Silicon diffused power transistors BU406/BU407

DESCRIPTION

High-voltage, high-speed, glass-passivated npn power transistors in a TO-220 envelope, intended for use in converters, inverters, switching regulators, motor control systems, etc.

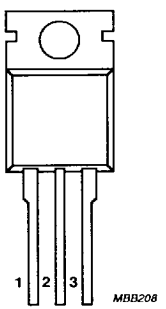
PINNING

PIN	DESCRIPTION
1	base
2	collector
3	emitter

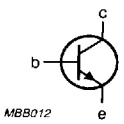
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_{CESM}	collector-emitter voltage	peak value; $V_{BE} = 0$		
	BU406		400	V
	BU407		330	V
V_{CEO}	collector-emitter voltage	open base		
	BU406		200	V
	BU407		150	V
$V_{CE\ sat}$	collector-emitter saturation voltage		1	V
I_C	collector current	DC value	7	A
I_{CM}	collector current	peak value	15	A
$I_{C\ sat}$	collector saturation current		5	A
P_{tot}	total power dissipation	up to $T_{mb} = 25$ °C	65	W
t_{off}	turn-off time	inductive load	0.75	µs

PIN CONFIGURATION



Front view



The collector is connected to the mounting base.

Fig.1 Simplified outline and symbol.

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LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CESM}	collector-emitter voltage	peak value; $V_{BE} = 0$			
	BU406		–	400	V
	BU407		–	330	V
V_{CEO}	collector-emitter voltage	open base			
	BU406		–	200	V
	BU407		–	150	V
I_C	collector current	DC value	–	7	A
I_{CM}	collector current	peak value	–	15	A
I_B	base current	DC value	–	4	A
I_{BM}	base current	peak value	–	6	A
P_{tot}	total power dissipation	up to $T_{mb} = 25$ °C	–	65	W
T_{stg}	storage temperature range		–65	150	°C
T_j	junction temperature		–	150	°C

THERMAL RESISTANCE

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j\text{-}mb}$	from junction to mounting base	1.92	K/W

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CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CES}	collector cut-off current (note 1)	$V_{CE} = V_{CES\ max}$; $V_{BE} = 0$	–	5	mA
	BU406	V_{CE} = 250 V; $V_{BE} = 0$	–	0.1	mA
	BU406	V_{CE} = 350 V; V_{BE} = 0; T_j = 150 °C	–	1	mA
	BU407	V_{CE} = 200 V; $V_{BE} = 0$	–	0.1	mA
	BU407	V_{CE} = 200 V; V_{BE} = 0; T_j = 150 °C	–	1	mA
I_{EBO}	emitter cut-off current	V_{EB} = 5 V; $I_C = 0$	–	1	mA
$V_{CE\ sat}$	collector-emitter saturation voltage	I_C = 5 A; I_B = 0.5 A	–	1	V
$V_{BE\ sat}$	base-emitter saturation voltage	I_C = 5 A; I_B = 0.5 A	–	1.2	V
f_T	transition frequency	V_{CE} = 10 V; I_C = 0.5 A	4	–	MHz
$V_{CEO\ sust}$	collector-emitter sustaining voltage	I_C = 200 mA; I_B = 0; L = 25 mH			
	BU406		200	–	V
	BU407		150	–	V
Switching times inductive load (See Figs 2 and 3)					
t_{off}	turn-off time	$I_{C\ on}$ = 5 A; $I_{B\ on}$ = 0.5 A	–	0.75	µs

