SILICON PLANAR EPITAXIAL TRANSISTORS

P-N-P medium power transistors in plastic TO-92 packages, primarily designed for high-speed switching and driver applications for industrial service.

QUICK REFERENCE DATA

Collector-base voltage (open emitter)		$-V_{CBO}$	max.	60 V
Collector-emitter voltage (open base)	**PH2907**	$-V_{CEO}$	max.	40 V
	PH2907A	$-V_{CEO}$	max.	60 V
Collector current (d.c.)		$-I_C$	max.	600 mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	500 mW
Junction temperature		T_j	max.	150 °C
D.C. current gain at T_j = 25 °C $-I_C$ = 150 mA; $-V_{CE}$ = 10 V		h_{FE}	100 to 300	
Transition frequency at f = 100 MHz $-I_C$ = 50 mA; $-V_{CE}$ = 20 V; T_j = 25 °C		f_T	>	200 MHz
Storage time $-I_{Con}$ = 150 mA; $-I_{Bon}$ = I_{Boff} = 15 mA		t_s	<	80 ns

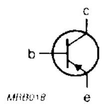
MECHANICAL DATA

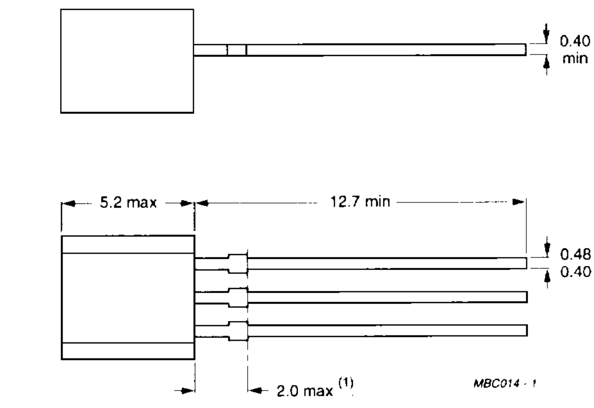
Dimensions in mm

Fig. 1 TO-92.

Pinning

1 = emitter
2 = base
3 = collector





Note (1) Terminal dimensions within this zone are uncontrolled to allow for plastic and terminal irregularities.

RATINGS

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

Collector-base voltage (open emitter)		$-V_{CBO}$	max.	60	V
Collector-emitter voltage (open base)	**PH2907**	$-V_{CEO}$	max.	40	V
	PH2907A	$-V_{CEO}$	max.	60	V
Emitter-base voltage (open collector)		$-V_{EBO}$	max.	5	V
Collector current (d.c.)		$-I_C$	max.	600	mA
Total power dissipation up to T_{amb} = 25 °C		P_{tot}	max.	500	mW
Storage temperature range		T_{stg}		−65 to + 150	°C
Junction temperature		T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	250	K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified

			2N2907	2N2907A	
Collector cut-off current					
$I_E = 0; -V_{CB} = 50$ V	$-I_{CBO}$	<	20	10	nA
$I_E = 0; -V_{CB} = 50$ V; $T_{amb} = 150$ °C	$-I_{CBO}$	<	20	10	μA
$+V_{BE} = 0{,}5$ V; $-V_{CE} = 30$ V	$-I_{CEX}$	<	50	50	nA
Base current					
$+V_{BE} = 0{,}5$ V; $-V_{CE} = 30$ V	I_{BEX}	<	50	50	nA
Collector-base breakdown voltage					
open emitter; $-I_C = 10$ μA	$-V_{(BR)CBO}$	>	60	60	V
Collector-emitter breakdown voltage*					
open base; $-I_C = 10$ mA	$-V_{(BR)CEO}$	>	40	60	V
Emitter-base breakdown voltage					
open collector; $-I_E = 10$ μA	$-V_{(BR)EBO}$	>	5	5	V
Saturation voltages*					
$-I_C = 150$ mA; $-I_B = 15$ mA	$-V_{CEsat}$	<	0,4	0,4	V
	$-V_{BEsat}$	<	1,3	1,3	V
$-I_C = 500$ mA; $-I_B = 50$ mA	$-V_{CEsat}$	<	1,6	1,6	V
	$-V_{BEsat}$	<	2,6	2,6	V
D.C. current gain					
$-I_C = 0{,}1$ mA; $-V_{CE} = 10$ V	h_{FE}	>	35	75	
$-I_C = 1$ mA; $-V_{CE} = 10$ V	h_{FE}	>	50	100	
$-I_C = 10$ mA; $-V_{CE} = 10$ V	h_{FE}	>	75	100	
$-I_C = 150$ mA; $-V_{CE} = 10$ V*	h_{FE}	>	100	100	
		<	300	300	
$-I_C = 500$ mA; $-V_{CE} = 10$ V*	h_{FE}	>	30	50	
Collector capacitance at f = 100 kHz					
$I_E = I_e = 0; -V_{CB} = 10$ V	C_c	<	8		pF
Emitter capacitance at f = 100 kHz					
$I_C = I_c = 0; -V_{EB} = 2$ V	C_e	<	30		pF
Transition frequency at f = 100 MHz					
$-I_C = 50$ mA; $-V_{CE} = 20$ V*	f_T	>	200		MHz

