






THE DATASHEET OF S9012



SPECIFICATION SHEET

| | |
|--------------------------------|--|
| SPECIFICATION SHEET NO. | P0610- SOT23S9012S2T1 |
| DATE | June 10, 2022 |
| REVISION | A0 |
| DESCRIPTION | SMD Plastic-Encapsulate Transistors, SOT-23 series, 3 pads S9012 Type, PNP Collector-Emitter Voltage 25V. Collector Current 0.5A Max. Operating Temp. Range -55°C ~+150°C, Package in Tape/Reel, 3000pcs/Reel RoHS/RoHS III compliant |
| CUSTOMER | |
| CUSTOMER PART NUMBER | |
| CROSS REF. PART NUMBER | |
| ORIGINAL PART NUMBER | MDD S9012 |
| PART CODE | SOT23S9012S2T1 |

| | | | |
|-------------------------|---|--|---|
| VENDOR APPROVE | | | |
| Issued/Checked/Approved |  |  |  |
| DATE: June 10, 2022 | | | |

| | |
|-------------------------|--|
| CUSTOMER APPROVE | |
| | |
| DATE: | |

6/13/2022

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES

MAIN FEATURE

- High Collector Current
- Complementary To S9013
- Excellent hFE Linearity



APPLICATION

- For PCB Application

RFQ

[Request For Quotation](#)

PART CODE GUIDE

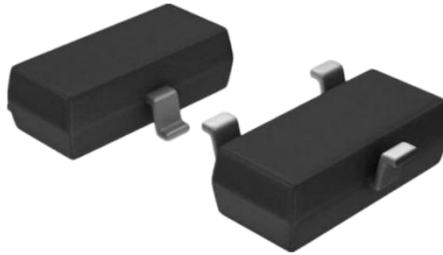
| SOT23 | S9012 | S | 2T1 |
|-------|-------|---|-----|
| 1 | 2 | 3 | 4 |

- 1) **SOT23**: SMD Plastic-Encapsulate Transistors, 3 pads SOT-23 series Code
- 2) **S9012**: Type code for S9012 Type
- 3) **S**: Package code, Package in Tape/Reel, 3000pcs/Reel
- 4) **2T1**: Marking code for “2T1” on the case surface, Different Marking for different specification

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES

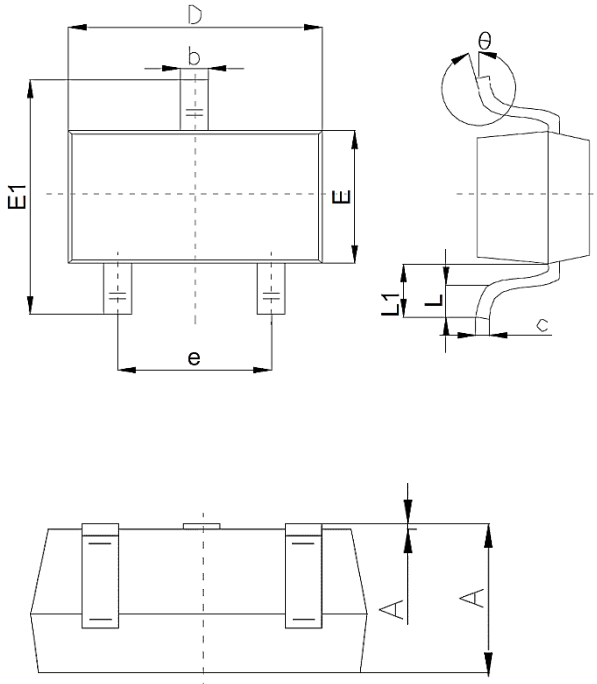
DIMENSION (Unit: Inch/mm)

Image for reference



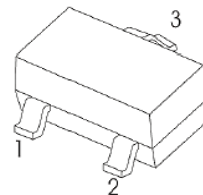
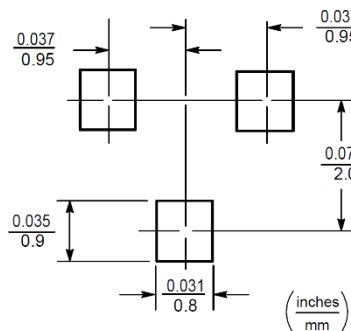
Marking: 2T1