Note

1. Measured with a half sine wave voltage (curve tracer).

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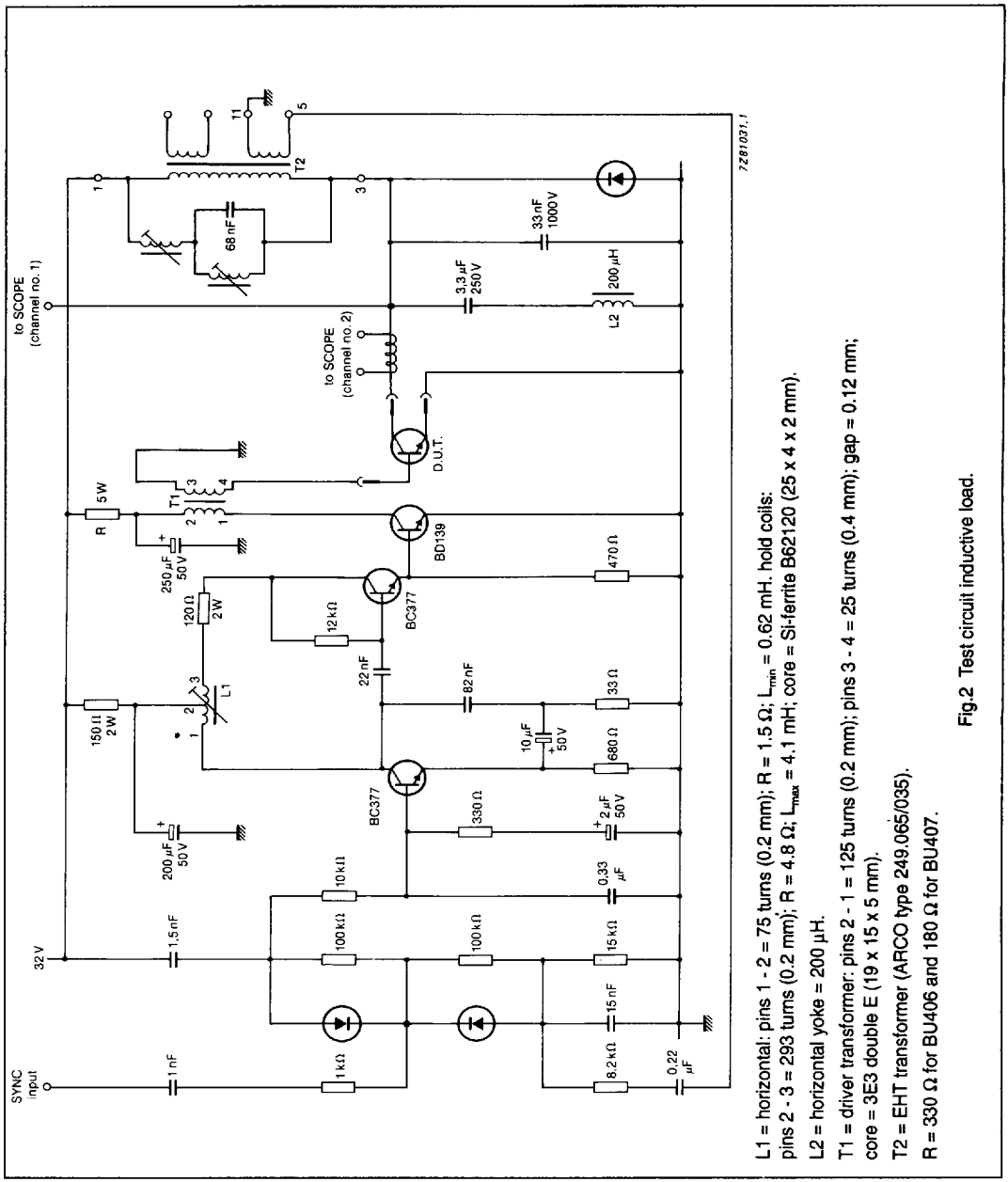

L1 = horizontal: pins 1 - 2 = 75 turns (0.2 mm); R = 1.5 Ω; L_{min} = 0.62 mH. hold coils: pins 2 - 3 = 293 turns (0.2 mm); R = 4.8 Ω; L_{max} = 4.1 mH; core = Si-ferrite B62120 (25 x 4 x 2 mm).
L2 = horizontal yoke = 200 µH.
T1 = driver transformer: pins 2 - 1 = 125 turns (0.2 mm); pins 3 - 4 = 25 turns (0.4 mm); gap = 0.12 mm; core = 3E3 double E (19 x 15 x 5 mm).
T2 = EHT transformer (ARCO type 249.065/035).
R = 330 Ω for BU406 and 180 Ω for BU407.

