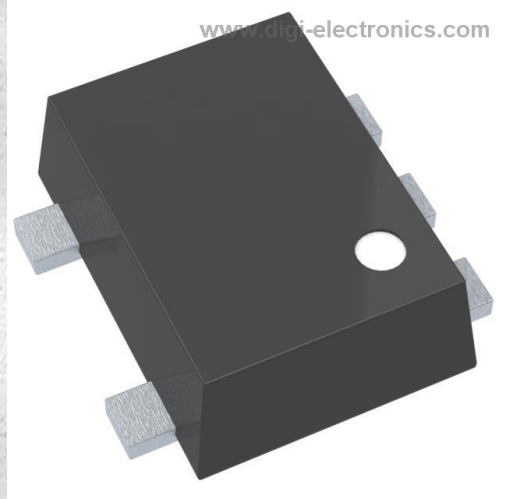
# EMG2DXV5T1 Datasheet




https://www.DiGi-Electronics.com

| | |
|---|---|
| DiGi Electronics Part Number | EMG2DXV5T1-DG |
| Manufacturer | onsemi |
| Manufacturer Product Number | EMG2DXV5T1 |
| Description | TRANS 2NPN PREBIAS 0.23W SOT553 |
| Detailed Description | Pre-Biased Bipolar Transistor (BJT) 2 NPN - Pre-Biased (Dual) 50V 100mA 230mW Surface Mount SOT-553 |

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| EMG2DXV5T1 | onsemi |
| Series: | Product Status: |
| - | Obsolete |
| Transistor Type: | Current - Collector (Ic) (Max): |
| 2 NPN - Pre-Biased (Dual) | 100mA |
| Voltage - Collector Emitter Breakdown (Max): | Resistor - Base (R1): |
| 50V | 47kOhms |
| Resistor - Emitter Base (R2): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 47kOhms | 80 @ 5mA, 10V |
| Vce Saturation (Max) @ Ib, Ic: | Current - Collector Cutoff (Max): |
| 250mV @ 300µA, 10mA | 500nA |
| Frequency - Transition: | Power - Max: |
| - | 230mW |
| Mounting Type: | Package / Case: |
| Surface Mount | SOT-553 |
| Supplier Device Package: | Base Product Number: |
| SOT-553 | EMG2DX |

## Environmental & Export classification

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

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**DATA SHEET**
www.onsemi.com

# Dual Bias Resistor Transistors

## NPN Silicon Surface Mount Transistors with Monolithic Bias Resistor Network

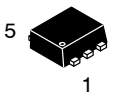
# EMG2DXV5, EMG5DXV5

This new series of digital transistors is designed to replace a single device and its external resistor bias network. The BRT (Bias Resistor Transistor) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base−emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space. The device is housed in the SOT−553 package which is designed for low power surface mount applications.

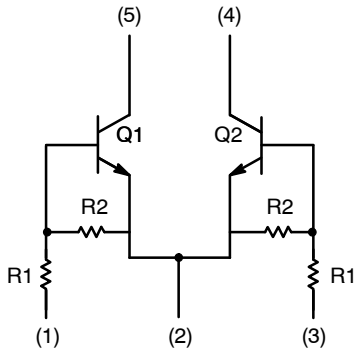
### Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- Moisture Sensitivity Level: 1
- Available in 8 mm, 7 inch Tape and Reel
- Lead−Free Solder Plating
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

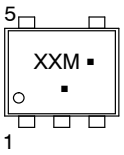
**NPN SILICON BIAS RESISTOR TRANSISTORS**




**SOT−553**
**CASE 463B**




### MARKING DIAGRAM




XX = UF (EMG5)
UP (EMG2)
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 6.

### MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted)

| Symbol | Rating | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 50 | Vdc |
| $V_{CEO}$ | Collector-Emitter Voltage | 50 | Vdc |
| $I_C$ | Collector Current | 100 | mAdc |

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.

