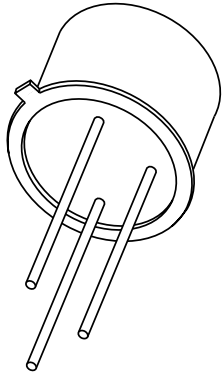


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# DATA SHEET



## **2N2907; 2N2907A** PNP switching transistors

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

1997 May 30

[查询"2N2907/A"供应商](#)**PNP switching transistors****2N2907; 2N2907A****FEATURES**

- High current (max. 600 mA)
- Low voltage (max. 60 V).

**APPLICATIONS**

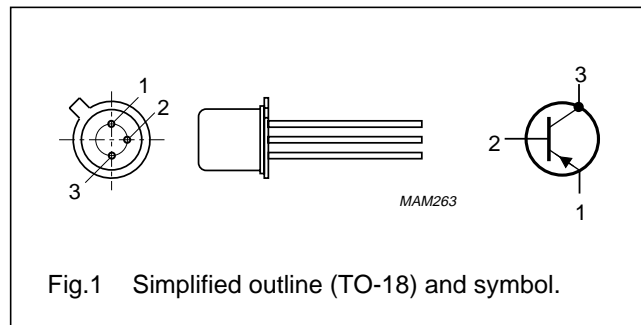
- Switching and linear amplification.

**DESCRIPTION**

PNP switching transistor in a TO-18 metal package.  
NPN complements: 2N2222 and 2N2222A.

**PINNING**

PIN	DESCRIPTION
1	emitter
2	base
3	collector, connected to case

**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–60	V
$V_{CEO}$	collector-emitter voltage 2N2907 2N2907A	open base	–	–40	V
			–	–60	V
$I_C$	collector current (DC)		–	–600	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	400	mW
$h_{FE}$	DC current gain	$I_C = -150\text{ mA}; V_{CE} = -10\text{ V}$	100	300	
$f_T$	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -20\text{ V}; f = 100\text{ MHz}$	200	–	MHz
$t_{off}$	turn-off time	$I_{Con} = -150\text{ mA}; I_{Bon} = -15\text{ mA}; I_{Boff} = 15\text{ mA}$	–	300	ns

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–60	V
$V_{CEO}$	collector-emitter voltage 2N2907 2N2907A	open base; $I_C < -100$ mA	–	–40	V
			–	–60	V
$V_{EBO}$	emitter-base voltage	open collector	–	–5	V
$I_C$	collector current (DC)		–	–600	mA
$I_{CM}$	peak collector current		–	–800	mA
$I_{BM}$	peak base current		–	–200	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	–	400	mW
		$T_{case} \leq 25$ °C	–	1.2	W
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	200	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air	438	K/W
$R_{th\ j-c}$	thermal resistance from junction to case		146	K/W

