

BC847BPDV6, SBC847BPDV6

NPN/PNP Dual General Purpose Transistor

This transistor is designed for general purpose amplifier applications. It is housed in the SOT-563 which is designed for low power surface mount applications.

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 and are RoHS Compliant

MAXIMUM RATINGS – NPN

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector–Emitter Voltage | V_{CEO} | 45 | V |
| Collector–Base Voltage | V_{CBO} | 50 | V |
| Emitter–Base Voltage | V_{EBO} | 6.0 | V |
| Collector Current – Continuous | I_C | 100 | mAdc |

MAXIMUM RATINGS – PNP

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector–Emitter Voltage | V_{CEO} | –45 | V |
| Collector–Base Voltage | V_{CBO} | –50 | V |
| Emitter–Base Voltage | V_{EBO} | –5.0 | V |
| Collector Current – Continuous | I_C | –100 | mAdc |

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.

THERMAL CHARACTERISTICS

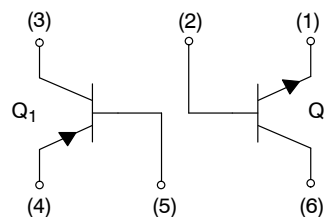
| Characteristic (One Junction Heated) | Symbol | Max | Unit |
|--|-----------------|----------------|----------------------------|
| Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 357 2.9 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance – Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 350 | $^\circ\text{C/W}$ |
| Characteristic (Both Junctions Heated) | Symbol | Max | Unit |
| Total Device Dissipation (Note 1) $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 500 4.0 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance – Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 250 | $^\circ\text{C/W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | –55 to +150 | $^\circ\text{C}$ |

1. FR-4 @ Minimum Pad

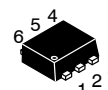


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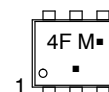


BC847BPDV6T1



SOT-563
CASE 463A

MARKING DIAGRAM



4F = Specific Device Code

M = Month Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|----------------------|--------------------------------|
| BC847BPDV6T1G | SOT-563 (Pb-Free) | 4 mm pitch 4000/Tape & Reel |
| SBC847BPDV6T1G | SOT-563 (Pb-Free) | 2 mm pitch 4000/Tape & Reel |
| BC847BPDV6T5G | SOT-563 (Pb-Free) | 2 mm pitch 8000/Tape & Reel |

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

BC847BPD XV6, SBC847BPD XV6

ELECTRICAL CHARACTERISTICS (NPN) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|---------------|--------|--------|-----------|---------------------|
| Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$) | $V_{(BR)CEO}$ | 45 | – | – | V |
| Collector–Emitter Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $V_{EB} = 0$) | $V_{(BR)CES}$ | 50 | – | – | V |
| Collector–Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$) | $V_{(BR)CBO}$ | 50 | – | – | V |
| Emitter–Base Breakdown Voltage ($I_E = 1.0\text{ }\mu\text{A}$) | $V_{(BR)EBO}$ | 6.0 | – | – | V |
| Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}$, $T_A = 150^\circ\text{C}$) | I_{CBO} | – – | – – | 15 5.0 | nA μA |

ON CHARACTERISTICS

| | | | | | |
|--|---------------|----------|------------|-------------|----|
| DC Current Gain ($I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) | h_{FE} | – 200 | 150 290 | – 475 | – |
| Collector–Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$) | $V_{CE(sat)}$ | – – | – – | 0.25 0.6 | V |
| Base–Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$) | $V_{BE(sat)}$ | – – | 0.7 0.9 | – – | V |
| Base–Emitter Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$) | $V_{BE(on)}$ | 580 – | 660 – | 700 770 | mV |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|--|-----------|-----|---|-----|-----|
| Current–Gain – Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | 100 | – | – | MHz |
| Output Capacitance ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$) | C_{obo} | – | – | 4.5 | pF |
| Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$) | NF | – | – | 10 | dB |

BC847BPD XV6, SBC847BPD XV6

ELECTRICAL CHARACTERISTICS (PNP) ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|---|---------------|--------|--------|-------------|---------------------|
| Collector–Emitter Breakdown Voltage ($I_C = -10\text{ mA}$) | $V_{(BR)CEO}$ | -45 | – | – | V |
| Collector–Emitter Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$, $V_{EB} = 0$) | $V_{(BR)CES}$ | -50 | – | – | V |
| Collector–Base Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$) | $V_{(BR)CBO}$ | -50 | – | – | V |
| Emitter–Base Breakdown Voltage ($I_E = -1.0\text{ }\mu\text{A}$) | $V_{(BR)EBO}$ | -5.0 | – | – | V |
| Collector Cutoff Current ($V_{CB} = -30\text{ V}$) ($V_{CB} = -30\text{ V}$, $T_A = 150^\circ\text{C}$) | I_{CBO} | – – | – – | -15 -4.0 | nA μA |

