

SILICON DIFFUSED POWER TRANSISTORS

High-voltage, high-speed, glass-passivated npn power transistors in a SOT93 envelope, intended for use in converters, inverters, switching regulators, motor control systems etc.

QUICK REFERENCE DATA

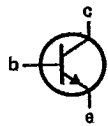
			BUP23B	BUP23C
Collector-emitter voltage peak value; $V_{BE} = 0$	V_{CESM}	max.	750	850 V
Collector-emitter voltage open base	V_{CEO}	max.	400	450 V
Collector-emitter saturation voltage	V_{CEsat}	max.	1.5	V
Collector saturation current	I_{Csat}	max.	10	A
Collector current (DC)	I_C	max.	15	A
Collector current (peak value)	I_{CM}	max.	30	A
Total power dissipation up to $T_{mb} = 25^\circ C$	P_{tot}	max.	175	W

MECHANICAL DATA

Dimensions in mm

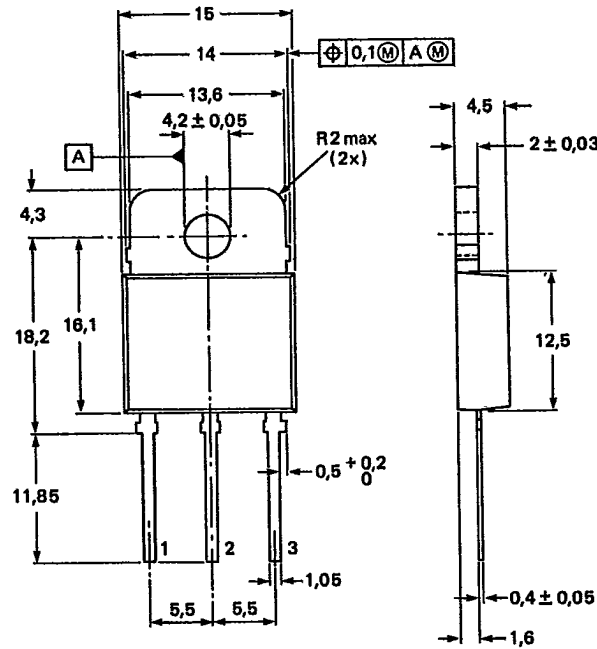
Fig. 1 SOT93.

Collector connected to mounting base.



Pinning:

- 1 = base
- 2 = collector
- 3 = emitter



7298898

BUP23B
BUP23C

T-33-15

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

			BUP23B	BUP23C
Collector-emitter voltage $V_{BE} = 0$; peak value	V_{CESM}	max.	750	850 V
Collector-emitter voltage open base	V_{CEO}	max.	400	450 V
Collector current (DC)	I_C	max.	15	A
Collector current (peak value)	I_{CM}	max.	30	A
Base current (DEC)	I_B	max.	6	A
Peak value	I_{BM}	max.	9	A
Total power dissipation up to $T_{mb} = 25^\circ C$	P_{tot}	max.	125	W
Storage temperature range	T_{stg}		-65 to +150	$^\circ C$
Junction temperature	T_j	max.	150	$^\circ C$

THERMAL RESISTANCE

From junction to mounting base	$R_{th j-mb}$	=	0.7	K/W
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CHARACTERISTICS

$T_j = 25^\circ C$ unless otherwise specified

Collector cut-off current*

$V_{CE} = V_{CESMmax}$; $V_{BE} = 0$

I_{CES}	max.	1	mA
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Emitter cut-off current

$I_C = 0$; $V_{EB} = 9 V$

I_{EBO}	max.	10	mA
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DC current gain

$I_C = 1 A$; $V_{CE} = 5 V$

h_{FE}	typ.	25	
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Collector-emitter sustaining voltage

$I_B = 0$; $I_C = 0.1 A$; $L = 25 mH$

		BUP23B	BUP23C
$V_{CEOsust}$	min.	400	450 V

Saturation voltages

$I_C = 10 A$; $I_B = 1.33 A$

V_{CEsat}	max.	1.5	- V
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$I_C = 10 A$; $I_B = 1.67 A$

V_{BEsat}	max.	1.5	- V
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V_{CEsat}	max.	-	1.5 V
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V_{BEsat}	max.	-	1.5 V
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* Measured with half-sinewave voltage (curve tracer).

