# MUN5214DW1, NSBC114YDXV6, NSBC114YDP6

# Dual NPN Bias Resistor Transistors R1 = 10 kΩ, R2 = 47 kΩ

## NPN Transistors with Monolithic Bias Resistor Network

This series of digital transistors is designed to replace a single device and its external resistor bias network. The Bias Resistor Transistor (BRT) 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.

### Features

- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- S and NSV 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

($T_A$ = 25°C, common for $Q_1$ and $Q_2$, unless otherwise noted)

| Rating | Symbol | Max | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 50 | Vdc |
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | Vdc |
| Collector Current – Continuous | $I_C$ | 100 | mAdc |
| Input Forward Voltage | $V_{IN(fwd)}$ | 40 | Vdc |
| Input Reverse Voltage | $V_{IN(rev)}$ | 6 | Vdc |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| MUN5214DW1T1G, SMUN5214DW1T1G | SOT−363 | 3,000/Tape & Reel |
| NSBC114YDXV6T1G NSVBC114YDXV6T1G | SOT−563 | 4,000/Tape & Reel |
| NSBC114YDXV6T5G | SOT−563 | 8,000/Tape & Reel |
| NSBC114YDP6T5G | SOT−963 | 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.

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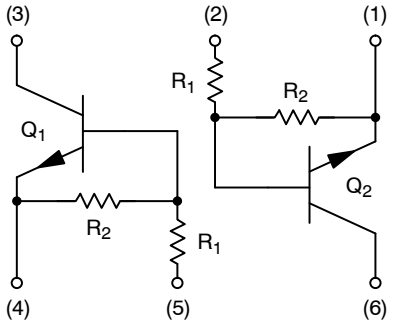
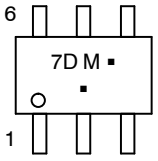
### PIN CONNECTIONS

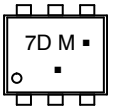



### MARKING DIAGRAMS

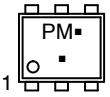
**SOT−363**
**CASE 419B**




**SOT−563**
**CASE 463A**




**SOT−963**
**CASE 527AD**




7D/P = Specific Device Code
M = Date Code*
▪ = Pb-Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

## THERMAL CHARACTERISTICS

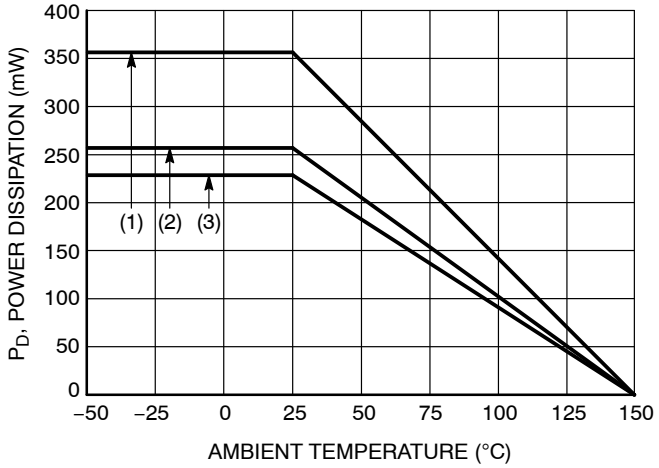
| Characteristic | | Symbol | Max | Unit |
|---|---|---|---|---|
| **MUN5214DW1 (SOT−363) ONE JUNCTION HEATED** | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 1) | | 187 | mW |
| | (Note 2) | | 256 | |
| Derate above 25°C | (Note 1) | | 1.5 | mW/°C |
| | (Note 2) | | 2.0 | |
| Thermal Resistance, Junction to Ambient | (Note 1) | $R_{\theta JA}$ | 670 | °C/W |
| | (Note 2) | | 490 | |
| **MUN5214DW1 (SOT−363) BOTH JUNCTION HEATED** (Note 3) | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 1) | | 250 | mW |
| | (Note 2) | | 385 | |
| Derate above 25°C | (Note 1) | | 2.0 | mW/°C |
| | (Note 2) | | 3.0 | |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | | °C/W |
| | (Note 1) | | 493 | |
| | (Note 2) | | 325 | |
| Thermal Resistance, Junction to Lead | | $R_{\theta JL}$ | | °C/W |
| | (Note 1) | | 188 | |
| | (Note 2) | | 208 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to +150 | °C |
| **NSBC114YDXV6 (SOT−563) ONE JUNCTION HEATED** | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 1) | | 357 | mW |
| Derate above 25°C | (Note 1) | | 2.9 | mW/°C |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | | °C/W |
| | (Note 1) | | 350 | |
| **NSBC114YDXV6 (SOT−563) BOTH JUNCTION HEATED** (Note 3) | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 1) | | 500 | mW |
| Derate above 25°C | (Note 1) | | 4.0 | mW/°C |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | | °C/W |
| | (Note 1) | | 250 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to +150 | °C |
| **NSBC114YDP6 (SOT−963) ONE JUNCTION HEATED** | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 4) | | 231 | MW |
| | (Note 5) | | 269 | |
| Derate above 25°C | (Note 4) | | 1.9 | mW/°C |
| | (Note 5) | | 2.2 | |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | | °C/W |
| | (Note 4) | | 540 | |
| | (Note 5) | | 464 | |
| **NSBC114YDP6 (SOT−963) BOTH JUNCTION HEATED** (Note 3) | | | | |
| Total Device Dissipation | | $P_D$ | | |
| $T_A$ = 25°C | (Note 4) | | 339 | MW |
| | (Note 5) | | 408 | |
| Derate above 25°C | (Note 4) | | 2.7 | mW/°C |
| | (Note 5) | | 3.3 | |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | | °C/W |
| | (Note 4) | | 369 | |
| | (Note 5) | | 306 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | −55 to +150 | °C |

