

| Parameter | Value |
|---------------|---------------|
| V_{CC} | -50V |
| $I_{C(MAX.)}$ | -100mA |
| R_1 | 2.2k Ω |
| R_2 | 47k Ω |

●Features

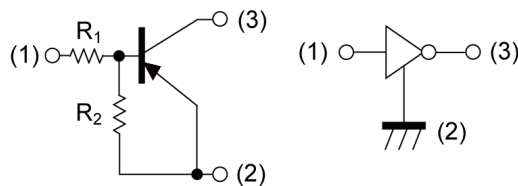
- 1) Built-In Biasing Resistors, $R_1 = 2.2k\Omega$, $R_2 = 47k\Omega$
- 2) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see inner circuit).
- 3) Only the on/off conditions need to be set for operation, making the circuit design easy.
- 4) Complementary NPN Types: DTC123J series

●Application

INVERTER, INTERFACE, DRIVER

●Inner circuit

DTA123JM/ DTA123JEB/ DTA123JUB

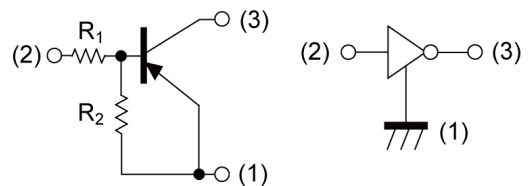


(1) IN (BASE)
 (2) GND (+) (EMITTER)
 (3) OUT (COLLECTOR)

●Outline

| | |
|------------------------------------|---------------------------------------|
| SOT-723 DTA123JM (VMT3) | SOT-416FL DTA123JEB (EMT3F) |
| SOT-416 DTA123JE3 (EMT3) | SOT-323FL DTA123JUB (UMT3F) |
| SOT-323 DTA123JU3 (UMT3) | SOT-346 DTA123JKA (SMT3) |

DTA123JE3/ DTA123JU3/ DTA123JKA



(1) GND (+) (EMITTER)
 (2) IN (BASE)
 (3) OUT (COLLECTOR)

●Packaging specifications

| Part No. | Package | Package size | Taping code | Reel size (mm) | Tape width (mm) | Quantity (pcs) | Marking |
|-----------|-----------|--------------|-------------|----------------|-----------------|----------------|---------|
| DTA123JM | SOT-723 | 1212 | T2L | 180 | 8 | 8000 | E32 |
| DTA123JEB | SOT-416FL | 1616 | TL | 180 | 8 | 3000 | E32 |
| DTA123JE3 | SOT-416 | 1616 | TL | 180 | 8 | 3000 | E32 |
| DTA123JUB | SOT-323FL | 2021 | TL | 180 | 8 | 3000 | 132 |
| DTA123JU3 | SOT-323 | 2021 | T106 | 180 | 8 | 3000 | 132 |
| DTA123JKA | SOT-346 | 2928 | T146 | 180 | 8 | 3000 | E32 |

● Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| Parameter | | Symbol | Values | Unit |
|------------------------------|-----------|-------------------|-------------|------------------|
| Supply voltage | | V_{CC} | -50 | V |
| Input voltage | | V_{IN} | -12 to 5 | V |
| Output current | | I_O | -100 | mA |
| Collector current | | $I_{C(MAX)}^{*1}$ | -100 | mA |
| Power dissipation | DTA123JM | P_D^{*2} | 150 | mW |
| | DTA123JEB | | 150 | |
| | DTA123JE3 | | 150 | |
| | DTA123JUB | | 200 | |
| | DTA123JU3 | | 200 | |
| | DTA123JKA | | 200 | |
| Junction temperature | | T_j | 150 | $^\circ\text{C}$ |
| Range of storage temperature | | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

