

| Parameter | Value |
|---------------|---------------|
| V_{CC} | 50V |
| $I_{C(MAX.)}$ | 100mA |
| R_1 | 4.7k Ω |
| R_2 | 4.7k Ω |

●Features

- 1) Built-In Biasing Resistors, $R_1 = R_2 = 4.7k\Omega$
- 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 PNP Types: DTA143E series

●Application

INVERTER, INTERFACE, DRIVER

●Inner circuit

DTC143EM/ DTC143EEB/ DTC143EUB

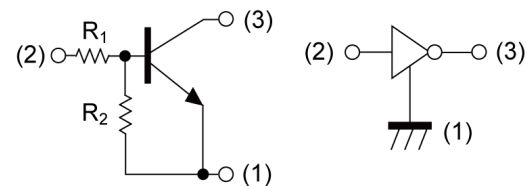


(1) IN (BASE)
 (2) GND (EMITTER)
 (3) OUT (COLLECTOR)

●Outline

| | |
|--|---|
| <p>SOT-723</p> <p>DTC143EM (VMT3)</p> | <p>SOT-416FL</p> <p>DTC143EEB (EMT3F)</p> |
| <p>SOT-416</p> <p>DTC143EE3 (EMT3)</p> | <p>SOT-323FL</p> <p>DTC143EUB (UMT3F)</p> |
| <p>SOT-323</p> <p>DTC143EU3 (UMT3)</p> | <p>SOT-346</p> <p>DTC143EKA (SMT3)</p> |

DTC143EE3/ DTC143EU3/ DTC143EKA



(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 |
|-----------|-----------|--------------|-------------|----------------|-----------------|----------------|---------|
| DTC143EM | SOT-723 | 1212 | T2L | 180 | 8 | 8000 | 23 |
| DTC143EEB | SOT-416FL | 1616 | TL | 180 | 8 | 3000 | 23 |
| DTC143EE3 | SOT-416 | 1616 | TL | 180 | 8 | 3000 | 23 |
| DTC143EUB | SOT-323FL | 2021 | TL | 180 | 8 | 3000 | 23 |
| DTC143EU3 | SOT-323 | 2021 | T106 | 180 | 8 | 3000 | 23 |
| DTC143EKA | SOT-346 | 2928 | T146 | 180 | 8 | 3000 | 23 |

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

| Parameter | | Symbol | Values | Unit |
|------------------------------|-----------|-------------------|-------------|------------------|
| Supply voltage | | V_{CC} | 50 | V |
| Input voltage | | V_{IN} | -10 to 30 | V |
| Output current | | I_O | 100 | mA |
| Collector current | | $I_{C(MAX)}^{*1}$ | 100 | mA |
| Power dissipation | DTC143EM | P_D^{*2} | 150 | mW |
| | DTC143EEB | | 150 | |
| | DTC143EE3 | | 150 | |
| | DTC143EUB | | 200 | |
| | DTC143EU3 | | 200 | |
| | DTC143EKA | | 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 |
| | $V_{I(on)}$ | $V_O = 0.3V, I_O = 20\text{mA}$ | 3.0 | - | - | |
| Output voltage | $V_{O(on)}$ | $I_O = 10\text{mA}, I_I = 0.5\text{mA}$ | - | 100 | 300 | mV |
| Input current | I_I | $V_I = 5V$ | - | - | 1.8 | mA |
| Output current | $I_{O(off)}$ | $V_{CC} = 50V, V_I = 0V$ | - | - | 500 | nA |
| DC current gain | G_I | $V_O = 5V, I_O = 10\text{mA}$ | 30 | - | - | - |
| Input resistance | R_I | - | 3.29 | 4.7 | 6.11 | k Ω |
| Resistance ratio | R_2/R_1 | - | 0.8 | 1.0 | 1.2 | - |
| 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)