1. FR−4 @ Minimum Pad.
2. FR−4 @ 1.0 × 1.0 Inch Pad.
3. Both junction heated values assume total power is sum of two equally powered channels.
4. FR−4 @ 100 $mm^2$, 1 oz. copper traces, still air.
5. FR−4 @ 500 $mm^2$, 1 oz. copper traces, still air.

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C, common for $Q_1$ and $Q_2$, unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Base Cutoff Current ($V_{CB}$ = 50 V, $I_E$ = 0) | $I_{CBO}$ | – | – | 100 | nAdc |
| Collector-Emitter Cutoff Current ($V_{CE}$ = 50 V, $I_B$ = 0) | $I_{CEO}$ | – | – | 500 | nAdc |
| Emitter-Base Cutoff Current ($V_{EB}$ = 6.0 V, $I_C$ = 0) | $I_{EBO}$ | – | – | 0.2 | mAdc |
| Collector-Base Breakdown Voltage ($I_C$ = 10 μA, $I_E$ = 0) | $V_{(BR)CBO}$ | 50 | – | – | Vdc |
| Collector-Emitter Breakdown Voltage (Note 6) ($I_C$ = 2.0 mA, $I_B$ = 0) | $V_{(BR)CEO}$ | 50 | – | – | Vdc |
| **ON CHARACTERISTICS** | | | | | |
| DC Current Gain (Note 6) ($I_C$ = 5.0 mA, $V_{CE}$ = 10 V) | $h_{FE}$ | 80 | 140 | – | |
| Collector-Emitter Saturation Voltage (Note 6) ($I_C$ = 10 mA, $I_B$ = 0.3 mA) | $V_{CE(sat)}$ | – | – | 0.25 | V |
| Input Voltage (Off) ($V_{CE}$ = 5.0 V, $I_C$ = 100 μA) | $V_{i(off)}$ | – | 0.7 | – | Vdc |
| Input Voltage (On) ($V_{CE}$ = 0.2 V, $I_C$ = 1.0 mA) | $V_{i(on)}$ | – | 0.8 | – | Vdc |
| Output Voltage (On) ($V_{CC}$ = 5.0 V, $V_B$ = 2.5 V, $R_L$ = 1.0 kΩ) | $V_{OL}$ | – | – | 0.2 | Vdc |
| Output Voltage (Off) ($V_{CC}$ = 5.0 V, $V_B$ = 0.5 V, $R_L$ = 1.0 kΩ) | $V_{OH}$ | 4.9 | – | – | Vdc |
| Input Resistor | R1 | 7 | 10 | 13 | kΩ |
| Resistor Ratio | $R_1/R_2$ | 0.17 | 0.21 | 0.25 | |

6. Pulsed Condition: Pulse Width = 300 ms, Duty Cycle ≤ 2%.




(1) SOT−363; 1.0 × 1.0 Inch Pad
(2) SOT−563; Minimum Pad
(3) SOT−963; 100 mm$^2$, 1 oz. Copper Trace

