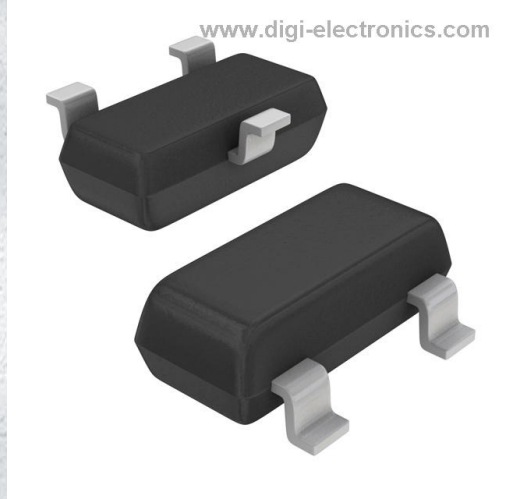
# SMMBTA56LT1G Datasheet




https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | SMMBTA56LT1G-DG |
| Manufacturer | onsemi |
| Manufacturer Product Number | SMMBTA56LT1G |
| Description | TRANS PNP 80V 0.5A SOT23-3 |
| Detailed Description | Bipolar (BJT) Transistor PNP 80 V 500 mA 50MHz 22 5 mW Surface Mount SOT-23-3 (TO-236) |

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| SMMBTA56LT1G | onsemi |
| Series: | Product Status: |
| - | Active |
| Transistor Type: | Current - Collector (Ic) (Max): |
| PNP | 500 mA |
| Voltage - Collector Emitter Breakdown (Max): | Vce Saturation (Max) @ Ib, Ic: |
| 80 V | 250mV @ 10mA, 100mA |
| Current - Collector Cutoff (Max): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 100nA | 100 @ 100mA, 1V |
| Power - Max: | Frequency - Transition: |
| 225 mW | 50MHz |
| Operating Temperature: | Grade: |
| -55°C ~ 150°C (TJ) | Automotive |
| Qualification: | Mounting Type: |
| AEC-Q101 | Surface Mount |
| Package / Case: | Supplier Device Package: |
| TO-236-3, SC-59, SOT-23-3 | SOT-23-3 (TO-236) |
| Base Product Number: | |
| SMMBTA56 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.21.0095 | |

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**DATA SHEET**
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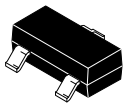
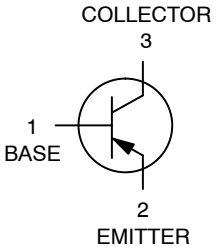
# Driver Transistors

## PNP Silicon

# MMBTA55L Series, MMBTA56L Series, SMMBTA56L Series



**SOT−23**
**CASE 318**
**STYLE 6**




### Features

- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector − Emitter Voltage<br>MMBTA55<br>MMBTA56, SMMBTA56 | $V_{CEO}$ | <br>−60<br>−80 | Vdc |
| Collector − Base Voltage<br>MMBTA55<br>MMBTA56, SMMBTA56 | $V_{CBO}$ | <br>−60<br>−80 | Vdc |
| Emitter − Base Voltage | $V_{EBO}$ | −4.0 | Vdc |
| Collector Current − Continuous | $I_C$ | −500 | mAdc |

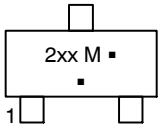
### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR− 5 Board<br>(Note 1) $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | <br>225<br>1.8 | <br>mW<br>mW/°C |
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 556 | °C/W |
| Total Device Dissipation Alumina<br>Substrate, (Note 2) $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | <br>300<br>2.4 | <br>mW<br>mW/°C |
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 417 | °C/W |
| Junction and Storage Temperature | $T_J$, $T_{stg}$ | −55 to +150 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR− 5 = 1.0 × 0.75 × 0.062 in.
2. Alumina = 0.4 × 0.3 × 0.024 in. 99.5% alumina.