### THERMAL CHARACTERISTICS

| Symbol | Characteristic | Max | Unit |
|---|---|---|---|
| $P_D$ | Total Device Dissipation<br>$T_A$ = 25°C<br>Derate above 25°C | 230 (Note 1)<br>338 (Note 2)<br>1.8 (Note 1)<br>2.7 (Note 2) | mW<br><br>°C/W |
| $R_{\theta JA}$ | Thermal Resistance − Junction-to-Ambient | 540 (Note 1)<br>370 (Note 2) | °C/W |
| $R_{\theta JL}$ | Thermal Resistance − Junction-to-Lead | 264 (Note 1)<br>287 (Note 2) | °C/W |
| $T_J$, $T_{stg}$ | Junction and Storage Temperature Range | −55 to +150 | °C |

1. FR−4 @ Minimum Pad
2. FR−4 @ 1.0 x 1.0 inch Pad

# EMG2DXV5, EMG5DXV5

## DEVICE MARKING AND RESISTOR VALUES

| Device | Package | Marking | R1 (K) | R2 (K) |
|---|---|---|---|---|
| EMG2DXV5 | SOT−553 | UP | 47 | 47 |
| EMG5DXV5 | SOT−553 | UF | 10 | 47 |

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

| Symbol | Characteristic | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Q1 & Q2)** | | | | | |
| $I_{CBO}$ | Collector-Base Cutoff Current ($V_{CB}$ = 50 V, $I_E$ = 0) | – | – | 100 | nAdc |
| $I_{CEO}$ | Collector-Emitter Cutoff Current ($V_{CE}$ = 50 V, $I_B$ = 0) | – | – | 500 | nAdc |
| $I_{EBO}$ | Emitter-Base Cutoff Current ($V_{EB}$ = 6.0 V, $I_C$ = 0) EMG2DXV5<br>EMG5DXV5 | –<br>– | –<br>– | 0.1<br>0.2 | mAdc |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage ($I_C$ = 10 μA, $I_E$ = 0) | 50 | – | – | Vdc |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage (Note 3)<br>($I_C$ = 2.0 mA, $I_B$ = 0) | 50 | – | – | Vdc |
| **ON CHARACTERISTICS (Q1 & Q2)** (Note 3) | | | | | |
| $h_{FE}$ | DC Current Gain ($V_{CE}$ = 10 V, $I_C$ = 5.0 mA) EMG2DXV5<br>EMG5DXV5 | 80<br>80 | 140<br>140 | –<br>– | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage (IC = 10 mA, $I_B$ = 0.3 mA) | – | – | 0.25 | Vdc |
| $V_{OL}$ | Output Voltage (on)<br>($V_{CC}$ = 5.0 V, $V_B$ = 3.5 V, $R_L$ = 1.0 kΩ) EMG2DXV5<br>($V_{CC}$ = 5.0 V, $V_B$ = 2.5 V, $R_L$ = 1.0 kΩ) EMG5DXV5 | <br>–<br>– | <br>–<br>– | <br>0.2<br>0.2 | Vdc |
| $V_{OH}$ | Output Voltage (off) ($V_{CC}$ = 5.0 V, $V_B$ = 0.5 V, $R_L$ = 1.0 kΩ) | 4.9 | – | – | Vdc |
| $R_1$ | Input Resistor EMG2DXV5<br>EMG5DXV5 | 32.9<br>7.0 | 47<br>10 | 61.1<br>13 | kΩ |
| $R_1/R_2$ | Resistor Ratio EMG2DXV5<br>EMG5DXV5 | 0.8<br>0.17 | 1.0<br>0.21 | 1.2<br>0.25 | |

3. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%

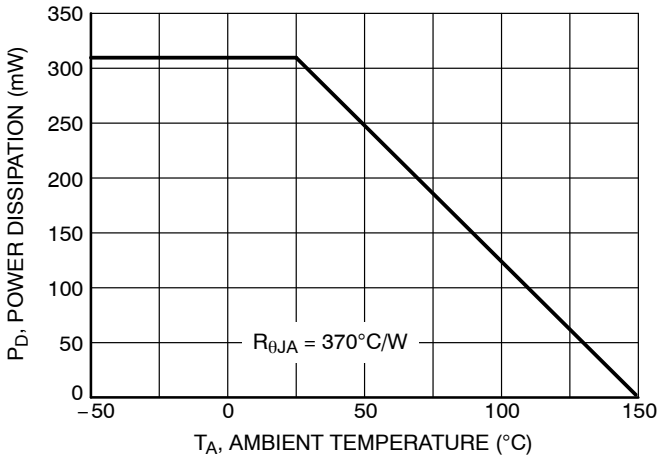



**Figure 1. Derating Curve**

# EMG2DXV5, EMG5DXV5

## TYPICAL ELECTRICAL CHARACTERISTICS — EMG2DXV5

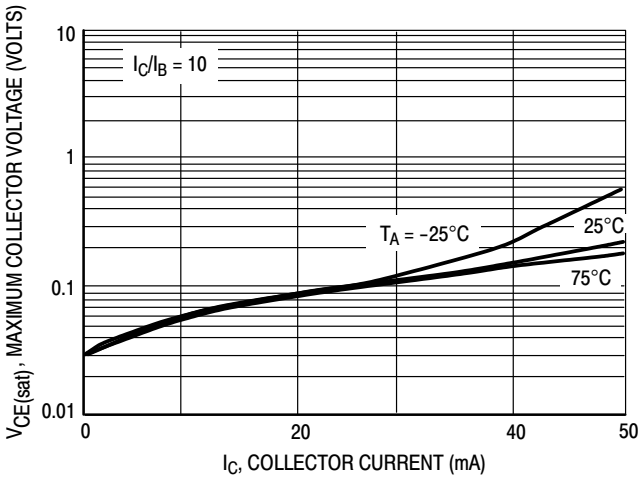



**Figure 2. $V_{CE(sat)}$ versus $I_C$**

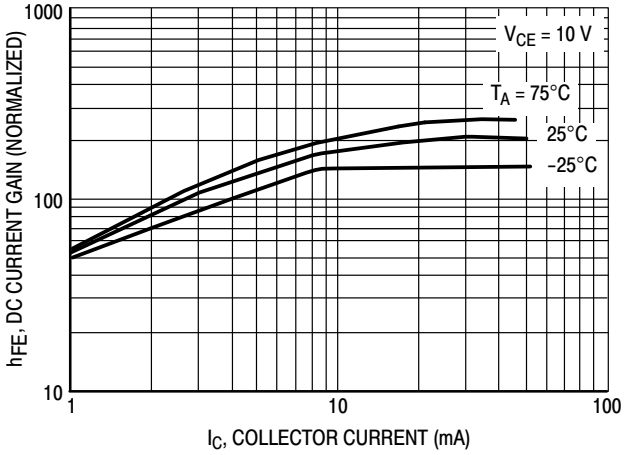



**Figure 3. DC Current Gain**

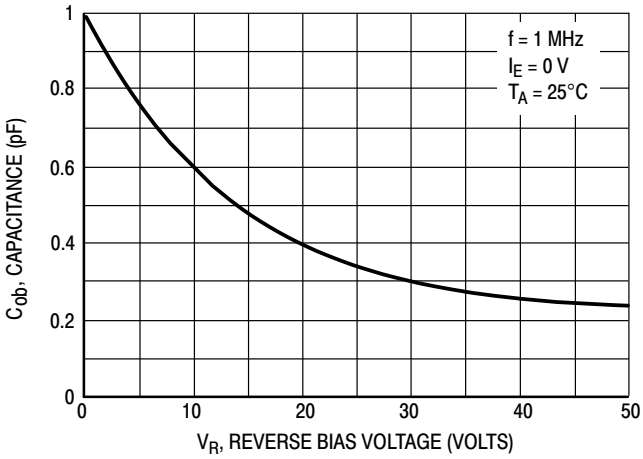



**Figure 4. Output Capacitance**

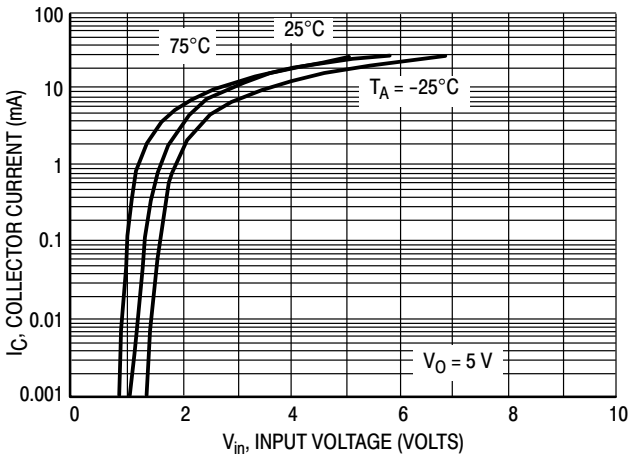



