

# LOGIC MIGRATION GUIDE

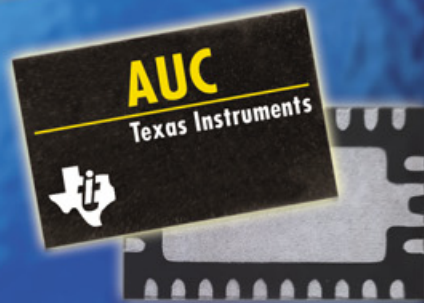
# Get on board



► **Widebus™ and Widebus+™:**  
CMOS & BiCMOS Families



► **Little Logic:**  
CMOS Families



► **Gates and Octals:**  
Bipolar and CMOS Families





## INTRODUCTION

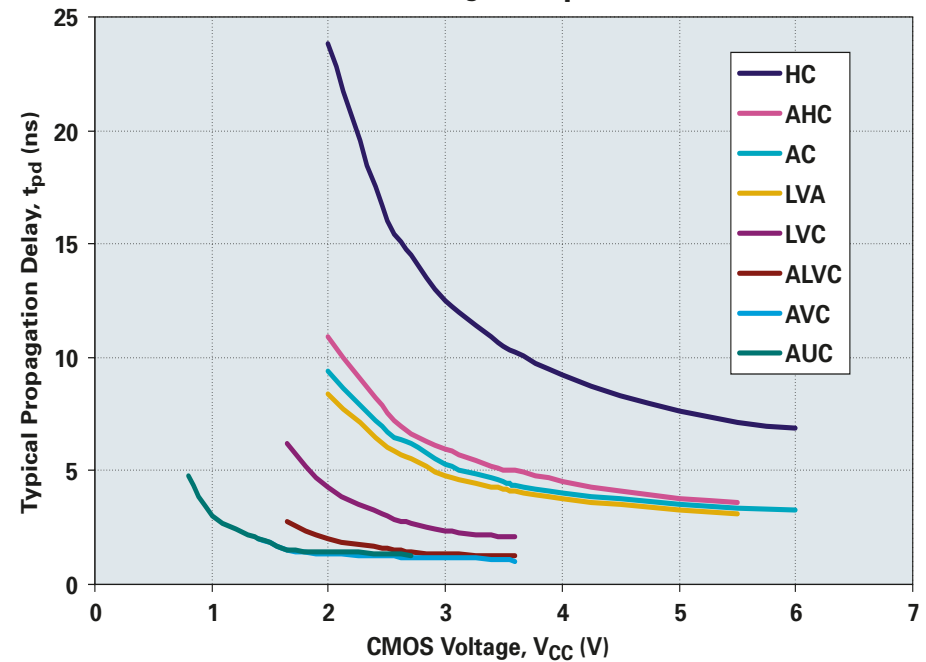
As the world leader in logic, Texas Instruments (TI) offers a full spectrum of logic functions and technologies from mature bipolar and BiCMOS families to the latest advanced CMOS families. TI's process technologies offer the logic performance and features required in today's ever-changing electronics market, while maintaining support for the traditional logic products.

As end equipment evolves with more functionality and size requirements, the demand for designers to keep up increases. Qualifying new core chips along with high-performance peripheral devices takes enough time; designers should not have to worry about finding the ideal logic technology or function. TI makes it easy by offering the broadest mature and innovative logic portfolio in the market, along with best-in-class support and a firm commitment to remain in the market.

A wide variety of packaging options are a bonus for those looking to design with TI Logic. TI has made advancements to the logic industry by introducing the latest packaging innovations, including the NanoStar™ chip-scale package, the QFN space-saving package for gates and octals, and the latest in ball grid array (BGA) packages. As the world leader in logic, TI offers logic families at every price/performance node, benchmark delivery reliability and leading service and support.