### MARKING DIAGRAM




2xx = Device Code
x = H for MMBTA55LT1G
xx = GM for MMBTA56LT1G, SMMBTA56LT1G
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

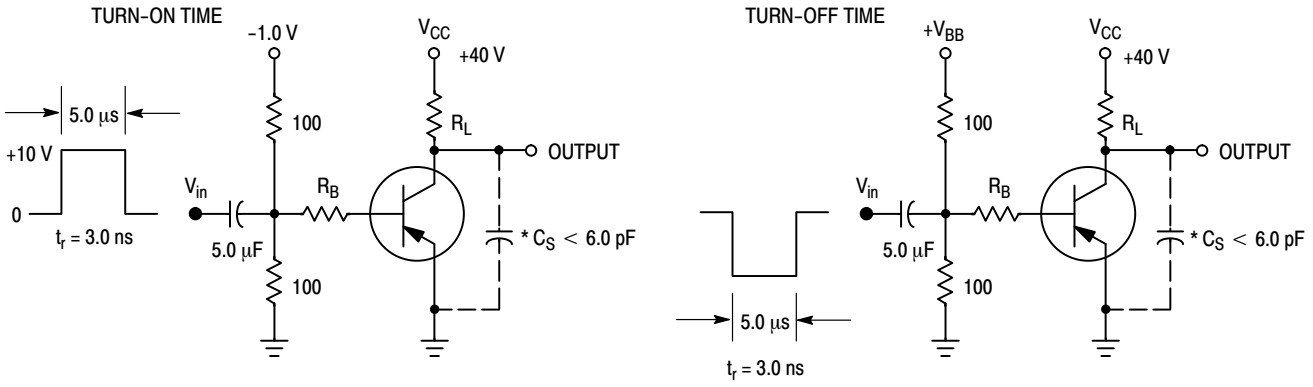
# MMBTA55L Series, MMBTA56L Series, SMMBTA56L Series

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector – Emitter Breakdown Voltage (Note 3)<br>($I_C$ = −1.0 mAdc, $I_B$ = 0)<br>MMBTA55<br>MMBTA56, SMMBTA56 | $V_{(BR)CEO}$ | <br><br>−60<br>−80 | <br><br>–<br>– | Vdc |
| Emitter – Base Breakdown Voltage<br>($I_E$ = −100 μAdc, $I_C$ = 0) | $V_{(BR)EBO}$ | <br>−4.0 | <br>– | Vdc |
| Collector Cutoff Current<br>($V_{CE}$ = −60 Vdc, $I_B$ = 0) | $I_{CES}$ | <br>– | <br>−0.1 | μAdc |
| Collector Cutoff Current<br>($V_{CB}$ = −60 Vdc, $I_E$ = 0)<br>MMBTA55<br>($V_{CB}$ = −80 Vdc, $I_E$ = 0)<br>MMBTA56, SMMBTA56 | $I_{CBO}$ | <br><br>–<br><br>– | <br><br>−0.1<br><br>−0.1 | μAdc |
| **ON CHARACTERISTICS** | | | | |
| DC Current Gain<br>($I_C$ = −10 mAdc, $V_{CE}$ = −1.0 Vdc)<br>($I_C$ = −100 mAdc, $V_{CE}$ = −1.0 Vdc) | $h_{FE}$ | <br>100<br>100 | <br>–<br>– | – |
| Collector – Emitter Saturation Voltage<br>($I_C$ = −100 mAdc, $I_B$ = −10 mAdc) | $V_{CE(sat)}$ | <br>– | <br>−0.25 | Vdc |
| Base – Emitter On Voltage<br>($I_C$ = −100 mAdc, $V_{CE}$ = −1.0 Vdc) | $V_{BE(on)}$ | <br>– | <br>−1.2 | Vdc |
| **SMALL– SIGNAL CHARACTERISTICS** | | | | |
| Current – Gain – Bandwidth Product (Note 4)<br>($I_C$ = −100 mAdc, $V_{CE}$ = −1.0 Vdc, f = 100 MHz) | $f_T$ | <br>50 | <br>– | MHz |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
4. $f_T$ is defined as the frequency at which $|h_{fe}|$ extrapolates to unity.