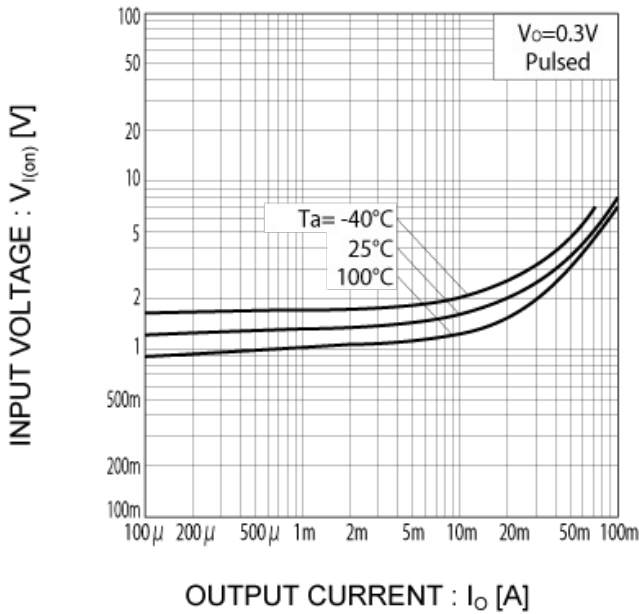


Fig.2 Output current vs. input voltage (OFF characteristics)