Logic suppliers have historically focused on speed as the number one priority for product family improvement. The majority of TI's newer product technologies offer the fastest performance, such as AUC (1.8 V), ALVC (3.3 V) and LV-A (5 V), depending on operating voltage level requirements; while others such as AUP focus on delivering best-in-class power consumption performance.

### CMOS Voltage vs. Speed

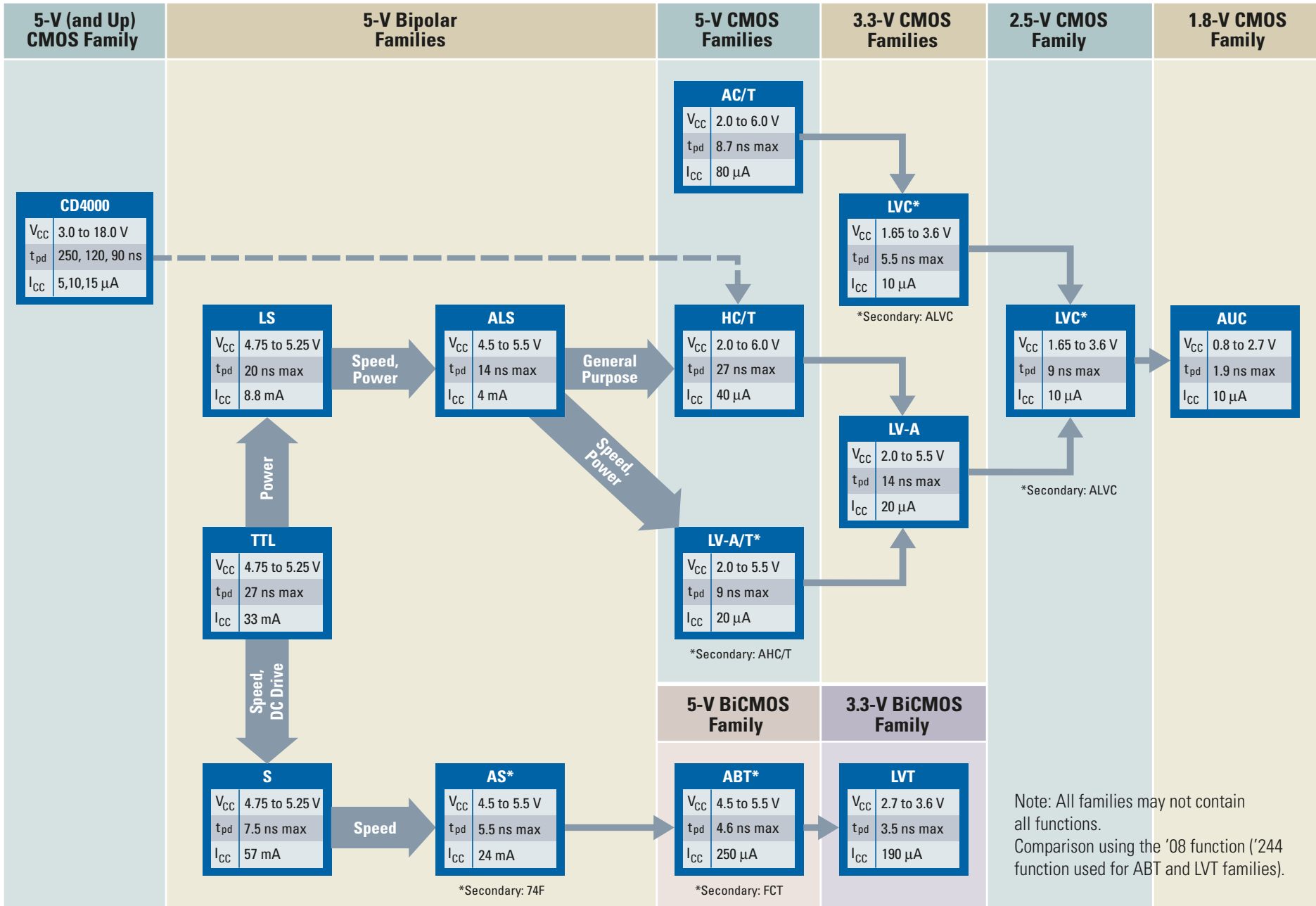


Note: Comparison of 16245 functions with 500- $\Omega$ /30-pF load.