ON CHARACTERISTICS

| | | | | | |
|---|---------------|-----------|--------------|----------------|---|
| DC Current Gain ($I_C = -10\text{ }\mu\text{A}$, $V_{CE} = -5.0\text{ V}$) ($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$) | h_{FE} | – 200 | 150 290 | – 475 | – |
| Collector–Emitter Saturation Voltage ($I_C = -10\text{ mA}$, $I_B = -0.5\text{ mA}$) ($I_C = -100\text{ mA}$, $I_B = -5.0\text{ mA}$) | $V_{CE(sat)}$ | – – | – – | -0.3 -0.65 | V |
| Base–Emitter Saturation Voltage ($I_C = -10\text{ mA}$, $I_B = -0.5\text{ mA}$) ($I_C = -100\text{ mA}$, $I_B = -5.0\text{ mA}$) | $V_{BE(sat)}$ | – – | -0.7 -0.9 | – – | V |
| Base–Emitter On Voltage ($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$) ($I_C = -10\text{ mA}$, $V_{CE} = -5.0\text{ V}$) | $V_{BE(on)}$ | -0.6 – | – – | -0.75 -0.82 | V |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|---|----------|-----|---|-----|-----|
| Current–Gain – Bandwidth Product ($I_C = -10\text{ mA}$, $V_{CE} = -5.0\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | 100 | – | – | MHz |
| Output Capacitance ($V_{CB} = -10\text{ V}$, $f = 1.0\text{ MHz}$) | C_{ob} | – | – | 4.5 | pF |
| Noise Figure ($I_C = -0.2\text{ mA}$, $V_{CE} = -5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$) | NF | – | – | 10 | dB |