● Electrical characteristics ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------|--------------|--|--------|------|------|------------|
| | | | Min. | Typ. | Max. | |
| Input voltage | $V_{I(off)}$ | $V_{CC} = -5V, I_O = -100\mu\text{A}$ | - | - | -0.5 | V |
| | $V_{I(on)}$ | $V_O = -0.3V, I_O = -5\text{mA}$ | -1.1 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O = -5\text{mA}, I_I = -0.25\text{mA}$ | - | -100 | -300 | mV |
| Input current | I_I | $V_I = -5V$ | - | - | -3.6 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = -50V, V_I = 0V$ | - | - | -500 | nA |
| DC current gain | G_I | $V_O = -5V, I_O = -10\text{mA}$ | 80 | - | - | - |
| Input resistance | R_1 | - | 1.54 | 2.2 | 2.86 | k Ω |
| Resistance ratio | R_2/R_1 | - | 17 | 21 | 26 | - |
| Transition frequency | f_T^{*1} | $V_{CE} = -10V, I_E = 5\text{mA}, f = 100\text{MHz}$ | - | 250 | - | MHz |

*1 Characteristics of built-in transistor.

*2 Each terminal mounted on a reference land.

●Electrical characteristic curves ($T_a=25^\circ\text{C}$)

Fig.1 Input voltage vs. output current (ON characteristics)

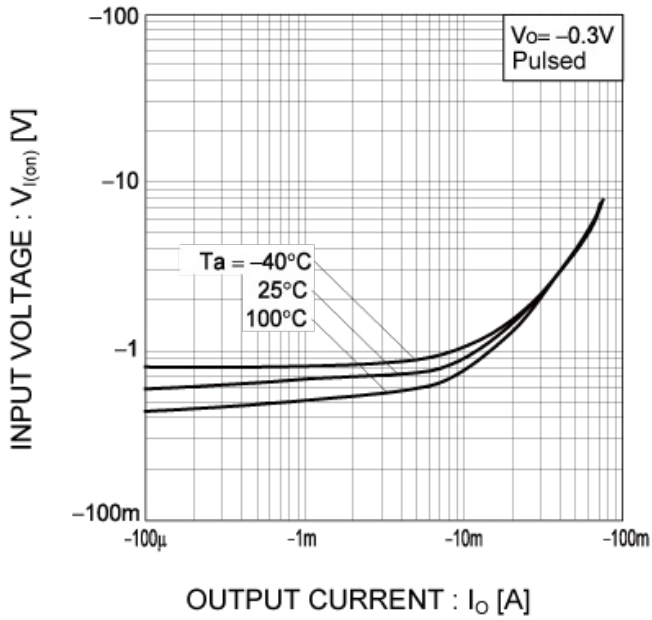


Fig.2 Output current vs. input voltage (OFF characteristics)