## FOR MORE INFORMATION

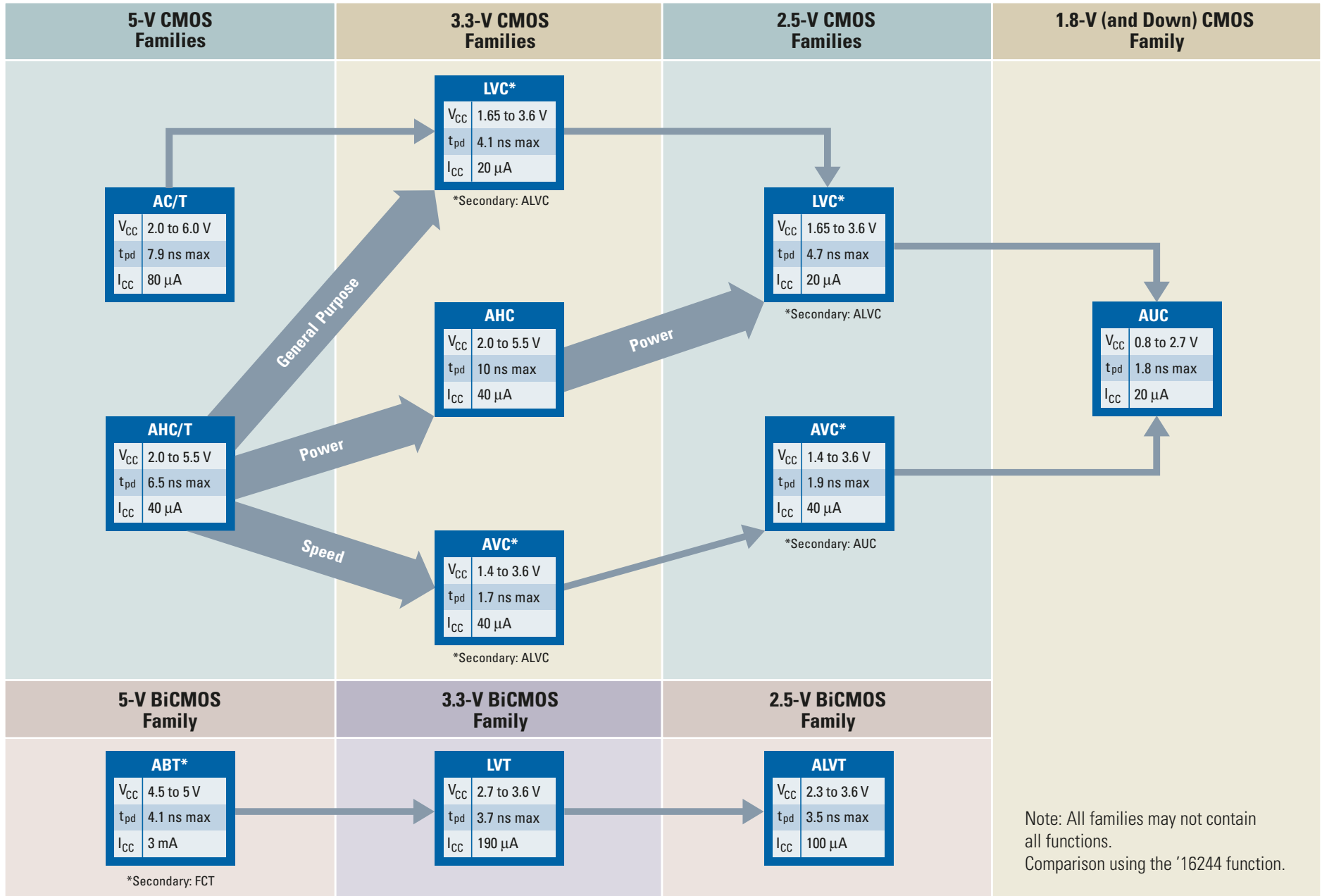
- For additional logic information, including application reports, samples and datasheets, visit: [logic.ti.com](http://logic.ti.com)
- To access the TI Logic KnowledgeBase and get answers to your technical questions, visit: [www.ti.com/logickb](http://www.ti.com/logickb)