**Figure 1. Derating Curve**

## TYPICAL CHARACTERISTICS
## MUN5214DW1, NSBC114YDXV6

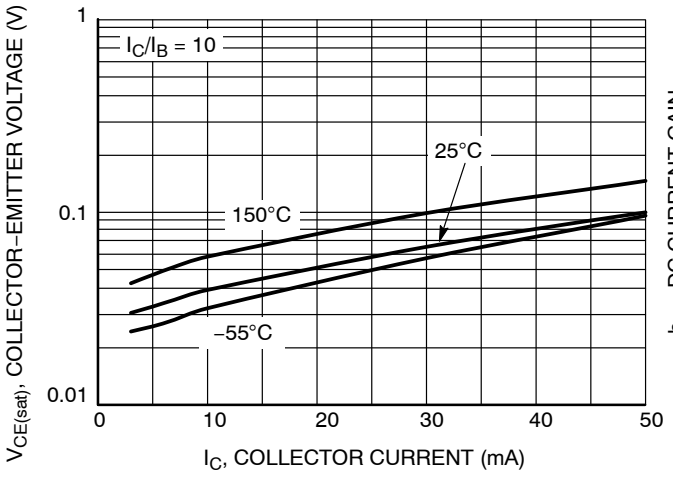



**Figure 2. $V_{CE(sat)}$ vs. $I_C$**

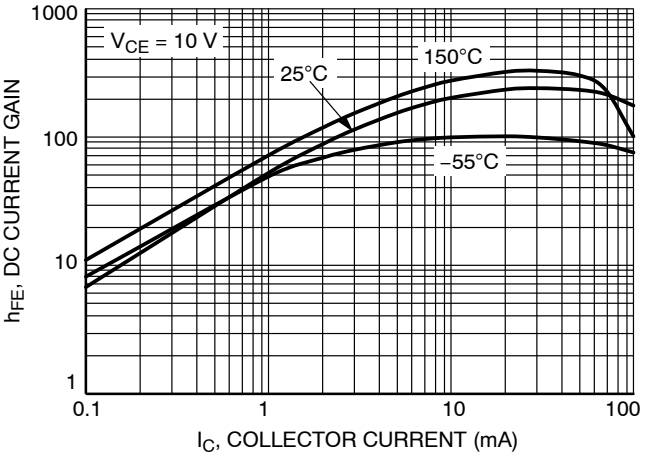



**Figure 3. DC Current Gain**

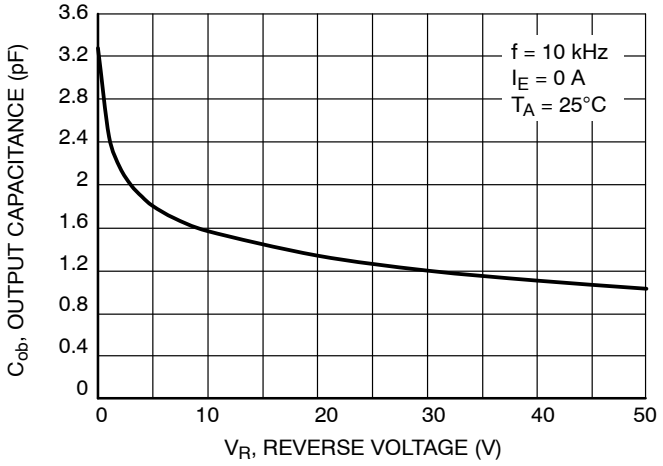



**Figure 4. Output Capacitance**

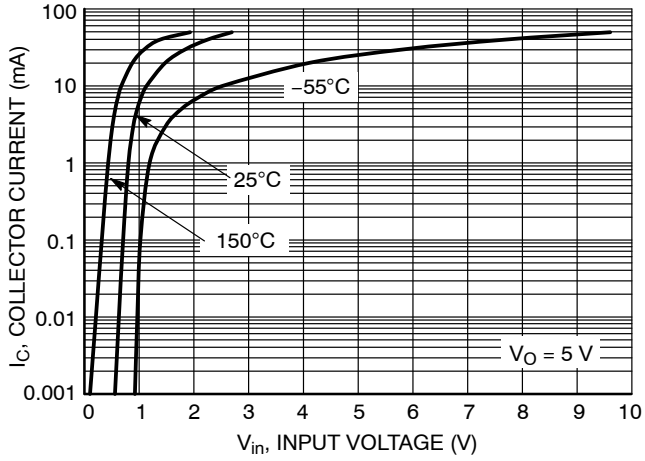



