

CMUT3904 NPN
CMUT3906 PNP

ULTRAmi™ SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTORS



SOT-523 CASE

Central™
Semiconductor Corp.

DESCRIPTION:

The CENTRAL SEMICONDUCTOR CMUT3904, CMUT3906 types are complementary silicon transistors manufactured by the epitaxial planar process, epoxy molded in an ULTRAmi™ surface mount package, designed for small signal general purpose amplifier and switching applications.

Marking code for CMUT3904 is AC1.

Marking code for CMUT3906 is AC2.

MAXIMUM RATINGS: ($T_A=25^\circ\text{C}$)

| | <u>SYMBOL</u> | <u>CMUT3904</u> | <u>CMUT3906</u> | <u>UNITS</u> |
|---|----------------|-----------------|-----------------|---------------------------|
| Collector-Base Voltage | V_{CBO} | 60 | 40 | V |
| Collector-Emitter Voltage | V_{CEO} | 40 | 40 | V |
| Emitter-Base Voltage | V_{EBO} | 6.0 | 5.0 | V |
| Collector Current | I_C | | 200 | mA |
| Power Dissipation | P_D | | 250 | mW |
| Operating and Storage Junction Temperature | T_J, T_{stg} | | -65 to +150 | $^\circ\text{C}$ |
| Thermal Resistance | Θ_{JA} | | 500 | $^\circ\text{C}/\text{W}$ |

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

| <u>SYMBOL</u> | <u>TEST CONDITIONS</u> | <u>CMUT3904</u> | | <u>CMUT3906</u> | | <u>UNITS</u> |
|---------------|---|-----------------|------------|-----------------|------------|--------------|
| | | <u>MIN</u> | <u>MAX</u> | <u>MIN</u> | <u>MAX</u> | |
| I_{CEV} | $V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$ | | 50 | | 50 | nA |
| BV_{CBO} | $I_C=10\mu\text{A}$ | 60 | | 40 | | V |
| BV_{CEO} | $I_C=1.0\text{mA}$ | 40 | | 40 | | V |
| BV_{EBO} | $I_E=10\mu\text{A}$ | 6.0 | | 5.0 | | V |
| $V_{CE(SAT)}$ | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | | 0.20 | | 0.25 | V |
| $V_{CE(SAT)}$ | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.30 | | 0.40 | V |
| $V_{BE(SAT)}$ | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | 0.65 | 0.85 | 0.65 | 0.85 | V |
| $V_{BE(SAT)}$ | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.95 | | 0.95 | V |
| h_{FE} | $V_{CE}=1.0\text{V}, I_C=0.1\text{mA}$ | 40 | | 60 | | |
| h_{FE} | $V_{CE}=1.0\text{V}, I_C=1.0\text{mA}$ | 70 | | 80 | | |
| h_{FE} | $V_{CE}=1.0\text{V}, I_C=10\text{mA}$ | 100 | 300 | 100 | 300 | |
| h_{FE} | $V_{CE}=1.0\text{V}, I_C=50\text{mA}$ | 60 | | 60 | | |
| h_{FE} | $V_{CE}=1.0\text{V}, I_C=100\text{mA}$ | 30 | | 30 | | |

R0 (30-May 2001)

ULTRAmultiTM SURFACE MOUNT
COMPLEMENTARY
SILICON TRANSISTORS

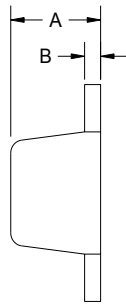
ELECTRICAL CHARACTERISTICS: Continued

| SYMBOL | TEST CONDITIONS | CMUT3904 | | CMUT3906 | | UNITS |
|----------|--|----------|-----|----------|-----|------------------|
| | | MIN | MAX | MIN | MAX | |
| f_T | $V_{CE}=20V, I_C=10mA, f=100MHz$ | 300 | | 250 | | MHz |
| C_{ob} | $V_{CB}=5.0V, I_E=0, f=1.0MHz$ | | 4.0 | | 4.5 | pF |
| C_{ib} | $V_{BE}=0.5V, I_C=0, f=1.0MHz$ | | 8.0 | | 10 | pF |
| h_{ie} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 1.0 | 10 | 2.0 | 12 | $k\Omega$ |
| h_{re} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 0.5 | 8.0 | 0.1 | 10 | $\times 10^{-4}$ |
| h_{fe} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 100 | 400 | 100 | 400 | |
| h_{oe} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 1.0 | 40 | 3.0 | 60 | $\mu mhos$ |
| NF | $V_{CE}=5.0V, I_C=100\mu A, R_S=1.0k\Omega$ $f=10Hz$ to $15.7kHz$ | | 5.0 | | 4.0 | dB |
| t_d | $V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$ | | 35 | | 35 | ns |
| t_r | $V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$ | | 35 | | 35 | ns |
| t_s | $V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$ | | 200 | | 225 | ns |
| t_f | $V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$ | | 50 | | 75 | ns |

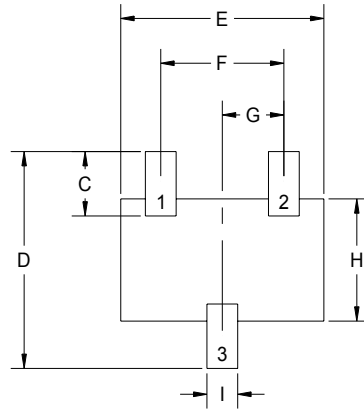
MECHANICAL OUTLINE - SOT-523

| SYMBOL | INCHES | | MILLIMETERS | |
|--------|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.025 | 0.029 | 0.63 | 0.73 |
| B | 0.004 | 0.005 | 0.10 | 0.13 |
| C | 0.015 | 0.019 | 0.39 | 0.49 |
| D | 0.061 | 0.065 | 1.55 | 1.65 |
| E | 0.061 | 0.065 | 1.55 | 1.65 |
| F | 0.039 | 0.040 | 0.98 | 1.02 |
| G | 0.019 | 0.020 | 0.48 | 0.52 |
| H | 0.033 | 0.037 | 0.83 | 0.93 |
| I | 0.009 | 0.010 | 0.23 | 0.25 |

SOT-523 (REV: R1)



BOTTOM VIEW



R1

LEAD CODE:

- 1) Base
- 2) Emitter
- 3) Collector

R0 (30-May 2001)



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