



T-29-90

SILICON PLANAR EPITAXIAL TRANSISTORS

P-N-P transistors in TO-39 metal envelopes primarily intended for large signal, low-noise, low-power audio frequency applications for industrial service.

QUICK REFERENCE DATA

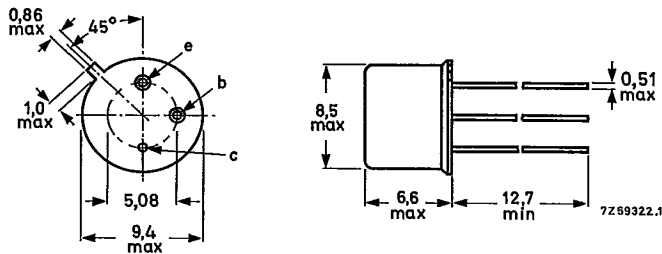
		2N4030 2N4032	2N4031 2N4033	
Collector-base voltage (open emitter)	$-V_{CBO}$ max.	60	80	V
Collector-emitter voltage (open base)	$-V_{CEO}$ max.	60	80	V
Collector current (d.c.)	$-I_C$ max.		1	A
Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$	P_{tot} max.		0,8	W
Junction temperature	T_j max.		200	$^\circ\text{C}$
D.C. current gain		25	70	
$-I_C = 500\text{ mA}; -V_{CE} = 5\text{ V}$	$h_{FE} >$			
Transition frequency at $f = 100\text{ MHz}$		100	150	MHz
$-I_C = 50\text{ mA}; -V_{CE} = 10\text{ V}$	$f_T >$			

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-39.

Collector connected to case



Maximum lead diameter is guaranteed only for 12,7 mm.

Accessories: 56245 (distance disc).

Qualification approved to CECC 50 002-131

RATINGS

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

			2N4030 2N4032	2N4031 2N4033
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80 V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80 V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5 V
Collector current (d.c.)	$-I_C$	max.	1	A
Total power dissipation up to $T_{amb} = 25\text{ }^{\circ}\text{C}$	P_{tot}	max.	0,8	W
up to $T_{case} = 25\text{ }^{\circ}\text{C}$	P_{tot}	max.	4,0	W
Storage temperature	T_{stg}		-65 to +200	$^{\circ}\text{C}$
Junction temperature	T_j	max.	200	$^{\circ}\text{C}$

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j-a}$	=	218	K/W
From junction to case	$R_{th\ j-c}$	=	44	K/W

CHARACTERISTICS

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

			2N4030 2N4032	2N4031 2N4033
Collector cut-off current				
$I_E = 0; -V_{CB} = 50\text{ V}$	$-I_{CBO}$	<	50	- nA
$I_E = 0; -V_{CB} = 60\text{ V}$	$-I_{CBO}$	<	-	50 nA
$I_E = 0; -V_{CB} = 50\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	$-I_{CBO}$	<	50	- μA
$I_E = 0; -V_{CB} = 60\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	$-I_{CBO}$	<	-	50 μA
Emitter cut-off current				
$I_C = 0; -V_{EB} = 5\text{ V}$	$-I_{EBO}$	<	10	10 μA
Breakdown voltages				
$I_E = 0; -I_C = 10\text{ }\mu\text{A}$	$-V_{(BR)CBO}$	>	60	80 V
$I_B = 0; -I_C = 10\text{ mA}$	$-V_{(BR)CEO}$	>	60	80 V *
$I_C = 0; -I_E = 10\text{ }\mu\text{A}$	$-V_{(BR)EBO}$	>	5	5 V

* Measured under pulse conditions: $t_p = 300\text{ }\mu\text{s}; \delta \leq 0,01$.