**Figure 5. Output Current versus Input Voltage**

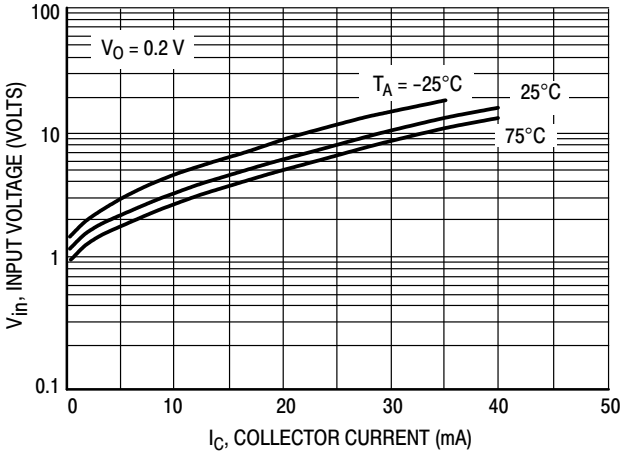



**Figure 6. Input Voltage versus Output Current**

# EMG2DXV5, EMG5DXV5

## TYPICAL ELECTRICAL CHARACTERISTICS – EMG5DXV5 (continued)

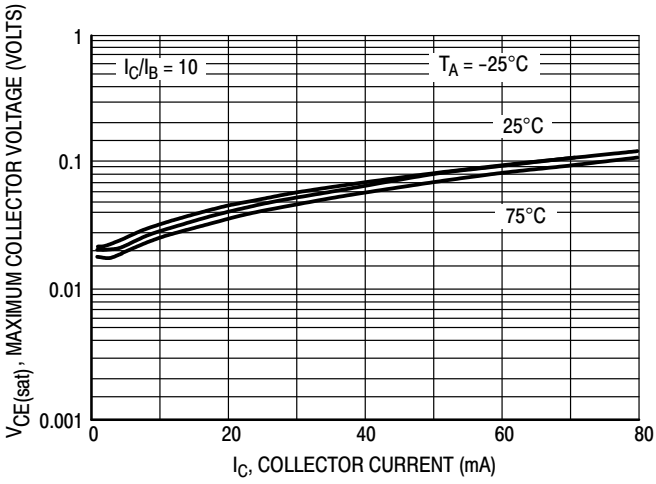



**Figure 7. $V_{CE(sat)}$ versus $I_C$**

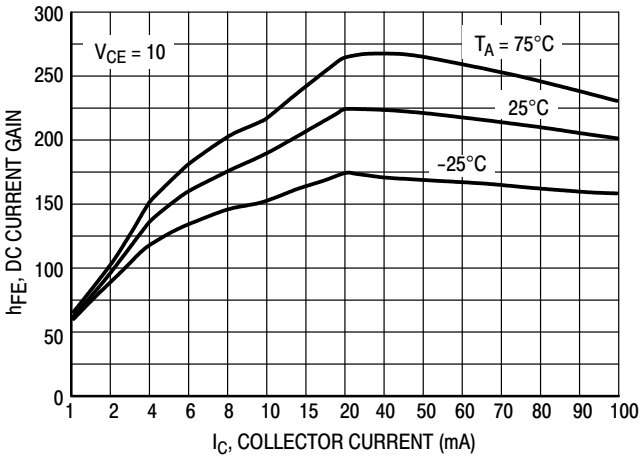



**Figure 8. DC Current Gain**

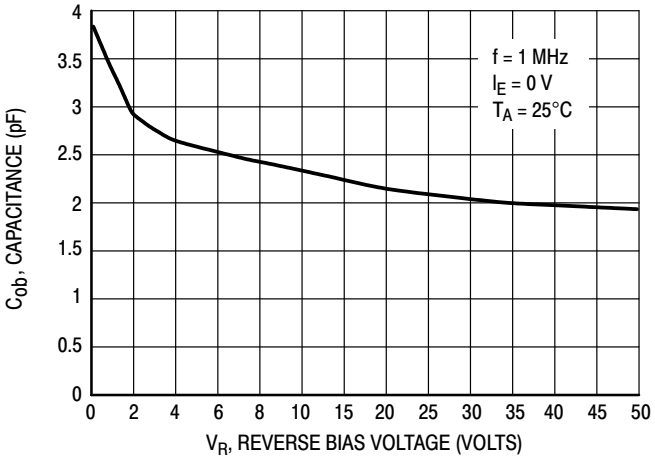



**Figure 9. Output Capacitance**

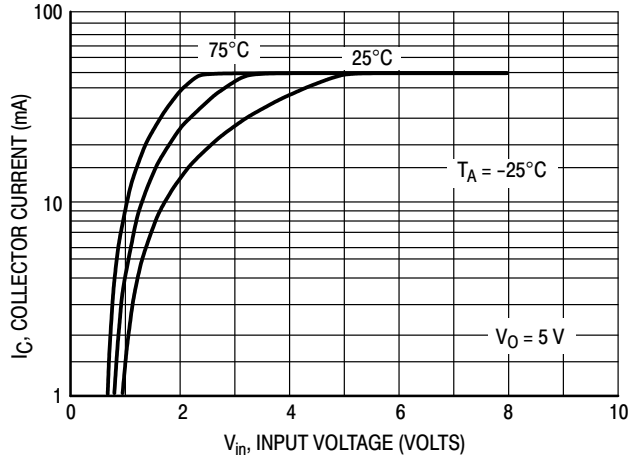



