Silicon Diffused Power Transistor BU4523AX

GENERAL DESCRIPTION

Enhanced performance, new generation, high-voltage, high-speed switching npn transistor in a plastic envelope intended for use in horizontal deflection circuits of colour television receivers and p.c monitors. Features exceptional tolerance to base drive and collector current load variations resulting in a very low worst case dissipation.

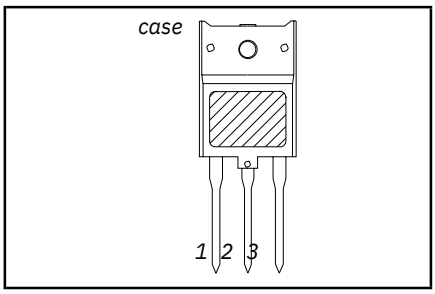
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
VCESM	Collector-emitter voltage peak value	VBE = 0 V	-	1500	V
VCEO	Collector-emitter voltage (open base)		-	800	V
IC	Collector current (DC)		-	11	A
ICM	Collector current peak value		-	29	A
Ptot	Total power dissipation	Ths ≤ 25 ˚C	-	45	W
VCEsat	Collector-emitter saturation voltage	IC = 8 A; IB = 2 A	-	3.0	V
ICsat	Collector saturation current	f = 16 kHz	8	-	A
		f = 70 kHz	6.5	-	A
tf	Fall time	ICsat = 8 A; f = 16 kHz	0.3	0.4	µ s
		ICsat = 6.5 A; f = 70 kHz	0.14	-	µ s

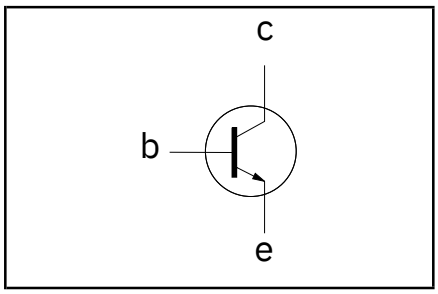
PINNING - SOT399

PIN	DESCRIPTION
1	base
2	collector
3	emitter
case	isolated

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
VCESM	Collector-emitter voltage peak value	VBE = 0 V	-	1500	V
VCEO	Collector-emitter voltage (open base)		-	800	V
IC	Collector current (DC)		-	11	A
ICM	Collector current peak value		-	29	A
IB	Base current (DC)		-	7	A
IBM	Base current peak value		-	10	A
-IR	Reverse base1BM current peak value		-	7	A
Ptot	Total power dissipation	Ths ≤ 25 ˚C	-	45	W
Tstg	Storage temperature		-55	150	˚C
Tj	Junction temperature		-	150	˚C

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
Rth j-hs	Junction to heatsink	with heatsink compound	-	2.8	K/W
Rth j-a	Junction to ambient	in free air	35	-	K/W

1 Turn-off current.

ISOLATION LIMITING VALUE & CHARACTERISTIC

Ths = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Visol	Repetitive peak voltage from all three terminals to external heatsink	R.H. ≤ 65 % ; clean and dustfree	-	-	2500	V
Cisol	Capacitance from T2 to external heatsink	f = 1 MHz	-	22	-	pF

STATIC CHARACTERISTICS

Ths = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
ICES	Collector cut-off current 2	VBE = 0 V; VCE = $V_{CESMmax}$	-	-	1.0	mA
		VBE = 0 V; VCE = VCESMmax; Tj = 125 ˚C	-	-	2.0	mA
IEBO	Emitter cut-off current	VEB = 6 V; IC = 0 A	-	-	100	µA
BVEBO	Emitter-base breakdown voltage	IB = 1 mA	7.5	12.5	-	V
VCEOsust	Collector-emitter sustaining voltage	IB = 0 A; IC = 100 mA; L = 25 mH	800	-	-	V
VCEsat	Collector-emitter saturation voltage	IC = 8 A; IB = 2 A	-	-	3.0	V
VBEsat	Base-emitter saturation voltage	IC = 8 A; IB = 2 A	0.85	0.95	1.1	V
hFE	DC current gain	IC = 1 A; VCE = 5 V	-	14	-	
hFE		IC = 8 A; VCE = 5 V	4.2	5.8	7.3	