PHILIPS INTERNATIONAL

56E D ■ 7110826 0042658 509 ■ PHIN

		2N4030	2N4031
		2N4032	2N4033
Base-emitter voltage			
$-I_C = 500 \text{ mA}; -V_{CE} = 0,5 \text{ V}$	$-V_{BE} <$	1,1	1,1 V *
$-I_C = 1000 \text{ mA}; -V_{CE} = 1,0 \text{ V}$	$-V_{BE} <$	1,2	- V *
Saturation voltages			
$-I_C = 150 \text{ mA}; -I_B = 15 \text{ mA}$	$-V_{CEsat} <$	0,15	0,15 V
	$-V_{BEsat} <$	0,90	0,90 V *
$-I_C = 500 \text{ mA}; -I_B = 50 \text{ mA}$	$-V_{CEsat} <$	0,50	0,50 V
$-I_C = 1000 \text{ mA}; -I_B = 100 \text{ mA}$	$-V_{CEsat} <$	1,00	- V
		2N4030	2N4032
		2N4031	2N4033
D.C. current gain *			
$-I_C = 100 \mu\text{A}; -V_{CE} = 5 \text{ V}$	$h_{FE} >$	30	75
$-I_C = 100 \text{ mA}; -V_{CE} = 5 \text{ V}$	$h_{FE} >$	40	100
	$h_{FE} <$	120	300
$-I_C = 100 \text{ mA}; -V_{CE} = 5 \text{ V}; T_{amb} = -55 \text{ }^\circ\text{C}$	$h_{FE} >$	15	40
$-I_C = 5000 \text{ mA}; -V_{CE} = 5 \text{ V}$	$h_{FE} >$	25	70
$-I_C = 1000 \text{ mA}; -V_{CE} = 5 \text{ V}$	$h_{FE} >$	15	
	$h_{FE} >$	10	
	$h_{FE} >$	40	
	$h_{FE} >$	25	
Collector capacitance at $f = 1 \text{ MHz}$			
$I_E = I_e = 0; -V_{CB} = 10 \text{ V}$	$C_c <$	20	pF
Emitter capacitance at $f = 1 \text{ MHz}$			
$I_C = I_c = 0; -V_{EB} = 0,5 \text{ V}$	$C_e <$	110	pF
		2N4030	2N4032
		2N4031	2N4033
Transition frequency at $f = 100 \text{ MHz}$			
$-I_C = 50 \text{ mA}; -V_{CE} = 10 \text{ V}$	$f_T >$	100	150 MHz
	$f_T <$	400	500 MHz

* Measured under pulse conditions: $t_p = 300 \mu\text{s}; \delta \leq 0,01$.

Switching times

$-I_{Con} = 500 \text{ mA}; -I_{Bon} = 50 \text{ mA}$

Turn-on time

$-I_{Con} = 500 \text{ mA}; -I_{Bon} = +I_{Boff} = 50 \text{ mA}$

Storage time

Fall time

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$t_{on} < 100 \text{ ns}$

$t_s < 350 \text{ ns}$

$t_f < 50 \text{ ns}$

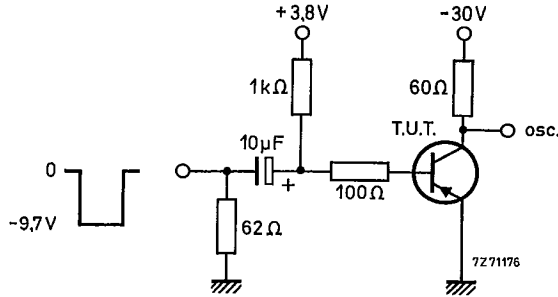


Fig. 2 Switching circuit.

Pulse generator:

Rise time $t_r < 20 \text{ ns}$

Fall time $t_f < 20 \text{ ns}$

Pulse duration $t_p = 10 \mu\text{s}$

Duty factor $\delta < 0,02$

Source impedance $Z_S = 50 \Omega$

Oscilloscope:

Rise time $t_r = 10 \text{ ns}$

Input impedance $Z_I > 100 \text{ k}\Omega$