*Total Shunt Capacitance of Test Jig and Connectors For PNP Test Circuits, Reverse All Voltage Polarities

**Figure 1. Switching Time Test Circuits**

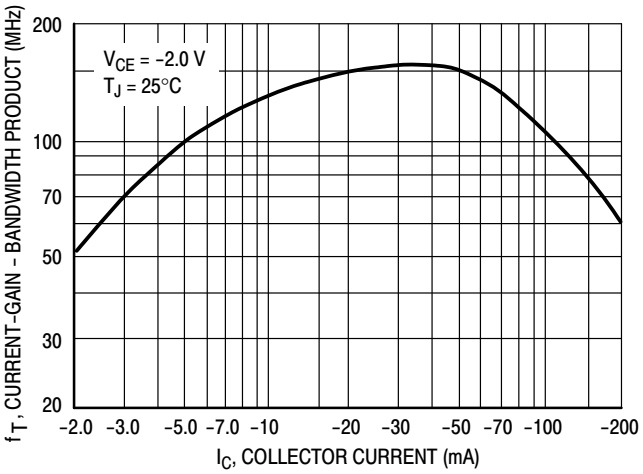



**Figure 2. Current−Gain — Bandwidth Product**

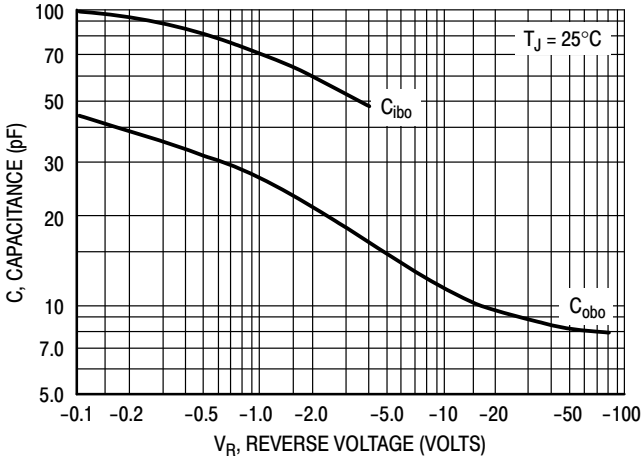



**Figure 3. Capacitance**

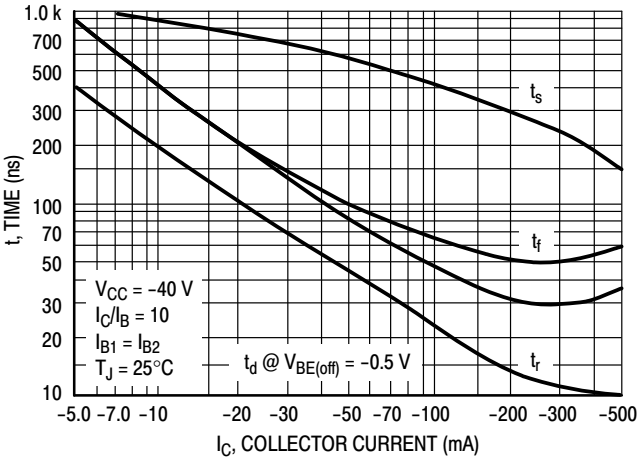



**Figure 4. Switching Time**

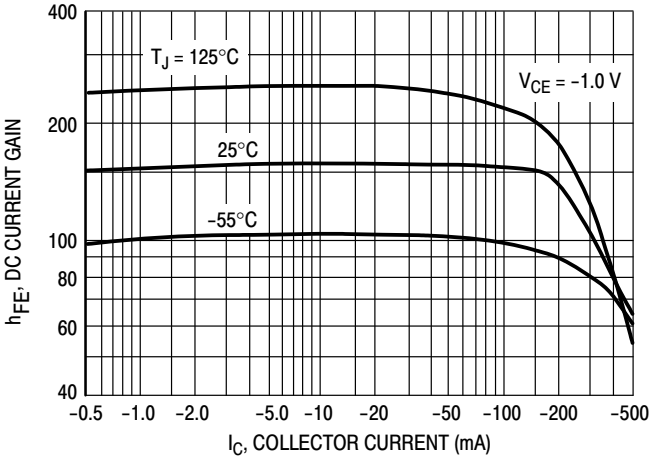



**Figure 5. DC Current Gain**

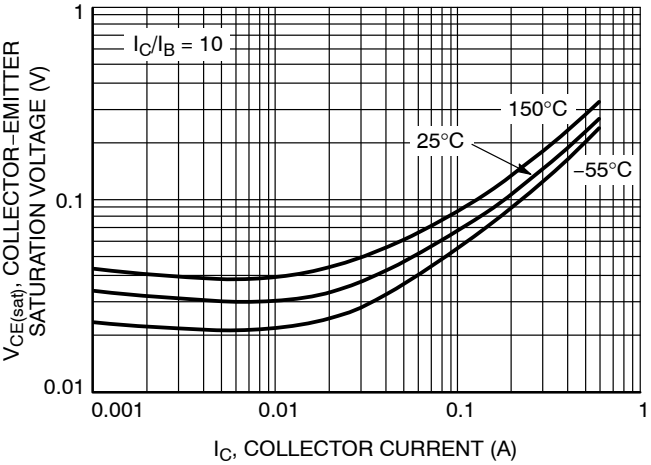