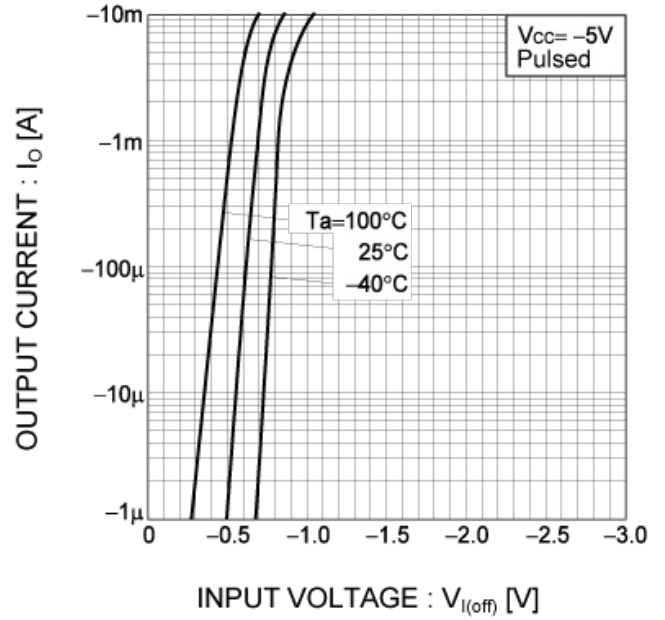


Fig.3 Output current vs. output voltage

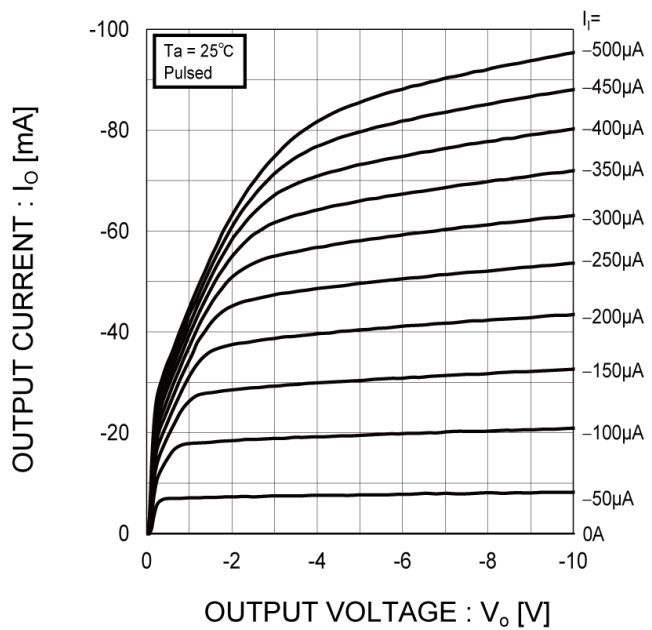
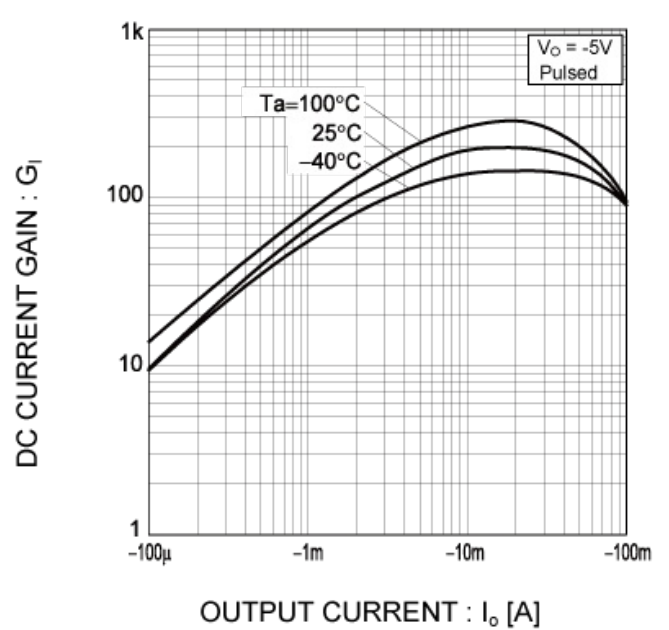
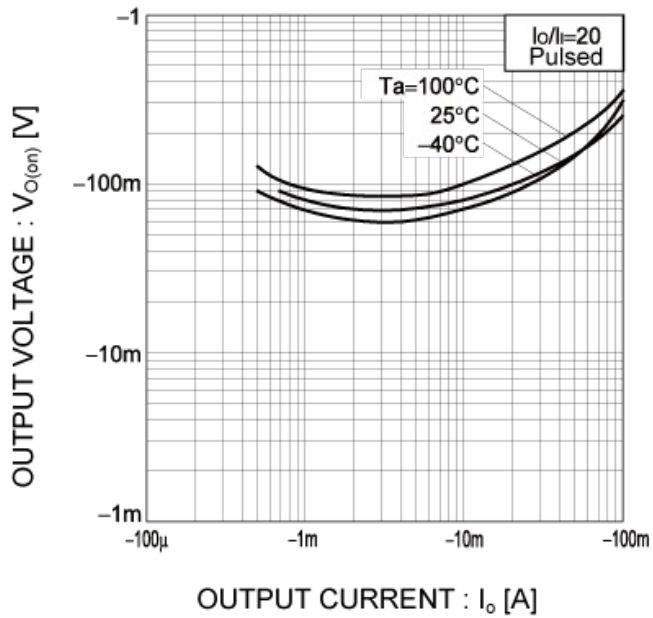


