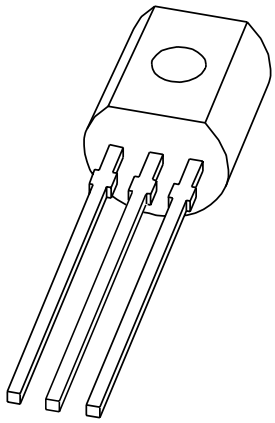
DATA SHEET



BRY56
Programmable unijunction transistor

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Jul 21

Philips
Semiconductors

PHILIPS

Programmable unijunction transistor BRY56

DESCRIPTION

Planar PNPN trigger device in a TO-92; SOT54 plastic package.

APPLICATIONS

- Switching applications such as:
  - Motor control
  - Oscillators
  - Relay replacement
  - Timers
  - Pulse shapers, etc.

PINNING

PIN	DESCRIPTION
1	gate
2	anode
3	cathode

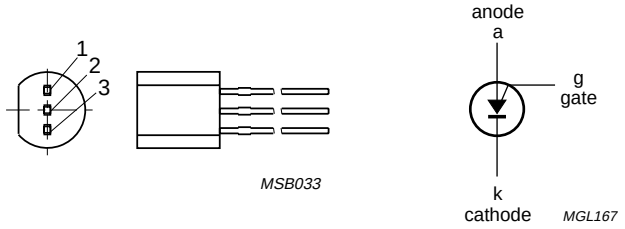


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{GA}	gate-anode voltage		–	70	V
$I_{A(AV)}$	average anode current		–	175	mA
P_{tot}	total power dissipation	$T_{amb} \leq 75$ °C	–	300	mW
T_j	operating junction temperature		–	150	°C
I_P	peak point current	V_S = 10 V; R_G = 10 kΩ	–	0.2	µA
I_V	valley point current	V_S = 10 V; R_G = 10 kΩ	2	–	µA

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{GA}	gate-anode voltage		–	70	V
$I_{A(AV)}$	average anode current		–	175	mA
I_{ARM}	repetitive peak anode current	t_p = 10 μs; δ = 0.01	–	2.5	A
I_{ASM}	non-repetitive peak anode current	t_p = 10 μs	–	3	A
dI_A/dt	rate of rise of anode current	$I_A \leq 2.5$ A	–	20	A/μs
P_{tot}	total power dissipation	$T_{amb} \leq 75$ °C	–	300	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

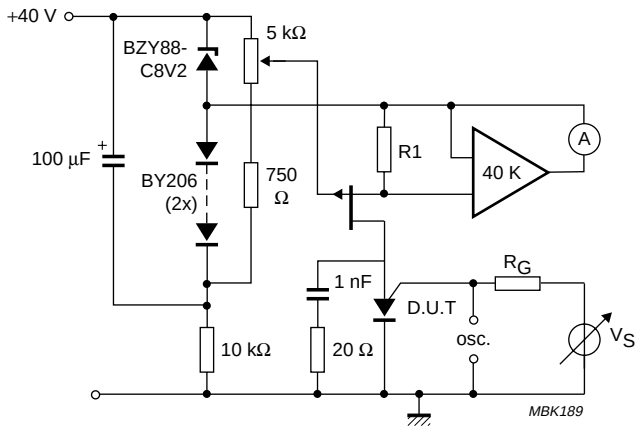
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	in free air	250	K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_P	peak point current	V_S = 10 V; R_G = 10 kΩ; see Fig.7	–	–	200	nA
		V_S = 10 V; R_G = 100 kΩ; see Fig.7	–	–	60	nA
I_V	valley point current	V_S = 10 V; R_G = 10 kΩ; see Fig.7	2	–	–	μA
		V_S = 10 V; R_G = 100 kΩ; see Fig.7	1	–	–	μA
V_{offset}	offset voltage	typical curve; I_A = 0; see Fig.7	–	V_P–V_S	–	V
I_{GAO}	gate-anode leakage current	I_K = 0; V_{GA} = 70 V; see Fig.5	–	–	10	nA
I_{GKS}	gate-cathode leakage current	V_{AK} = 0; V_{KG} = 70 V; see Fig.6	–	–	100	nA
V_{AK}	anode-cathode voltage	I_A = 100 mA	–	–	1.4	V
V_{OM}	peak output voltage	V_{AA} = 20 V; C = 10 nF; see Figs 8 and 9	6	–	–	V
t_r	rise time	V_{AA} = 20 V; C = 10 nF; see Fig.9	–	–	80	ns



I_P and I_V determined by value of R1.

$R1 = \frac{1}{I_A}$; i.e. maximum voltage drop over R1 = 1 V.

Internal resistance of oscilloscope = 10 MΩ.

Fig.2 Measuring circuit for peak and valley point currents.

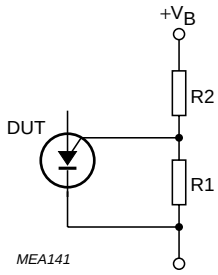


Fig.3 BRY56 with 'program' resistors R1 and R2.

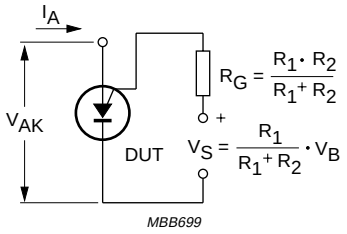


Fig.4 Equivalent test circuit for characteristics testing.

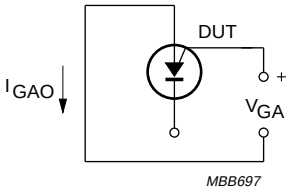


Fig.5 Equivalent test circuit for gate-anode leakage current.