DYNAMIC CHARACTERISTICS

Ths = 25 ˚C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
	Switching times (16 kHz line deflection circuit)	ICsat = 8.0 A;IB1 = 1.6 A (IB2 = -4.0 A)			
ts	Turn-off storage time		4.5	5.5	µs
tf	Turn-off fall time		0.30	0.40	µs
	Switching times (70 kHz line deflection circuit)	I_{Csat} = 6.5 A;I_{B1} = 1.3 A (I_{B2} = -3.9 A)			
ts	Turn-off storage time		2.3	-	µs
tf	Turn-off fall time		0.14	-	µs

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

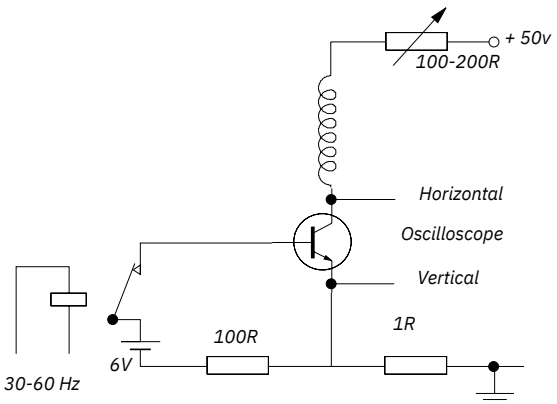


Fig.1. Test circuit for V CEOsust.

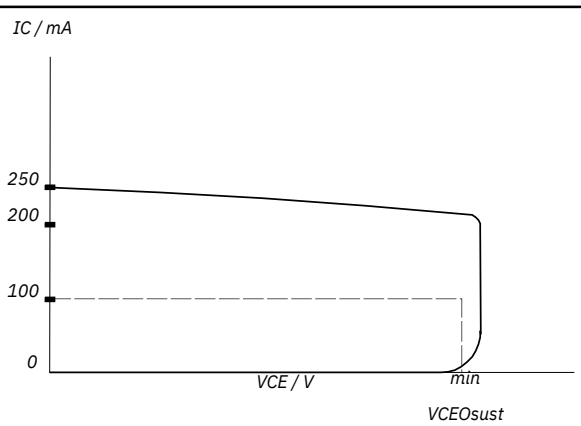


Fig.2. Oscilloscope display for V CEOsust.

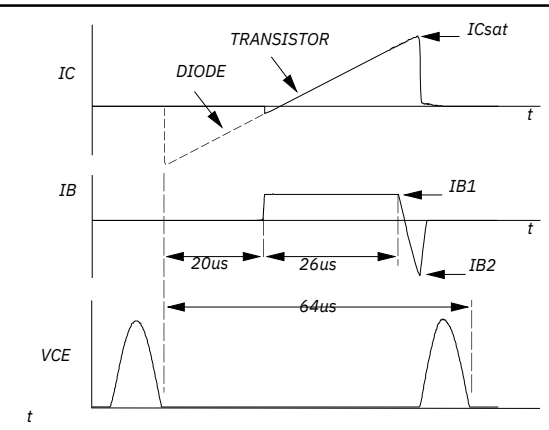


Fig.3. Switching times waveforms (16 kHz).

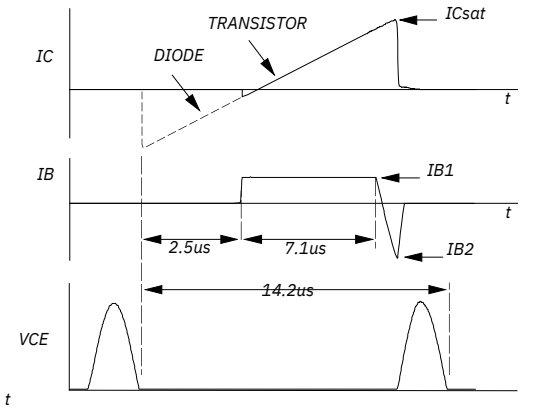


Fig.4. Switching times waveforms (70 kHz).

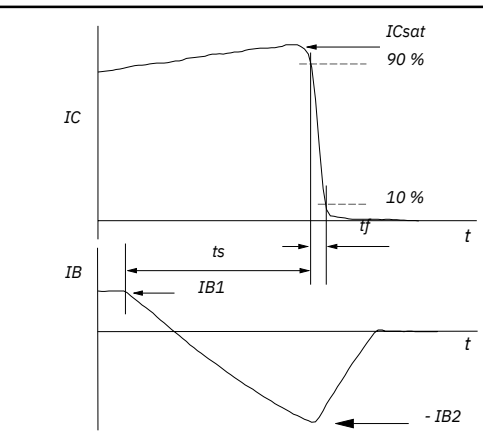


Fig.5. Switching times definitions.