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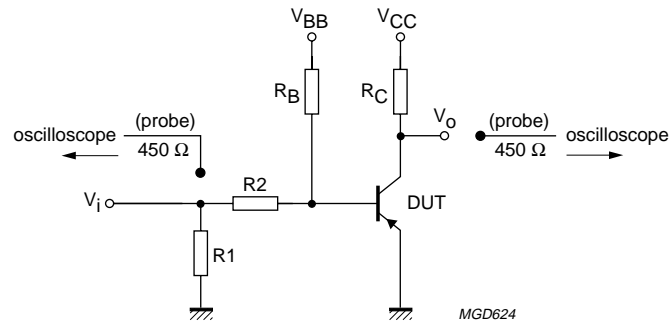
**CHARACTERISTICS** $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current 2N2907	$I_E = 0; V_{CB} = -50\text{ V}$	–	–20	nA
		$I_E = 0; V_{CB} = -50\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	–	–20	$\mu\text{A}$
$I_{CBO}$	collector cut-off current 2N2907A	$I_E = 0; V_{CB} = -50\text{ V}$	–	–10	nA
		$I_E = 0; V_{CB} = -50\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	–	–10	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = -5\text{ V}$	–	–50	nA
$h_{FE}$	DC current gain 2N2907	$V_{CE} = -10\text{ V}$			
		$I_C = -0.1\text{ mA}$	35	–	
		$I_C = -1\text{ mA}$	50	–	
		$I_C = -10\text{ mA}$	75	–	
		$I_C = -150\text{ mA}; \text{note 1}$	100	300	
$h_{FE}$	DC current gain 2N2907A	$V_{CE} = -10\text{ V}$			
		$I_C = -0.1\text{ mA}$	75	–	
		$I_C = -1\text{ mA}$	100	–	
		$I_C = -10\text{ mA}$	100	–	
		$I_C = -150\text{ mA}; \text{note 1}$	100	300	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$		–400	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$		–1.6	V
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{note 1}$		–1.3	V
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{note 1}$		–2.6	V
$C_c$	collector capacitance	$I_E = I_C = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	8	pF
$C_e$	emitter capacitance	$I_C = I_E = 0; V_{EB} = -2\text{ V}; f = 1\text{ MHz}$	–	30	pF
$f_T$	transition frequency	$I_C = -50\text{ mA}; V_{CE} = -20\text{ V}; f = 100\text{ MHz}; \text{note 1}$	200	–	MHz
<b>Switching times (between 10% and 90% levels); see Fig.2</b>					
$t_{on}$	turn-on time	$I_{Con} = -150\text{ mA}; I_{Bon} = -15\text{ mA}; I_{Boff} = 15\text{ mA}$	–	45	ns
$t_d$	delay time		–	15	ns
$t_r$	rise time		–	35	ns
$t_{off}$	turn-off time		–	300	ns
$t_s$	storage time		–	250	ns
$t_f$	fall time		–	50	ns

**Note**1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .

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$V_I = -9.5 \text{ V}$ ;  $T = 500 \text{ } \mu\text{s}$ ;  $t_p = 10 \text{ } \mu\text{s}$ ;  $t_r = t_f \leq 3 \text{ ns}$ .  
 $R_1 = 68 \text{ } \Omega$ ;  $R_2 = 325 \text{ } \Omega$ ;  $R_B = 325 \text{ } \Omega$ ;  $R_C = 160 \text{ } \Omega$ .  
 $V_{BB} = 3.5 \text{ V}$ ;  $V_{CC} = -29.5 \text{ V}$ .  
 Oscilloscope input impedance  $Z_i = 50 \text{ } \Omega$ .

Fig.2 Test circuit for switching times.

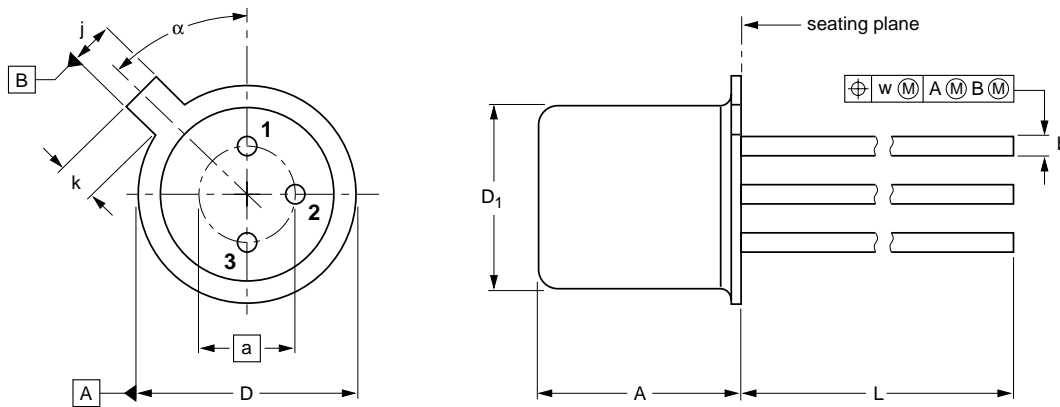
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PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads

SOT18/13



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	a	b	D	D <sub>1</sub>	j	k	L	w	α
mm	5.31 4.74	2.54	0.47 0.41	5.45 5.30	4.70 4.55	1.03 0.94	1.1 0.9	15.0 12.7	0.40	45°

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT18/13	B11/C7 type 3	TO-18			97-04-18

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**DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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Printed in The Netherlands

117047/00/02/pp8

Date of release: 1997 May 30

Document order number: 9397 750 02224

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