TYPICAL NPN CHARACTERISTICS

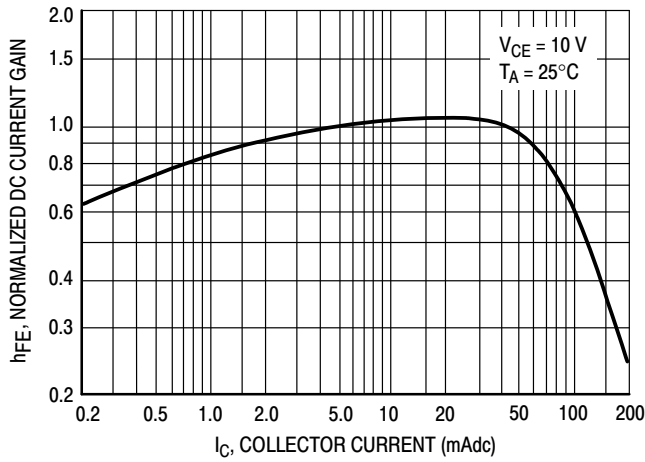


Figure 1. Normalized DC Current Gain

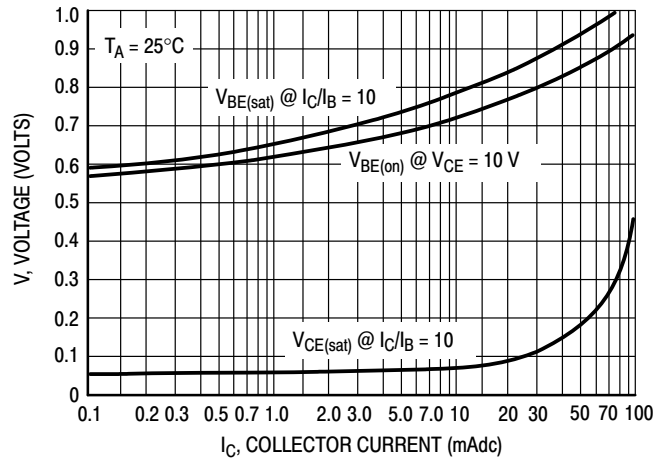


Figure 2. "Saturation" and "On" Voltages

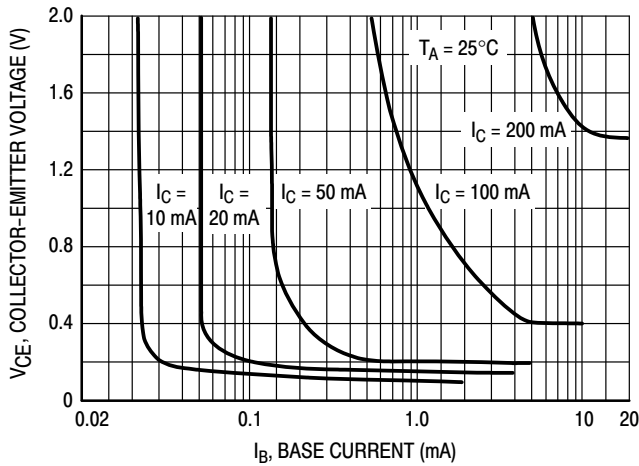


Figure 3. Collector Saturation Region

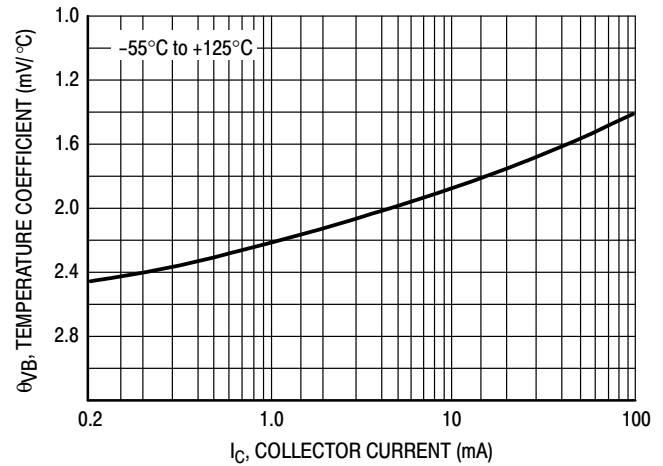


Figure 4. Base-Emitter Temperature Coefficient

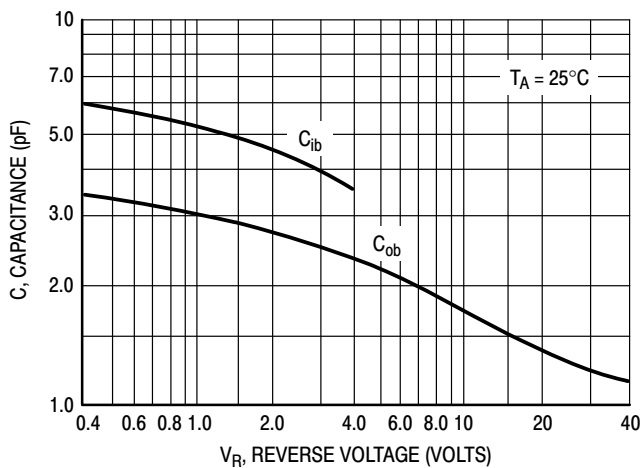


Figure 5. Capacitances

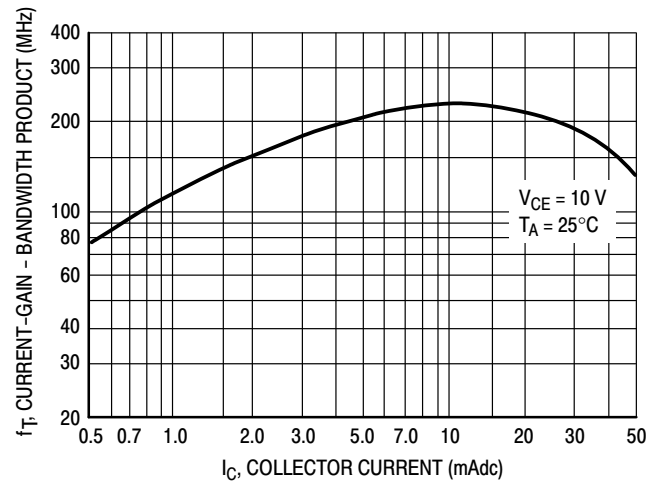


Figure 6. Current-Gain - Bandwidth Product

TYPICAL PNP CHARACTERISTICS

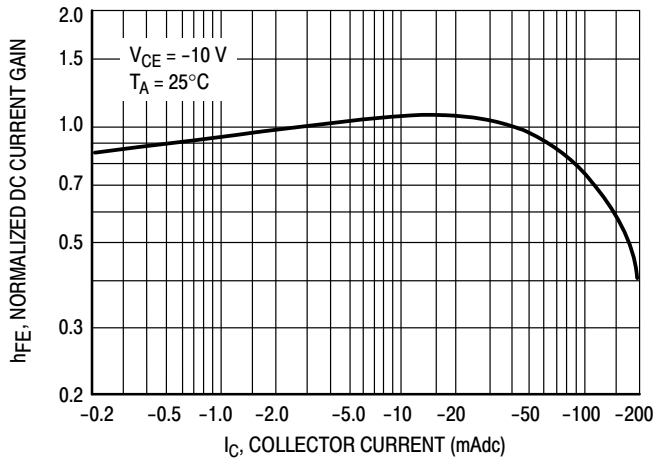


Figure 7. Normalized DC Current Gain

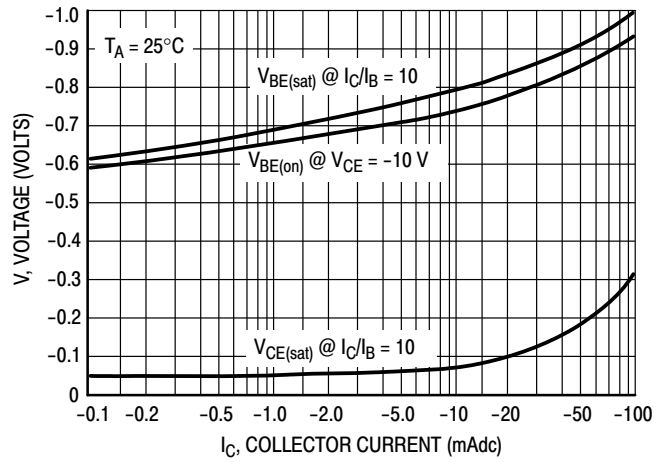


Figure 8. "Saturation" and "On" Voltages

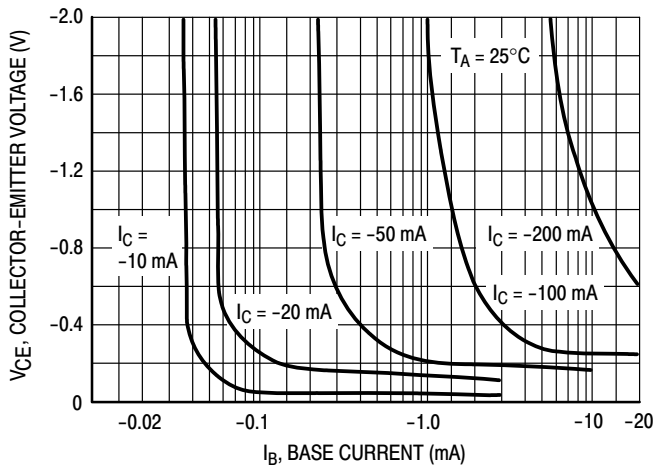


Figure 9. Collector Saturation Region

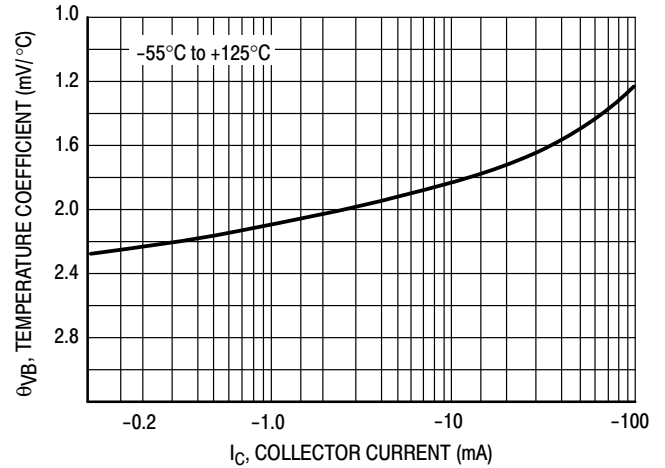