Fig.4 DC current gain vs. output current



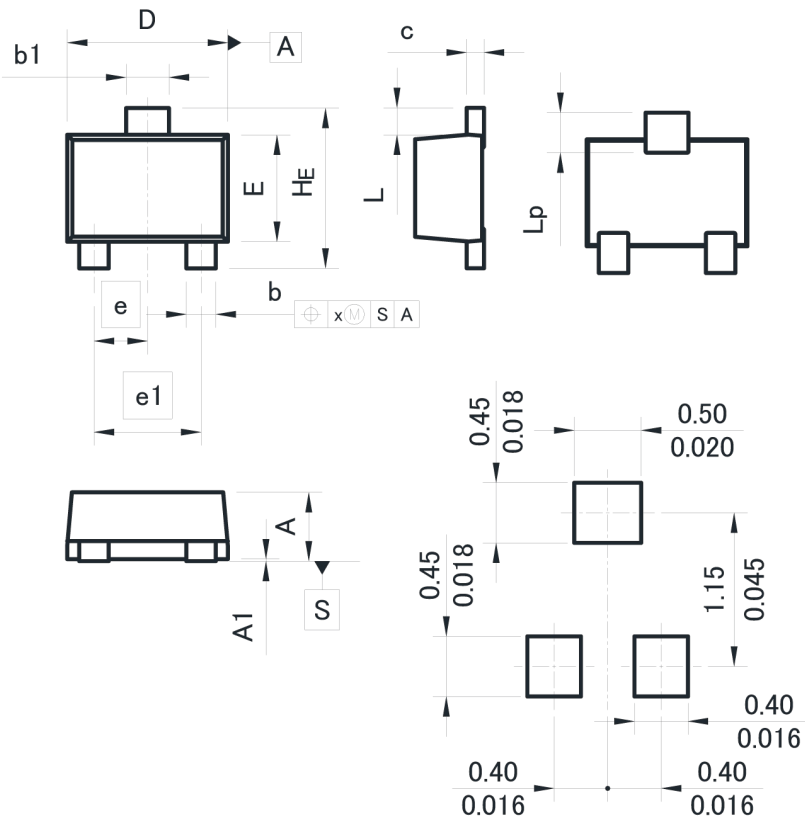
● Electrical characteristic curves ($T_a = 25^\circ\text{C}$)

Fig.5 Output voltage vs. output current



●Dimensions

SOT-723
SC-105AA
(VMT3)



Soldering footprint

Unit: (mm / inches)

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.45 | 0.55 | 0.018 | 0.022 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.17 | 0.27 | 0.007 | 0.011 |
| b1 | 0.27 | 0.37 | 0.011 | 0.015 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.10 | 1.30 | 0.043 | 0.051 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| e | 0.40 | | 0.016 | |
| e1 | 0.80 | | 0.031 | |
| HE | 1.10 | 1.30 | 0.043 | 0.051 |
| L | 0.10 | 0.30 | 0.004 | 0.012 |
| Lp | 0.20 | 0.40 | 0.008 | 0.016 |
| x | - | 0.10 | - | 0.004 |