SOT-23



| Symbol | Value (mm) | | |
|--------|--------------|------|------|
| | Min. | Typ. | Max. |
| A | 0.90 | | 1.40 |
| A1 | | | 0.10 |
| b | 0.30 | | 0.50 |
| c | 0.08 | | 0.20 |
| D | 2.80 | 2.90 | 3.10 |
| E | 1.20 | | 1.60 |
| E1 | 2.25 | | 2.80 |
| e | 1.80 | 1.90 | 2.00 |
| L | 0.10 | | 0.50 |
| L1 | 0.40 | | 0.55 |
| θ | 0° | | 10° |

Recommend Pad Layout



- 1.Base
- 2.Emmitter
- 3.Collector

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES
MECHANICAL DATA

| Case | Terminals | Polarity | Mounting Position | Weight per piece |
|----------------------------------|--|---------------------------------|-------------------|------------------------------|
| JEDEC SOT-23 molded plastic body | Solder plated, Solderable per MIL-STD-750, Method 2026 | Polarity symbol marking on case | Any | 0.00019 Ounce, 0.00591 grams |

MAX. RATINGS AT Ta=25 °C

| Parameter | SYMBOLS | VALUE | UNITS |
|---|------------------|------------|-------|
| | | LIMIT | |
| Collector-base Voltage | V _{CBO} | -40 | Volts |
| Collector-emitter Voltage | V _{CEO} | -25 | Volts |
| Emitter-base Voltage | V _{EBO} | -5 | Volts |
| Collector Current - Continuous | I _C | -0.5 | A |
| Collector Power Dissipation | P _C | 300 | mW |
| Thermal Resistance From Junction To Ambient | R _{θJA} | 416 | °C/W |
| Junction Temperature | T _J | +150 | °C |
| Storage Temperature Range | T _{STG} | -55 ~ +150 | °C |

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES
ELECTRICAL CHARACTERISTICS AT Ta= 25 °C

| Parameter | SYMBOLS | VALUE | | | UNIT | Condition |
|--------------------------------------|----------------------|-------|------|------|------|--|
| | | Min. | Typ. | Max. | | |
| Collector-base Breakdown Voltage | V _{CBO} | -40 | | | V | I _C = -100 μA, I _E =0 |
| Collector-emitter Breakdown Voltage | V _{CEO} | -25 | | | V | I _C = -1mA, I _B =0 |
| Emitter-base Breakdown Voltage | V _{EBO} | -5 | | | V | I _E = -100 μA, I _C =0 |
| Collector Cut-off Current | I _{CBO} | | | -0.1 | μA | V _{CB} = -40V, I _E =0 |
| Collector Cut-off Current | I _{CEO} | | | -0.1 | μA | V _{CB} =-20V, I _B =0 |
| Emitter Cut-off Current | I _{EBO} | | | -0.1 | μA | V _{EB} = -5V, I _C =0 |
| DC Current Gain | h _{FE(1)} | 120 | | 400 | | V _{CE} =-1V, I _C =-50mA |
| Collector-emitter Saturation Voltage | V _{CE(sat)} | | | -0.6 | V | I _C = -500mA, I _B =-50mA |
| Base-emitter Saturation Voltage | V _{BE(sat)} | | | -1.2 | V | I _C =-500mA, I _B =-50 mA |
| Transition Frequency | f _T | 150 | | | MHz | V _{CE} =-6 V, I _C = -20mA f= 30 MHz |
| Collector output capacitance | C _{ob} | | | 5 | pF | V _{CB} =10 V, I _E =0, f=1 MHz |

CLASSIFICATION OF Hfe (1)