Figure 10. Base-Emitter Temperature Coefficient

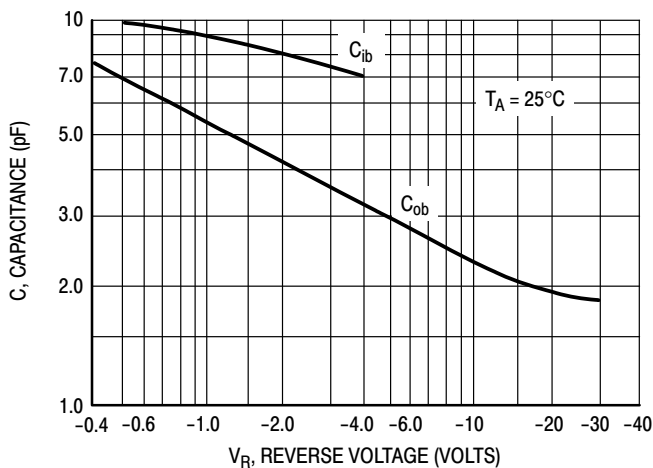


Figure 11. Capacitances

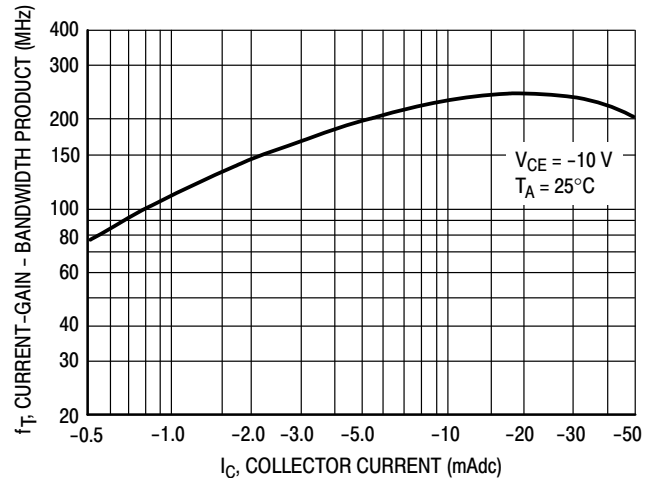


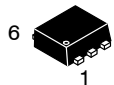
Figure 12. Current-Gain - Bandwidth Product

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®

ON



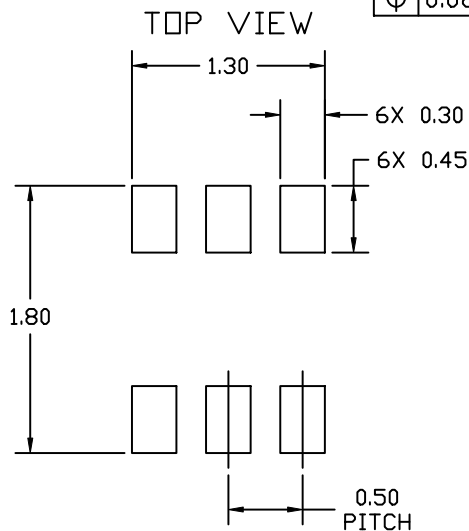
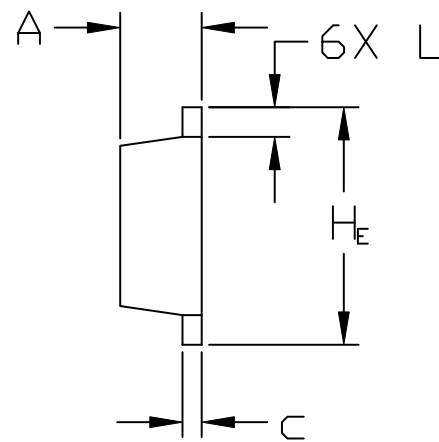
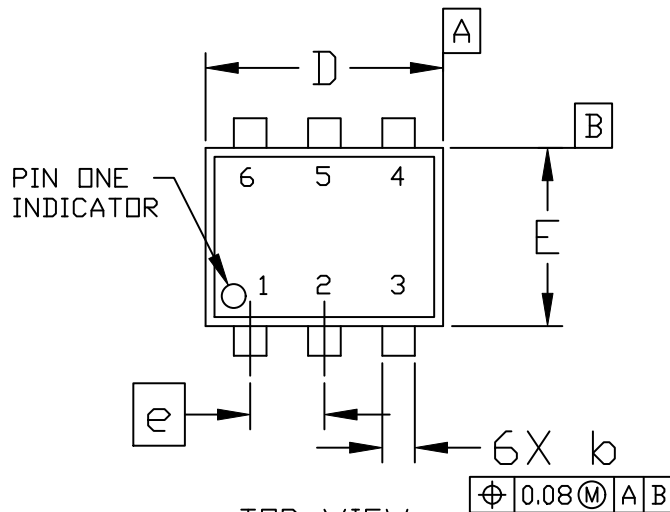
SCALE 4:1

SOT-563, 6 LEAD
CASE 463A
ISSUE H

DATE 26 JAN 2021

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



SIDE VIEW

| 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 | 1.50 | 1.60 | 1.70 |
| E | 1.10 | 1.20 | 1.30 |
| e | 0.50 BSC | | |
| L | 0.10 | 0.20 | 0.30 |
| H _E | 1.50 | 1.60 | 1.70 |

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.

| | | |
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SOT-563, 6 LEAD
CASE 463A
ISSUE H

DATE 26 JAN 2021

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

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

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

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

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

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

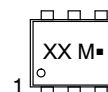
STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

STYLE 11:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2


**GENERIC
MARKING DIAGRAM***



XX = Specific Device Code
M = Month Code
■ = Pb-Free Package

*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.

| | | |
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