



MMBT3904

SMALL SIGNAL NPN TRANSISTOR

PRELIMINARY DATA

Type	Marking
MMBT3904	34

- SILICON EPITAXIAL PLANAR NPN TRANSISTOR
- MINIATURE SOT-23 PLASTIC PACKAGE FOR SURFACE MOUNTING CIRCUITS
- TAPE AND REEL PACKING
- THE PNP COMPLEMENTARY TYPE IS MMBT3906

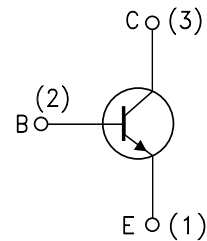
APPLICATIONS

- WELL SUITABLE FOR PORTABLE EQUIPMENT
- SMALL LOAD SWITCH TRANSISTOR WITH HIGH GAIN AND LOW SATURATION VOLTAGE



SOT-23

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage ($I_E = 0$)	60	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	40	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	6	V
I_C	Collector Current	200	mA
P_{tot}	Total Dissipation at $T_C = 25\text{ }^\circ\text{C}$	350	mW
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

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THERMAL DATA

$R_{thj-amb}$ •	Thermal Resistance Junction-Ambient	Max	357.1	°C/W
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• Device mounted on a PCB area of 1 cm²

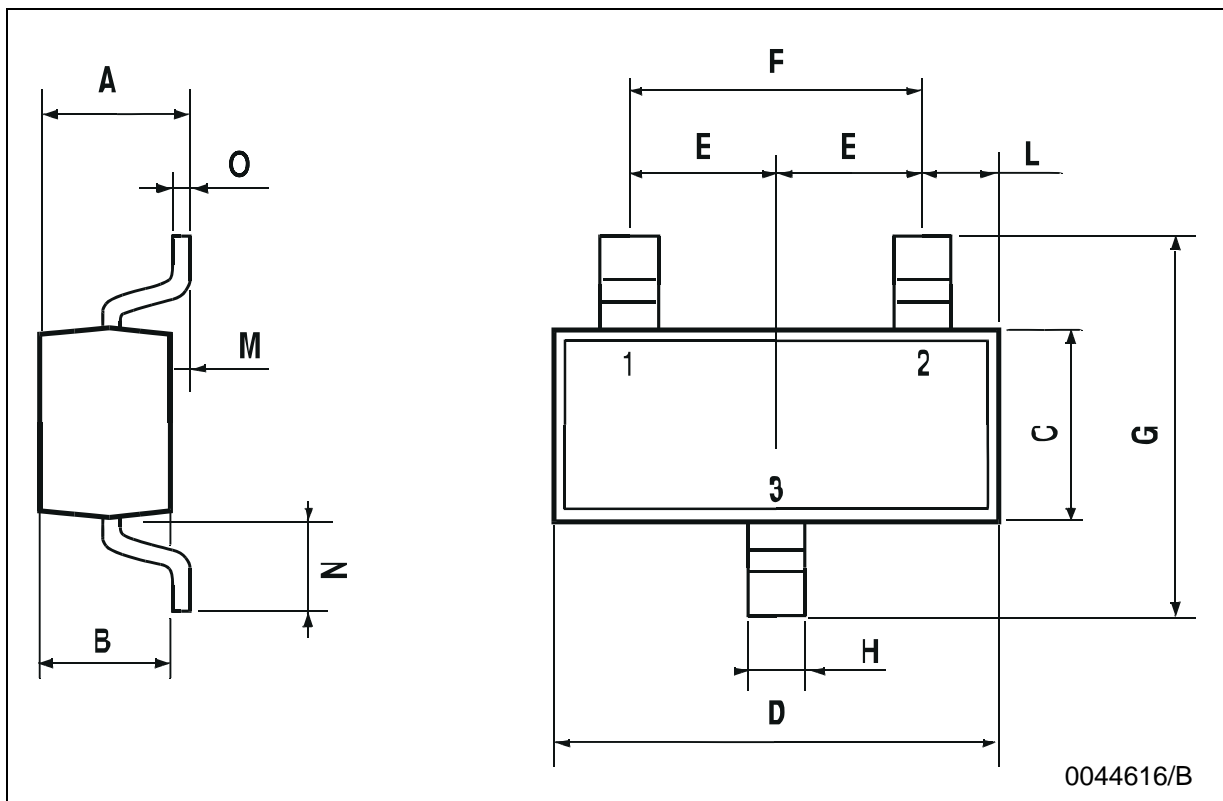
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CEX}	Collector Cut-off Current (V _{BE} = -3 V)	V _{CE} = 30 V			50	nA
I _{BEX}	Base Cut-off Current (V _{BE} = -3 V)	V _{CE} = 30 V			50	nA
V _{(BR)CEO} *	Collector-Emitter Breakdown Voltage (I _B = 0)	I _C = 1 mA	40			V
V _{(BR)CBO}	Collector-Base Breakdown Voltage (I _E = 0)	I _C = 10 μA	60			V
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 μA	6			V
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 10 mA I _B = 1 mA I _C = 50 mA I _B = 5 mA			0.2 0.2	V V
V _{BE(sat)} *	Base-Emitter Saturation Voltage	I _C = 10 mA I _B = 1 mA I _C = 50 mA I _B = 5 mA	0.65		0.85 0.95	V V
h _{FE} *	DC Current Gain	I _C = 0.1 mA V _{CE} = 1 V I _C = 1 mA V _{CE} = 1 V I _C = 10 mA V _{CE} = 1 V I _C = 50 mA V _{CE} = 1 V I _C = 100 mA V _{CE} = 1 V	60 80 100 60 30		300	
f _T	Transition Frequency	I _C = 10 mA V _{CE} = 20 V f = 100 MHz	250	270		MHz
C _{CB0}	Collector-Base Capacitance	I _E = 0 V _{CB} = 10 V f = 1 MHz		4		pF
C _{EBO}	Emitter-Base Capacitance	I _C = 0 V _{EB} = 0.5 V f = 1 MHz		18		pF
NF	Noise Figure	V _{CE} = 5 V I _C = 0.1 mA f = 10 Hz to 15.7 KHz R _G = 1 KΩ		5		dB
t _d	Delay Time	I _C = 10 mA I _B = 1 mA			35	ns
t _r	Rise Time	V _{CC} = 30 V			35	ns
t _s	Storage Time	I _C = 10 mA I _{B1} = -I _{B2} = 1 mA			200	ns
t _f	Fall Time	V _{CC} = 30 V			50	ns

* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

SOT-23 MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.85		1.1	33.4		43.3
B	0.65		0.95	25.6		37.4
C	1.20		1.4	47.2		55.1
D	2.80		3	110.2		118
E	0.95		1.05	37.4		41.3
F	1.9		2.05	74.8		80.7
G	2.1		2.5	82.6		98.4
H	0.38		0.48	14.9		18.8
L	0.3		0.6	11.8		23.6
M	0		0.1	0		3.9
N	0.3		0.65	11.8		25.6
O	0.09		0.17	3.5		6.7



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