**Figure 5. Output Current vs. Input Voltage**

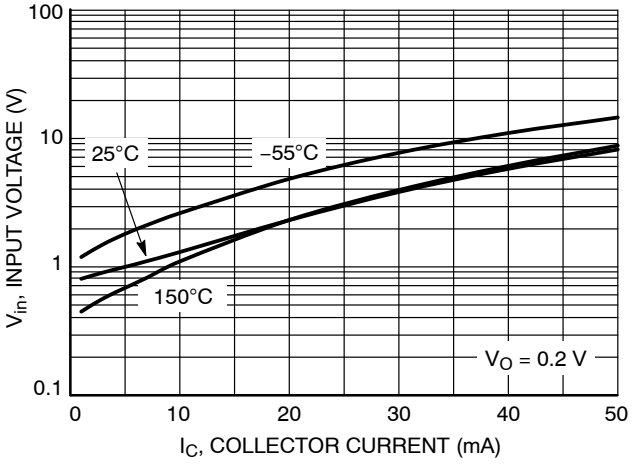



**Figure 6. Input Voltage vs. Output Current**

## TYPICAL CHARACTERISTICS
## NSBC114YDP6

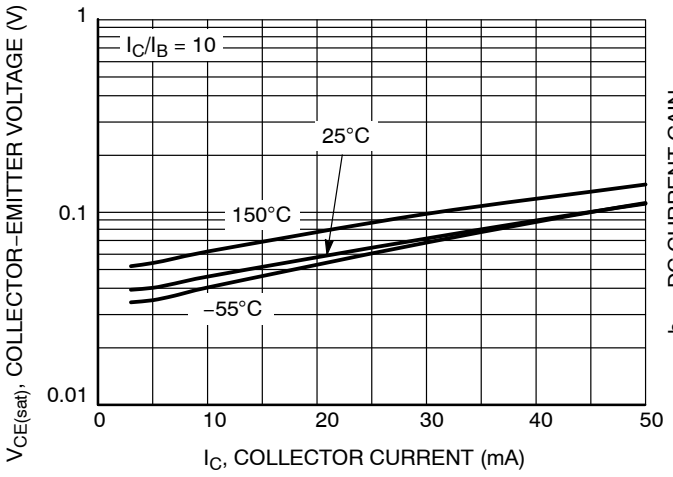



**Figure 7. $V_{CE(sat)}$ vs. $I_C$**

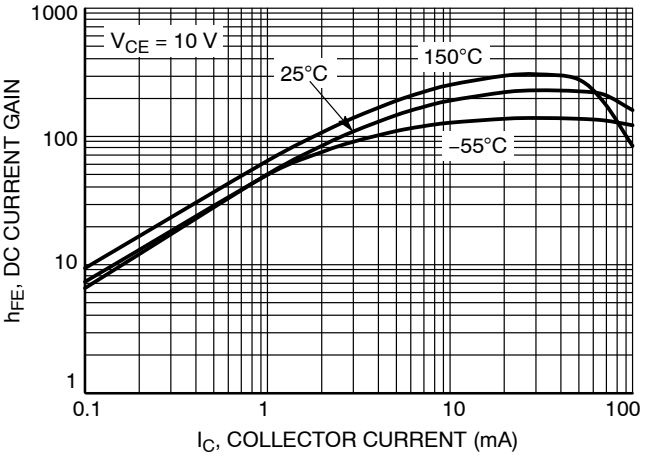



**Figure 8. DC Current Gain**

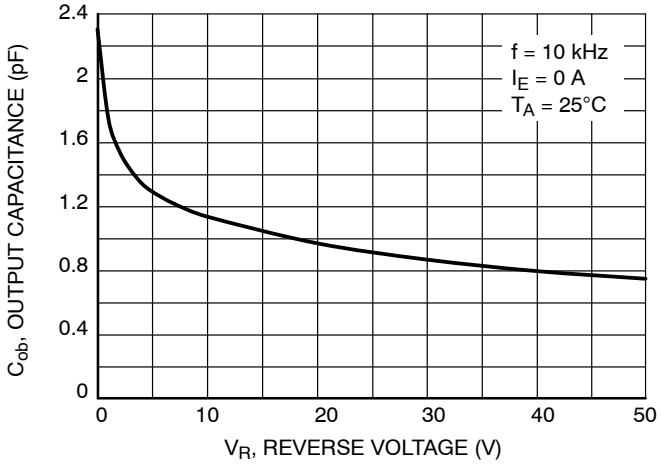



