

NST847BPDP6T5G

Dual Complementary General Purpose Transistor

The NST847BPDP6T5G device is a spin-off of our popular SOT-23/SOT-323/SOT-563 three-leaded device. It is designed for general purpose amplifier applications and is housed in the SOT-963 six-leaded surface mount package. By putting two discrete devices in one package, this device is ideal for low-power surface mount applications where board space is at a premium.

Features

- h_{FE} , 200–450
- Low $V_{CE(sat)}$, ≤ 0.3 V
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- This is a Pb-Free Device

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--------------------------------|-----------|--------------|--------|
| Collector – Emitter Voltage | V_{CEO} | 45 | Vdc |
| Collector – Base Voltage | V_{CB0} | 50 | Vdc |
| Emitter – Base Voltage | V_{EBO} | 6.0 | Vdc |
| Collector Current – Continuous | I_C | 100 | mAdc |
| Electrostatic Discharge | HBM MM | ESD Class | 2 B |

THERMAL CHARACTERISTICS

| Characteristic (Single Heated) | Symbol | Max | Unit |
|---|-----------------|----------------|----------------------------|
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C (Note 1) | P_D | 240 1.9 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 520 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C (Note 2) | P_D | 280 2.2 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 446 | $^\circ\text{C}/\text{W}$ |
| Characteristic (Dual Heated) (Note 3) | Symbol | Max | Unit |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C (Note 1) | P_D | 350 2.8 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 1) | $R_{\theta JA}$ | 357 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C (Note 2) | P_D | 420 3.4 | mW mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 297 | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

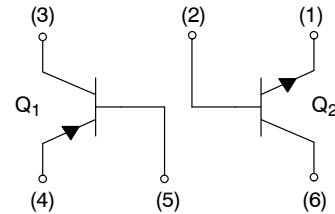
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-4 @ 100 mm², 1 oz. copper traces, still air.
2. FR-4 @ 500 mm², 1 oz. copper traces, still air.
3. Dual heated values assume total power is sum of two equally powered channels



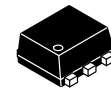
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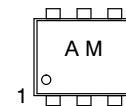
NST847BPDP6T5G*

*Q1 PNP
Q2 NPN



SOT-963
CASE 527AD

MARKING DIAGRAM



A = Device Code
M = Date Code

ORDERING INFORMATION

| Device | Package | Shipping† |
|----------------|----------------------|------------------|
| NST847BPDP6T5G | SOT-963 (Pb-Free) | 8000/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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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------------------------|----------------------|------------------|------------------|----------------------|
| OFF CHARACTERISTICS | | | | | |
| Collector–Emitter Breakdown Voltage (I _C = 1.0 mA, I _B = 0) (I _C = -1.0 mA, I _B = 0) | (NPN) (PNP) | V _{(BR)CEO} | 45 -45 | - - | V |
| Collector–Base Breakdown Voltage (I _C = 10 μA, I _E = 0) (I _C = -10 μA, I _E = 0) | (NPN) (PNP) | V _{(BR)CBO} | 50 -50 | - - | V |
| Collector–Emitter Breakdown Voltage (I _C = 10 μA) (I _C = -10 μA) | (NPN) (PNP) | V _{(BR)CES} | 50 -50 | - - | V |
| Emitter–Base Breakdown Voltage (I _E = 1.0 μA, I _C = 0) (I _E = -1.0 μA, I _C = 0) | (NPN) (PNP) | V _{(BR)EBO} | 6.0 -5.0 | - - | V |
| Collector Cutoff Current (V _{CB} = 30 V) (V _{CB} = 30 V, T _A = 150°C) (V _{CB} = -30 V) (V _{CB} = -30 V, T _A = 150°C) | (NPN) (NPN) (PNP) (PNP) | I _{CBO} | - - - - | - - - - | nA μA nA μA |