Silicon diffused power transistors

LF

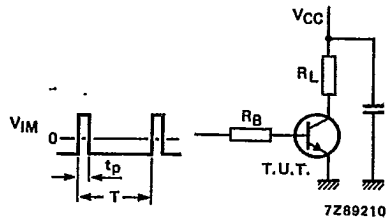
BUP23B
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		BUP23B	BUP23C
Switching times resistive load (Figs 2 and 3)			
$I_{C\ on} = 10\ A; I_{B\ on} = -I_{B\ off} = 1.33\ A$	t_{on}	typ. 0.7	— μs
	t_s	typ. 2.0	— μs
	t_f	typ. 0.27	— μs
$I_{C\ on} = 10\ A; I_{B\ on} = -I_{B\ off} = 1.67\ A$	t_{on}	—	0.7 μs
	t_s	—	2.0 μs
	t_f	—	0.27 μs
Switching times inductive load (Figs 4 and 5)			
$I_{C\ on} = 10\ A, I_{B\ on} = 1.33\ A$	t_s	typ. 2.1	— μs
	t_f	typ. 40	— ns
$I_{C\ on} = 10\ A; I_{B\ on} = 1.67\ A$	t_s	—	2.1 μs
	t_f	—	40 ns

BUP23B
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$V_{CC} = 250 \text{ V}$
 $V_{IM} = -6 \text{ to } +8 \text{ V}$

$\frac{t_p}{T} = 0,01$

$t_p = 20 \mu\text{s}$

The values of R_B and R_L are selected in accordance with I_{Con} and I_B requirements.

Fig. 2 Test circuit resistive load.

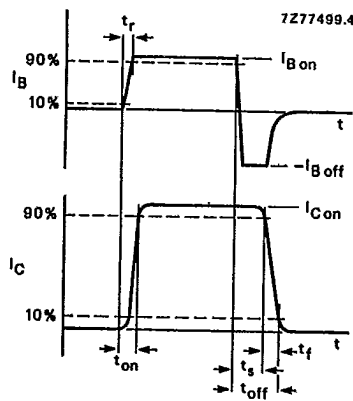


Fig. 3 Switching times waveforms with resistive load.

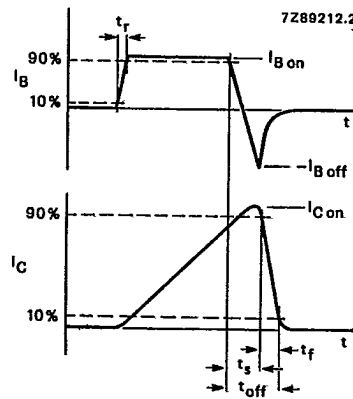
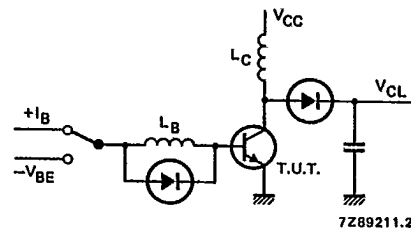
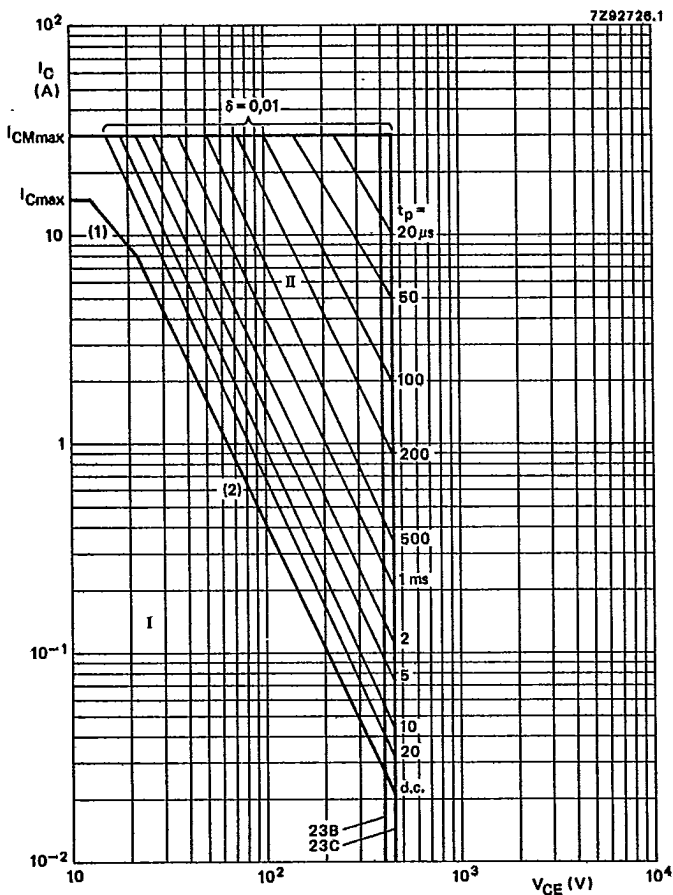


