SILICON DIFFUSED POWER TRANSISTORS

High-voltage, high-speed, glass-passivated npn power transistors in a TO-3 envelope, intended for use in converters, inverters, switching regulators, motor control systems etc.

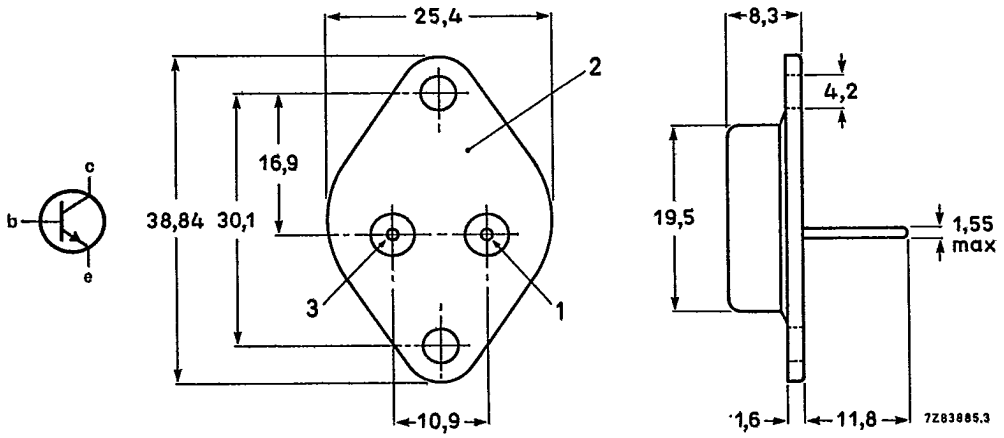
QUICK REFERENCE DATA

			BUS24B	24C	
Collector-emitter voltage					
peak value; $V_{BE} = 0$	V_{CESM}	max.	750	850	V
open base	V_{CEO}	max.	400	450	V
Collector-emitter saturation voltage $I_C = 20$ A	V_{CEsat}	max.	1.5		V
Collector current					
saturation	I_{Csat}	max.	20		A
DC	I_C	max.	30		A
peak value	I_{CM}	max.	50		A
Total power dissipation up to $T_{mb} = 25$ °C	P_{tot}	max.	250		W
Fall time; resistive load	t_f	max.	0.7		μs

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-3.



Pinning:

1 = base
2 = collector
3 = emitter

Collector connected to case.

RATINGS

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

			BUS24B	24C	
Collector-emitter voltage					
peak value; V_{BE} = 0	V_{CESM}	max.	750	850	V
open base	V_{CEO}	max.	400	450	V
Collector current					
saturation	I_{Csat}	max.	20		A
DC	I_C	max.	30		A
peak value	I_{CM}	max.	50		A
Base current					
DC	I_B	max.	6.0		A
peak value	I_{BM}	max.	10		A
Total power dissipation					
up to T_{mb} = 25 °C	P_{tot}	max.	250		W
Storage temperature range	T_{stg}		−65 to + 200		°C
Junction temperature	T_j	max.	200		°C

THERMAL RESISTANCE

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

DEVELOPMENT DATA

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current*						
$V_{CE} = V_{CESMmax}$; $V_{BE} = 0$		I_{CES}	max.	1.0		mA
Emitter cut-off current						
V_{EB} = 9 V; I_C = 0		I_{EBO}	max.	10		mA
				BUS24B	24C	
Collector-emitter sustaining voltage (Figs 2 and 3)						
I_B = 0; I_C = 0.1 A; L = 25 mH		$V_{CEOsust}$	min.	400	450	V
Saturation voltages						
I_C = 20 A; I_B = 2.66 A	BUS24B	V_{CEsat}	max.	1.5		V
		V_{BEsat}	max.	1.5		V
I_B = 3.34 A	BUS24C	V_{CEsat}	max.	1.5		V
		V_{BEsat}	max.	1.5		V
Current gain						
I_C = 3 A; V_{CE} = 5 V		h_{FE}	typ.	25		
Switching times resistive load (Figs 4 and 5)						
$I_{C\,on}$ = 20 A; V_{CC} = 250 V						
$I_{B\,on} = I_{B\,off}$ = 2.66 A	BUS24B	t_{on}	max.	1.0		μs
		t_s	max.	4.5		μs
		t_f	max.	0.7		μs
$I_{B\,on} = I_{B\,off}$ = 3.34 A	BUS24C	t_{on}	max.	1.0		μs
		t_s	max.	4.5		μs
		t_f	max.	0.7		μs
Switching times inductive load (Figs 6 and 7)						
$I_{C\,on}$ = 20 A						
$I_{B\,on} = I_{B\,off}$ as resistive load						
V_{BE} = −5 V; L_B = 1 μH;						
V_{CL} = 250 V; T_{mb} = 100 °C.		t_s	typ.	2.5		μs
		t_s	max.	3.0		μs
		t_f	typ.	0.1		μs
		t_f	max.	0.25		μs

* Measured with a half-sinewave voltage (curve tracer).

