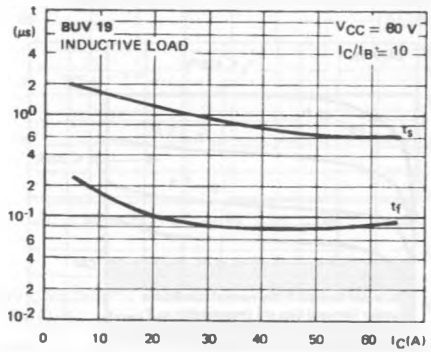

Switching Times vs Junction Temperature.