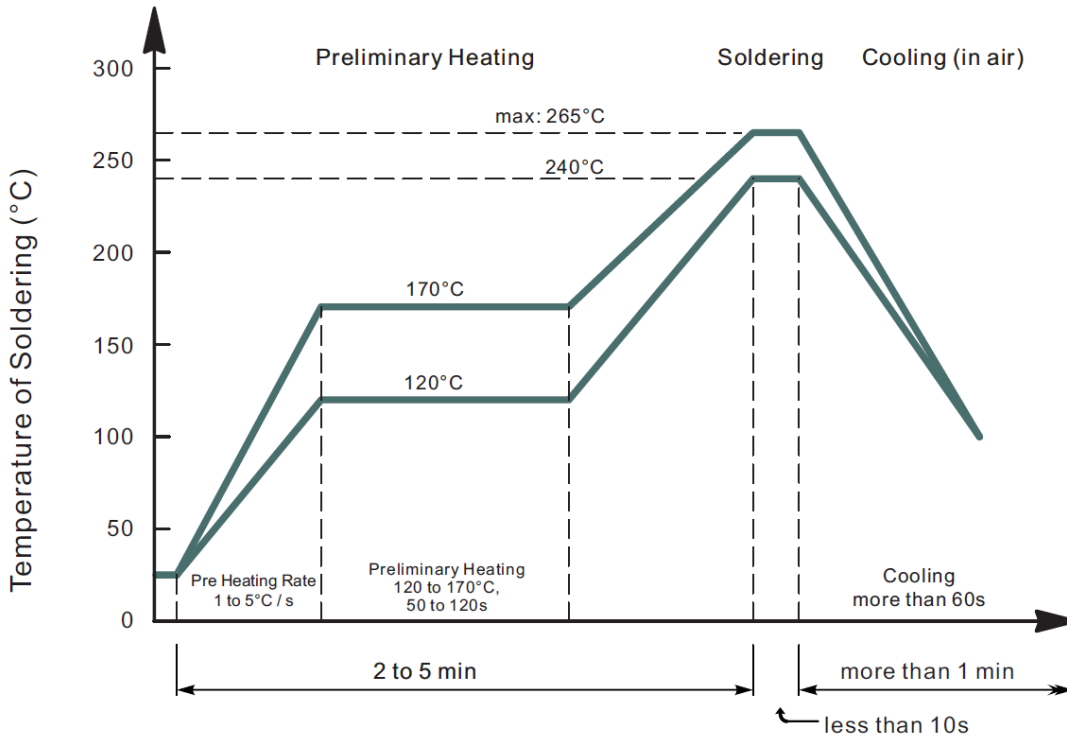
| Rank | L | H | J |
|-------|-----------|-----------|---------|
| Range | 120 ~ 200 | 200 ~ 300 | 300~400 |

SMD PLASTIC-ENCCAPULATE TRANSISTORS SOT23 SERIES
RELIABILITY

| Number | Experiment Items | Experiment Method And Conditions | Reference Documents |
|--------|------------------------------------|--|---------------------------------|
| 1 | Solder Resistance Test | Test 260°C± 5°C for 10 ± 2 sec. Immerse body into solder 1/16" ± 1/32" | MIL-STD-750D METHOD-2031.2 |
| 2 | Solderability Test | 230°C ±5°C for 5 sec. | MIL-STD-750D METHOD-2026.1 0 |
| 3 | Pull Test | 1 kg in axial lead direction for 10 sec. | MIL-STD-750D METHOD-2036.4 |
| 4 | Bend Test | 0.5Kg Weight Applied To Each Lead, Bending Arcs 90 °C ± 5 °C For 3 Times | MIL-STD-750D METHOD-2036.4 |
| 5 | High Temperature Reverse Bias Test | TA=100°C for 1000 Hours at VR=80% Rated VR | MIL-STD-750D METHOD-1038.4 |
| 6 | Forward Operation Life Test | TA=25°C Rated Average Rectified Current | MIL-STD-750D METHOD-1027.3 |
| 7 | Intermittent Operation Life Test | On state: 5 min with rated IRMS Power Off state: 5 min with Cool Forced Air. On and off for 1000 cycles. | MIL-STD-750D METHOD-1036.3 |
| 8 | Pressure Cooker Test | 15 PSIG, TA=121°C, 4 hours | MIL-S-19500 APPENOIXC |
| 9 | Temperature Cycling Test | -55°C~+125°C; 30 Minutes For Dwelled Time 5 minutes for transferred time. Total: 10 cycles. | MIL-STD-750D METHOD-1051.7 |
| 10 | Thermal Shock Test | 0°C for 5 minutes., 100°C for 5minutes, Total: 10 cycles | MIL-STD-750D METHOD-1056.7 |
| 11 | Forward Surge Test | 8.3ms Single Sale Sine-wave One Surge. | MIL-STD-750D METHOD-4066.4 |
| 12 | Humidity Test | TA=65°C, RH=98% for 1000 hours. | MIL-STD-750D METHOD-1021.3 |
| 13 | High Temperature Storage life Test | 150°C for 1000 Hours | MIL-STD-750D METHOD-1031.5 |