**Figure 6. Collector Emitter Saturation Voltage vs. Collector Current**

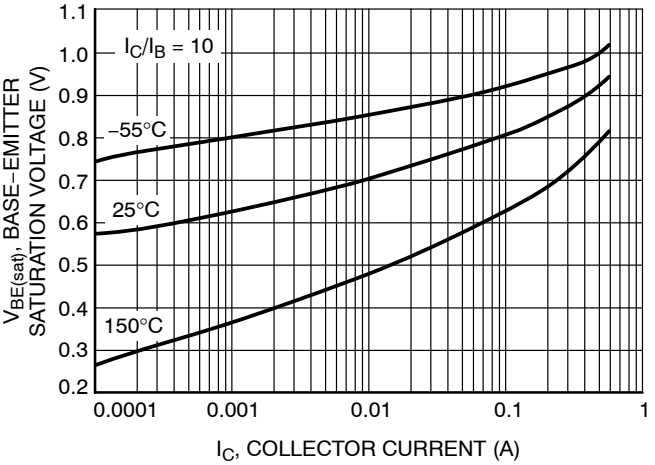



**Figure 7. Base Emitter Saturation Voltage vs. Collector Current**

# MMBTA55L Series, MMBTA56L Series, SMMBTA56L Series

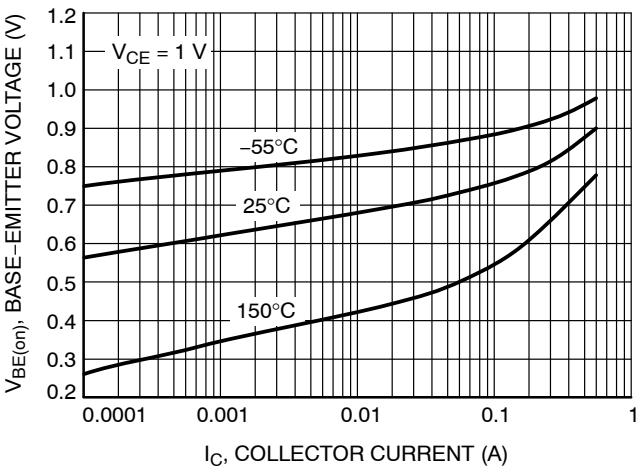



**Figure 8. Base Emitter Voltage vs. Collector Current**

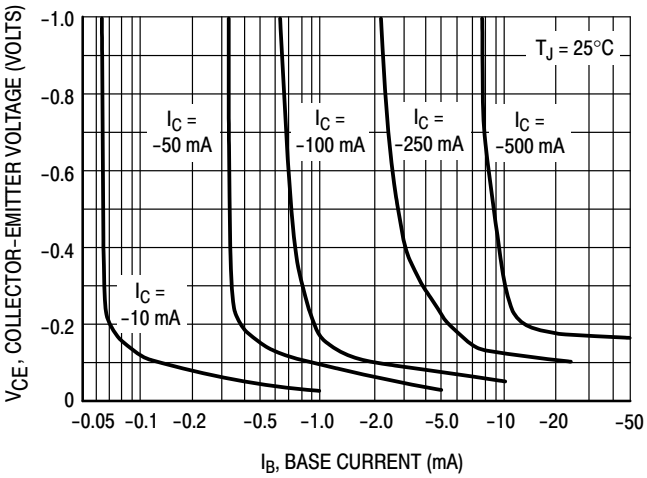



**Figure 9. Collector Saturation Region**

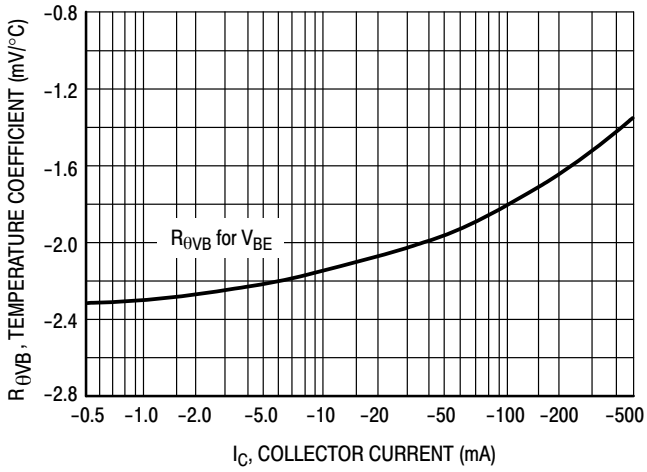



**Figure 10. Base−Emitter Temperature Coefficient**

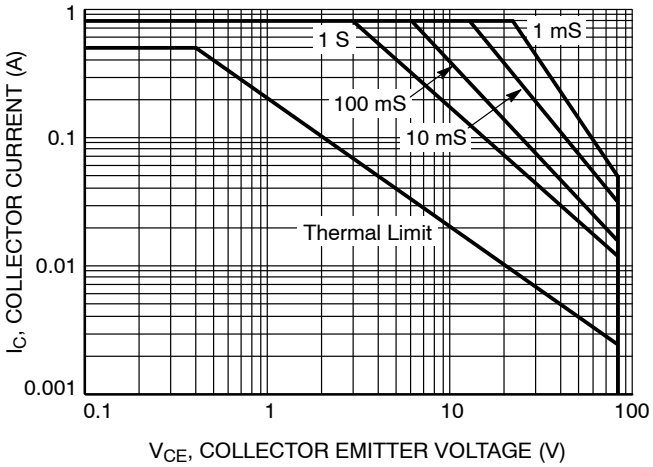



**Figure 11. Safe Operating Area**

## ORDERING INFORMATION

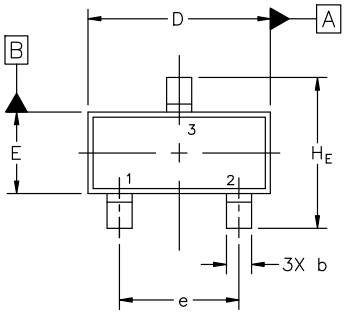
| Device Order Number | Package Type | Shipping† |
|---|---|---|
| MMBTA55LT1G | SOT−23 (Pb−Free) | 3,000 / Tape & Reel |
| MMBTA55LT3G | SOT−23 (Pb−Free) | 10,000 / Tape & Reel |
| MMBTA56LT1G | SOT−23 (Pb−Free) | 3,000 / Tape & Reel |
| SMMBTA56LT1G | SOT−23 (Pb−Free) | 3,000 / Tape & Reel |
| MMBTA56LT3G | SOT−23 (Pb−Free) | 10,000 / Tape & Reel |
| SMMBTA56LT3G | SOT−23 (Pb−Free) | 10,000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