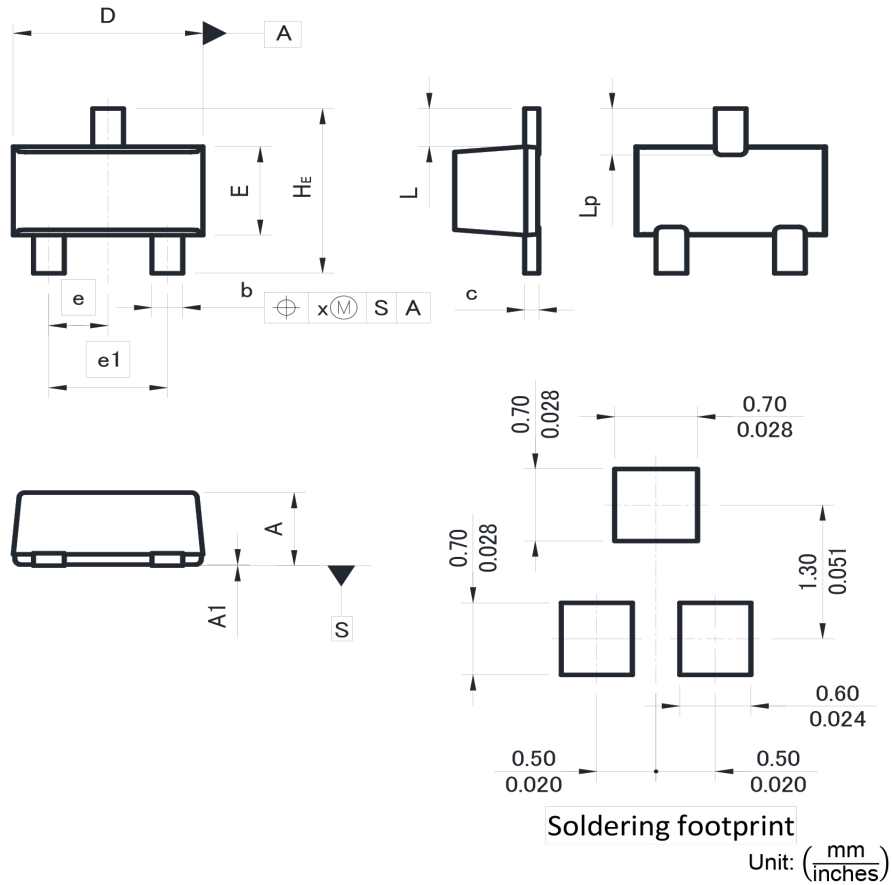
Dimension in mm / inches

●Dimensions

SOT-416FL

SC-89

(EMT3F)

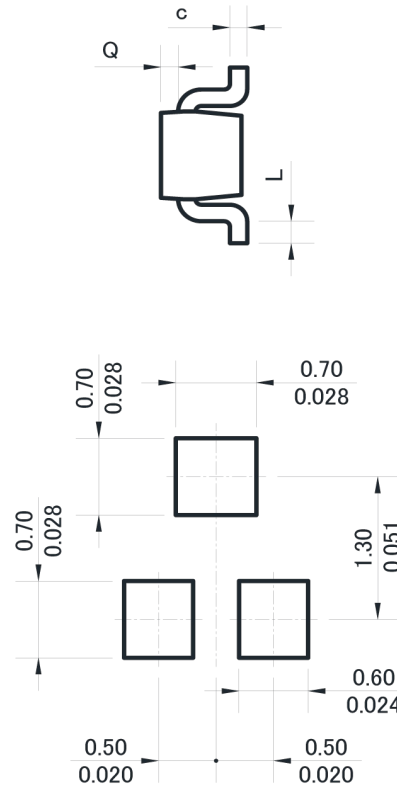
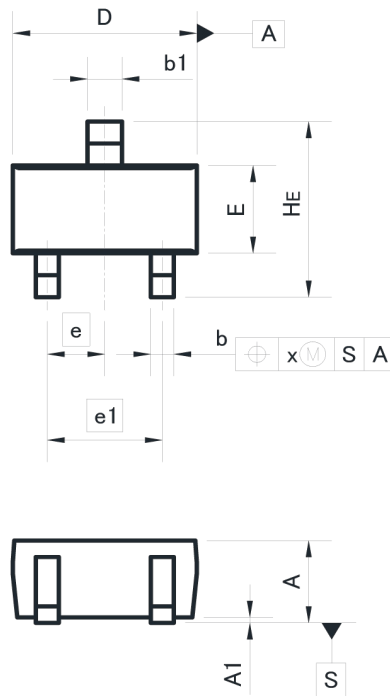


| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.60 | 0.90 | 0.024 | 0.035 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.21 | 0.36 | 0.008 | 0.014 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 0.76 | 0.96 | 0.030 | 0.038 |
| e | 0.50 | | 0.020 | |
| e1 | 0.90 | 1.10 | 0.035 | 0.043 |
| HE | 1.50 | 1.70 | 0.059 | 0.067 |
| L | 0.37 | | 0.015 | |
| Lp | 0.35 | 0.55 | 0.014 | 0.022 |
| x | - | 0.10 | - | 0.004 |

Dimension in mm / inches

●Dimensions

SOT-416
SC-75A
(EMT3)



Soldering footprint

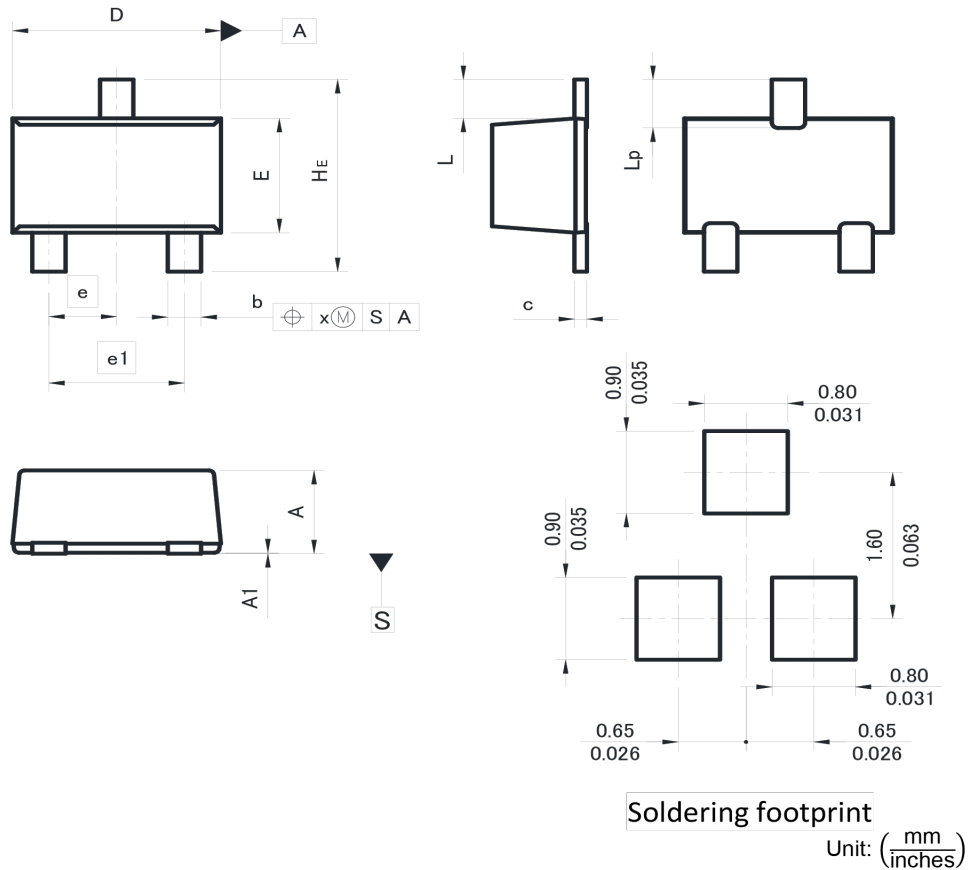
Unit: $\left(\frac{\text{mm}}{\text{inches}}\right)$

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.60 | 0.90 | 0.024 | 0.035 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.15 | 0.30 | 0.006 | 0.012 |
| b1 | 0.25 | 0.40 | 0.010 | 0.016 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| e | 0.50 | | 0.020 | |
| e1 | 1.00 | | 0.039 | |
| HE | 1.40 | 1.80 | 0.055 | 0.071 |
| L | 0.10 | - | 0.004 | - |
| Q | 0.05 | 0.25 | 0.002 | 0.010 |
| x | - | 0.10 | - | 0.004 |

