

## Radiation Hardened Octal D-Type Flip-Flop, Three-State, Positive Edge Triggered

Intersil's Satellite Applications Flow™ (SAF) devices are fully tested and guaranteed to 100kRAD total dose. These QML Class T devices are processed to a standard flow intended to meet the cost and shorter lead-time needs of large volume satellite manufacturers, while maintaining a high level of reliability.

The Intersil HCTS374T is a Radiation Hardened Non-Inverting Octal D-type, Positive Edge Triggered Flip-Flop with three-state outputs. The eight flip-flops enter data into their registers on the LOW-to-HIGH transition of the clock (CP). Data is also transferred to the outputs during this transition. The output enable ( $\overline{OE}$ ) controls the three-state outputs and is independent of the register operation. When the output enable is high, the outputs are in the high impedance state.

### Specifications

Specifications for Rad Hard QML devices are controlled by the Defense Supply Center in Columbus (DSCC). The SMD numbers listed below must be used when ordering.

**Detailed Electrical Specifications for the HCTS374T are contained in SMD 5962-95748.** A "hot-link" is provided from our website for downloading.

[www.intersil.com/spacedefense/newsafclasst.asp](http://www.intersil.com/spacedefense/newsafclasst.asp)

Intersil's Quality Management Plan (QM Plan), listing all Class T screening operations, is also available on our website.

[www.intersil.com/quality/manuals.asp](http://www.intersil.com/quality/manuals.asp)

### Ordering Information

| ORDERING NUMBER | PART NUMBER | TEMP. RANGE (°C) |
|-----------------|-------------|------------------|
| 5962R9574801TRC | HCTS374DTR  | -55 to 125       |
| 5962R9574801TXC | HCTS374KTR  | -55 to 125       |

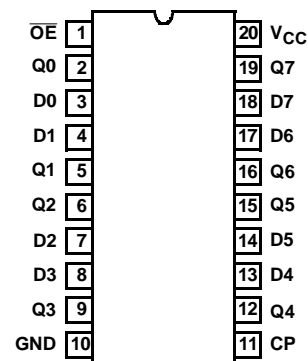
NOTE: **Minimum order quantity for -T is 150 units through distribution, or 450 units direct.**

### Features

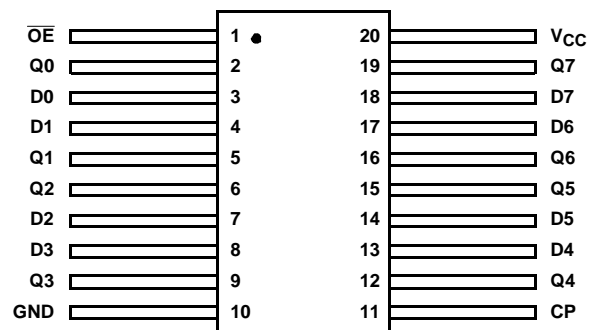
- QML Class T, Per MIL-PRF-38535
- Radiation Performance
  - Gamma Dose ( $\gamma$ )  $1 \times 10^5$  RAD(Si)
  - Latch-Up Free Under Any Conditions
  - SEP Effective LET No Upsets:  $>100$  MEV-cm<sup>2</sup>/mg
  - Single Event Upset (SEU) Immunity  $< 2 \times 10^{-9}$  Errors/Bit-Day (Typ)
- 3 Micron Radiation Hardened SOS CMOS
- Fanout (Over Temperature Range)
  - Bus Driver Outputs - 15 LSTTL Loads
- Significant Power Reduction Compared to LSTTL ICs
- DC Operating Voltage Range: 4.5V to 5.5V
- LSTTL Input Compatibility
  - $V_{IL} = 0.8V$  Max
  - $V_{IH} = V_{CC}/2$  Min
- Input Current Levels  $I_i \leq 5mA$  at  $V_{OL}, V_{OH}$

### Pinouts

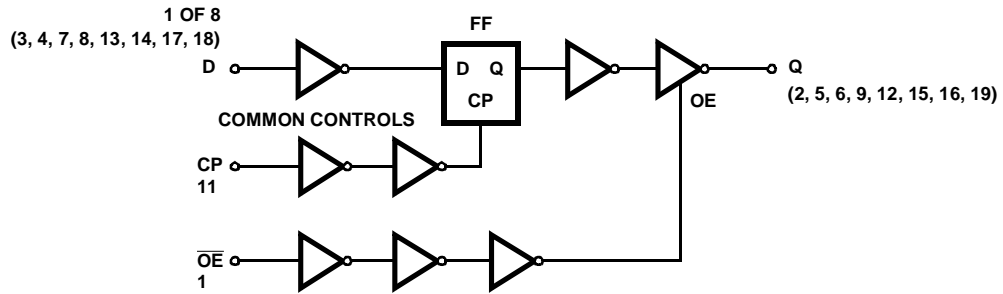
**HCTS374T (SBDIP), CDIP2-T20**  
TOP VIEW