Fig.2 Test circuit inductive load.

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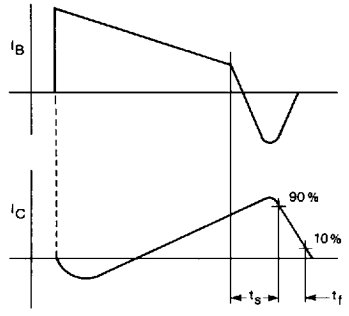
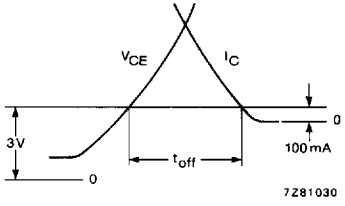
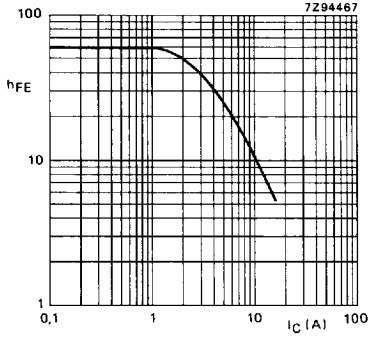




The turn-off time is the time taken for I_C to decrease to 100 mA after V_{CE} has risen 3 V into its flyback position.

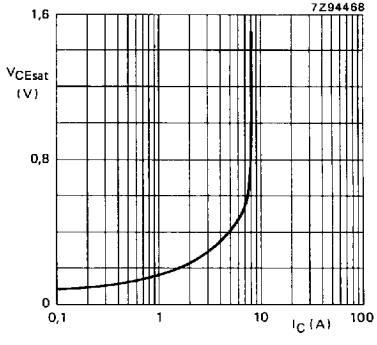
Fig.3 Waveforms for fall, storage and turn-off times.



BU406.

V_{CE} = 5 V; T_j = 25 °C.

Fig.4 DC current gain, typical values.



BU406.

I_C/I_B = 10; T_j = 25 °C.

Fig.5 Collector-emitter saturation voltage as a function of collector current, typical values.

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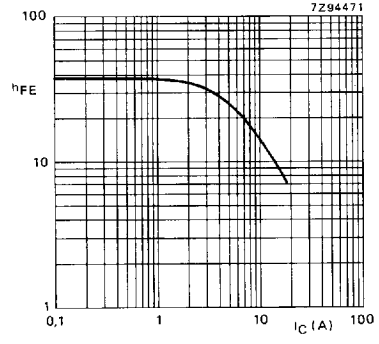
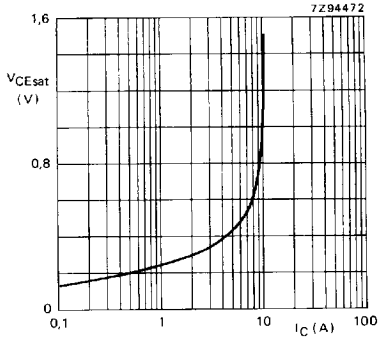


BU407.

V_{CE} = 5 V; T_j = 25 °C.

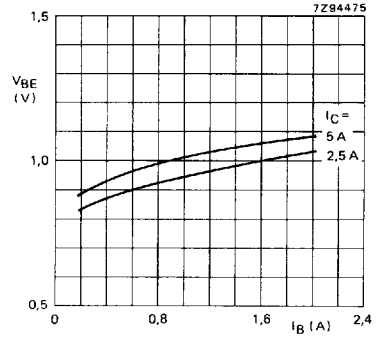
Fig.6 DC current gain, typical values.



