Silicon Diffused Power Transistor BU2522AW

GENERAL DESCRIPTION

New generation, high-voltage, high-speed switching npn transistor in a plastic envelope intended for use in horizontal deflection circuits of high resolution monitors. Features improved RBSOA performance and is suitable for use in horizontal deflection circuits of pc monitors.

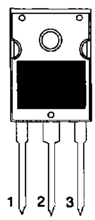
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0$ V	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
P_{tot}	Total power dissipation	$T_{mb} \leq 25$ ˚C	-	125	W
V_{CEsat}	Collector-emitter saturation voltage	$I_C = 6.0$ A; $I_B = 1.2$ A	-	5.0	V
I_{Csat}	Collector saturation current	f = 64 kHz	6.0	-	A
t_f	Fall time	$I_{Csat} = 6.0$ A; f = 64 kHz	0.12	0.25	µs

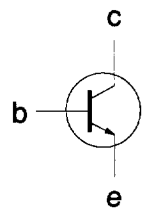
PINNING - SOT429

PIN	DESCRIPTION
1	base
2	collector
3	emitter
tab	collector

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	Collector-emitter voltage peak value	$V_{BE} = 0$ V	-	1500	V
V_{CEO}	Collector-emitter voltage (open base)		-	800	V
I_C	Collector current (DC)		-	10	A
I_{CM}	Collector current peak value		-	25	A
I_B	Base current (DC)		-	6	A
I_{BM}	Base current peak value		-	9	A
$-I_{B(AV)}$	Reverse base current	average over any 20 ms period	-	150	mA
$-I_{BM}$	Reverse base current peak value [1]		-	6	A
P_{tot}	Total power dissipation	$T_{mb} \leq 25$ ˚C	-	125	W
T_{stg}	Storage temperature		-65	150	˚C
T_j	Junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\,j\text{-}mb}$	Junction to mounting base	with heatsink compound	-	1.0	K/W
$R_{th\,j\text{-}a}$	Junction to ambient	in free air	45	-	K/W

1 Turn-off current.

STATIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CES}	Collector cut-off current [2]	V_{BE} = 0 V; V_{CE} = $V_{CESMmax}$	-	-	0.25	mA
I_{CES}		V_{BE} = 0 V; V_{CE} = $V_{CESMmax}$; T_j = 125 °C	-	-	2.0	mA
I_{EBO}	Emitter cut-off current	V_{EB} = 7.5 V; I_C = 0 A	-	-	0.25	mA
BV_{EBO}	Emitter-base breakdown voltage	I_B = 1 mA	7.5	13.5	-	V
$V_{CEOsust}$	Collector-emitter sustaining voltage	I_B = 0 A; I_C = 100 mA; L = 25 mH	800	-	-	V
V_{CEsat}	Collector-emitter saturation voltage	I_C = 6.0 A; I_B = 1.2 A	-	-	5.0	V
V_{BEsat}	Base-emitter saturation voltage	I_C = 6.0 A; I_B = 1.2 A	-	-	1.3	V
h_{FE}	DC current gain	I_C = 1 A; V_{CE} = 5 V	-	10	-	
h_{FE}		I_C = 6 A; V_{CE} = 5 V	5	7	8	

DYNAMIC CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
C_c	Collector capacitance	I_E = 0 A; V_{CB} = 10 V; f = 1 MHz	115	-	pF
	Switching times (64 kHz line deflection circuit)	I_{Csat} = 6.0 A; L_C = 170 µH; C_{fb} = 5.4 nF; $I_{B(end)}$ = 0.7 A;L_B = 0.6 µH;-V_{BB} = 2 V; (-dI_B/dt = 3.33A/µs)			
t_s	Turn-off storage time		1.7	2.0	µs
t_f	Turn-off fall time		0.12	0.25	µs

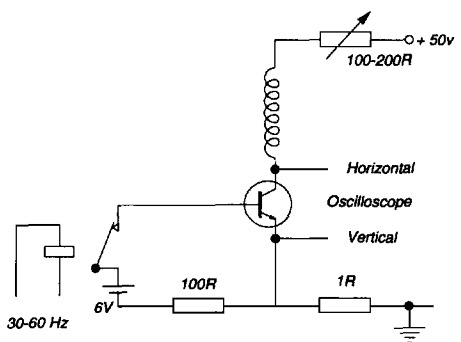


Fig.1. Test circuit for $V_{CEOsust}$.

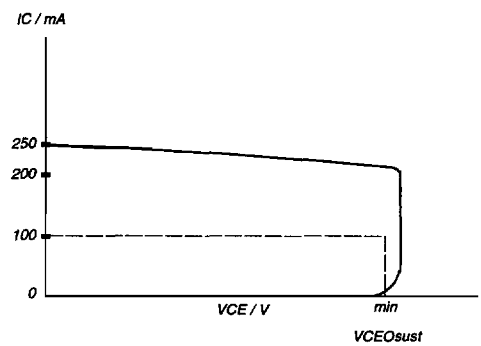


Fig.2. Oscilloscope display for $V_{CEOsust}$.