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES

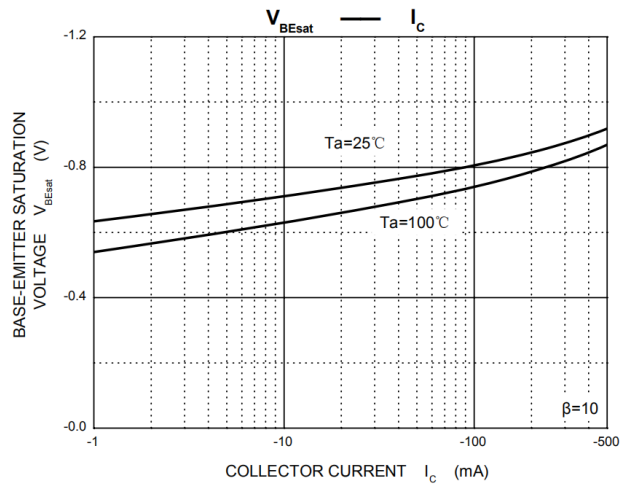
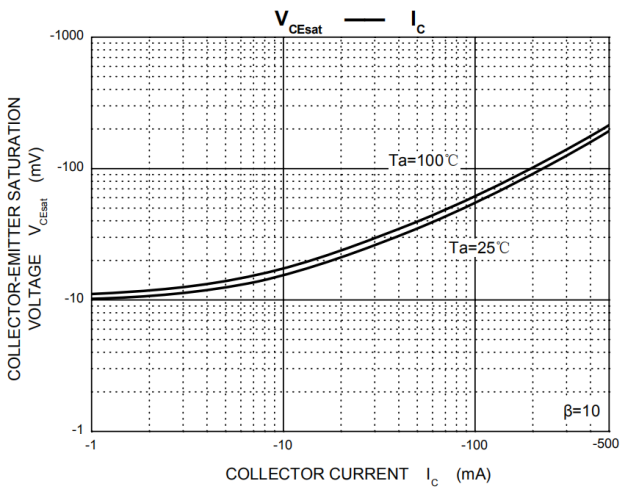
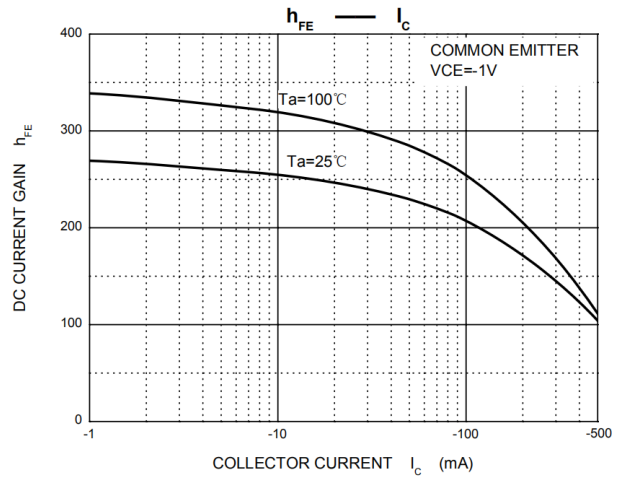
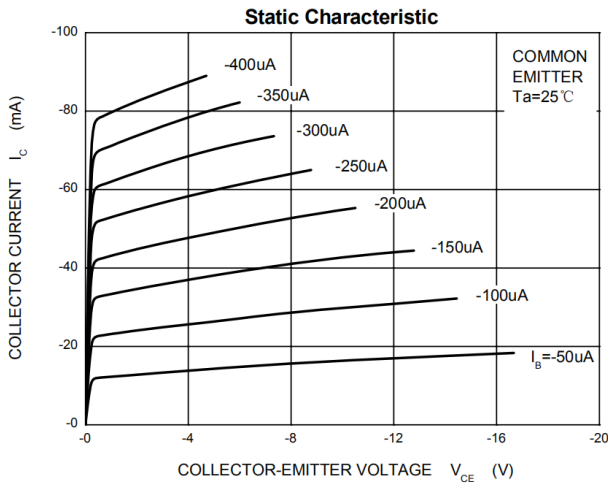
SUGGESTED REFLOW PROFILE (For Reference Only)