Fig. 4 Switching times waveforms with inductive load.



$V_{CL} = 250 \text{ V}$
 $V_{CC} = 30 \text{ V}$
 $-V_{BE} = 5 \text{ V}$
 $L_B = 1 \mu\text{H}$
 $L_C = 200 \mu\text{H}$

Fig. 5 Test circuit inductive load.



- (1) Lines for P_{tot} max and P_{tot} peak max.
- (2) Second-breakdown limits.
- I Region of permissible DC operation.
- II Permissible extension for repetitive pulse operation.

Fig. 6 Safe operating area at $T_{mb} \leq 25$ °C.

BUP23B
BUP23C

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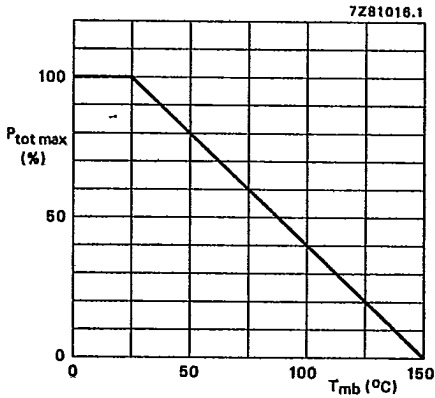


Fig. 7 Total power dissipation derating curve.

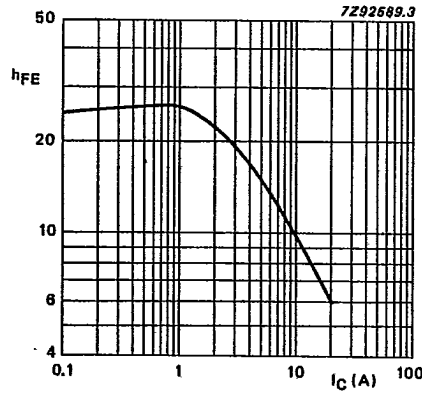


Fig. 8 Typical values DC current gain at $T_{mb} = 25 \text{ }^\circ\text{C}$.

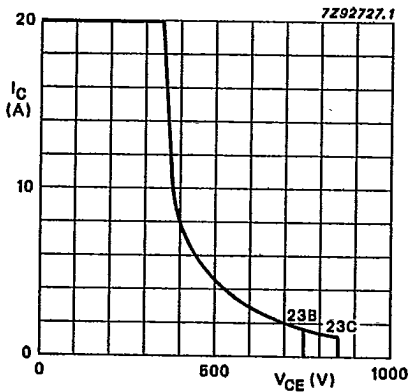


Fig. 9 Reverse bias SOAR; $T_{mb} = 100 \text{ }^\circ\text{C}$; $V_{BE(off)} = 1 \text{ to } 5 \text{ V}$; $L_B = 0 \text{ to } 3 \text{ } \mu\text{H}$.