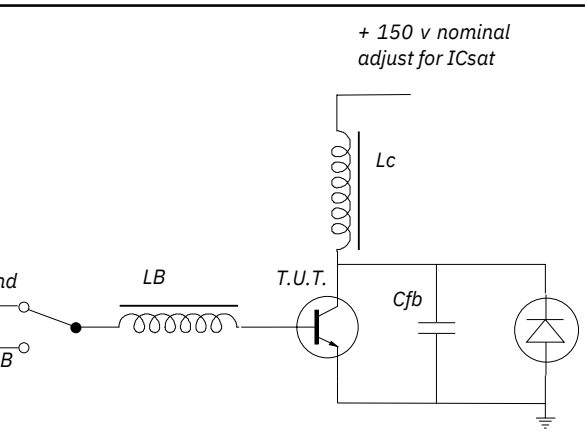


Fig.6. Switching times test circuit.

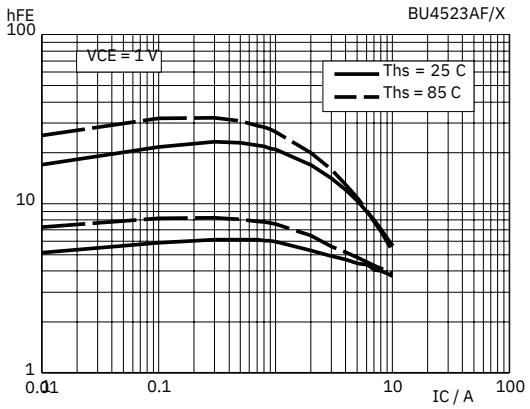


Fig.7. High and low DC current gain.

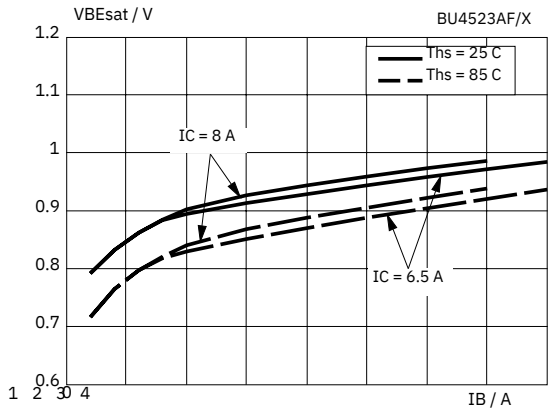


Fig.10. Typical base-emitter saturation voltage.

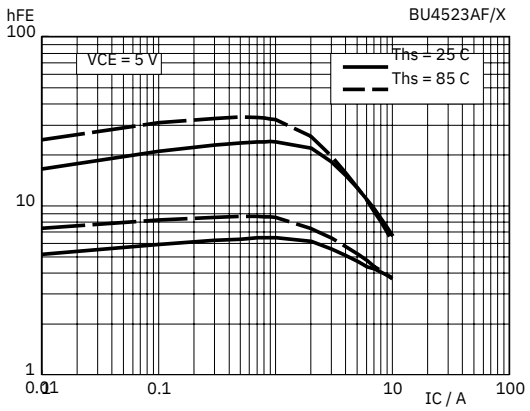


Fig.8. High and low DC current gain.

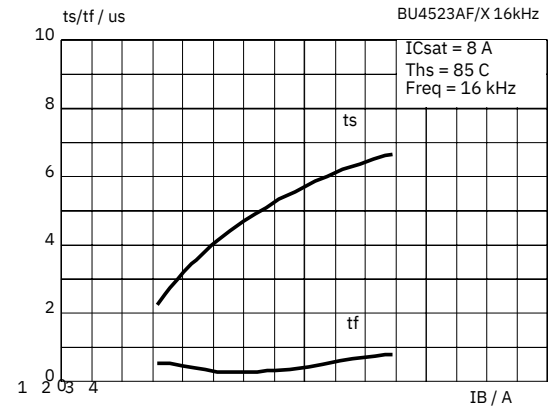


Fig.11. Typical collector storage and fall time.
IC =8 A; Tj = 85C˚; f = 16kHz

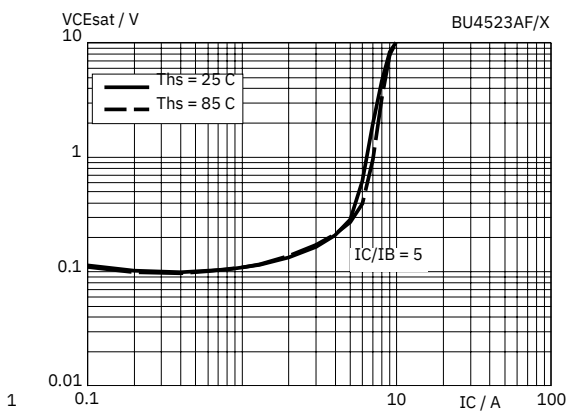


Fig.9. Typical collector-emitter saturation voltage.

