

PMBT2222; PMBT2222A

FEATURES

- High current (max. 600 mA)
- Low voltage (max. 40 V).

APPLICATIONS

- Switching and linear amplification.

DESCRIPTION

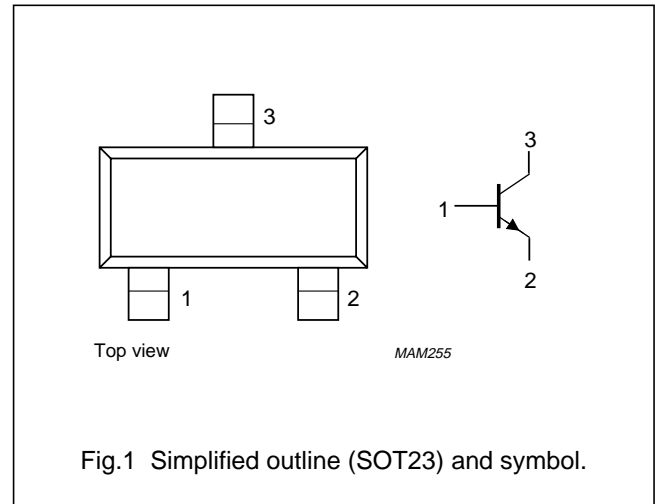
NPN switching transistor in a SOT23 plastic package.
PNP complements: PMBT2907 and PMBT2907A.

MARKING

TYPE NUMBER	MARKING CODE ⁽¹⁾
PMBT2222	*1B
PMBT2222A	*1P

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



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			
	PMBT2222		–	60	V
	PMBT2222A		–	75	V
V _{CEO}	collector-emitter voltage	open base			
	PMBT2222		–	30	V
	PMBT2222A		–	40	V
V _{EBO}	emitter-base voltage	open collector			
	PMBT2222		–	5	V
	PMBT2222A		–	6	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} ≤ 25 °C; note 1	–	250	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C
T _{amb}	operating ambient temperature		–65	+150	°C

Note

1. Transistor mounted on an FR4 printed-circuit board.

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Transistor mounted on an FR4 printed-circuit board.

CHARACTERISTICS
 $T_j = 25\text{ °C}$ unless otherwise specified.

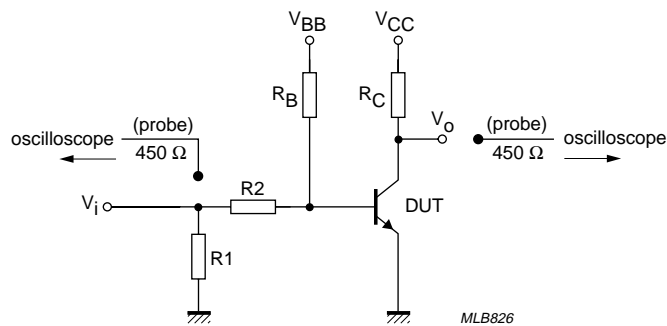
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current PMBT2222	$I_E = 0; V_{CB} = 50\text{ V}$	–	10	nA
		$I_E = 0; V_{CB} = 50\text{ V}; T_j = 125\text{ °C}$	–	10	μA
	collector cut-off current PMBT2222A	$I_E = 0; V_{CB} = 60\text{ V}$	–	10	nA
		$I_E = 0; V_{CB} = 60\text{ V}; T_j = 125\text{ °C}$	–	10	μA
I_{EBO}	emitter cut-off current PMBT2222A	$I_C = 0; V_{EB} = 5\text{ V}$	–	10	nA
h_{FE}	DC current gain	$I_C = 0.1\text{ mA}; V_{CE} = 10\text{ V}$	35	–	
		$I_C = 1\text{ mA}; V_{CE} = 10\text{ V}$	50	–	
		$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}$	75	–	
		$I_C = 10\text{ mA}; V_{CE} = 10\text{ V}; T_{amb} = -55\text{ °C}$	35	–	
		$I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$	100	300	
		$I_C = 150\text{ mA}; V_{CE} = 1\text{ V}$	50	–	
	DC current gain PMBT2222 PMBT2222A	$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$	30 40	– –	
V_{CEsat}	collector-emitter saturation voltage PMBT2222 PMBT2222A	$I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$	– –	400 300	mV mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	– –	1.6 1	V V
	base-emitter saturation voltage PMBT2222 PMBT2222A	$I_C = 150\text{ mA}; I_B = 15\text{ mA}; \text{note 1}$	– 0.6	1.3 1.2	V V
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	– –	2.6 2	V V
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	8	pF

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
C _e	emitter capacitance	I _C = i _c = 0; V _{EB} = 500 mV; f = 1 MHz	-	30	
	PMBT2222			25	
f _T	transition frequency	I _C = 20 mA; V _{CE} = 20 V; f = 100 MHz	250	-	MHz
	PMBT2222A			300	MHz
F	noise figure	I _C = 100 μA; V _{CE} = 5 V; R _S = 1 kΩ; f = 1 kHz	-	4	dB
Switching times (between 10% and 90% levels); (see Fig.2)					
t _{on}	turn-on time	I _{Con} = 150 mA; I _{Bon} = 15 mA; I _{Boff} = -15 mA	-	35	ns
t _d	delay time		-	15	ns
t _r	rise time		-	20	ns
t _{off}	turn-off time		-	250	ns
t _s	storage time		-	200	ns
t _f	fall time		-	60	ns

Note

1. Pulse test: t_p ≤ 300 μs; δ ≤ 0.02.



V_i = 9.5 V; T = 500 μs; t_p = 10 μs; t_r = t_f ≤ 3 ns.
 R₁ = 68 Ω; R₂ = 325 Ω; R_B = 325 Ω; R_C = 160 Ω.
 V_{BB} = -3.5 V; V_{CC} = 29.5 V.
 Oscilloscope: input impedance Z_i = 50 Ω.

Fig.2 Test circuit for switching times.