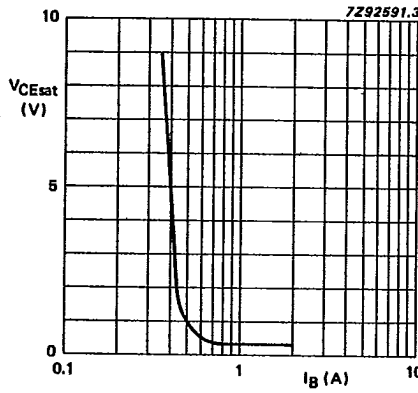


Fig. 10 Typical values V_{CEsat} at $T_j = 25 \text{ }^\circ\text{C}$; $I_C = 10 \text{ A}$.

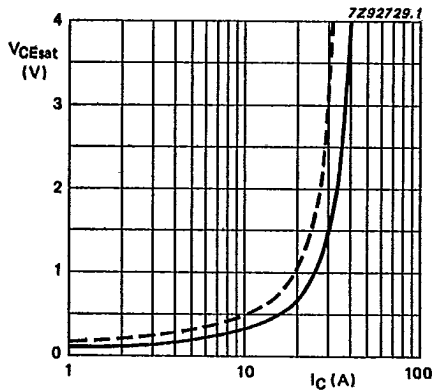


Fig. 11 Typical values collector voltage at $T_j = 25 \text{ }^\circ\text{C}$; $I_C/I_B = 7, 5 \text{ and } 6$ for BUP22B and BUP23C resp; (—) = BUP23B; (---) = BUP23C.

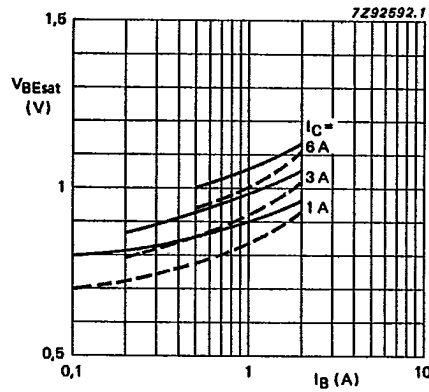


Fig. 12 Typical values V_{BE} at $T_j = 25 \text{ }^\circ\text{C}$; (—) = BUP23B; (---) = BUP23C.

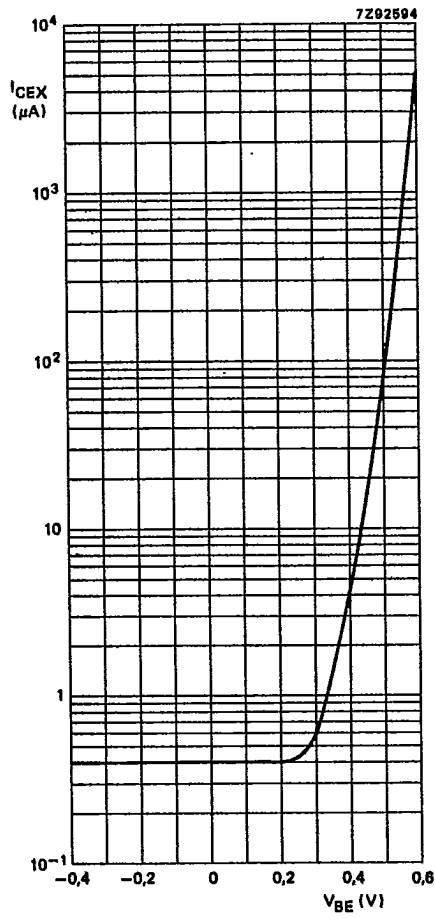


Fig. 13 Typical values collector cut-off current at $T_j = 25\text{ }^\circ\text{C}$; $V_{CE} = 250\text{ V}$.