ON CHARACTERISTICS (Note 4)

| | | | | | | |
|--|----------------|----------------------|-------------------------|--------------------------------|--------------------------------|---|
| DC Current Gain (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = -2.0 mA, V _{CE} = -5.0 V) | (NPN) (PNP) | h _{FE} | 200 220 | 290 290 | 450 475 | - |
| Collector–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA) (I _C = -10 mA, I _B = -0.5 mA) (I _C = -100 mA, I _B = -5.0 mA) | (NPN) (PNP) | V _{CE(sat)} | - - - - | - - - - | 0.25 0.60 -0.30 -0.70 | V |
| Base–Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5.0 mA) (I _C = -10 mA, I _B = -0.5 mA) (I _C = -100 mA, I _B = -5.0 mA) | (NPN) (PNP) | V _{BE(sat)} | - - - - | 0.70 0.90 -0.70 -0.90 | - - - - | V |
| Base–Emitter On Voltage (I _C = 2.0 mA, V _{CE} = 5.0 V) (I _C = 10 mA, V _{CE} = 5.0 V) (I _C = -2.0 mA, V _{CE} = -5.0 V) (I _C = -10 mA, V _{CE} = -5.0 V) | (NPN) (PNP) | V _{BE(on)} | 0.58 - -0.60 - | 0.66 - - - | 0.70 0.77 -0.75 -0.82 | V |

SMALL-SIGNAL CHARACTERISTICS

| | | | | | | |
|--|----------------|-----------------|------------|--------|------------|-----|
| Current–Gain – Bandwidth Product (I _C = 10 mA, V _{CE} = 5.0 V, f = 100 MHz) (I _C = -10 mA, V _{CE} = -5.0 V, f = 100 MHz) | (NPN) (PNP) | f _T | 100 100 | - - | - - | MHz |
| Output Capacitance (V _{CB} = 10 V, f = 1.0 MHz) (V _{CB} = -10 V, f = 1.0 MHz) | (NPN) (PNP) | C _{ob} | - - | - - | 4.5 4.5 | pF |
| Noise Figure (I _C = 0.2 mA, V _{CE} = 5.0 V, R _S = 2 kΩ, f = 1 kHz, BW = 200 Hz) (I _C = -0.2 mA, V _{CE} = -5.0 V, R _S = 2 kΩ, f = 1 kHz, BW = 200 Hz) | (NPN) (PNP) | NF | - - | - - | 10 10 | dB |