**Figure 9. Output Capacitance**

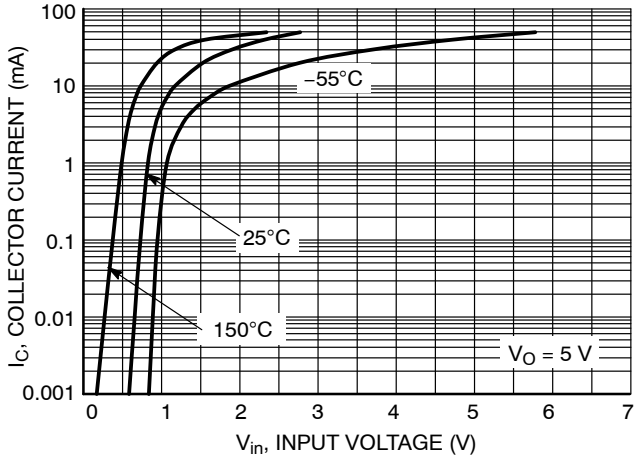



**Figure 10. Output Current vs. Input Voltage**

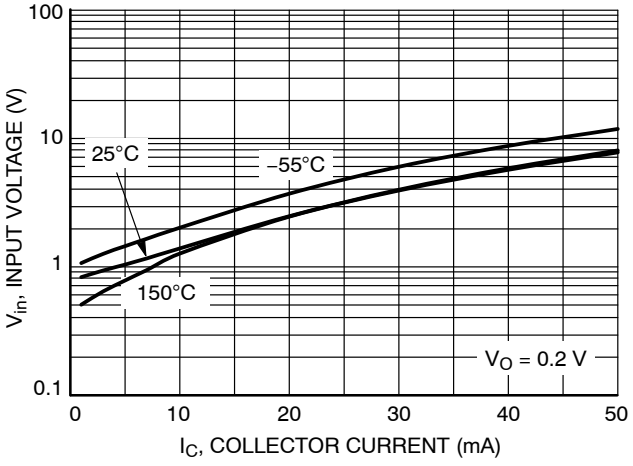
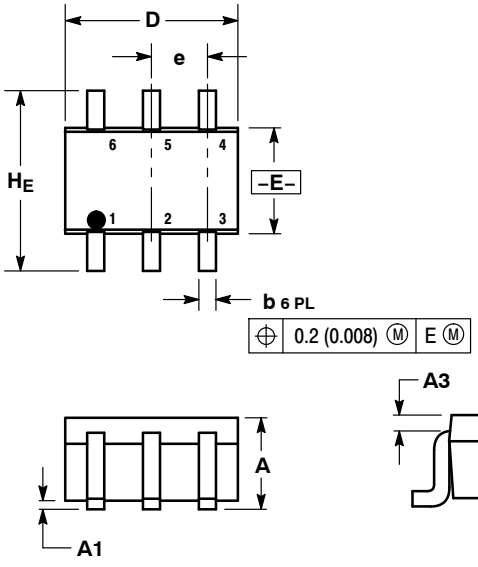



**Figure 11. Input Voltage vs. Output Current**

## PACKAGE DIMENSIONS

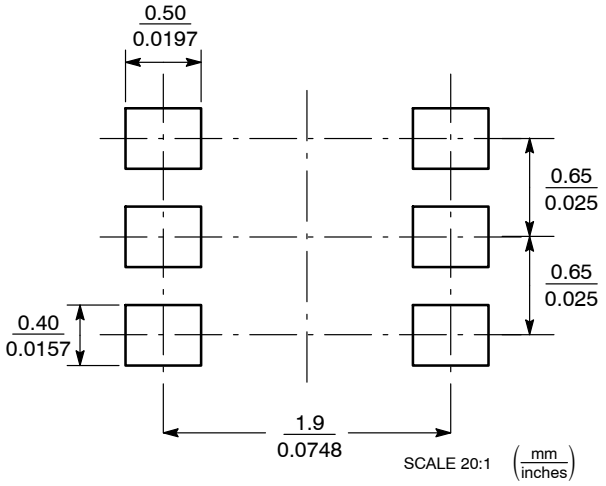
**SC−88/SC70−6/SOT−363**
CASE 419B−02
ISSUE W




