BUW 91

FAST SWITCHING POWER TRANSISTOR
TRANSISTOR DE PUISSANCE DE COMMUTATION RAPIDE

ADVANCE INFORMATION

SUPERSWITCH 2

HIGHER EFFICIENCY DUE TO :

- Faster switching times
- Lower switching losses
- Lower on state voltage drop
- Base current requirements

NEW DATA FOR WORST CASE DESIGN

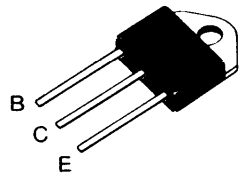
- Characteristics specified at 100°C

NEW DATA FOR OPTIMAL DESIGN

- 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.

V_{CEOsus}	200 V
V_{CEV}	300 V
V_{CEsat}	⩽ 1 V
I_{Csat}	6 A
I_{CSM}	45 A
t_{fi}(100°C)	⩽ 250 ns

Case *Boîtier* **: TOP-3 (CB - 244)**



ABSOLUTE RATINGS (LIMITING VALUES)
VALEURS LIMITES ABSOLUES D'UTILISATION

Collector-emitter voltage *Tension collecteur-émetteur*		V_{CEO}	200	V
Collector-emitter voltage *Tension collecteur-émetteur*	V_{BE} = − 1,5 V	V_{CEV}	300	V
Emitter-base voltage *Tension émetteur-base*		V_{EBO}	7	V
Collector current *Courant collecteur*		$I_{C(RMS)}$ I_{CM}	15 20	A
Base current *Courant base*		$I_{B(RMS)}$ I_{BM}	3 5	A
Reverse bias base power dissipation (B.E. junction in avalanche) *Dissipation de puissance base-émetteur en avalanche*		P_{base}	1	W
Power dissipation *Dissipation de puissance*	T_{case} 25°C	P_{tot}	125	W
Junction temperature *Température de jonction*		T_j	− 65, + 175	°C

Thermal resistance junction-case *Résistance thermique jonction-boîtier*	$R_{th(j-c)}$	1,2	°C/W