2 Measured with half sine-wave voltage (curve tracer).

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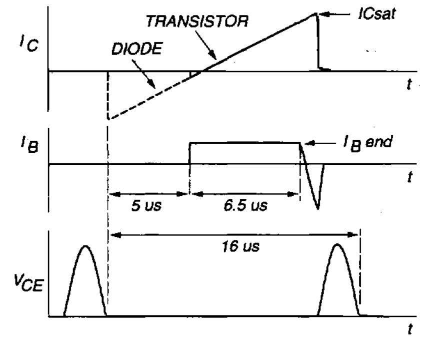

Fig.3. Switching times waveforms (64 kHz).

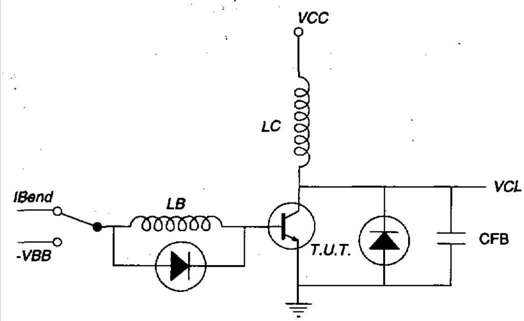

Fig.6. Test Circuit RBSOA. $V_{CC} = 140$ V; $-V_{BB} = 4$ V; $L_C = 100 - 400$ µH; $V_{CL} \leq 1500$ V; $L_B = 3$ µH; $C_{FB} = 1 - 2.2$ nF; $I_B(end) = 1.6 - 2$ A

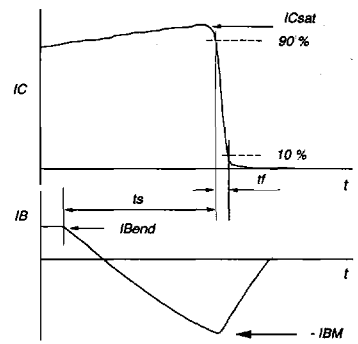

Fig.4. Switching times definitions.

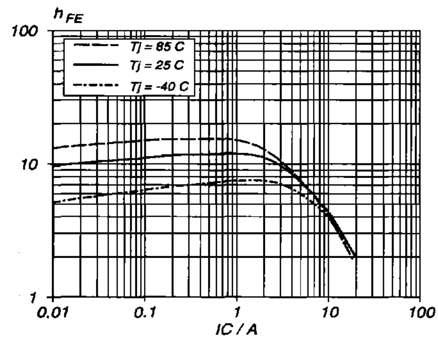

Fig.7. Typical DC current gain. $h_{FE} = f(I_C)$ $V_{CE} = 5$ V

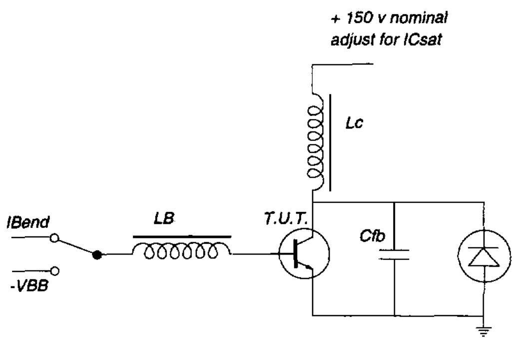

Fig.5. Switching times test circuit.

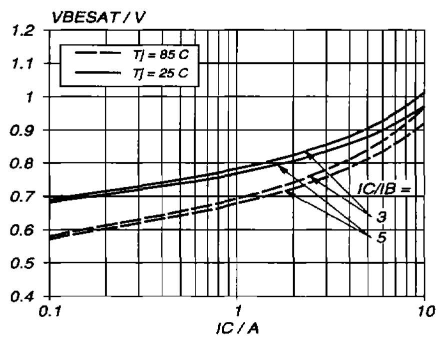

Fig.8. Typical base-emitter saturation voltage. $V_{BE}sat = f(I_C)$; parameter I_C/I_B

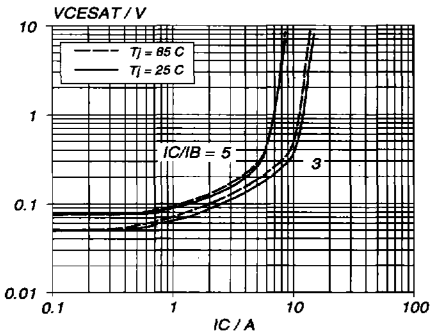

Fig.9. Typical collector-emitter saturation voltage. $V_{CE}sat = f(I_C)$; parameter I_C/I_B