4. Pulse Test: Pulse Width ≤ 300 μs; Duty Cycle ≤ 2.0%.

NST847BPDP6T5G

NPN TRANSISTOR

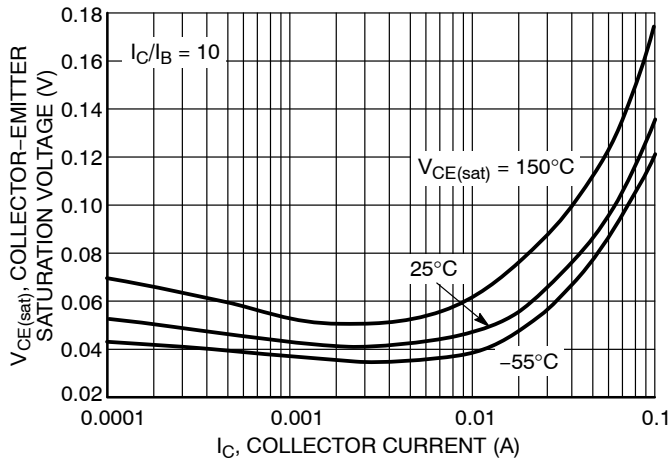


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

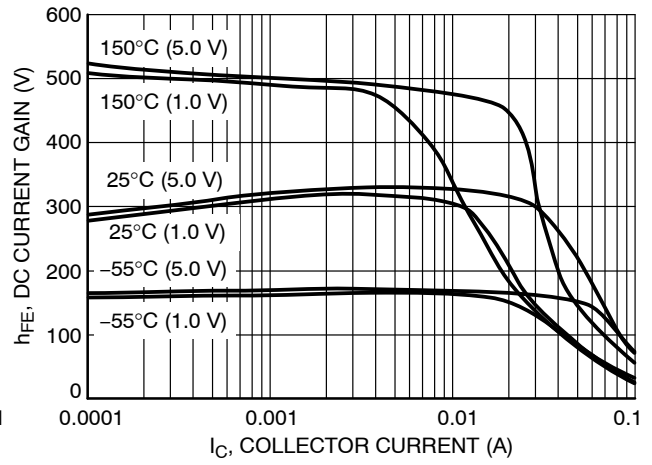


Figure 2. DC Current Gain vs. Collector Current

NPN TRANSISTOR

NST847BPDP6T5G

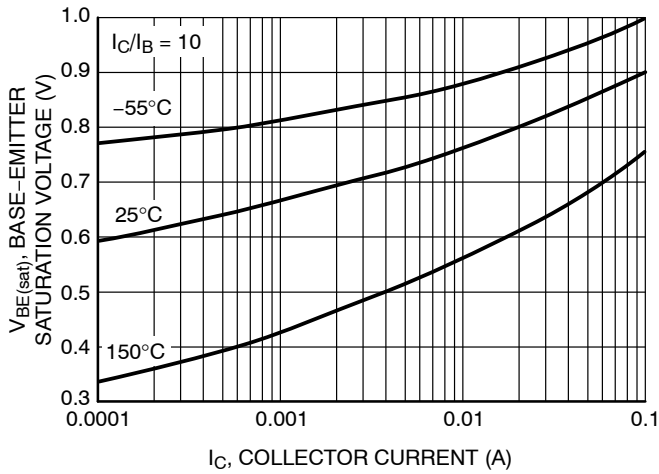


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

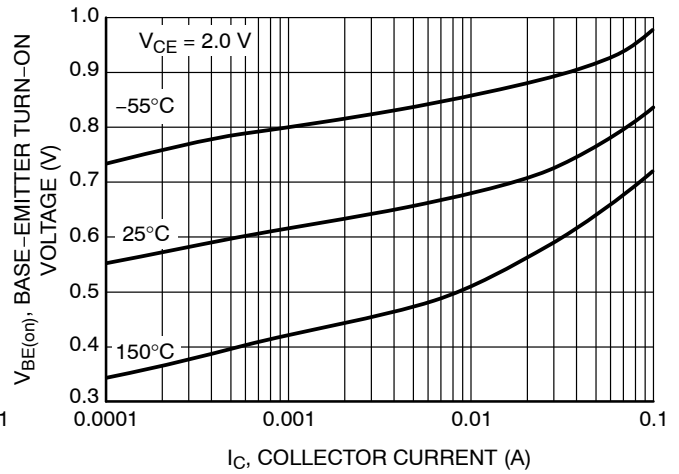


Figure 4. Base Emitter Turn-On Voltage vs. Collector Current

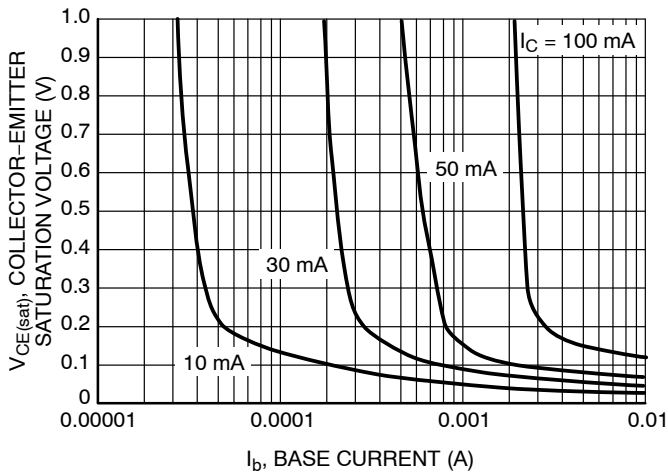


Figure 5. Saturation Region

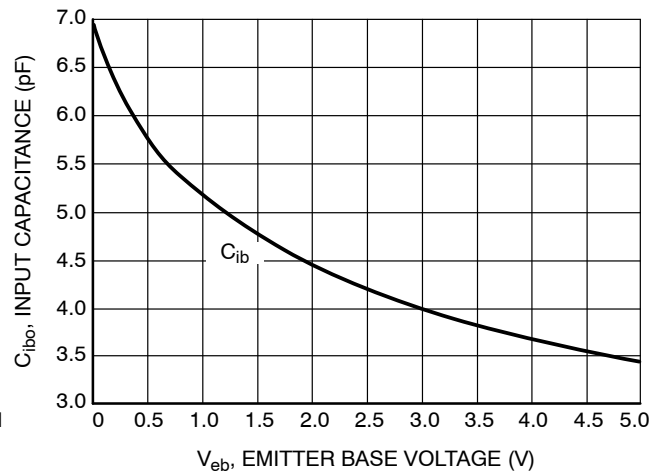