Dimension in mm/inches

●Dimensions

SOT-323FL
 SC-85
 (UMT3F)

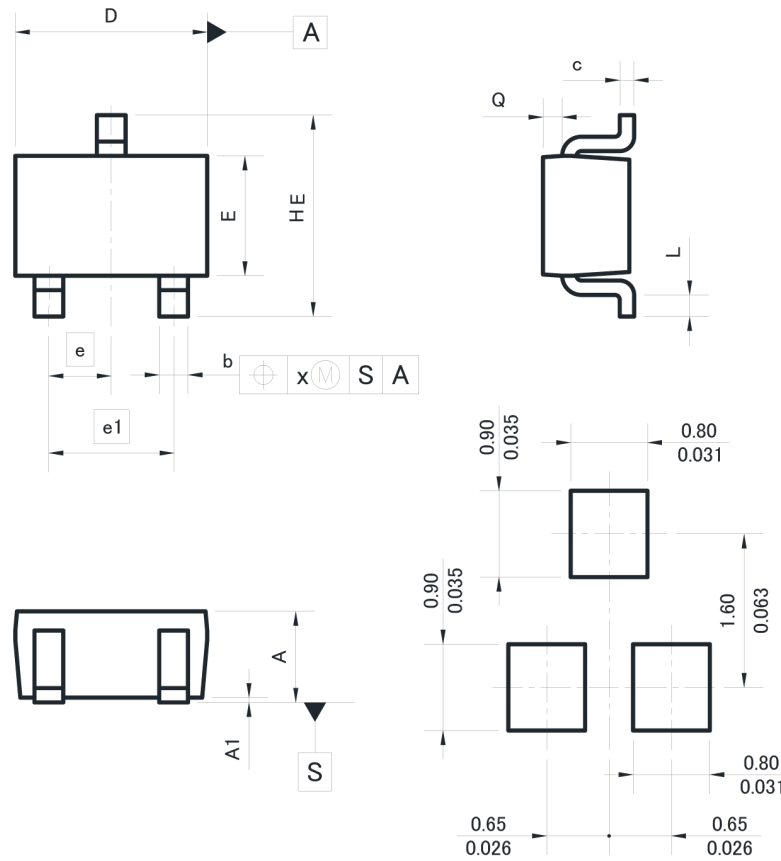


| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.80 | 1.10 | 0.031 | 0.043 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.27 | 0.42 | 0.011 | 0.017 |
| c | 0.08 | 0.18 | 0.003 | 0.007 |
| D | 1.90 | 2.10 | 0.075 | 0.083 |
| E | 1.15 | 1.35 | 0.045 | 0.053 |
| e | 0.65 | | 0.026 | |
| e1 | 1.20 | 1.40 | 0.047 | 0.055 |
| HE | 2.00 | 2.20 | 0.079 | 0.087 |
| L | 0.43 | | 0.017 | |
| Lp | 0.43 | 0.63 | 0.017 | 0.025 |
| x | - | 0.10 | - | 0.004 |

Dimension in mm / inches

●Dimensions

SOT-323
 SC-70
 (UMT3)



Soldering footprint
 Unit: (mm / inches)

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.80 | 1.10 | 0.031 | 0.043 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.25 | 0.40 | 0.010 | 0.016 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.90 | 2.10 | 0.075 | 0.083 |
| E | 1.15 | 1.35 | 0.045 | 0.053 |
| e | 0.65 | | 0.026 | |
| e1 | 1.30 | | 0.051 | |
| HE | 2.00 | 2.20 | 0.079 | 0.087 |
| L | 0.10 | - | 0.004 | - |
| Q | 0.10 | 0.30 | 0.004 | 0.012 |
| x | - | 0.10 | - | 0.004 |

