NPN general purpose transistor

PMSS3904

FEATURES

- S-mini package.

DESCRIPTION

NPN transistor in a plastic SOT323 package, primarily intended for use in telephony and professional communication equipment.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

MARKING CODE

PMSS3904	PO4

PIN CONFIGURATION

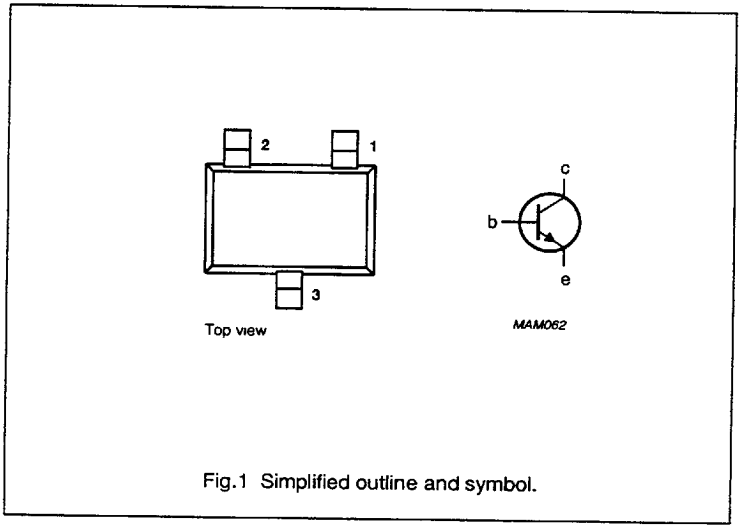


Fig.1 Simplified outline and symbol.

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
P_{tot}	total power dissipation	up to T_{amb} = 25 °C	–	200	mW
h_{FE}	DC current gain	I_C = 10 mA; V_{CE} = 1 V	100	300	
f_T	transition frequency	I_C = 10 mA; V_{CE} = 20 V; f = 100 MHz	180	–	MHz

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	open base	–	40	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	DC collector current		–	200	mA
P_{tot}	total power dissipation	up to T_{amb} = 25 °C; note 1	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

Note

1. Refer to SOT323 standard mounting conditions.

THERMAL RESISTANCE

SYMBOL	PARAMETER	CONDITIONS	THERMAL RESISTANCE
$R_{th\ j-a}$	from junction to ambient in free air	note 1	625 K/W

Note

1. Refer to SOT323 standard mounting conditions.

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

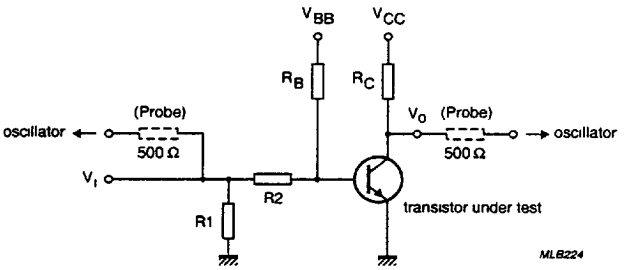
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter I_C = 10 μA; $I_E = I_e$ = 0	60	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base I_C = 1 mA; $I_B = I_b$ = 0; note 1	40	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector I_E = 10 μA; $I_C = I_c$ = 0	6	–	V
I_{CEX}	current at reverse biased emitter junction	V_{CE} = 30 V; V_{EB} = 3 V	–	50	nA
I_{CEX}	collector cut-off current emitter junction	V_{CE} = 30 V; V_{EB} = 3 V; T_j = 150 °C	–	10	μA
I_{EBX}	emitter cut-off current emitter junction	V_{CE} = 30 V; V_{EB} = 3 V	–	−50	nA
V_{CEsat}	saturation voltage	I_C = 10 mA; I_B = 1 mA	–	200	mV
		I_C = 50 mA; I_B = 5 mA; note 1	–	300	mV
V_{BEsat}	saturation voltage	I_C = 10 mA; I_B = 1 mA	650	850	mV
		I_C = 50 mA; I_B = 5 mA; note 1	–	950	mV
C_c	collector capacitance	V_{CB} = 5 V; $I_E = I_e$ = 0; f = 1 MHz	–	4	pF
C_e	emitter capacitance	V_{EB} = 0.5 V; $I_E = I_e$ = 0; f = 1 MHz	–	12	pF
f_T	transition frequency	I_C = 10 mA; V_{CE} = 20 V; f = 100 MHz	180	–	MHz
h_{FE}	DC current gain				
		I_C = 0.1 mA; V_{CE} = 1 V	40	–	
		I_C = 1 mA; V_{CE} = 1 V	70	–	
		I_C = 10 mA; V_{CE} = 1 V	100	300	
		I_C = 50 mA; V_{CE} = 1 V; note 1	60	–	
		I_C = 100 mA; V_{CE} = 1 V; note 1	30	–	
F	noise figure	I_C = 100 μA; V_{CE} = 5 V; R_S = 1 kΩ; f = 10 Hz to 15.7 kHz	–	5	dB

Note

1. Pulse test: $t_p \leq 300$ μs; $\delta \leq 0.02$.

Table 1 Switching times (resistive load); see Fig.2.

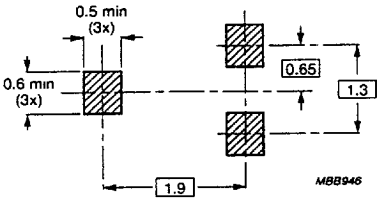
SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
t_{on}	turn-on time	I_{Con} = 10 mA; I_{Bon} = 1 mA; V_{CC} = 3 V; V_{BB} = −1.9 V		
t_d	delay time		45	ns
t_r	rise time		55	ns
t_{off}	turn-off time	I_{Con} = 10 mA; I_{Bon} = I_{Boff} = 1 mA; V_{CC} = 3 V; V_{BB} = −1.9 V		
t_s	storage time		900	ns
t_f	fall time		90	ns



V_i = 5 V; $t_p \geq 4$ µs; $t_r = t_f \leq 3$ ns
R1 = 56 Ω; R2 = 2.5 kΩ; R_B = 3.9 kΩ; R_C = 270 Ω

Fig.2 Test circuit for switching times (see Table 1).

MOUNTING



Dimensions in mm.

Fig.3 SOT323 typical soldering pattern.