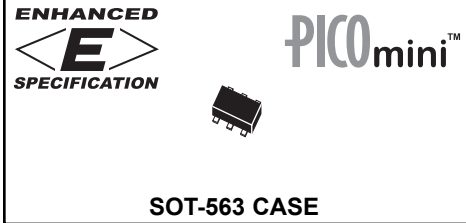


CMLT3904E NPN
 CMLT3906E PNP
 CMLT3946E NPN/PNP

**ENHANCED SPECIFICATION
 COMPLEMENTARY PICOmini™
 SILICON TRANSISTORS**



MARKING CODES: CMLT3904E: L04
 CMLT3906E: L06
 CMLT3946E: L46

Central™

Semiconductor Corp.

DESCRIPTION:

The Central Semiconductor CMLT3904E (two single NPN), CMLT3906E (two single PNP), and CMLT3946E (one each NPN and PNP complementary) are combinations of enhanced specification transistors in a space saving SOT-563 package, designed for small signal general purpose amplifier and switching applications.

ENHANCED SPECIFICATIONS:

- ◆ BV_{CBO} from 40V min to 60V min. (PNP)
- ◆ BV_{EBO} from 5.0V min to 6.0V min. (PNP)
- ◆ $V_{CE(SAT)}$ from 0.3V max to 0.2V max. (NPN),
 from 0.4V max to 0.2V max. (PNP)
- ◆ h_{FE} from 60 min to 70 min. (NPN/PNP)

| MAXIMUM RATINGS: ($T_A=25^\circ\text{C}$) | SYMBOL | | UNITS |
|---|----------------|-------------|--------------------|
| ◆ Collector-Base Voltage | V_{CBO} | 60 | V |
| ◆ Collector-Emitter Voltage | V_{CEO} | 40 | V |
| ◆ Emitter-Base Voltage | V_{EBO} | 6.0 | V |
| ◆ Collector Current | I_C | 200 | mA |
| Power Dissipation | P_D | 350 | mW (Note 1) |
| Power Dissipation | P_D | 300 | mW (Note 2) |
| Power Dissipation | P_D | 150 | mW (Note 3) |
| Operating and Storage Junction Temperature | T_J, T_{stg} | -65 to +150 | $^\circ\text{C}$ |
| Thermal Resistance | Θ_{JA} | 357 | $^\circ\text{C/W}$ |

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

| SYMBOL | TEST CONDITIONS | NPN | | PNP | MAX | UNITS |
|-----------------|---|------|-------|-------|-------|-------|
| | | MIN | TYP | TYP | | |
| I_{CEV} | $V_{CE}=30\text{V}, V_{EB}=3.0\text{V}$ | - | - | - | 50 | nA |
| ◆ BV_{CBO} | $I_C=10\mu\text{A}$ | 60 | 115 | 90 | - | V |
| BV_{CEO} | $I_C=1.0\text{mA}$ | 40 | 60 | 55 | - | V |
| ◆ BV_{EBO} | $I_E=10\mu\text{A}$ | 6.0 | 7.5 | 7.9 | - | V |
| ◆ $V_{CE(SAT)}$ | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | | 0.057 | 0.050 | 0.100 | V |
| ◆ $V_{CE(SAT)}$ | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.100 | 0.100 | 0.200 | V |
| $V_{BE(SAT)}$ | $I_C=10\text{mA}, I_B=1.0\text{mA}$ | 0.65 | 0.75 | 0.75 | 0.85 | V |
| $V_{BE(SAT)}$ | $I_C=50\text{mA}, I_B=5.0\text{mA}$ | | 0.85 | 0.85 | 0.95 | V |
| ◆ h_{FE} | $V_{CE}=1.0\text{V}, I_C=0.1\text{mA}$ | 90 | 240 | 130 | | |
| ◆ h_{FE} | $V_{CE}=1.0\text{V}, I_C=1.0\text{mA}$ | 100 | 235 | 150 | | |

◆ Enhanced specification.