50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

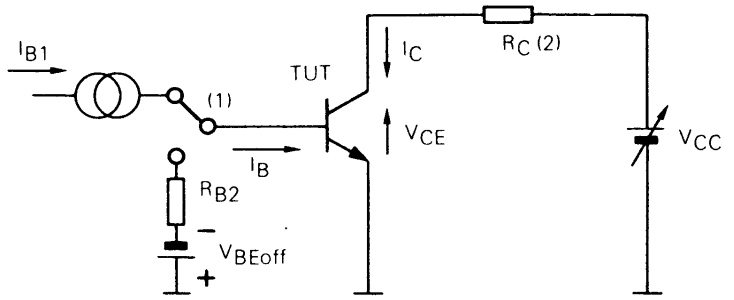
THOMSON-CSF COMPOSANTS

ELECTRICAL CHARACTERISTICS - *CARACTÉRISTIQUES ÉLECTRIQUES*••

SYMBOLS	Min	Typ	Max	UNITS	TEST CONDITIONS - *CONDITIONS DE MESURE*
OFF CHARACTERISTICS - *CARACTÉRISTIQUES A L'ÉTAT BLOQUÉ*					
V_{CEOsus}	200			V	$I_B = 0$, $I_C = 0,2$ A, L = 25 mH
$V_{(BR)EBO}$	7			V	$I_C = 0$, $I_E = 50$ mA
I_{CEV}			0,5 2	mA	$T_j = 25°C$ $T_j = 100°C$ } $V_{CE} = V_{CEV}$, $V_{BE} = -1,5$ V
I_{CER}			0,5 2,5	mA	$T_j = 25°C$ $T_j = 100°C$ } $V_{CE} = V_{CEV}$, $R_{BE} = 10\,\Omega$
I_{EBO}			1	mA	$I_C = 0$, $V_{BE} = -5$ V
ON CHARACTERISTICS - *CARACTÉRISTIQUES A L'ÉTAT CONDUCTEUR*					
V_{CEsat}*		0,45 0,55	1 1	V	$T_j = 25°C$ $T_j = 100°C$ } $I_C = 6$ A, $I_B = 0,6$ A
V_{CEsat}*		0,3 0,3	0,8 0,8	V	$T_j = 25°C$ $T_j = 100°C$ } $I_C = 3$ A, $I_B = 0,15$ A
V_{BEsat}*		1,15 1,15	1,6 1,6	V	$T_j = 25°C$ $T_j = 100°C$ } $I_C = 6$ A, $I_B = 0,6$ A
SWITCHING CHARACTERISTICS - *CARACTÉRISTIQUES DE COMMUTATION*••					
TURN-ON SWITCHING CHARACTERISTICS - *CARACTÉRISTIQUES DE COMMUTATION A LA MISE EN CONDUCTION (fig. 2)*					
di_C/dt		33 28		A/μs	$T_j = 25°C$ $T_j = 100°C$ } $R_C = 0$, $V_{CC} = 160$ V $I_{B1} = 0,9$ A
V_{CE} (2 μs)		1,05 1,53		V	$T_j = 25°C$ $T_j = 100°C$ } $V_{CC} = 160$ V $R_C = 27\,\Omega$ $I_{B1} = 0,6$ A
V_{CE} (4 μs)		0,75 0,95		V	$T_j = 25°C$ $T_j = 100°C$
TURN-OFF SWITCHING CHARACTERISTICS - *CARACTÉRISTIQUES DE COMMUTATION A L'OUVERTURE (fig. 3)*					
ON INDUCTIVE LOAD - *SUR CHARGE INDUCTIVE*					
With negative bias - *Avec polarisation négative*					
t_{si}		0,75 1,2	1,2 1,7	μs	$T_j = 25°C$ $T_j = 100°C$ } $I_C = 6$ A $I_{B1} = 0,6$ A $V_{BB} = -5$ V $R_{B2} = 4,2\,\Omega$ $V_{CC} = 160$ V $V_{clamp} = 200$ V $L_C = 1,3$ mH
t_{fi}		0,08 0,12	0,2 0,25	μs	$T_j = 25°C$ $T_j = 100°C$
t_{ti}		0,01 0,03		μs	$T_j = 25°C$ $T_j = 100°C$
t_c		0,12 0,22		μs	$T_j = 25°C$ $T_j = 100°C$
Without negative bias - *Sans polarisation négative*					
t_{si}		1,8 3,3		μs	$T_j = 25°C$ $T_j = 100°C$ } $I_C = 6$ A $I_{B1} = 0,6$ A $V_{BB} = 0$ V $R_{B2} = 6,8\,\Omega$ $V_{CC} = 160$ V $V_{clamp.} = 200$ V $L_C = 1,3$ mH
t_{fi}		0,45 0,8		μs	$T_j = 25°C$ $T_j = 100°C$
t_{ti}		0,15 0,44		μs	$T_j = 25°C$ $T_j = 100°C$

••T_j = 25°C Unless otherwise stated *Pulsed - *Impulsions* $t_p \leqslant 300\,\mu$s, $\delta \leqslant 2$ %

FIGURE 1 : SWITCHING TIMES TEST CIRCUIT (RESISTIVE LOAD)