## GATES AND OCTALS



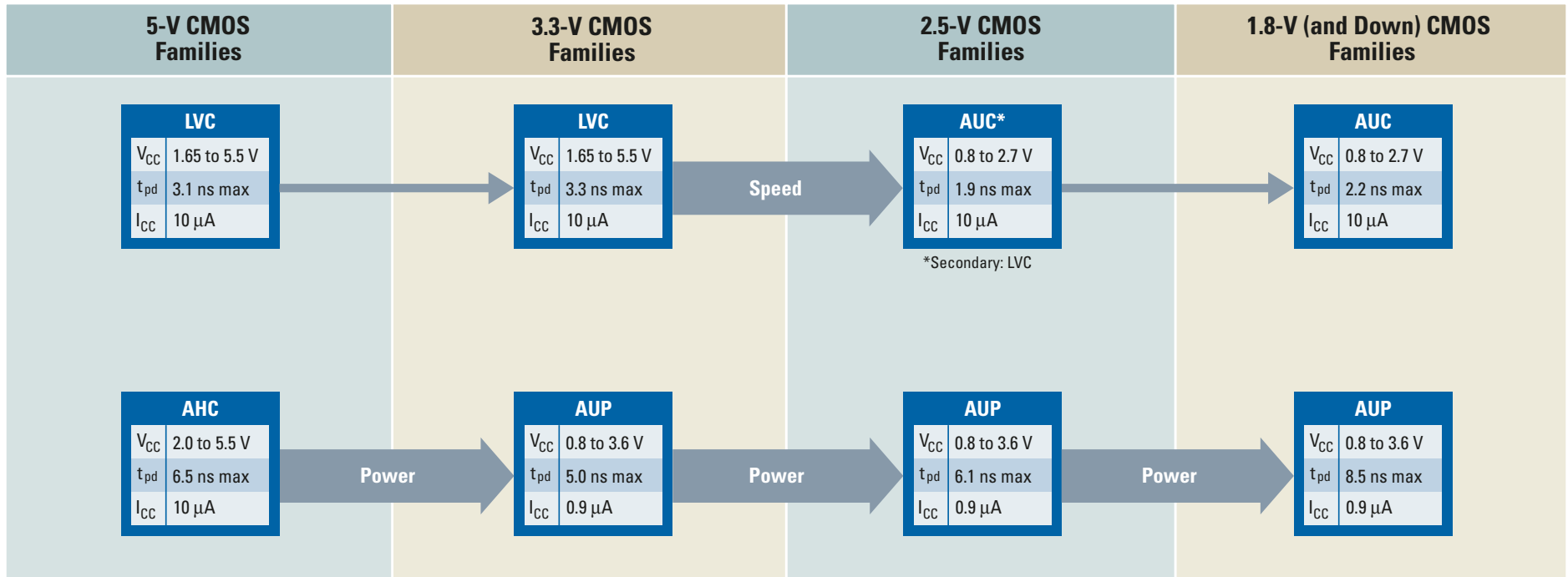


# WIDEBUS™ AND WIDEBUS+™





## LITTLE LOGIC FAMILY MIGRATION PATH



Note: All families may not contain all functions.  
Comparison using the '1G04 function.