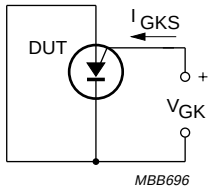


Fig.6 Equivalent test circuit for gate-cathode leakage current.

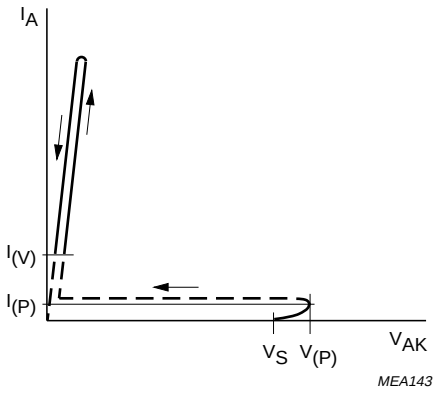


Fig.7 Offset voltage.

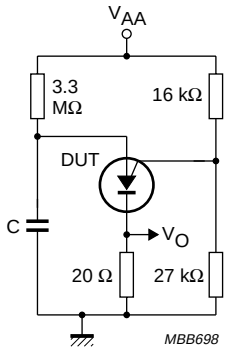


Fig.8 Test circuit for peak output voltage.

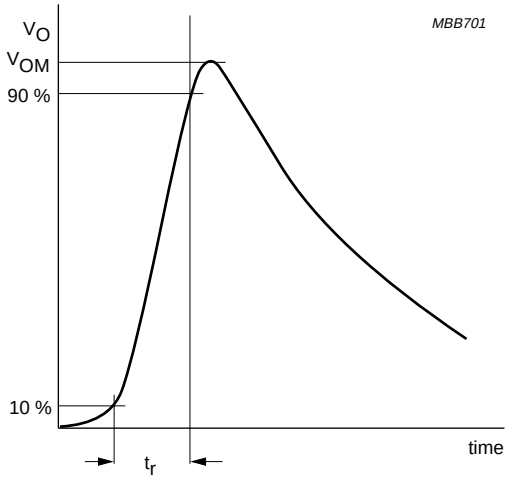
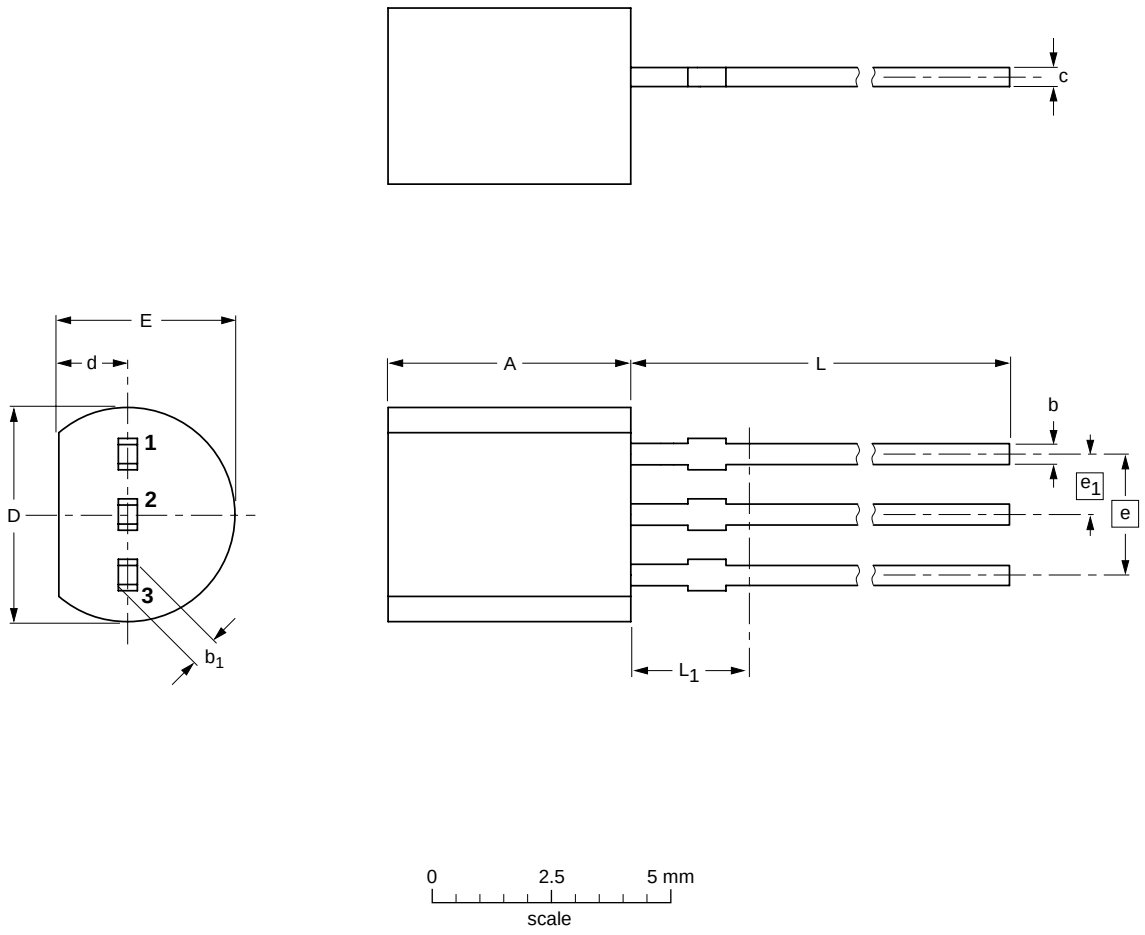


Fig.9 Peak output voltage.

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1(1)
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT54		TO-92	SC-43			97-02-28

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 given are 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 the 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.	

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NOTES

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