

**MMBTA06**  
NPN TRANSISTOR



**VOLTAGE:** 80 Volts

**CURRENT:** 0.5 Amperes

SOT-23

Marking and Polarity

**FEATURES**

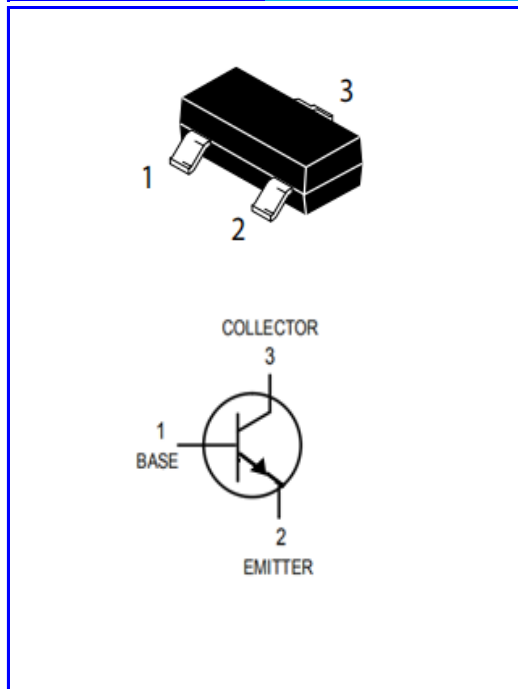
- High current capacity in compact package.  $I_C = 0.5$  A.
- Epitaxial planar type.
- Pb-Free Package is available.

**MECHANICAL DATA**

- **Package:** SOT-23
- **Epoxy UL:** 94V-0
- **Mounting position:** Any
- **Weight:** approx. 0.01g

**DEVICE MARKING**

Device	Marking
MMBTA06	1GM



**Maximum Ratings** (Ratings at 25°C ambient temperature unless otherwise specified.)

Parameter	Symbol	Value	Unit
Collector-Base Voltage)	$V_{CBO}$	80	V
Collect-Emitter Voltage	$V_{CEO}$	80	V
Emitter-Base Voltage	$V_{EBO}$	4	V
Collector Current	$I_C$	500	mA
Collector Power Dissipation	$P_C$	300	mW

**Thermal Characteristics** (Ratings at 25°C ambient temperature unless otherwise specified.)

Junction Temperature	$T_J$	-55 to 150	°C
Storage Temperature Range	$T_{STG}$	-55 to 150	°C
Typical thermal resistance (Note 2)	$R_{\theta JA}$	416	°C/W

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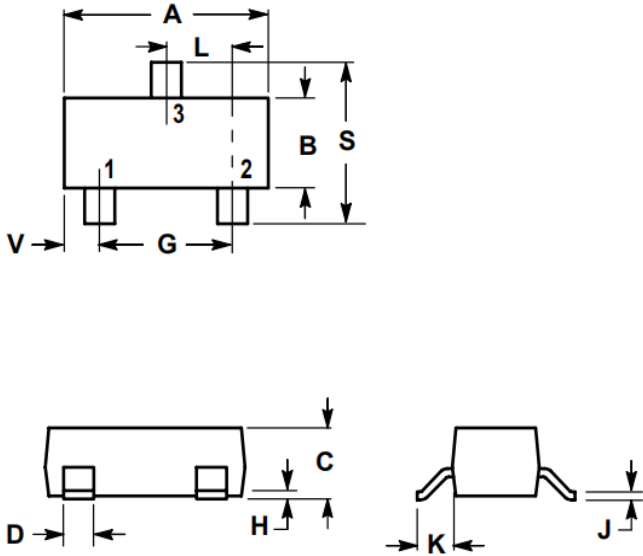
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Characteristic	Test Condition	Symbol	Min.	Typ.	Max.	Unit
Collector-Emitter Breakdown Voltage	$I_C=1\text{mA}, I_B=0$	$V_{(BR)CEO}$	80	-	-	V
Collector-Base Breakdown Voltage	$I_C=100\mu\text{A}, I_E=0$	$V_{(BR)CBO}$	80	-	-	V
Emitter-Base Breakdown Voltage	$I_E=100\mu\text{A}, I_C=0$	$V_{(BR)EBO}$	4	-	-	V
Collector Cutoff Current	$V_{CB}=200, I_E=0$	$I_{CBO}$	-	-	100	nA
Emitter Cutoff Current	$V_{EB}=6\text{V}, I_C=0$	$I_{EBO}$	-	-	100	$\mu\text{A}$
DC Current Gain	$V_{CE}=1\text{V}, I_C=10\text{mA}$	$H_{FE(1)}$	100	-	400	
	$V_{CE}=1\text{V}, I_C=100\text{mA}$	$H_{FE(2)}$	100	-	-	
Collector-Emitter Saturation Voltage	$I_C=100\text{mA}, I_B=10\text{mA}$	$V_{CE(Sat)}$	-	-	0.25	V
Base-Emitter Saturation Voltage	$I_C=100\text{mA}, I_B=10\text{mA}$	$V_{BE(Sat)}$	-	-	1.2	V
Transition Frequency	$V_{CE}=2\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	$F_T$	100	-	-	MHz

