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Jameco Part Number 38279PHILIPS

## 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

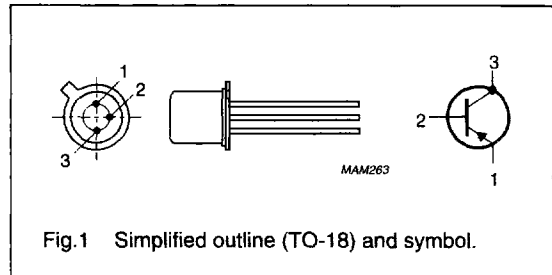


Fig.1 Simplified outline (TO-18) and symbol.

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–60	V
$V_{CEO}$	collector-emitter voltage	open base	–	–40	V
			–	–60	V
$I_C$	collector current (DC)		–	–600	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	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.

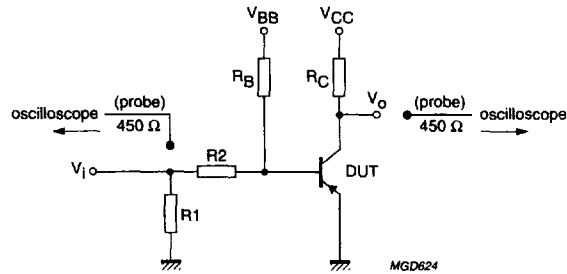
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{CBO}$	collector cut-off current 2N2907	$I_E = 0; V_{CB} = -50\text{ V}$	–	–20	nA
		$I_E = 0; V_{CB} = -50\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	–	–20	$\mu\text{A}$
$I_{CBO}$	collector cut-off current 2N2907A	$I_E = 0; V_{CB} = -50\text{ V}$	–	–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	$I_E = I_E = 0; V_{CB} = -10\text{ V}; f = 1\text{ MHz}$	–	8	pF
$C_e$	emitter capacitance	$I_C = I_C = 0; V_{EB} = -2\text{ V}; f = 1\text{ MHz}$	–	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.