

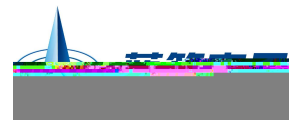


/ Revised record

E	2016-3				
F	2022-8-18	2	VCE(sat) (2) 0.12 VCESAT-IC		

MMBT3904W

Rev.F Aug.-2022



DATA SHEET

/ Descriptions

SOT-323 NPN Silicon NPN transistor in a SOT-323 Plastic Package.

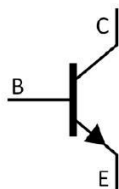
/ Features

Low current, Low voltage,HF Product.

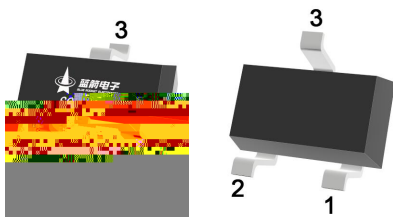
/ Applications

General purpose amplifier and switching.

/ Equivalent Circuit



/ Pinning



PIN1 Base PIN 2 Emitter PIN 3 Collector

/ h_{FE} Classifications & Marking

Marking	• H1A
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/ Absolute Maximum Ratings(Ta=25)

Parameter	Symbol	Rating	Unit
Collector to Base Voltage	V_{CBO}	60	V
Collector to Emitter Voltage	V_{CEO}	40	V
Emitter to Base Voltage	V_{EBO}	6.0	V
Collector Current - Continuous	I_C	200	mA
Collector Power Dissipation	P_C	200	mW
Collector Power Dissipation*	$*P_C$	350	mW
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	-55~150	°C

* 7×5×0.6mm

*When mounted on a 7×5×0.6mm ceramic board

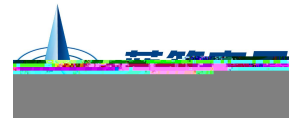
/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector to Base Breakdown Voltage	V_{CBO}	$I_C=10\mu A$ $I_E=0$	60			V
Collector to Emitter Breakdown Voltage	V_{CEO}	$I_C=1.0mA$ $I_B=0$	40			V
Emitter to Base Breakdown Voltage	V_{EBO}	$I_E=10\mu A$ $I_C=0$	6.0			V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=30V$ $I_E=0$			0.05	μA
Emitter to Base Current	I_{EBO}	$V_{EB}=3.0V$ $I_C=0$			0.05	μA
DC Current Gain	$h_{FE(1)}$	$V_{CE}=1.0V$ $I_C=10mA$	100		300	
	$h_{FE(2)}$	$V_{CE}=1.0V$ $I_C=100mA$	30			
	$h_{FE(3)}$	$V_{CE}=1.0V$ $I_C=50mA$	60			
	$h_{FE(4)}$	$V_{CE}=1.0V$ $I_C=1mA$	70			
	$h_{FE(5)}$	$V_{CE}=1.0V$ $I_C=0.1mA$	40			
Collector to Emitter Saturation Voltage	$V_{CE(sat) (1)}$	$I_C=10mA$ $I_B=1.0mA$			0.2	V
	$V_{CE(sat) (2)}$	$I_C=50mA$ $I_B=5.0mA$		0.12	0.3	V