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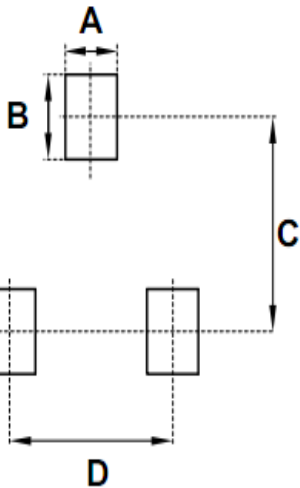
**OUTLINE DRAWINGS**



**SOT-23**

OUTLINE DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.800	-	3.040	0.1102	-	0.1197
B	1.200	-	1.400	0.0472	-	0.0551
C	0.890	-	1.110	0.0350	-	0.0437
D	0.370	-	0.500	0.0146	-	0.0197
G	1.780	-	2.040	0.0701	-	0.0803
H	0.013	-	0.100	0.0005	-	0.0039
J	0.085	-	0.177	0.0033	-	0.0070
K	0.350	-	0.690	0.0138	-	0.0272
L	0.890	-	1.020	0.0350	-	0.0402
S	2.100	-	2.640	0.0827	-	0.1039
V	0.450	-	0.600	0.0177	-	0.0236

**MOUNTING PAD LAYOUT**



**SOT-23**

RECOMMENDED MOUNTING PAD DIMENSIONS						
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	-	0.600	-	-	0.0236	-
B	-	0.800	-	-	0.0315	-
C	-	2.020	-	-	0.0795	-
D	-	1.900	-	-	0.0748	-

**PACKING INFORMATION**

**SOT-23**

Package Method	Reel Size (mm)	Quantity (pcs/reel)	Inner Box Size LxWxH(mm)	Quantity (pcs/Inner Box)	Carton Size LxWxH(mm)	Quantity (pcs/carton)
Tape Reel	Φ180	3000	340x340x40	6000	364x364x360	160000

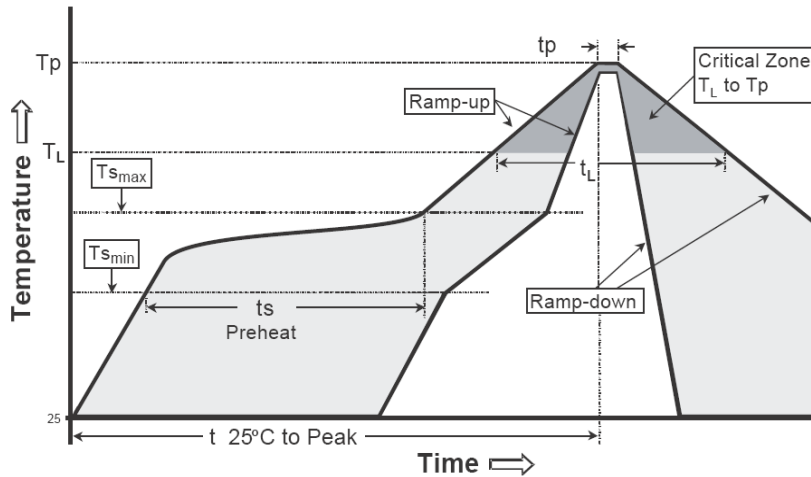
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**Recommended wave soldering condition**

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T <sub>L</sub> ) - Time (t <sub>L</sub> )	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T <sub>p</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(t <sub>p</sub> )	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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