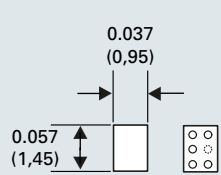
## PART NUMBER DEFINITION

|   |           |           |            |          |           |          |            |          |            |          |
|---|-----------|-----------|------------|----------|-----------|----------|------------|----------|------------|----------|
| <b>Logic Part Numbers</b>   | <b>SN</b> | <b>74</b> | <b>LVC</b> | <b>H</b> | <b>16</b> | <b>2</b> | <b>244</b> | <b>A</b> | <b>DGG</b> | <b>R</b> |
| <b>Standard Prefix:</b> SN or blank = none  |           |           |            |          |           |          |            |          |            |          |
| <b>Temperature Range:</b> 54 = -55°C to 125°C, 74 = -40°C to 85°C   |           |           |            |          |           |          |            |          |            |          |
| <b>Family:</b>  |           |           |            |          |           |          |            |          |            |          |
| <b>Features:</b> Blank = none, C = Configurable V <sub>CC</sub> , D = Level shifting, H = Bus hold, K = Active-clamp undershoot circuit, R = Damping resistors, S = Schottky diode clamping |           |           |            |          |           |          |            |          |            |          |
| <b>Bit Width:</b> Blank = n/a, 1G = Single-gate Little Logic, 8 = Octal, 16/18 = Widebus, 32 = Widebus+   |           |           |            |          |           |          |            |          |            |          |
| <b>Options:</b> Blank = none, 2 = Series damping resistor on output, 4 = Level shifter, 25 = 25-Ω line driver   |           |           |            |          |           |          |            |          |            |          |
| <b>Typical Device Function Number:</b>  |           |           |            |          |           |          |            |          |            |          |
| <b>Suffix Features:</b> Blank = none, C = -2-V undershoot protection, A = Improved version  |           |           |            |          |           |          |            |          |            |          |
| <b>TI Package Designator:</b>   |           |           |            |          |           |          |            |          |            |          |
| <b>Tape and Reel:</b> R = Standard reel, T = Small reel   |           |           |            |          |           |          |            |          |            |          |

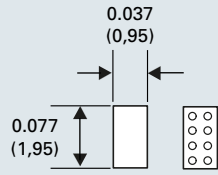
## LITERATURE

| <b>Selection Guides/Brochures</b> | <b>Lit. Number</b> | <b>Product/Application Clips (Continued)</b> | <b>Lit. Number</b> |
|-----------------------------------|--------------------|--|--------------------|
| Logic Selection Guide             | SDYU001            | NanoStar Product Clip                        | SCYB011            |
| Master Logic Cross Reference      | SCYB017A           | SN74VMEH22501 Application Clip               | SCYB009            |
| Logic Pocket Data Book            | SCYD013A           | SN74CBT34X245 Application Clip               | SCYB015            |
| Logic Package Migration Card      | SCYB006A           | AVCA (B) 164245 Translation Application Clip | SCYB012            |
| Little Logic Selection Guide      | SCYT129            | SPDT Analog Switch Application Clip          | SCYB014            |
| <b>Product/Application Clips</b>  |                    | Little Logic Product Clip                    | SCYB025            |
| AUP Product Clip                  | SCYB023            |  |                    |
| 1G97/98 Product Clip              | SCYB010            |  |                    |

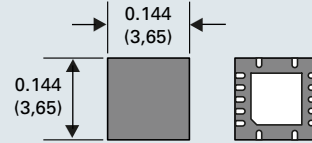
To order any TI Logic literature, please contact the TI Response Center at 1-800-477-8924 and provide the literature number.