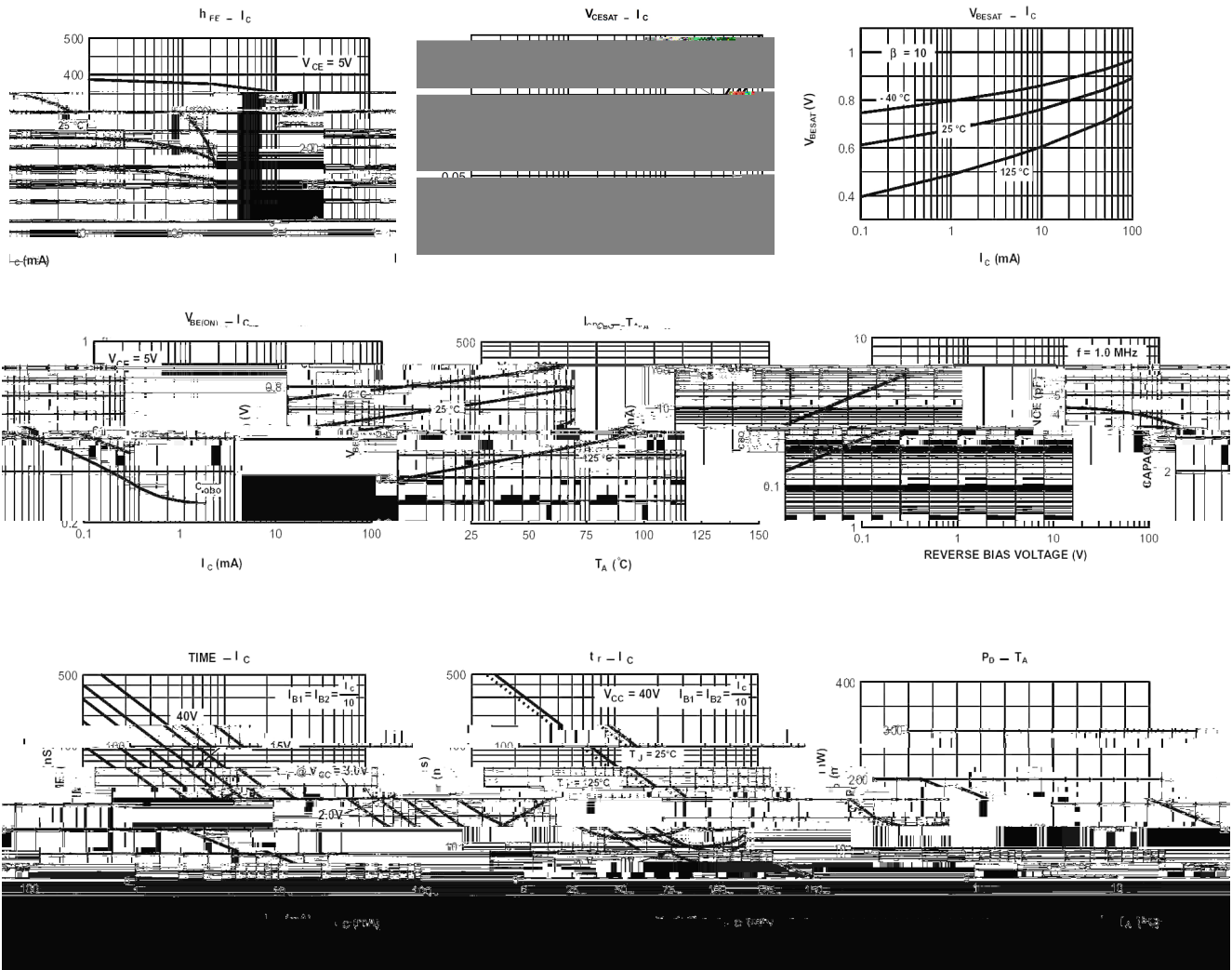


/ Electrical Characteristics(Ta=25)