**HCTS374T (FLATPACK), CDFP4-F20**  
TOP VIEW



**Functional Diagram**



**TRUTH TABLE**


| INPUTS          |   |    | OUTPUTS |
|-----------------|---|----|---------|
| $\overline{OE}$ | CP  | Dn | Qn      |
| L               |  | H  | H       |
| L               |  | L  | L       |
| L               | L   | X  | Q0      |
| H               | X   | X  | Z       |

H =High Level (Steady State).

L =Low Level (Steady State).

X =Immaterial.

Z =High Impedance.

 = Transition from Low to High Level.

Q0 =The level of Q before the indicated input conditions were established.

**Die Characteristics**

**DIE DIMENSIONS:**

(2743μm x 2692μm x 533μm ±51μm)  
 108 x 106 x 21mils ±2mil

**METALLIZATION:**

Type: Al Si  
 Thickness: 11kÅ ±1kÅ

**SUBSTRATE POTENTIAL:**

Unbiased (Silicon on Sapphire)

**BACKSIDE FINISH:**

Sapphire

**PASSIVATION:**

Type: Silox (SiO<sub>2</sub>)  
 Thickness: 13kÅ ±2.6kÅ

**WORST CASE CURRENT DENSITY:**

< 2.0e5 A/cm<sup>2</sup>

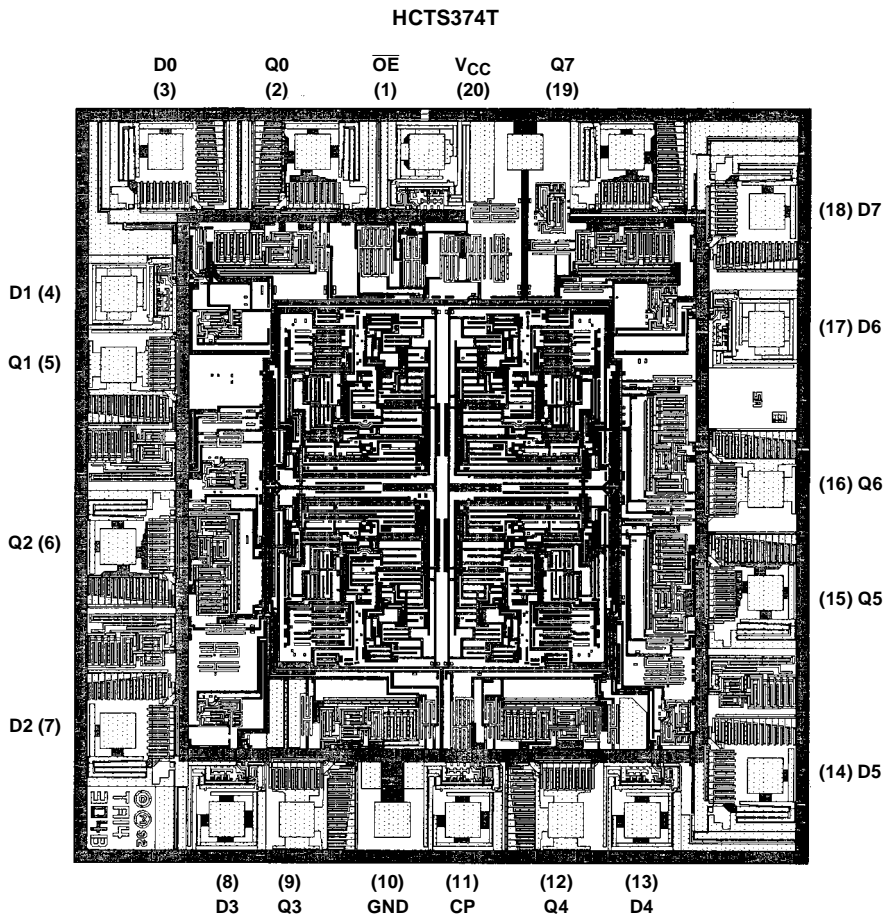
**TRANSISTOR COUNT:**

468

**PROCESS:**

CMOS SOS

**Metalization Mask Layout**



NOTE: The die diagram is a generic plot from a similar HCS device. It is intended to indicate approximate die size and bond pad location. The mask series for the HCTS374 is TA14404A.

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 Intersil Corporation's quality certifications can be viewed at [www.intersil.com/design/quality](http://www.intersil.com/design/quality)

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