- Notes: (1) Ceramic or aluminum core PC Board with copper mounting pad area of 4.0 mm²
 (2) FR-4 Epoxy PC Board with copper mounting pad area of 4.0 mm²
 (3) FR-4 Epoxy PC Board with copper mounting pad area of 1.4 mm²

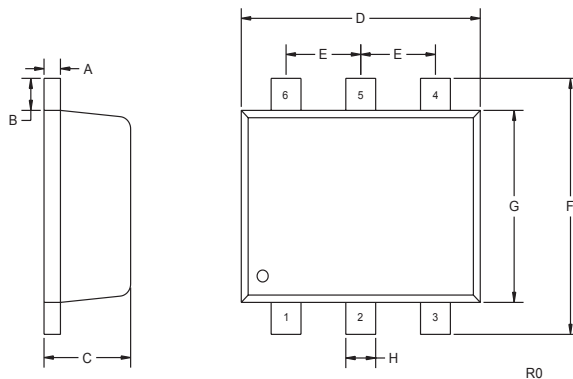
**ENHANCED SPECIFICATION
 COMPLEMENTARY PICOMini™
 SILICON TRANSISTORS**

ELECTRICAL CHARACTERISTICS (continued)

| SYMBOL | TEST CONDITIONS | MIN | NPN TYP | PNP TYP | MAX | UNITS |
|------------|--|-----------|------------|------------|-----|------------------|
| h_{FE} | $V_{CE}=1.0V, I_C=10mA$ | 100 | 215 | 150 | 300 | |
| ◆ h_{FE} | $V_{CE}=1.0V, I_C=50mA$ | 70 | 110 | 120 | | |
| h_{FE} | $V_{CE}=1.0V, I_C=100mA$ | 30 | 50 | 55 | | |
| f_T | $V_{CE}=20V, I_C=10mA, f=100MHz$ | 300 | | | | MHz |
| C_{ob} | $V_{CB}=5.0V, I_E=0, f=1.0MHz$ | | | | 4.0 | pF |
| C_{ib} | $V_{BE}=0.5V, I_C=0, f=1.0MHz$ | | | | 8.0 | pF |
| h_{ie} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 1.0 | | | 12 | $k\Omega$ |
| h_{re} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 0.1 | | | 10 | $\times 10^{-4}$ |
| h_{fe} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 100 | | | 400 | |
| h_{oe} | $V_{CE}=10V, I_C=1.0mA, f=1.0kHz$ | 1.0 | | | 60 | $\mu mhos$ |
| NF | $V_{CE}=5.0V, I_C=100\mu A, R_S=1.0K\Omega, f=10Hz$ to 15.7kHz | | | | 4.0 | dB |
| t_d | $V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$ | | | | 35 | ns |
| t_r | $V_{CC}=3.0V, V_{BE}=0.5V, I_C=10mA, I_{B1}=1.0mA$ | | | | 35 | ns |
| t_s | $V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$ | | | | 200 | ns |
| t_f | $V_{CC}=3.0V, I_C=10mA, I_{B1}=I_{B2}=1.0mA$ | | | | 50 | ns |

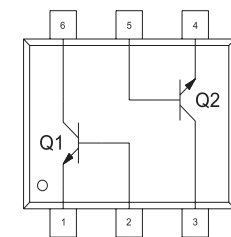
◆ Enhanced specification.

SOT-563 - MECHANICAL OUTLINE

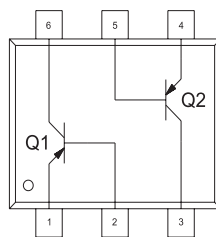


| SYMBOL | DIMENSIONS | | | |
|--------|------------|-------|-------------|------|
| | INCHES | | MILLIMETERS | |
| | MIN | MAX | MIN | MAX |
| A | 0.004 | 0.007 | 0.10 | 0.18 |
| B | 0.008 | | 0.20 | |
| C | 0.022 | 0.024 | 0.56 | 0.60 |
| D | 0.059 | 0.067 | 1.50 | 1.70 |
| E | 0.020 | | 0.50 | |
| F | 0.061 | 0.067 | 1.55 | 1.70 |
| G | 0.047 | | 1.20 | |
| H | 0.006 | 0.012 | 0.15 | 0.30 |

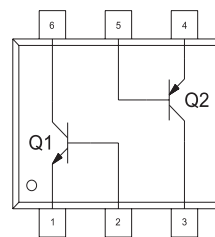
SOT-563 (REV: R0)



CMLT3904E
 MARKING CODE: L04



CMLT3906E
 MARKING CODE: L06



CMLT3946E
 MARKING CODE: L46

- LEAD CODE:**
- 1) EMITTER Q1
 - 2) BASE Q1
 - 3) COLLECTOR Q2
 - 4) EMITTER Q2
 - 5) BASE Q2
 - 6) COLLECTOR Q1



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