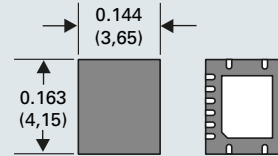
**5-ball/6-ball NanoStar™ (YEP) NanoFree™ (YZP)**  
 Ball pitch = 0.020 (0,50)  
 Height = 0.020 (0,50)  
 Area = 0.002 (1,26)



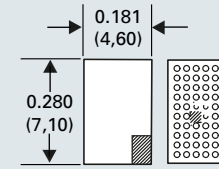
**8-ball NanoStar™ (YEP) NanoFree™ (YZP)**  
 Ball pitch = 0.020 (0,50)  
 Height = 0.020 (0,50)  
 Area = 0.003 (1,85)



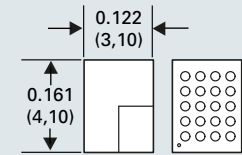
**14-pin QFN (RGY)**  
 Lead pitch = 0.020 (0,50)  
 Height = 0.039 (1,00)  
 Area = 0.021 (13,3)



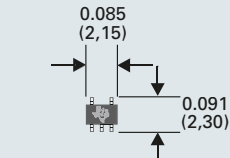
**16-pin QFN (RGY)**  
 Lead pitch = 0.020 (0,50)  
 Height = 0.039 (1,00)  
 Area = 0.023 (15,1)



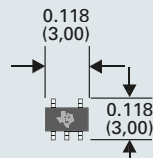
**56/48-ball VFBGA (GQL)**  
 Ball pitch = 0.026 (0,65)  
 Height = 0.039 (1,00)  
 Area = 0.051 (32,7)



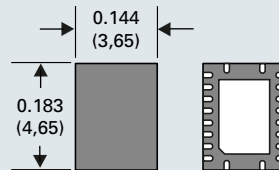
**20-ball VFBGA (GQN)**  
 Ball pitch = 0.026 (0,65)  
 Height = 0.039 (1,00)  
 Area = 0.020 (12,7)



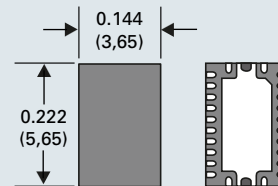
**5-pin SC-70 (DCK)**  
 Lead pitch = 0.026 (0,65)  
 Height = 0.037 (0,95)  
 Area = 0.008 (4,95)



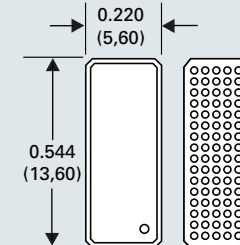
**5-pin SOT-23 (DBV)**  
 Lead pitch = 0.037 (0,95)  
 Height = 0.047 (1,20)  
 Area = 0.014 (9)



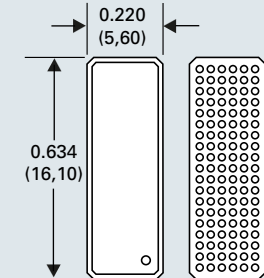
**20-pin QFN (RGY)**  
 Lead pitch = 0.020 (0,50)  
 Height = 0.039 (1,00)  
 Area = 0.026 (17,0)



**24-pin QFN (RHL)**  
 Lead pitch = 0.020 (0,50)  
 Height = 0.039 (1,00)  
 Area = 0.032 (21,0)



**96-ball LFBGA (GKE)**  
 Ball pitch = 0.031 (0,80)  
 Height = 0.055 (1,40)  
 Area = 0.139 (90,2)

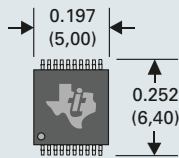


**114-ball LFBGA (GKF)**  
 Ball pitch = 0.031 (0,80)  
 Height = 0.055 (1,40)  
 Area = 0.139 (90,2)

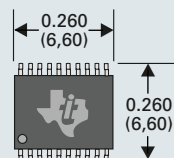
For more TI Logic packaging offerings, visit:  
[logic.ti.com](http://logic.ti.com)



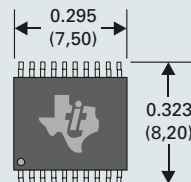
Dimensions are in inches (millimeters)