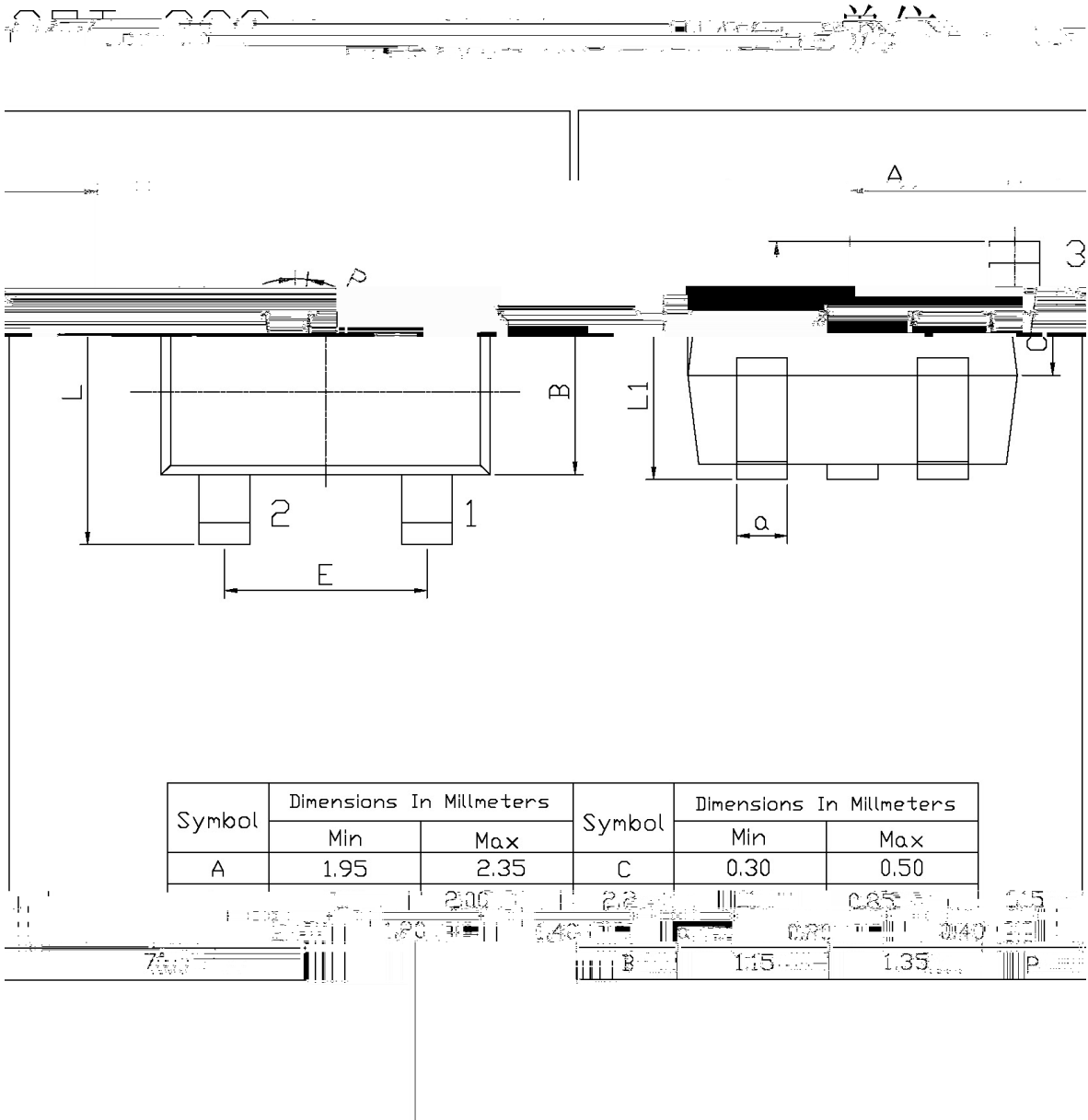
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Base to Emitter Saturation Voltage	$V_{BE(sat)} (1)$	$I_C=10mA$ $I_B=1.0mA$	0.65		0.85	V
	$V_{BE(sat)} (2)$	$I_C=50mA$ $I_B=5.0mA$			0.95	V
Transition Frequency	f_T	$I_C=10mA$ $V_{CE}=20V$ $f=100MHz$	300			MHz
Collector output capacitance	C_{ob}	$V_{CB}=5.0V$ $f=1.0MHz$			4.0	pF
Storage Time	t_{stg}	$V_{CC}=3.0V$ $I_C=10mA$ $I_{B1}=-I_{B2}=1.0mA$			200	ns
Fall Time	t_f	$V_{CC}=3.0V$ $I_C=10mA$ $I_{B1}=-I_{B2}=1.0mA$			50	ns
Delay Time	t_d	$V_{CC}=3.0V$ $V_{BE}=0.5V$ $I_C=10mA$ $I_{B1}=1.0mA$			35	ns
Rise Time	t_r	$V_{CC}=3.0V$ $V_{BE}=0.5V$ $I_C=10mA$ $I_{B1}=1.0mA$			35	ns
Input Capacitance	C_{ib}	$V_{EB}=0.5V$ $f=1.0MHz$			8.0	pF



