

## Radiation Hardened Dual-D Flip-Flop with Set and Reset

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 HCS74T is a Radiation Hardened Positive Edge Triggered Flip-Flop with set and reset.

The HCS74T utilizes advanced CMOS/SOS technology to achieve high-speed operation. This device is a member of radiation hardened, high-speed, CMOS/SOS Logic Family.

### 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 HCS74T are contained in SMD 5962-95782.** 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 INFORMATION	PART NUMBER	TEMP. RANGE (°C)
5962R9578201TCC	HCS74DTR	-55 to 125
5962R9578201TXC	HCS74KTR	-55 to 125

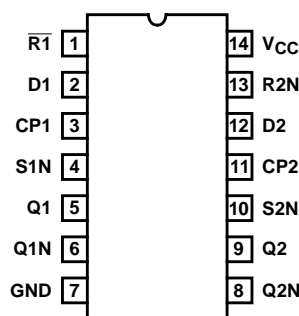
NOTE: **Minimum order quantity for -T is 150 units through distribution, or 450 units direct.**

### Features

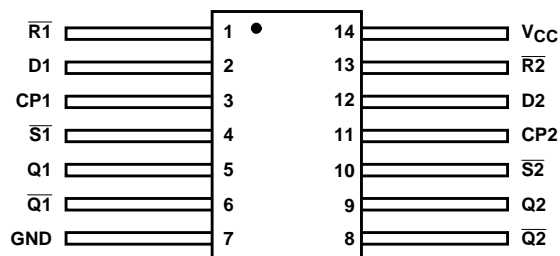
- QML Class T, Per MIL-PRF-38535
- Radiation Performance
  - Gamma Dose ( $\gamma$ )  $1 \times 10^5$  RAD(Si)
  - Latch-Up Free Under Any Conditions, SOS Process
  - SEP Effective LET No Upsets:  $>100$  MEV-cm<sup>2</sup>/mg
  - Single Event Upset (SEU) Immunity  $< 2 \times 10^{-9}$  Errors/Bit-Day (Typ)
- 3 Micron Radiation Hardened SOS CMOS
- Significant Power Reduction Compared to LSTTL ICs
- DC Operating Voltage Range: 4.5V to 5.5V
- Input Logic Levels
  - $V_{IL} = 30\%$  of  $V_{CC}$  Max
  - $V_{IH} = 70\%$  of  $V_{CC}$  Min
- Input Current Levels  $I_i \leq 5\mu A$  at  $V_{OL}, V_{OH}$

### Pinouts

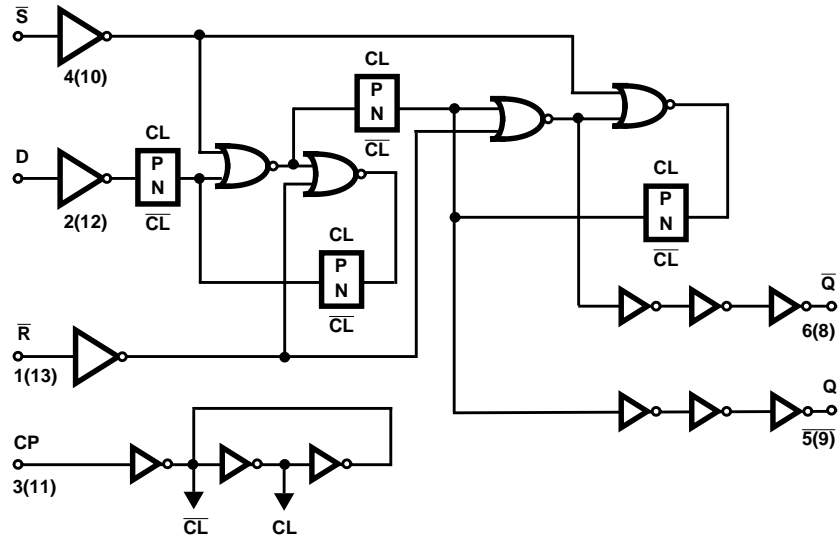
**HCS74T (SBDIP), CDIP2-T14**  
TOP VIEW



**HCS74T (FLATPACK), CDFF3-F14**  
TOP VIEW



**Functional Diagram**



**TRUTH TABLE**

INPUTS				OUTPUTS	
SET	RESET	CP	D	Q	Q̄
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H†	H†
H	H		H	H	L
H	H		L	L	H
H	H	L	X	Q0	Q̄0

NOTE: L = Logic Level Low, H = Logic Level High, X = Don't Care

= Transition from Low to High Level

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

† This configuration is non-stable, that is, it will not persist when set and reset inputs return to their inactive (High) level.