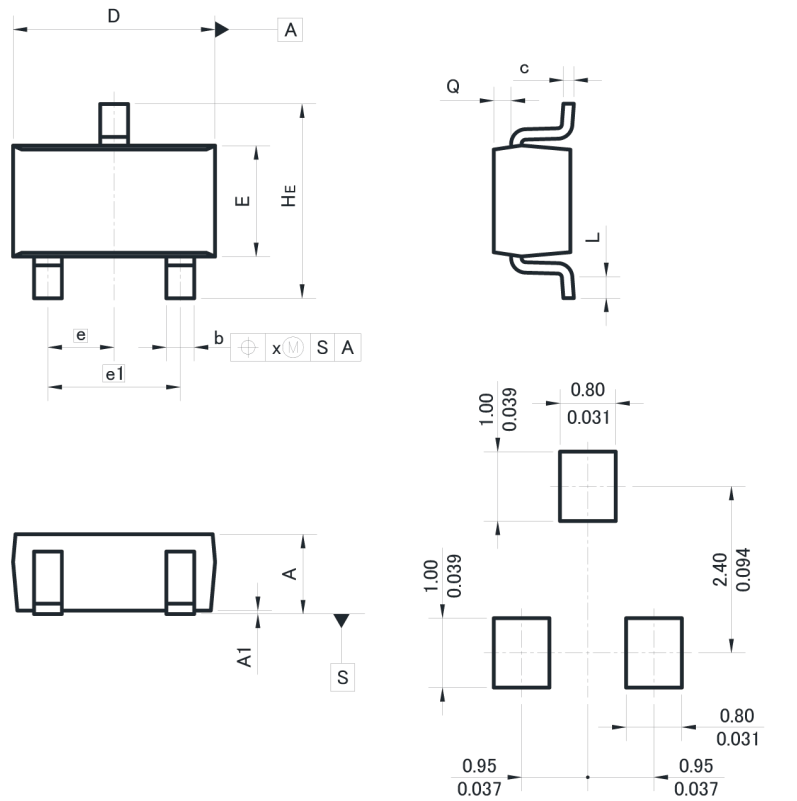
Dimension in mm / inches

●Dimensions

SOT-346

SC-59

(SMT3)



Soldering footprint

Unit: (mm / inches)

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.00 | 1.40 | 0.039 | 0.055 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.35 | 0.50 | 0.014 | 0.020 |
| c | 0.09 | 0.25 | 0.004 | 0.010 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 1.50 | 1.80 | 0.059 | 0.071 |
| e | 0.95 | | 0.037 | |
| e1 | 1.90 | | 0.075 | |
| HE | 2.60 | 3.00 | 0.102 | 0.118 |
| L | 0.30 | 0.60 | 0.012 | 0.024 |
| Q | 0.20 | 0.50 | 0.008 | 0.020 |
| x | - | 0.10 | - | 0.004 |

Dimension in mm / inches

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|-----------|-----------|------------|-----------|
| CLASS III | CLASS III | CLASS II b | CLASS III |
| CLASS IV | | CLASS III | |

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 - Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
 - Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
 - Sealing or coating our Products with resin or other coating materials
 - Use of our Products without cleaning residue of flux (Exclude cases where no-clean type fluxes is used. However, recommend sufficiently about the residue.) ; or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
 - Use of the Products in places subject to dew condensation
- The Products are not subject to radiation-proof design.
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- In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse, is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- De-rate Power Dissipation depending on ambient temperature. When used in sealed area, confirm that it is the use in the range that does not exceed the maximum junction temperature.
- Confirm that operation temperature is within the specified range described in the product specification.
- ROHM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

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1. Product performance and soldered connections may deteriorate if the Products are stored in the places where:
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 - [b] the temperature or humidity exceeds those recommended by ROHM
 - [c] the Products are exposed to direct sunshine or condensation
 - [d] the Products are exposed to high Electrostatic
2. Even under ROHM recommended storage condition, solderability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solderability before using Products of which storage time is exceeding the recommended storage time period.
3. Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
4. Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

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