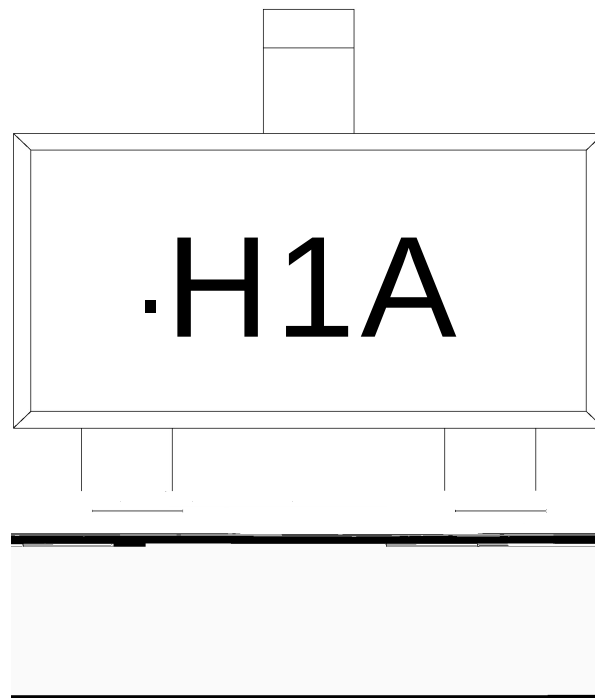
/ Electrical Characteristic Curve



/ Package Dimensions



/ Marking Instructions



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H

1A

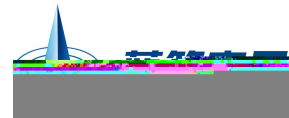
Note:

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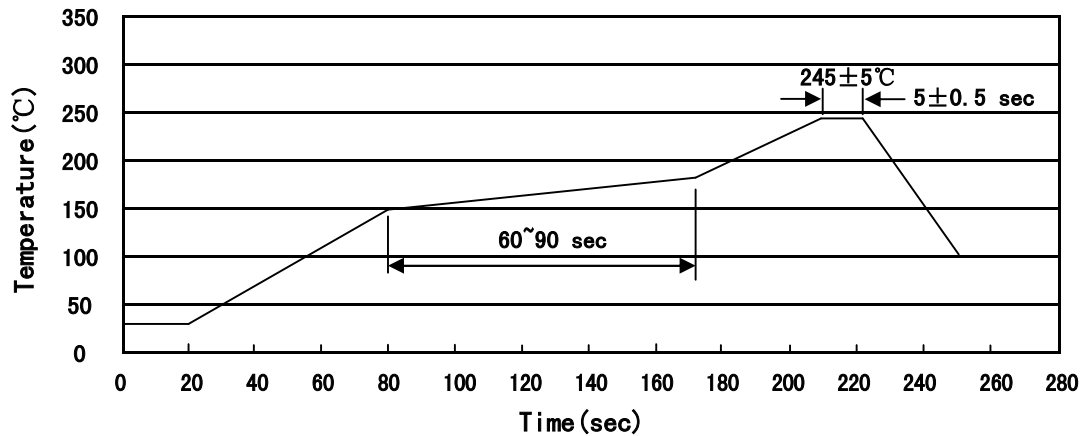
Identify

H: Company Code

1A: Product Type



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Note:

- | | | | | | |
|---|-------|-----|----|-----------|---|
| 1 | 150 | 180 | 60 | 90sec; | 1.Preheating:150~180 , Time:60~90sec. |
| 2 | 245±5 | | | 5±0.5sec; | 2.Peak Temp.:245±5 , Duration:5±0.5sec. |
| 3 | | | 2 | 10 /sec. | 3. Cooling Speed: 2~10 /sec. |

/ Resistance to Soldering Heat Test Conditions

260±5

10±1 sec.

Temp.:260±5°C

Time:10±1 sec

/ Packaging SPEC.

/ REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
SOT-323	3,000	10	30,000	6	180,000	7" ×8	180×120×180	390×385×205

/ Notices