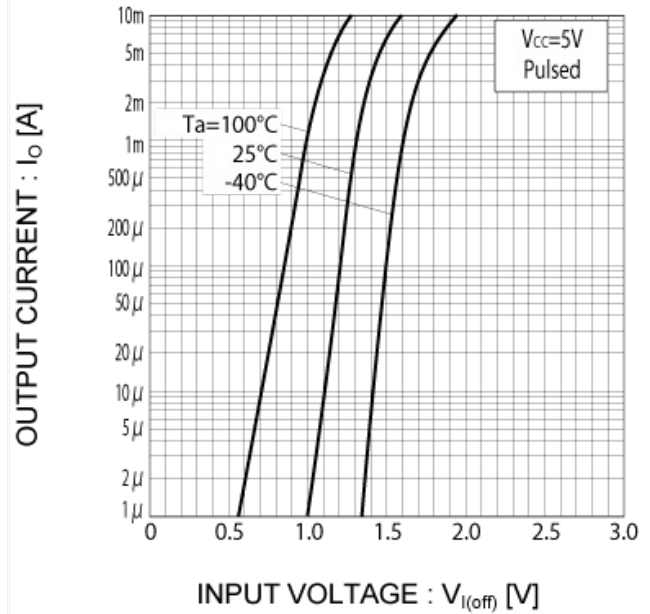


Fig.3 Output current vs. output voltage

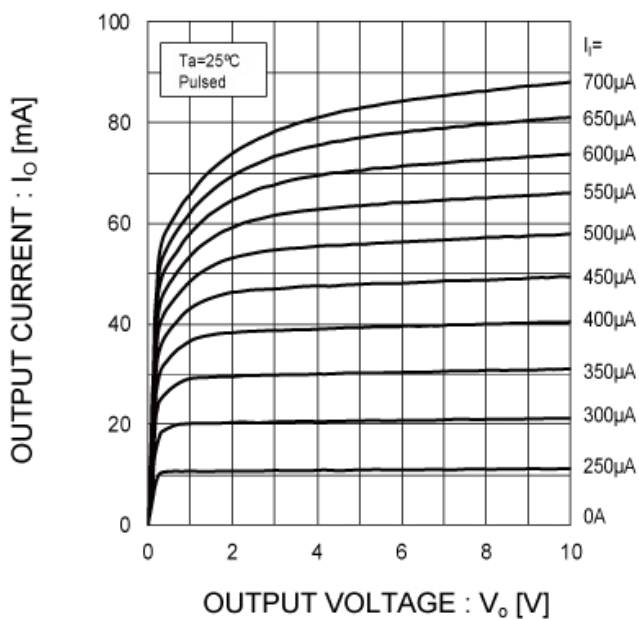
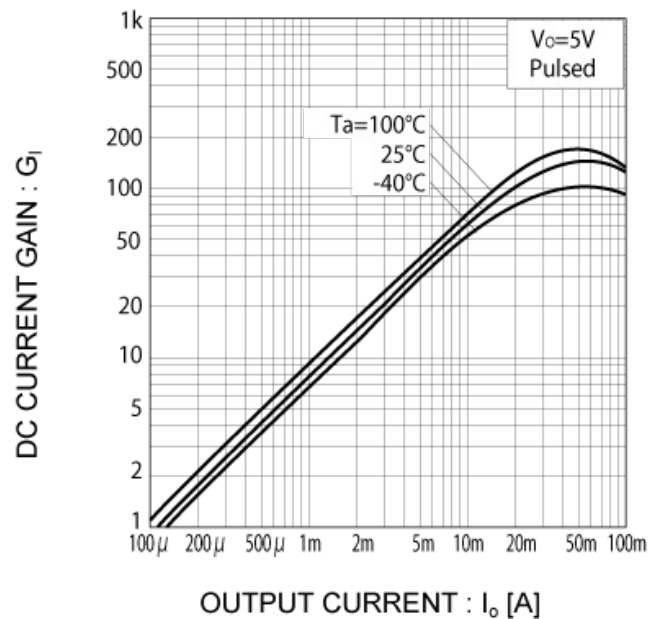
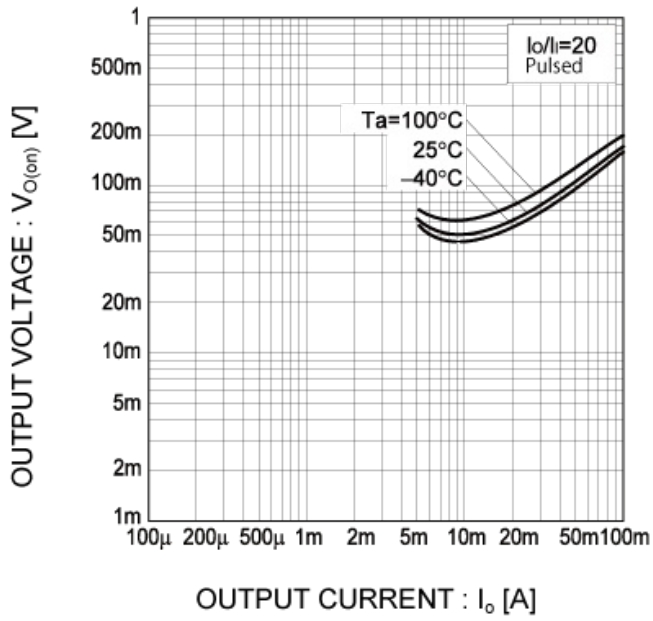


Fig.4 DC current gain vs. output current



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

Fig.5 Output voltage vs. output current



●Dimensions

SOT-723
 SC-105AA
 (VMT3)



Soldering footprint

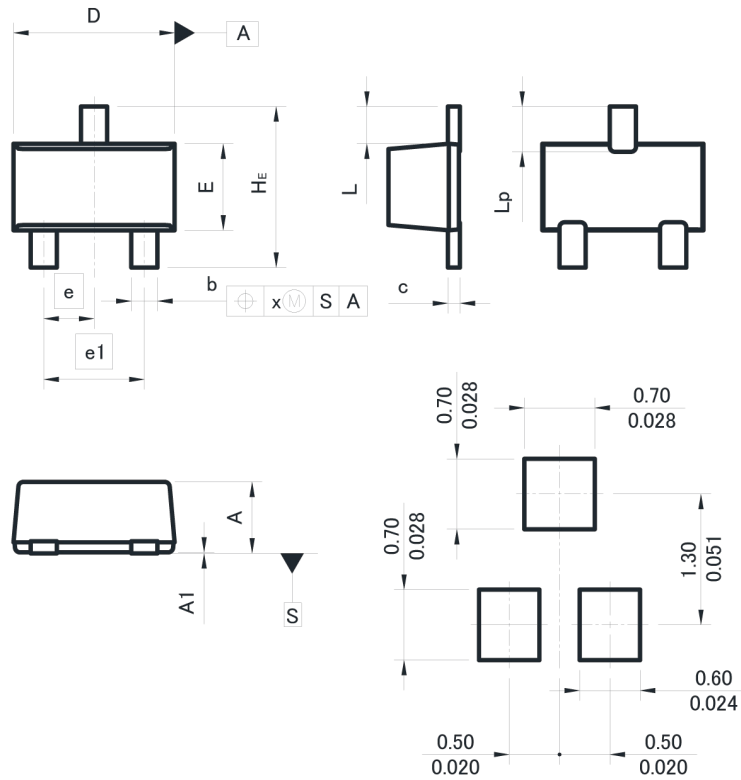
Unit: (mm / inches)

| 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)