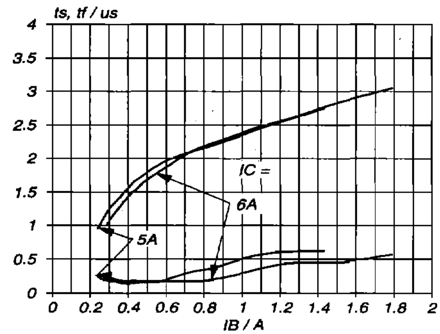

Fig.12. Typical collector storage and fall time. $ts = f(I_B)$; $tf = f(I_B)$; parameter I_C; $T_j = 85˚C$; $f = 64$ kHz

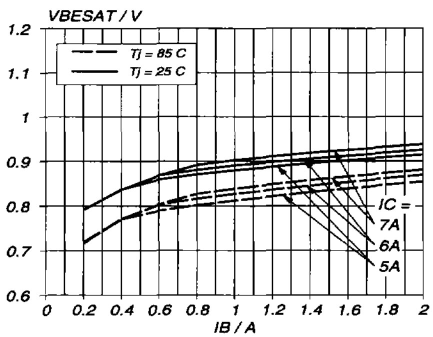

Fig.10. Typical base-emitter saturation voltage. $V_{BE}sat = f(I_B)$; parameter I_C

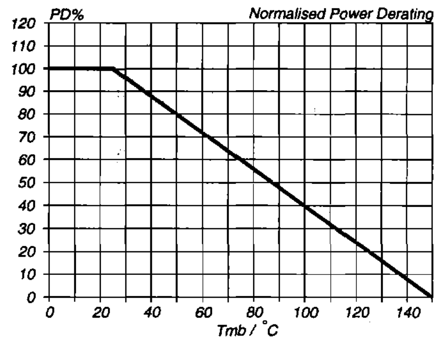

Fig.13. Normalised power dissipation. $PD\% = 100 \cdot P_D/P_{D\,25˚C} = f(T_{mb})$

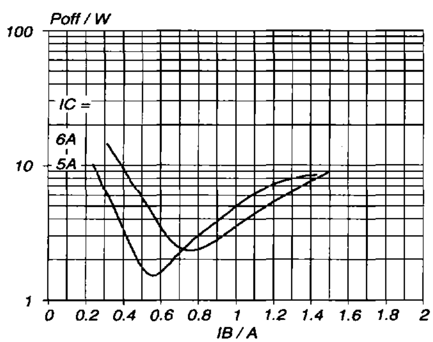

Fig.11. Typical turn-off losses. $T_j = 85˚C$ $Poff = f(I_B)$; parameter I_C; $f = 64$ kHz

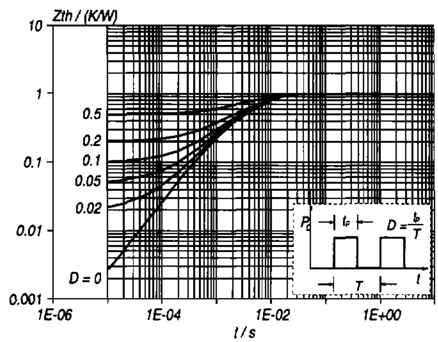

Fig.14. Transient thermal impedance. $Z_{th\,j\text{-}mb} = f(t)$; parameter $D = t_p/T$

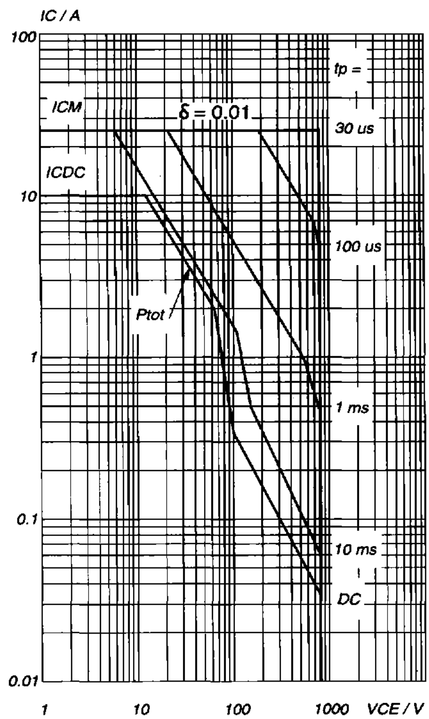

Fig.15. Forward bias safe operating area. T_{mb} = 25 ˚C
I_{CDC} & I_{CM} = f(V_{CE}); I_{CM} single pulse; parameter t_p
Second-breakdown limits independant of temperature.

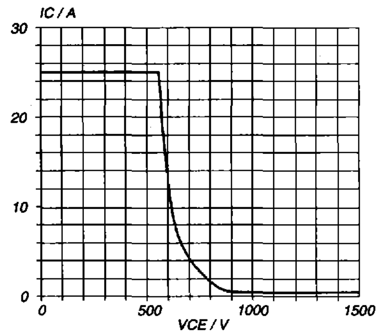

Fig.16. Reverse bias safe operating area. $T_j \leq T_{jmax}$