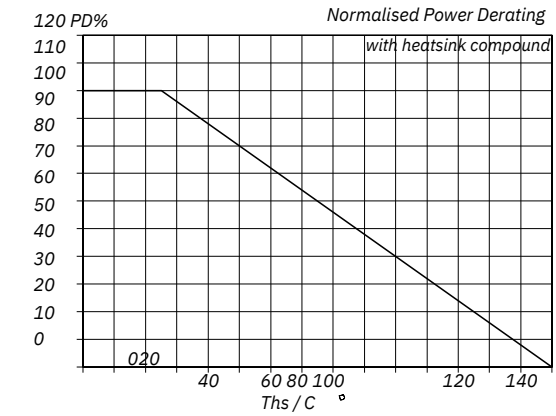


Fig.12. Normalised power dissipation.
PD% = 100 · PD/PD 25C˚

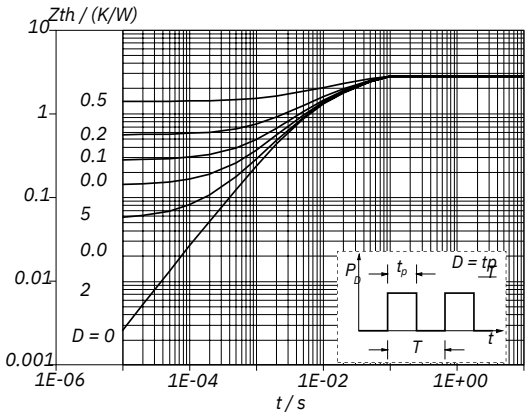


Fig.13. Transient thermal impedance.

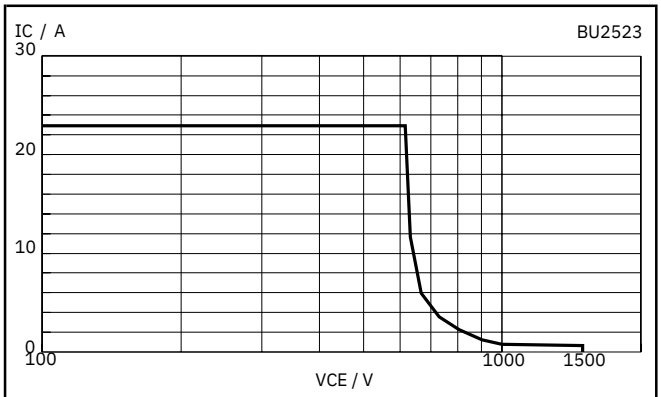


Fig.15. Reverse bias safe operating area. Tj ≤ T jmax

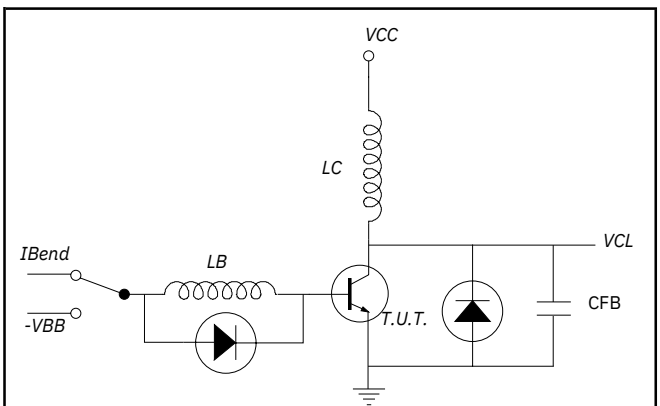


Fig.14. Test Circuit RBSOA.