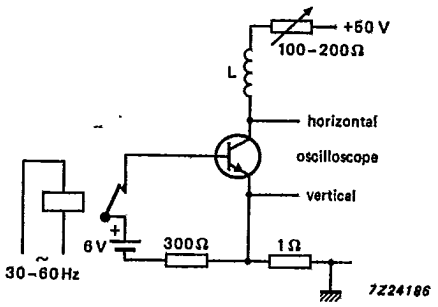


Fig. 2 Test circuit for $V_{CEOsust}$.

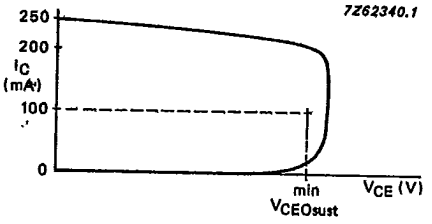


Fig. 3 Oscilloscope display for sustaining voltage.

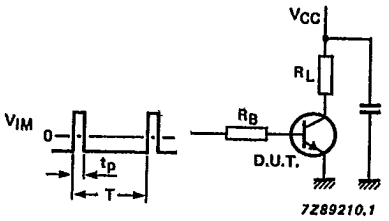


Fig. 4 Test circuit resistive load.

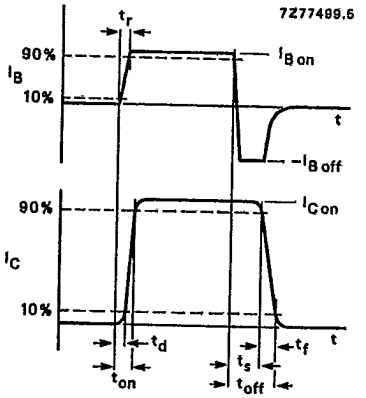


Fig. 5 Switching times waveforms with resistive load; $t_r \leqslant 20$ ns.

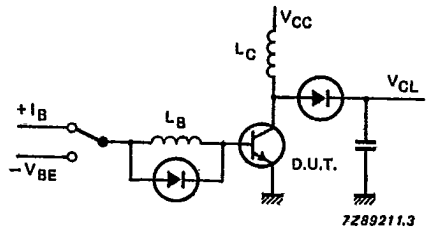


Fig. 6 Test circuit inductive load.

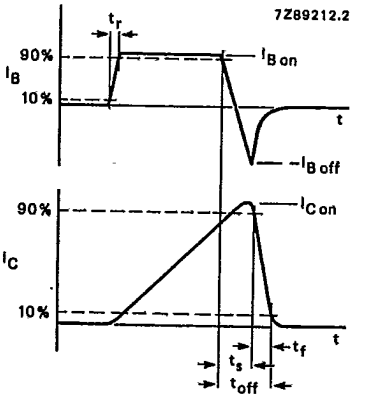
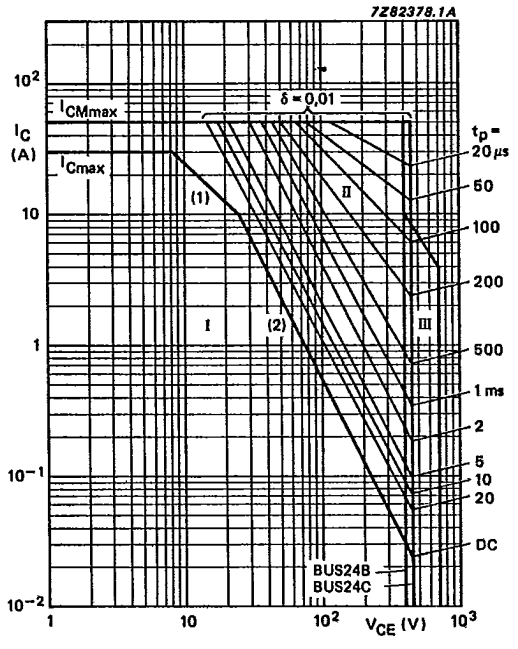


Fig. 7 Switching times waveforms with inductive load.



(1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.
(2) Second-breakdown limits.

I Region of permissible DC operation.
II Permissible extension for repetitive pulse operation.
III Area of permissible operation during turn-on in single transistor converters, provided $R_{BE} \leqslant 100\ \Omega$ and $t_p \leqslant 0.6\ \mu s$.