(1) Fast electronic switch
(2) Non-inductive resistor

FIGURE 2 : TURN-ON SWITCHING WAVEFORMS

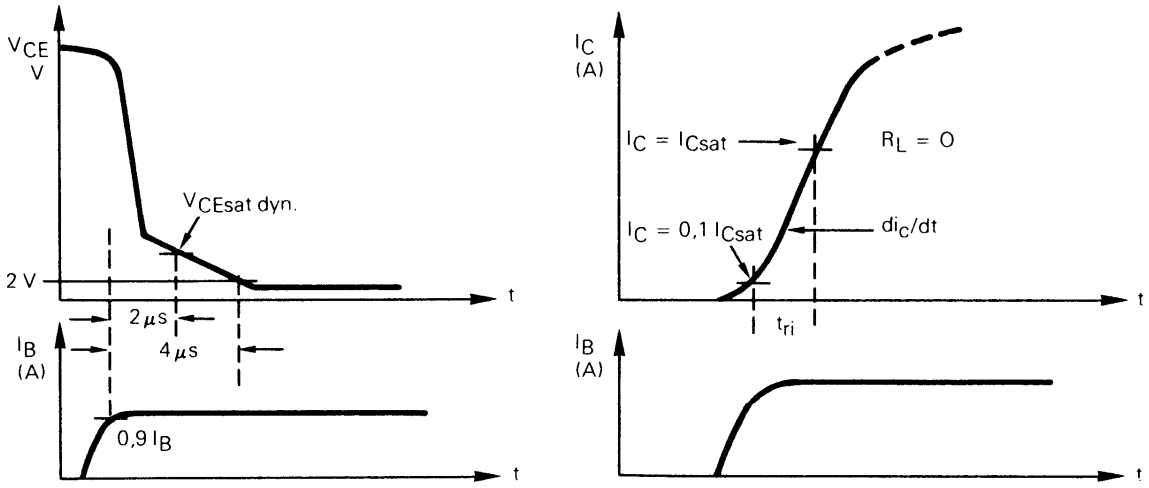
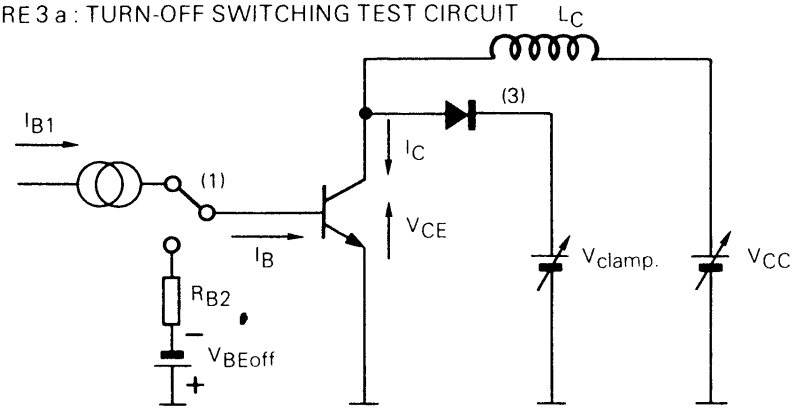
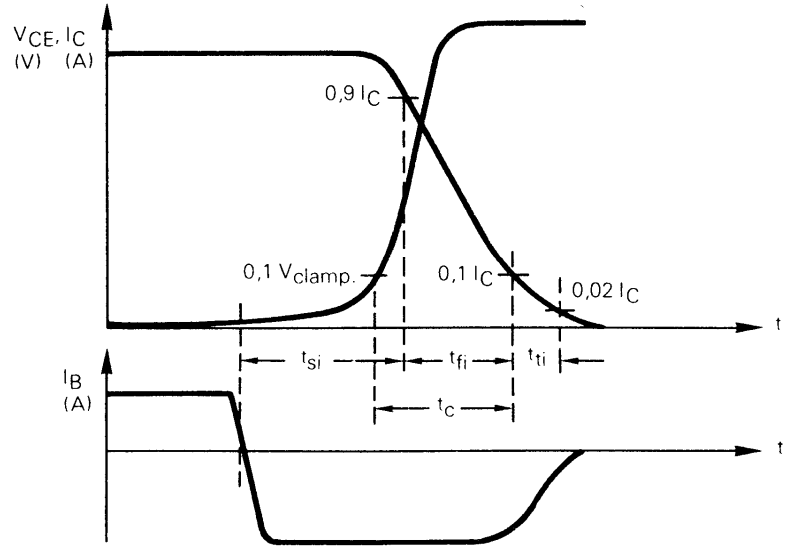