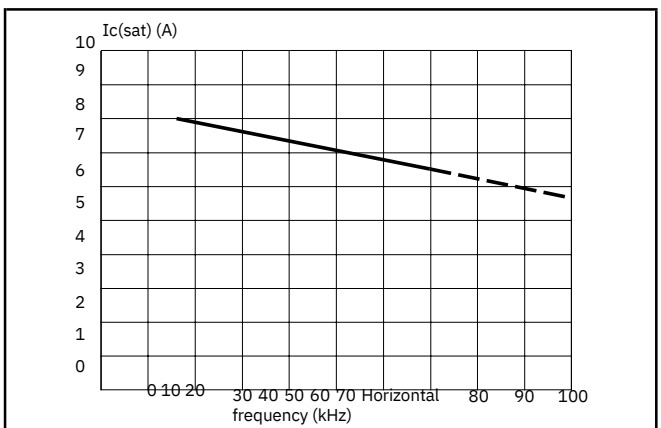


Fig.16. ICsat during normal running vs. frequency of operation for optimum performance

MECHANICAL DATA

Dimensions in mm

Net Mass: 5.88 g

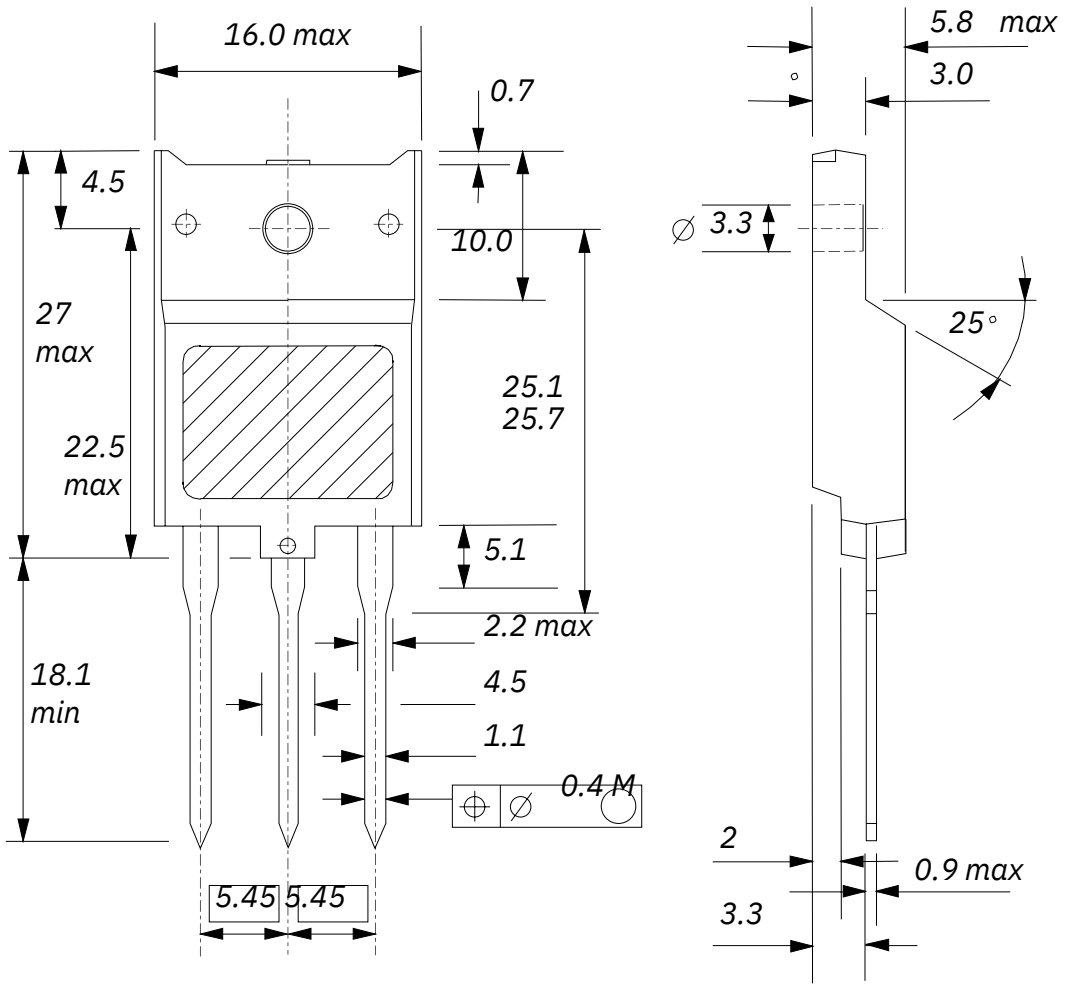


Fig.17. SOT399; The seating plane is electrically isolated from all terminals.

Notes
1. Refer to mounting instructions for F-pack envelopes.
2. Epoxy meets UL94 V0 at 1/8".

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.

Limiting values

Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information

Where application information is given, it is advisory and does not form part of the specification.

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.