* Measured under pulse conditions to avoid excessive dissipation: $t_p \leq 300$ μs; $\delta \leq 0{,}02$.

Turn-on time (see Fig. 2)
when switched to $-I_{Con}$ = 150 mA; $-I_{Bon}$ = 15 mA

delay time	t_d	$<$	10	ns
rise time	t_r	$<$	40	ns
turn-on time	t_{on}	$<$	45	ns

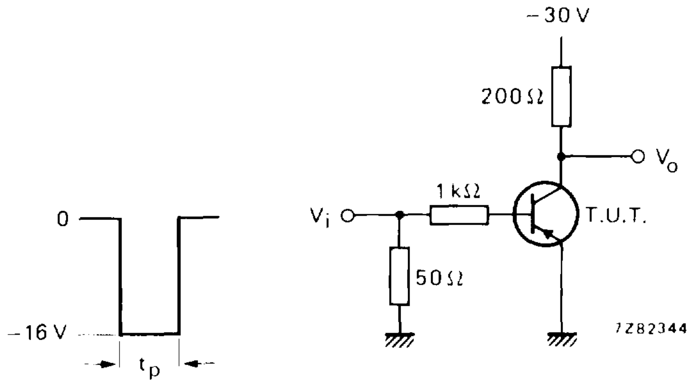


Fig. 2 Input waveform and test circuit for determining delay, rise and turn-on time.

Turn-off time (see Fig. 3)
when switched from $-I_{Con}$ = 150 mA; $-I_{Bon}$ = 15 mA
to cut-off with + I_{Boff} = 15 mA

storage time	t_s	$<$	80	ns
fall time	t_f	$<$	30	ns
turn-off time	t_{off}	$<$	100	ns

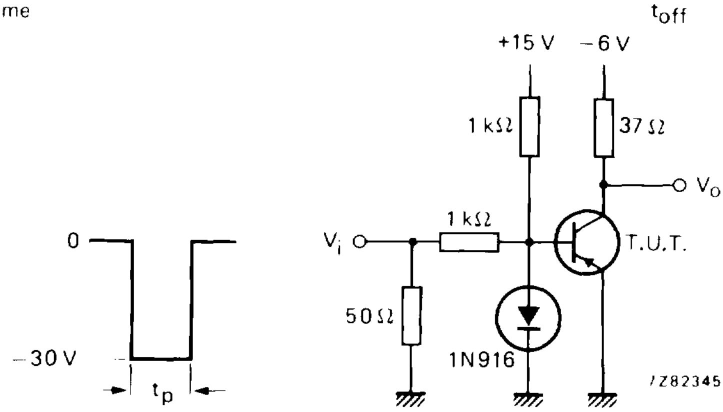


Fig. 3 Input waveform and test circuit for determining storage, fall and turn-off time.

Pulse generator (see Figs 2 and 3)

frequency	f	=	150	Hz
pulse duration	t_p	=	200	ns
rise time	t_r	$\leq$	2	ns
output impedance	Z_o	=	50	Ω

Oscilloscope (see Figs 2 and 3)

rise time	t_r	$\leq$	5	ns
input impedance	Z_i	$\leq$	10	MΩ