- Recommended peak temperature is over 245°C, If peak temperature is below 245 °C, you may adjust the following parameters; time length of peak temperature (longer), time length of soldering (longer), thickness of solder paste (thicker)
- Welding shall not exceed 2 times
- Remark: lead free solder paste (96.5 sn/3.0 Ag/0.5Cu)

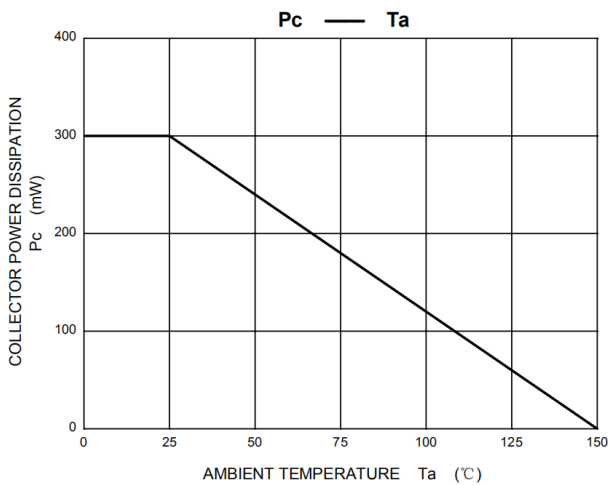
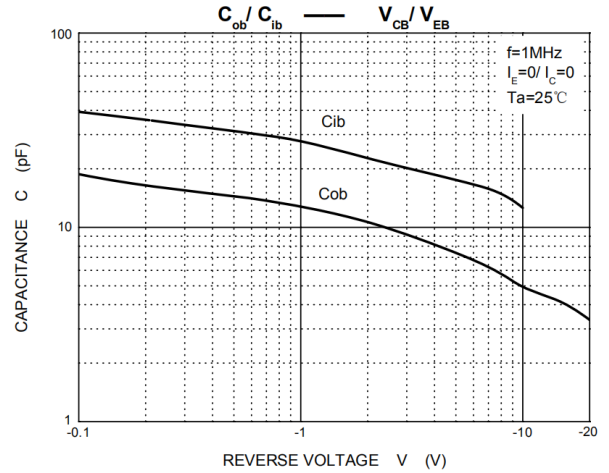
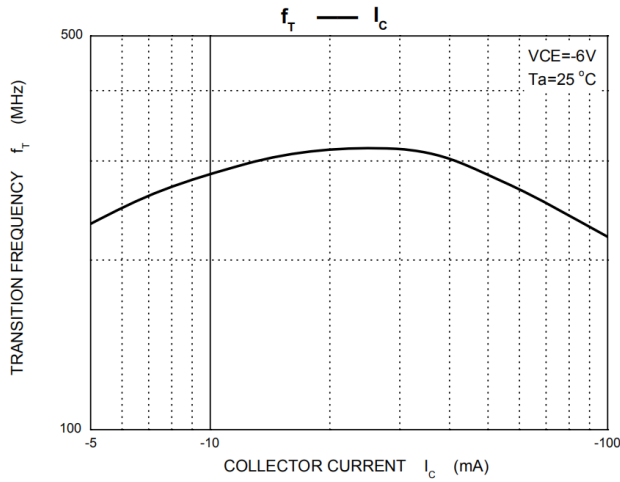
SMD PLASTIC-ENCCAPULATE TRANSISTORS SOT23 SERIES