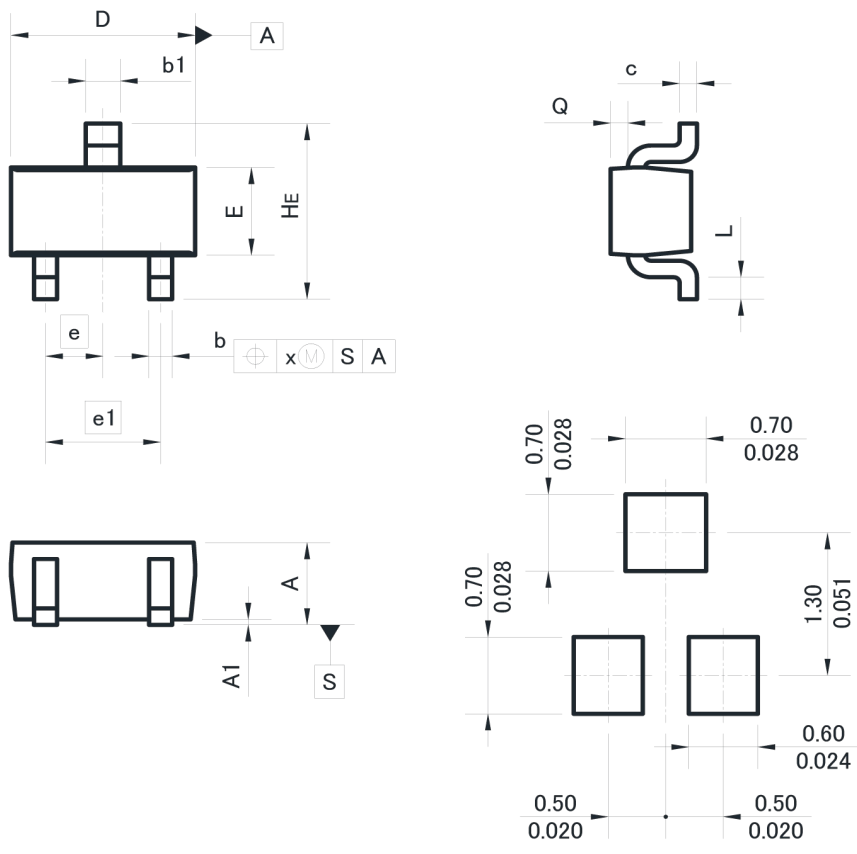
Soldering footprint
 Unit: ($\frac{\text{mm}}{\text{inches}}$)

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.65 | 0.85 | 0.026 | 0.033 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| b | 0.17 | 0.36 | 0.007 | 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 | 1.00 | | 0.039 | |
| HE | 1.50 | 1.30 | 0.059 | 0.051 |
| 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: ($\frac{\text{mm}}{\text{inches}}$)