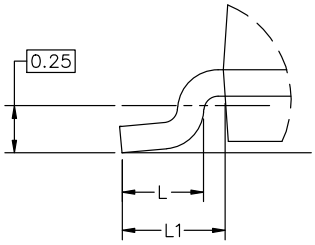
# MMBTA55L Series, MMBTA56L Series, SMMBTA56L Series

## PACKAGE DIMENSIONS

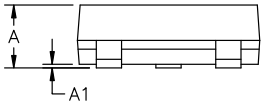
**SOT−23 (TO−236) 2.90x1.30x1.00 1.90P**
CASE 318
ISSUE AU



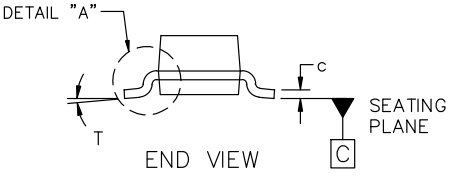

TOP VIEW




DETAIL "A"
Scale 3:1




SIDE VIEW

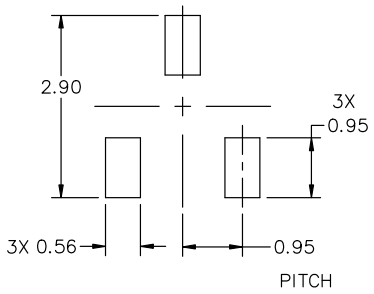



END VIEW

| MILLIMETERS | | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 0.89 | 1.00 | 1.11 |
| A1 | 0.01 | 0.06 | 0.10 |
| b | 0.37 | 0.44 | 0.50 |
| c | 0.08 | 0.14 | 0.20 |
| D | 2.80 | 2.90 | 3.04 |
| E | 1.20 | 1.30 | 1.40 |
| e | 1.78 | 1.90 | 2.04 |
| L | 0.30 | 0.43 | 0.55 |
| L1 | 0.35 | 0.54 | 0.69 |
| $H_E$ | 2.10 | 2.40 | 2.64 |
| T | 0° | −−− | 10° |

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

STYLE 6:
PIN 1. BASE
2. EMITTER
3. COLLECTOR




RECOMMENDED
MOUNTING FOOTPRINT

* For additional information on our Pb−Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
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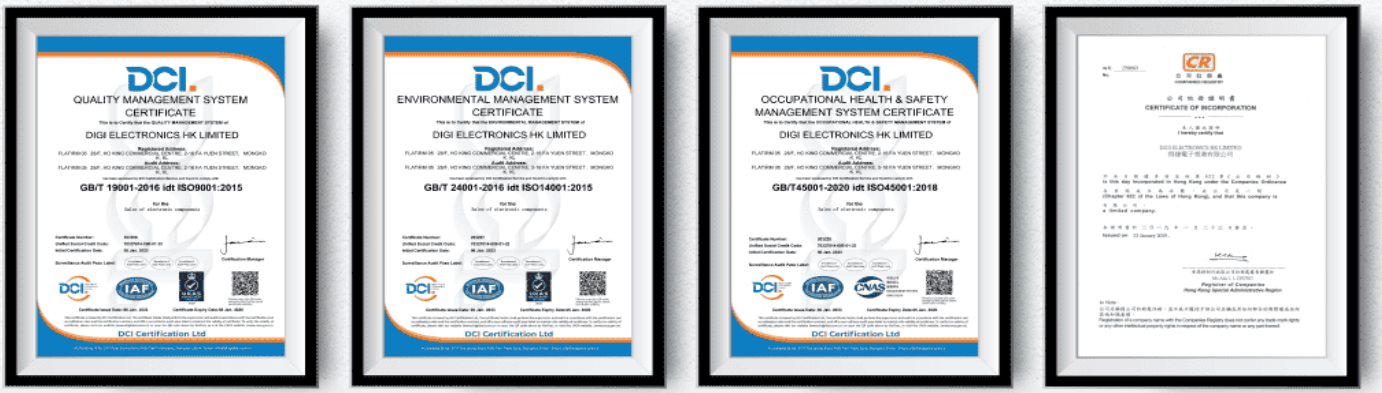



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