RATINGS AND CHARACTERISTIC CURVES (For Reference Only)



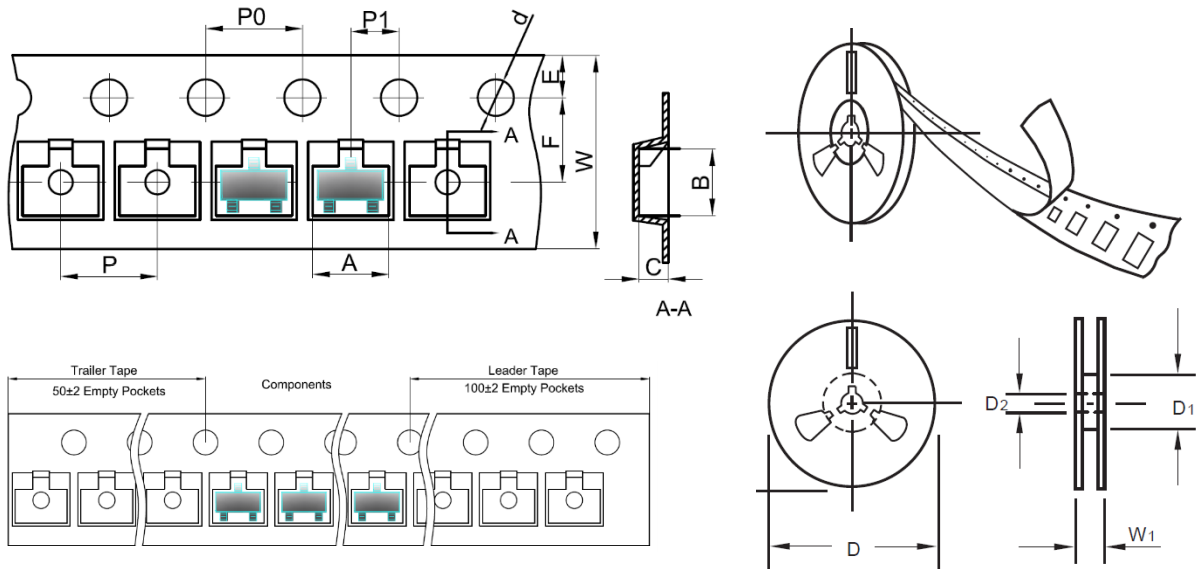
SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES

RATINGS AND CHARACTERISTIC CURVES (For Reference Only)



SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES
TAPE/REEL (Unit: mm)

All Devices are packed in accordance with EIA standard RS-481-A and specifications.



| Item | Symbol | Tolerance | SOT-23 |
|-------------------------|--------|-----------|--------|
| Carrier width | A | 0.1 | 3.15 |
| Carrier Length | B | 0.1 | 2.77 |
| Carrier Depth | C | 0.1 | 1.22 |
| Sprocket hole | d | 0.05 | 1.55 |
| 7"Reel outside diameter | D | 2.0 | 178.00 |
| 7"Reel inner diameter | D1 | Min. | 54.4 |
| Feed hole diameter | D2 | 0.5 | 13.00 |
| Sprocket hole position | E | 0.1 | 1.75 |
| Punch hole position | F | 0.1 | 3.50 |
| Punch hole pitch | P | 0.1 | 4.00 |
| Sprocket hole pitch | P0 | 0.1 | 4.00 |
| Embossment center | P1 | 0.1 | 2.00 |
| Overall tape thickness | T | 0.1 | 0.25 |
| Tape width | W | 0.3 | 8.00 |
| Reel width | W1 | 1.0 | 19.50 |

SMD PLASTIC-ENCAPULATE TRANSISTORS SOT23 SERIES

PACKAGE


| | |
|------------------|----------|
| Case Code | SOT-23 |
| Reel Size | 7" |
| Reel Size | 178 mm |
| MPQ/Reel | 3000 pcs |
| Qty. /Box | 6000 pcs |
| G.W/Box | 1 LBS |

DISCLAIMER

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