# HCS74T

## Die Characteristics

### DIE DIMENSIONS:

(2261 $\mu\text{m}$  x 2235 $\mu\text{m}$  x 533 $\mu\text{m}$   $\pm$ 51 $\mu\text{m}$ )  
89 x 88 x 21mils  $\pm$ 2mil

### METALLIZATION:

Type: Al Si  
Thickness: 11k $\text{\AA}$   $\pm$ 1k $\text{\AA}$

### SUBSTRATE POTENTIAL:

Unbiased (Silicon on Sapphire)

### BACKSIDE FINISH:

Sapphire

### PASSIVATION:

Type: Silox ( $\text{SiO}_2$ )  
Thickness: 13k $\text{\AA}$   $\pm$ 2.6k $\text{\AA}$

### WORST CASE CURRENT DENSITY:

$< 2.0\text{e}5 \text{ A/cm}^2$

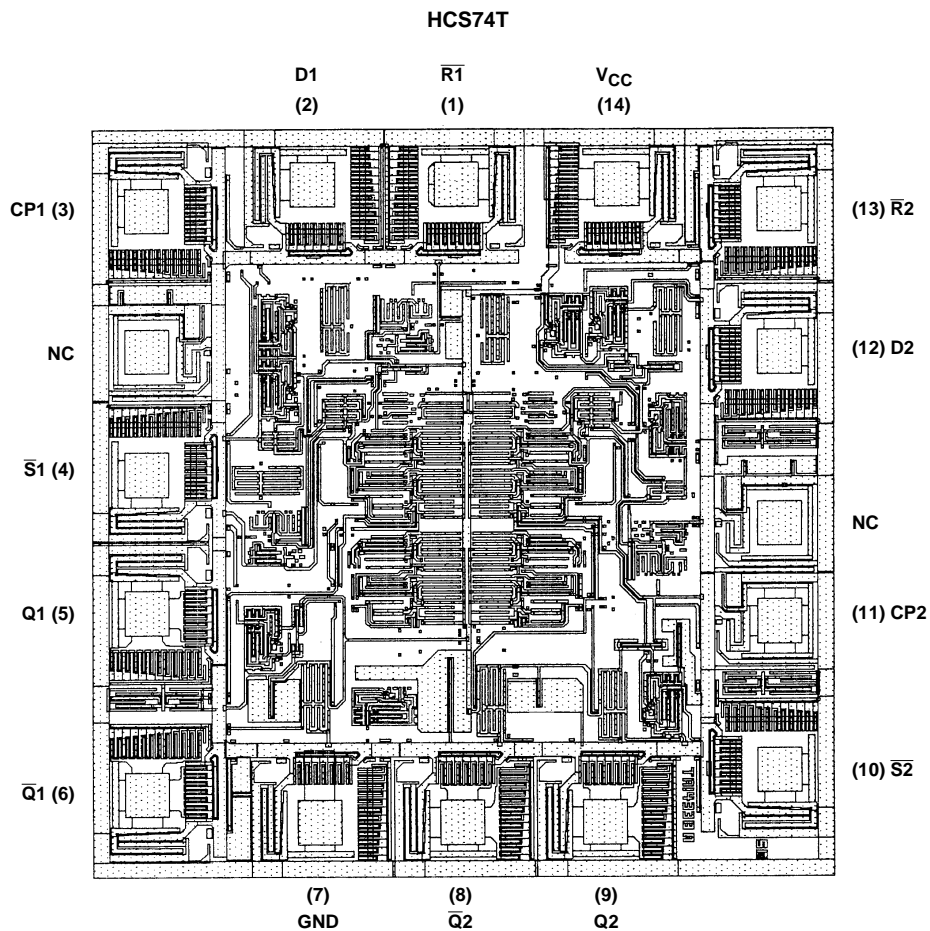
### TRANSISTOR COUNT:

192

### PROCESS:

CMOS SOS

## Metallization Mask Layout



All Intersil semiconductor products are manufactured, assembled and tested under **ISO9000** quality systems certification.

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