PHILIPS INTERNATIONAL 56E D 7110826 0042656 736 PHIN

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

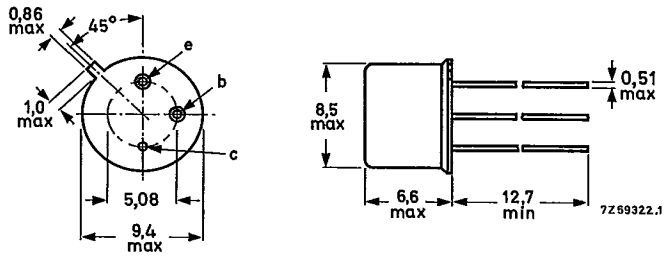
			2N4030 2N4032	2N4031 2N4033	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	60	80	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	60	80	V
Collector current (d.c.)	$-I_C$	max.	1		A
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	0,8		W
Junction temperature	T_j	max.	200		°C
	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

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

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RATINGS

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 °C	P_{tot}	max.	0,8		W
up to T_{case} = 25 °C	P_{tot}	max.	4,0		W
Storage temperature	T_{stg}		−65 to +200		°C
Junction temperature	T_j	max.	200		°C

THERMAL RESISTANCE

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

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

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

* Measured under pulse conditions: t_p = 300 μs; $\delta \leqslant 0{,}01$.

				2N4030 2N4032	2N4031 2N4033	
Base-emitter voltage						
$-I_C$ = 500 mA; $-V_{CE}$ = 0,5 V		$-V_{BE}$	<	1,1	1,1	V *
$-I_C$ = 1000 mA; $-V_{CE}$ = 1,0 V		$-V_{BE}$	<	1,2	–	V *
Saturation voltages						
$-I_C$ = 150 mA; $-I_B$ = 15 mA		$-V_{CEsat}$	<	0,15	0,15	V
		$-V_{BEsat}$	<	0,90	0,90	V *
$-I_C$ = 500 mA; $-I_B$ = 50 mA		$-V_{CEsat}$	<	0,50	0,50	V
$-I_C$ = 1000 mA; $-I_B$ = 100 mA		$-V_{CEsat}$	<	1,00	–	V

				2N4030 2N4031	2N4032 2N4033	
D.C. current gain *						
$-I_C$ = 100 μA; $-V_{CE}$ = 5 V		h_{FE}	>	30	75	
$-I_C$ = 100 mA; $-V_{CE}$ = 5 V		h_{FE}	>	40	100	
			<	120	300	
$-I_C$ = 100 mA; $-V_{CE}$ = 5 V; T_{amb} = –55 °C		h_{FE}	>	15	40	
$-I_C$ = 5000 mA; $-V_{CE}$ = 5 V		h_{FE}	>	25	70	
$-I_C$ = 1000 mA; $-V_{CE}$ = 5 V	**2N4030**	h_{FE}	>	15		
	2N4031	h_{FE}	>	10		
	2N4032	h_{FE}	>	40		
	2N4033	h_{FE}	>	25		
Collector capacitance at f = 1 MHz						
$I_E = I_e$ = 0; $-V_{CB}$ = 10 V		C_c	<	20		pF
Emitter capacitance at f = 1 MHz						
$I_C = I_c$ = 0; $-V_{EB}$ = 0,5 V		C_e	<	110		pF

				2N4030 2N4031	2N4032 2N4033	
Transition frequency at f = 100 MHz						
$-I_C$ = 50 mA; $-V_{CE}$ = 10 V		f_T	>	100	150	MHz
			<	400	500	MHz

* Measured under pulse conditions: t_p = 300 μs; $\delta \leqslant 0{,}01$.

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Switching times			
$-I_{Con}$ = 500 mA; $-I_{Bon}$ = 50 mA			
Turn-on time	t_{on}	<	100 ns
$-I_{Con}$ = 500 mA; $-I_{Bon}$ = $+I_{Boff}$ = 50 mA			
Storage time	t_s	<	350 ns
Fall time	t_f	<	50 ns

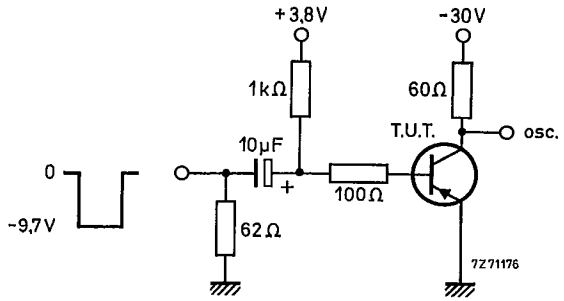

Fig. 2 Switching circuit.

Pulse generator:

Rise time	t_r	<	20 ns
Fall time	t_f	<	20 ns
Pulse duration	t_p	=	10 μs
Duty factor	δ	<	0,02
Source impedance	Z_S	=	50 Ω

Oscilloscope:

Rise time	t_r	=	10 ns
Input impedance	Z_I	>	100 kΩ