FIGURE 3 a : TURN-OFF SWITCHING TEST CIRCUIT



(1) Fast electronic switch
(2) Non-inductive resistor
(3) Fast recovery rectifier

FIGURE 3 b : TURN-OFF SWITCHING WAVEFORMS (INDUCTIVE LOAD)



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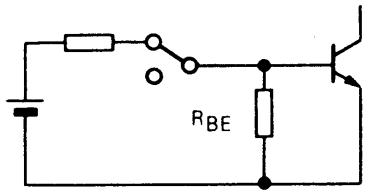
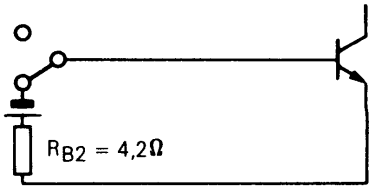


TRANSISTOR FORWARD BIASED
- **During the turn-on**
- **During the turn-off without negative base-emitter voltage and $6{,}8\,\Omega \leqslant R_{BE} \leqslant 50\,\Omega$**



TRANSISTOR REVERSE BIASED
- **During the turn-off with negative base-emitter voltage**

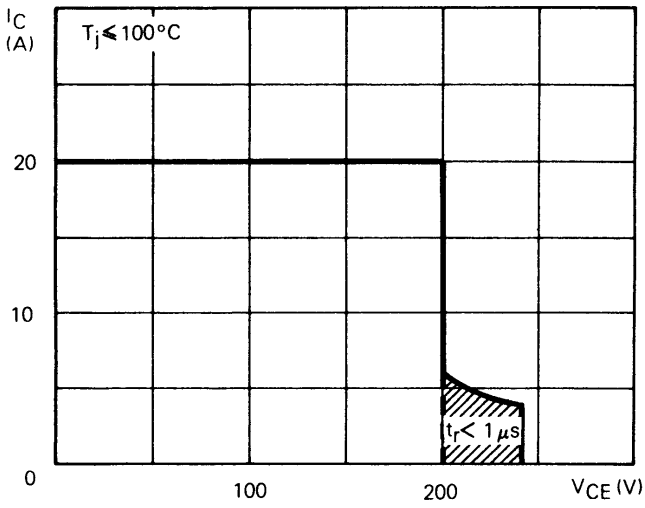


FIGURE 4 : Forward biased safe operating area (FBSOA)

The hatched zone can only be used for turn-on
La zone hachurée ne doit être utilisée que pour la mise en conduction

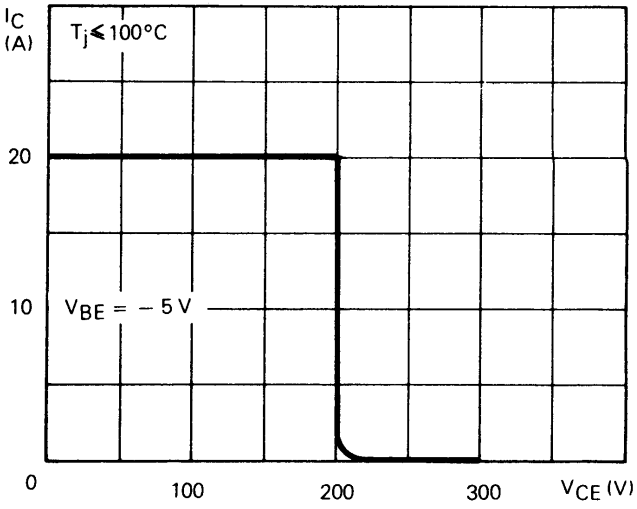


FIGURE 5 : Reverse biased safe operating area (RBSOA)