Fig. 8 Forward biased Safe Operating area at $T_{mb} = 25\ ^oC$.

DEVELOPMENT DATA

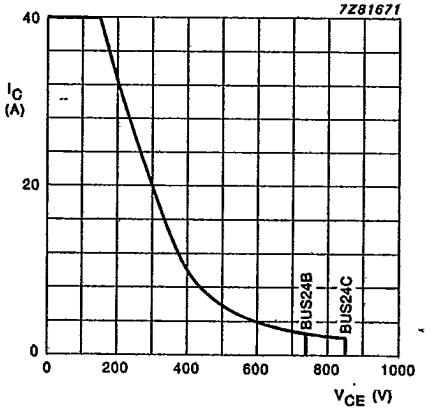


Fig. 9 Reverse bias SOAR; $T_{mb} \leqslant 100$ °C; $V_{BE} = -1$ V to -5 V.

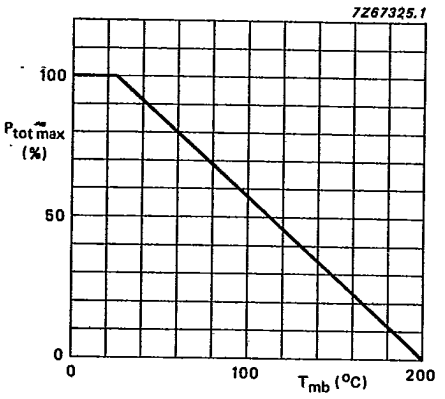


Fig. 10 Power derating curve.

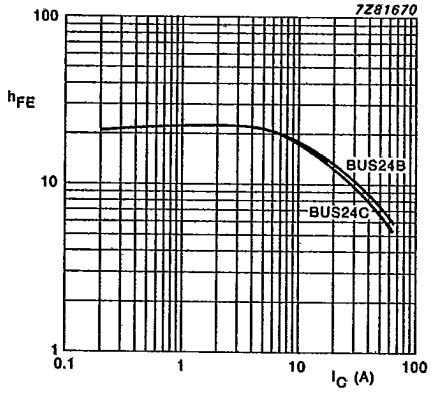


Fig. 11 DC current gain; $V_{CE} = 1.5$ V; $T_j = 25$ °C.

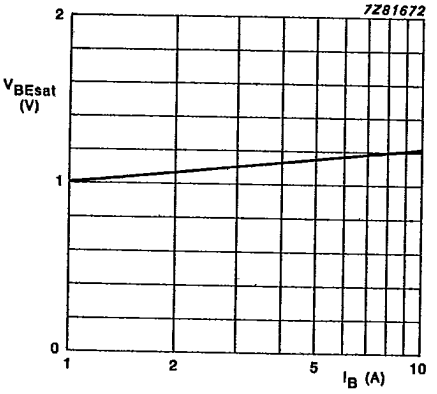


Fig. 12 Base-emitter saturation voltage as a function of base current; $I_C = 20$ mA; $T_{mb} = 25$ °C.

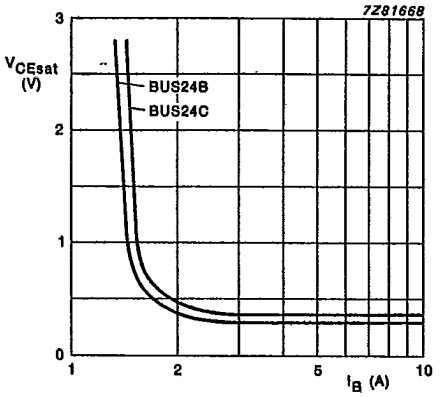


Fig. 13 Collector-emitter saturation voltage as a function of base current; I_C = 20 A; T_j = 25 °C.

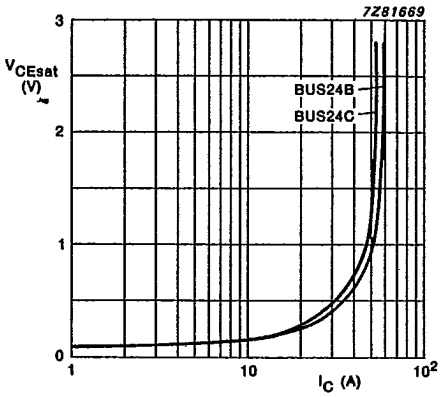


Fig. 14 Collector-emitter saturation voltage as a function of collector current: I_C/I_B = 7.5 for BUS24B; I_C/I_B = 6.0 for BUS24C.

DEVELOPMENT DATA