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.80 | 0.95 | 1.10 | 0.031 | 0.037 | 0.043 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A3 | 0.20 REF | | | 0.008 REF | | |
| b | 0.10 | 0.21 | 0.30 | 0.004 | 0.008 | 0.012 |
| C | 0.10 | 0.14 | 0.25 | 0.004 | 0.005 | 0.010 |
| D | 1.80 | 2.00 | 2.20 | 0.070 | 0.078 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| $H_E$ | 2.00 | 2.10 | 2.20 | 0.078 | 0.082 | 0.086 |

## SOLDERING FOOTPRINT*

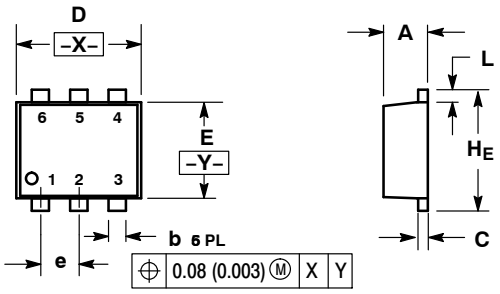



**SC−88/SC70−6/SOT−363**

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

## PACKAGE DIMENSIONS

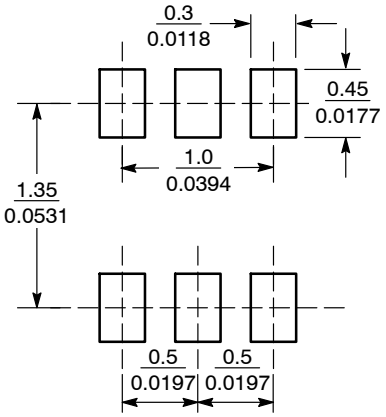
**SOT−563, 6 LEAD**
CASE 463A
ISSUE F




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.50 | 0.55 | 0.60 | 0.020 | 0.021 | 0.023 |
| b | 0.17 | 0.22 | 0.27 | 0.007 | 0.009 | 0.011 |
| C | 0.08 | 0.12 | 0.18 | 0.003 | 0.005 | 0.007 |
| D | 1.50 | 1.60 | 1.70 | 0.059 | 0.062 | 0.066 |
| E | 1.10 | 1.20 | 1.30 | 0.043 | 0.047 | 0.051 |
| e | 0.5 BSC | | | 0.02 BSC | | |
| L | 0.10 | 0.20 | 0.30 | 0.004 | 0.008 | 0.012 |
| $H_E$ | 1.50 | 1.60 | 1.70 | 0.059 | 0.062 | 0.066 |

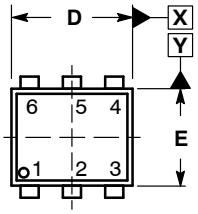
### SOLDERING FOOTPRINT*



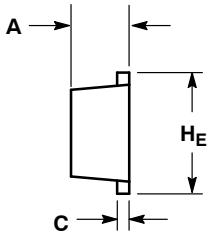

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## PACKAGE DIMENSIONS

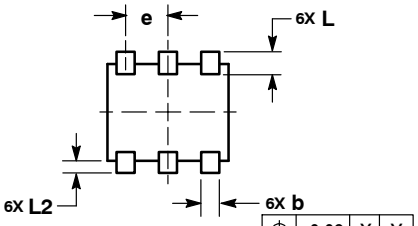
**SOT−963**
CASE 527AD
ISSUE E




TOP VIEW




SIDE VIEW

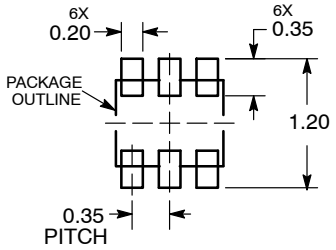



BOTTOM VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| | MILLIMETERS | | |
|---|---|---|---|
| DIM | MIN | NOM | MAX |
| A | 0.34 | 0.37 | 0.40 |
| b | 0.10 | 0.15 | 0.20 |
| C | 0.07 | 0.12 | 0.17 |
| D | 0.95 | 1.00 | 1.05 |
| E | 0.75 | 0.80 | 0.85 |
| e | 0.35 BSC | | |
| $H_E$ | 0.95 | 1.00 | 1.05 |
| L | 0.19 REF | | |
| L2 | 0.05 | 0.10 | 0.15 |

### RECOMMENDED MOUNTING FOOTPRINT*




DIMENSIONS: MILLIMETERS

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



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**DTC114YD/D**

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- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

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(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

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ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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