Figure 6. Input Capacitance

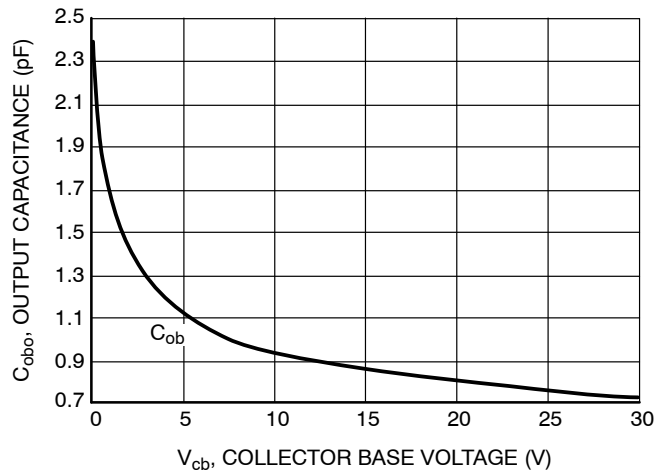


Figure 7. Output Capacitance

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PNP TRANSISTOR

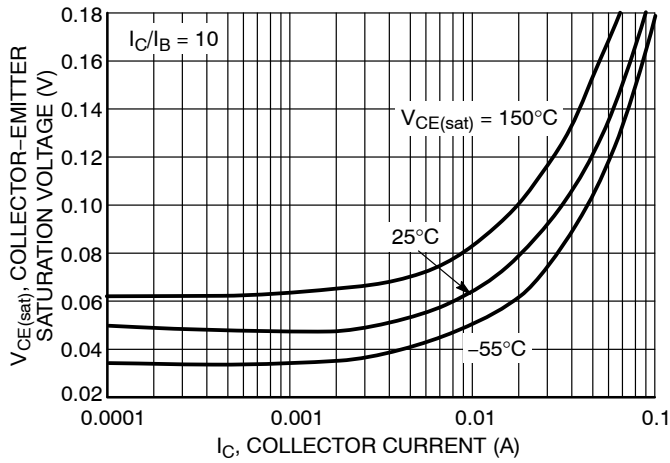


Figure 8. Collector Emitter Saturation Voltage vs. Collector Current

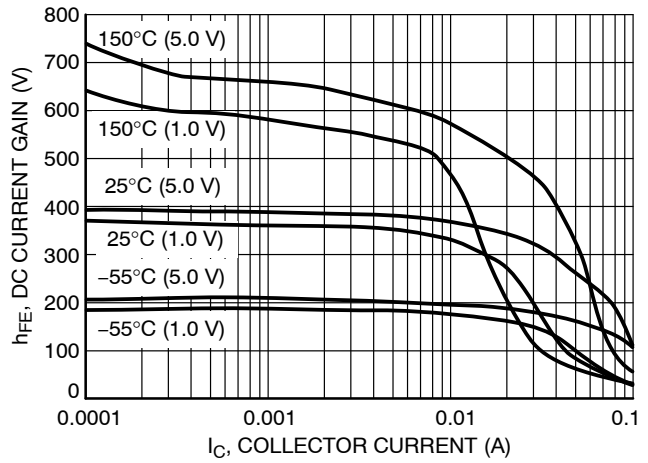


Figure 9. DC Current Gain vs. Collector Current

PNP TRANSISTOR

NST847BPDP6T5G

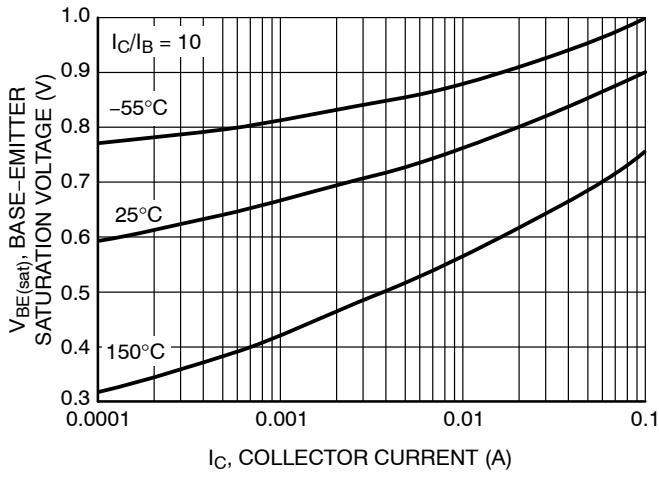


Figure 10. Base Emitter Saturation Voltage vs. Collector Current

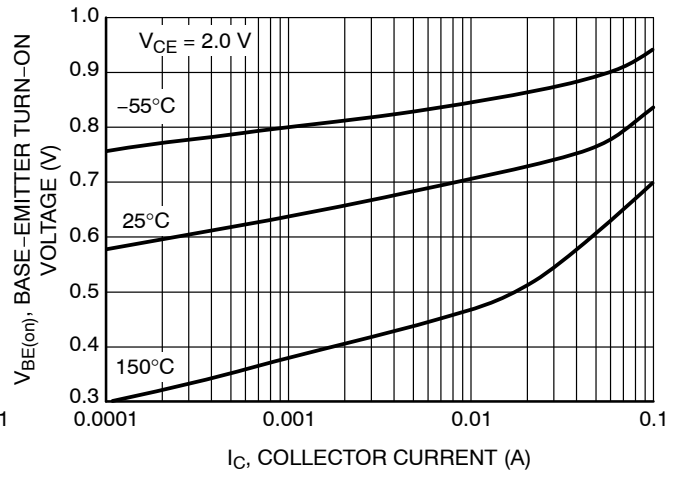


Figure 11. Base Emitter Turn-On Voltage vs. Collector Current