**Figure 10. Output Current versus Input Voltage**

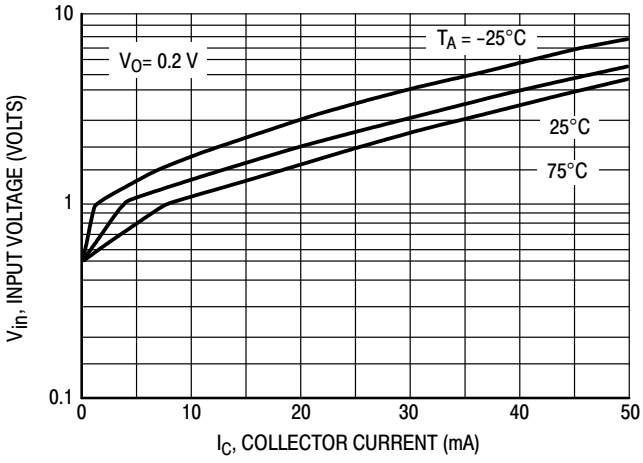



**Figure 11. Input Voltage versus Output Current**

## TYPICAL APPLICATIONS FOR NPN BRTS

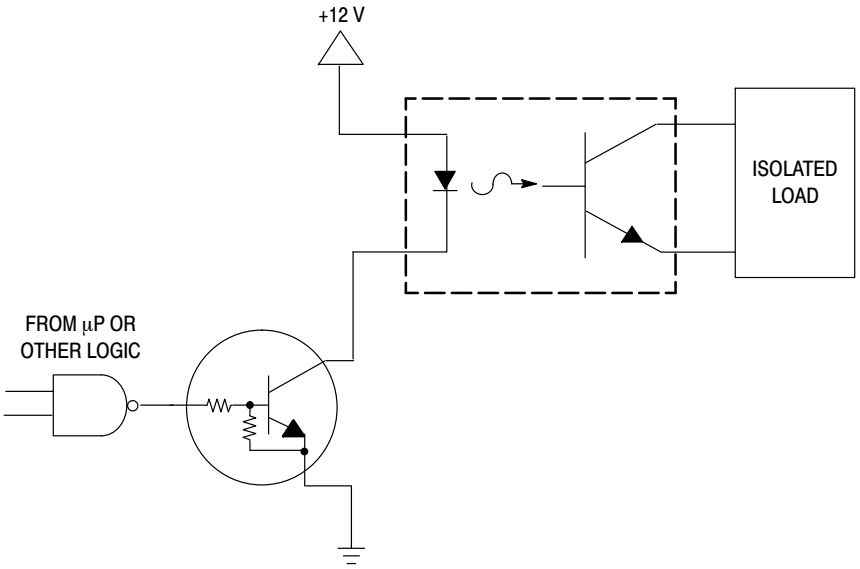



**Figure 12. Level Shifter: Connects 12 or 24 Volt Circuits to Logic**

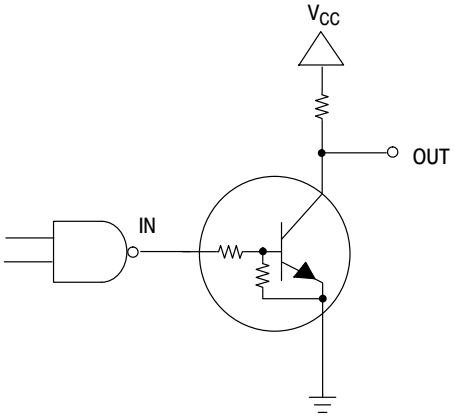



**Figure 13. Open Collector Inverter: Inverts the Input Signal**

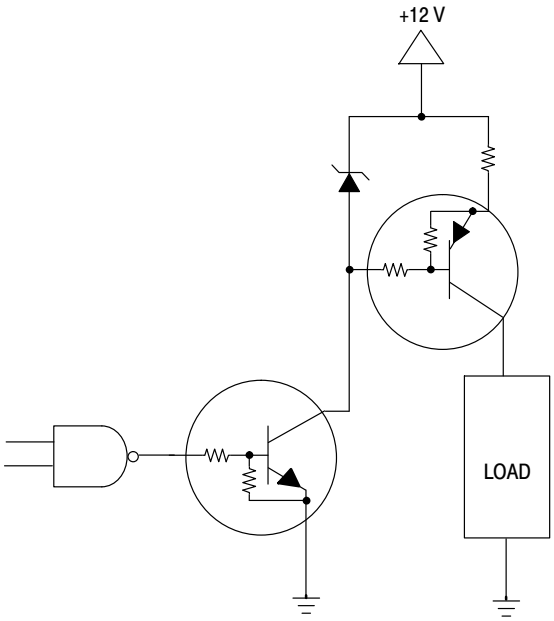



**Figure 14. Inexpensive, Unregulated Current Source**

## DEVICE ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| EMG2DXV5T1G | SOT−553<br>(Pb−Free) | 4,000 / Tape & Reel |

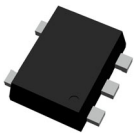
**DISCONTINUED** (Note 4)

| | | |
|---|---|---|
| EMG2DXV5T5G | SOT−553<br>(Pb−Free) | 8,000 / Tape & Reel |
| EMG5DXV5T1G | SOT−553<br>(Pb−Free) | 4,000 / Tape & Reel |
| EMG5DXV5T5G | SOT−553<br>(Pb−Free) | 8,000 / 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.