BU407.

I_C/I_B = 10; T_j = 25 °C.

Fig.7 Collector-emitter saturation voltage as a function of collector current, typical values.



T_j = 25 °C.

Fig.8 Base-emitter voltage as a function of base current, typical values.

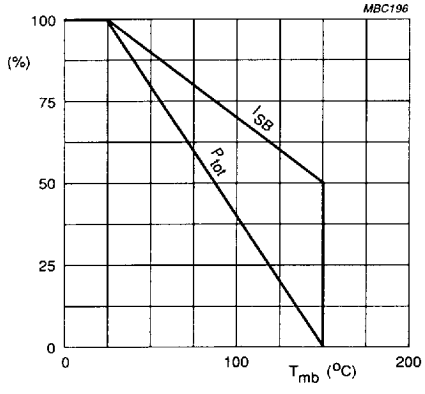


Fig.9 Power derating and second breakdown current curves.

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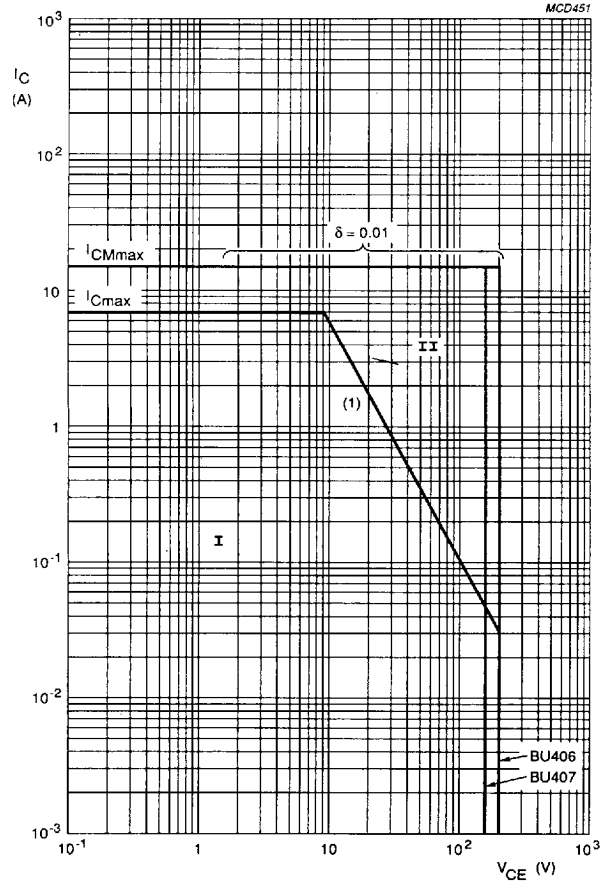

$T_{mb} \leq 25$ °C.

(1) Second breakdown limits.

I - Region of permissible DC operation.

II - Permissible extension for repetitive pulse operation.

Fig.10 Safe operating area.

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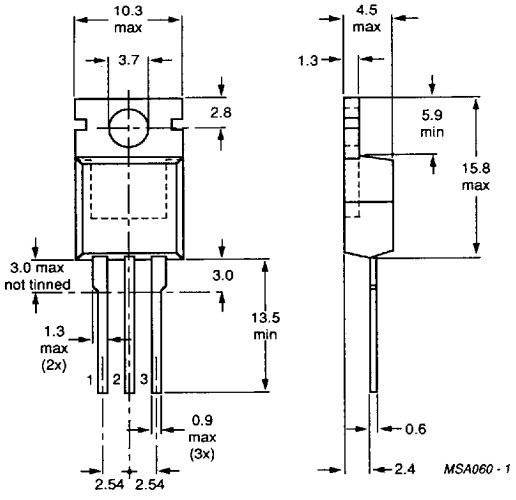
PACKAGE OUTLINE



Dimensions in mm.

Fig.11 TO-220AB.

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