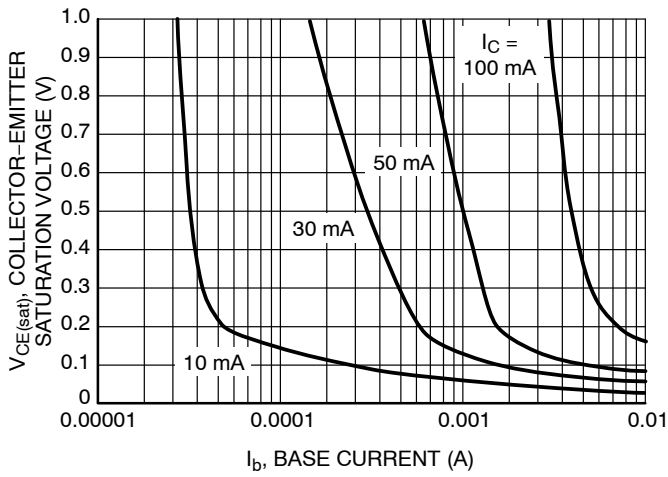


Figure 12. Saturation Region

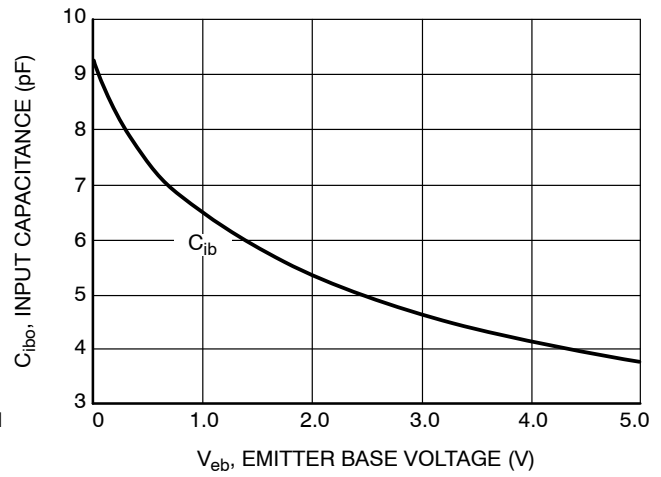


Figure 13. Input Capacitance

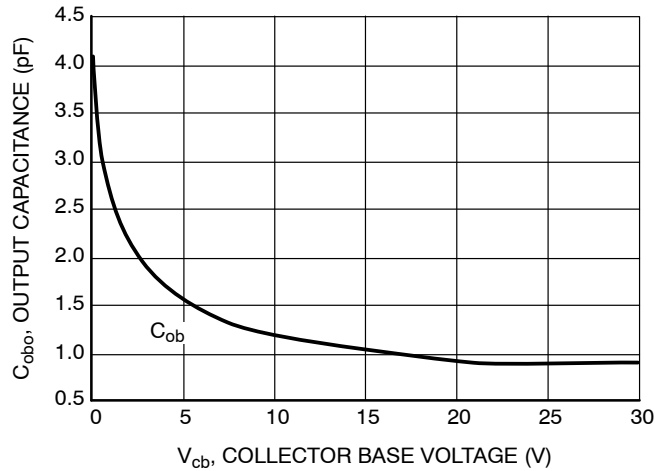


Figure 14. Output Capacitance

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

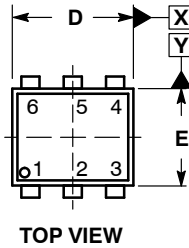
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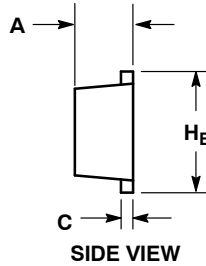
SCALE 4:1

SOT-963
CASE 527AD-01
ISSUE E

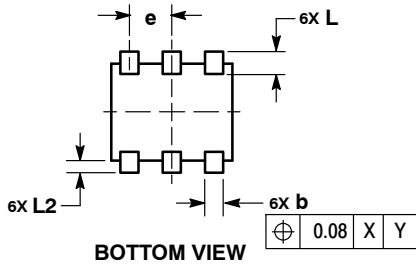
DATE 09 FEB 2010



TOP VIEW



SIDE VIEW



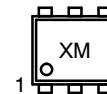
BOTTOM VIEW

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 |

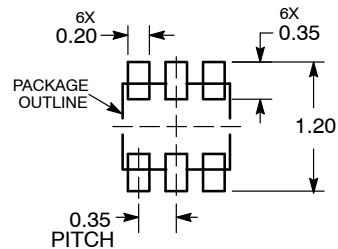
GENERIC MARKING DIAGRAM*



X = Specific Device Code
M = Month Code

*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.

RECOMMENDED MOUNTING FOOTPRINT



DIMENSIONS: MILLIMETERS

- 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. EMITTER2
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. SOURCE3
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

| | | |
|-------------------------|----------------------------|---|
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| DESCRIPTION: | SOT-963, 1X1, 0.35P | PAGE 1 OF 1 |

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