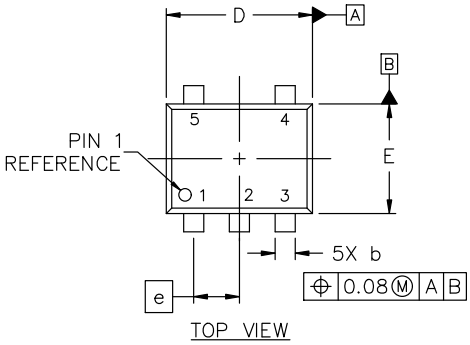
4. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS



**SOT−553−5 1.60x1.20x0.55, 0.50P**
CASE 463B
ISSUE D

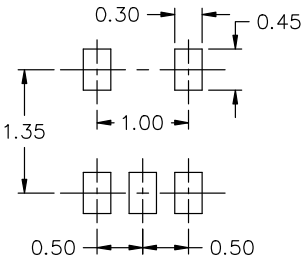
DATE 21 FEB 2024




NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.50 | 0.55 | 0.60 |
| b | 0.17 | 0.22 | 0.27 |
| c | 0.08 | 0.13 | 0.18 |
| D | 1.55 | 1.60 | 1.65 |
| E | 1.15 | 1.20 | 1.25 |
| e | 0.50 BSC | | |
| H | 1.55 | 1.60 | 1.65 |
| L | 0.10 | 0.20 | 0.30 |




RECOMMENDED MOUNTING FOOTPRINT*

* FOR ADDITIONAL INFORMATION ON OUR Pb−FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

### GENERIC MARKING DIAGRAM*


XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

STYLE 1:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 2:
PIN 1. CATHODE
2. COMMON ANODE
3. CATHODE 2
4. CATHODE 3
5. CATHODE 4

STYLE 3:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. CATHODE 1

STYLE 4:
PIN 1. SOURCE 1
2. DRAIN 1/2
3. SOURCE 1
4. GATE 1
5. GATE 2

STYLE 5:
PIN 1. ANODE
2. EMITTER
3. BASE
4. COLLECTOR
5. CATHODE

STYLE 6:
PIN 1. EMITTER 2
2. BASE 2
3. EMITTER 1
4. COLLECTOR 1
5. COLLECTOR 2/BASE 1

STYLE 7:
PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

STYLE 8:
PIN 1. CATHODE
2. COLLECTOR
3. N/C
4. BASE
5. EMITTER

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. ANODE
5. ANODE

| | | |
|---|---|---|
| **DOCUMENT NUMBER:** | **98AON11127D** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
| **DESCRIPTION:** | **SOT−553−5 1.60x1.20x0.55, 0.50P** | **PAGE 1 OF 1** |

## ADDITIONAL INFORMATION

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**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales

# OUR CERTIFICATE

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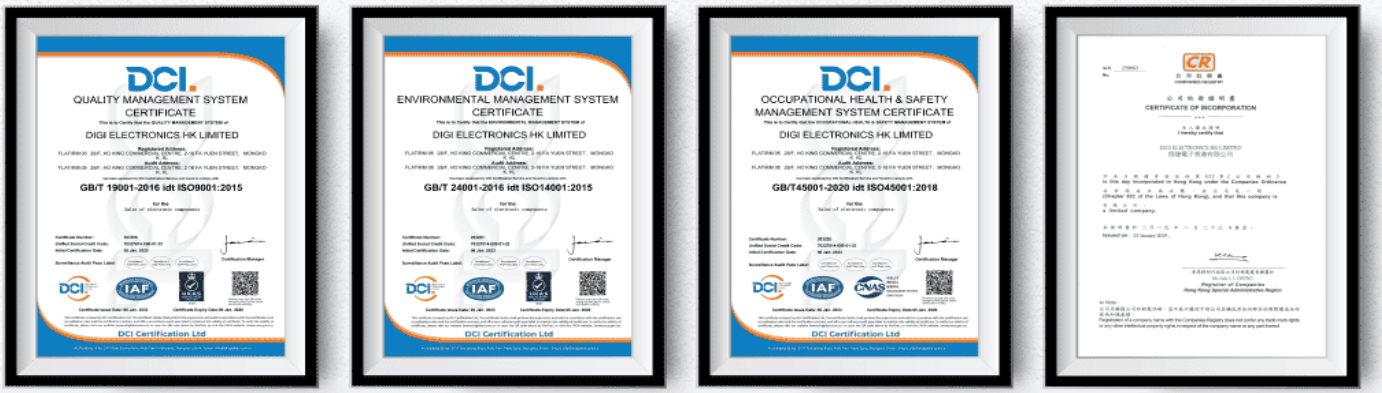



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

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