| 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 |

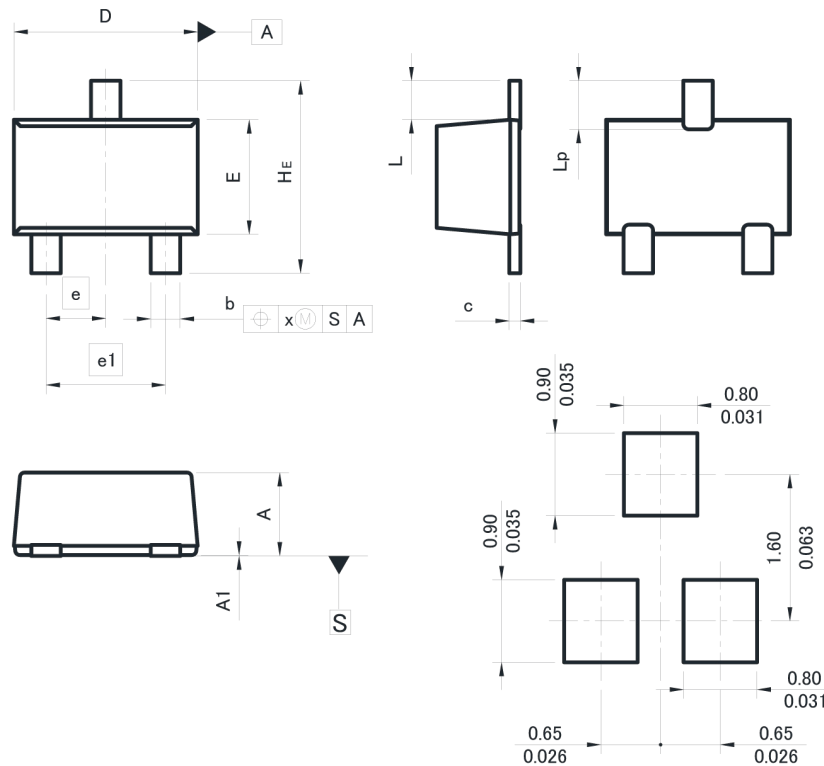
Dimension in mm/inches

●Dimensions

SOT-323FL

SC-85

(UMT3F)



Soldering footprint

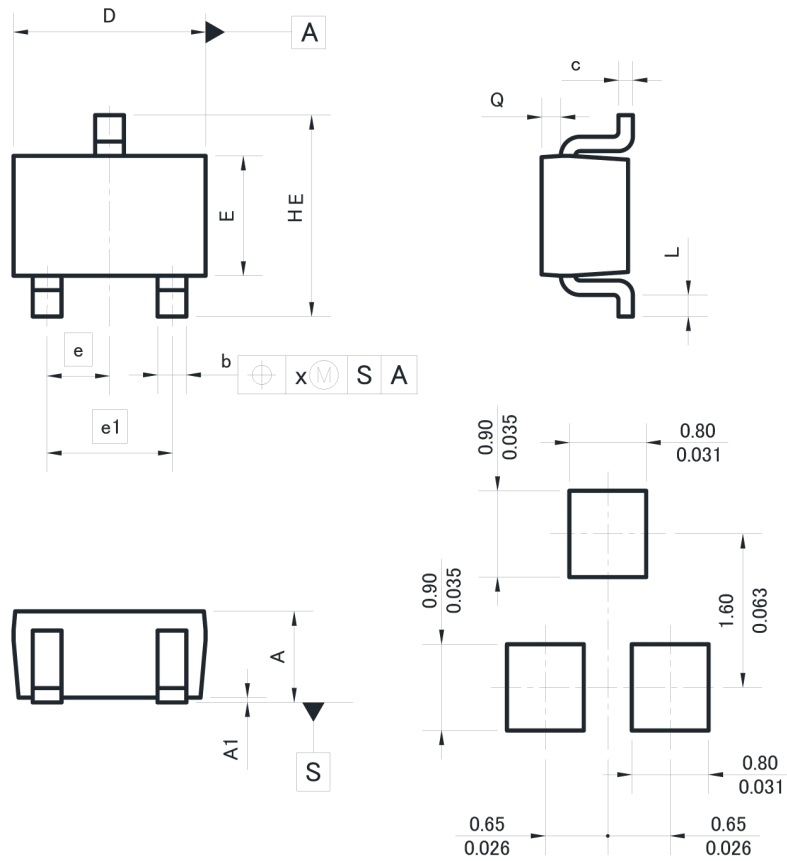
Unit: ($\frac{\text{mm}}{\text{inches}}$)

| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.85 | 1.05 | 0.033 | 0.041 |
| 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 | 1.30 | | 0.051 | |
| 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 |
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 - 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
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- Please verify and confirm characteristics of the final or mounted products in using the Products.
- 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.
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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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