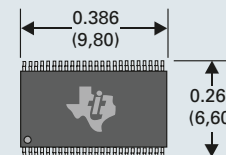
**20-pin TVSOP (DGV)**  
 Lead pitch = 0.016 (0,40)  
 Height = 0.047 (1,20)  
 Area = 0.050 (32)



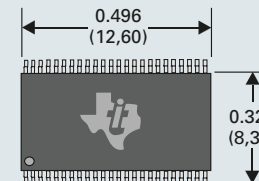
**20-pin TSSOP (PW)**  
 Lead pitch = 0.026 (0,65)  
 Height = 0.047 (1,20)  
 Area = 0.068 (44)



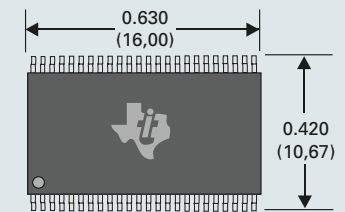
**20-pin SSOP (DB)**  
 Lead pitch = 0.026 (0,65)  
 Height = 0.079 (2,0)  
 Area = 0.095 (62)



**48-pin Widebus™ TVSOP (DGV)**  
 Lead pitch = 0.016 (0,40)  
 Height = 0.047 (1,20)  
 Area = 0.100 (63)



**48-pin Widebus™ TSSOP (DGG)**  
 Lead pitch = 0.020 (0,50)  
 Height = 0.047 (1,20)  
 Area = 0.162 (105)



**48-pin Widebus™ SSOP (DL)**  
 Lead pitch = 0.025 (0,635)  
 Height = 0.110 (2,79)  
 Area = 0.265 (171)



## TI Worldwide Technical Support

### Internet

#### TI Semiconductor Product Information Center Home Page

support.ti.com

#### TI Semiconductor KnowledgeBase Home Page

support.ti.com/sc/knowledgebase

### Product Information Centers

#### Americas

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| Phone          | +1(972) 644-5580                   |
| Fax            | +1(972) 927-6377                   |
| Internet/Email | support.ti.com/sc/pic/americas.htm |

#### Europe, Middle East, and Africa

|                       |                                |
|-----------------------|--------------------------------|
| Phone                 |                                |
| Belgium (English)     | +32 (0) 27 45 55 32            |
| Finland (English)     | +358 (0) 9 25173948            |
| France                | +33 (0) 1 30 70 11 64          |
| Germany               | +49 (0) 8161 80 33 11          |
| Israel (English)      | 1800 949 0107                  |
| Italy                 | 800 79 11 37                   |
| Netherlands (English) | +31 (0) 546 87 95 45           |
| Russia                | +7 (0) 95 7850415              |
| Spain                 | +34 902 35 40 28               |
| Sweden (English)      | +46 (0) 8587 555 22            |
| United Kingdom        | +44 (0) 1604 66 33 99          |
| Fax                   | +(49) (0) 8161 80 2045         |
| Internet              | support.ti.com/sc/pic/euro.htm |

#### Asia

|               |                                  |
|---------------|----------------------------------|
| Phone         |                                  |
| International | +886-2-23786800                  |
| Domestic      | <u>Toll-Free Number</u>          |
| Australia     | 1-800-999-084                    |
| China         | 800-820-8682                     |
| Hong Kong     | 800-96-5941                      |
| Indonesia     | 001-803-8861-1006                |
| Korea         | 080-551-2804                     |
| Malaysia      | 1-800-80-3973                    |
| New Zealand   | 0800-446-934                     |
| Philippines   | 1-800-765-7404                   |
| Singapore     | 800-886-1028                     |
| Taiwan        | 0800-006800                      |
| Thailand      | 001-800-886-0010                 |
| Fax           | 886-2-2378-6808                  |
| Email         | tiasia@ti.com<br>ti-china@ti.com |
| Internet      | support.ti.com/sc/pic/asia.htm   |

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|                |                                 |
|----------------|---------------------------------|
| Fax            |                                 |
| International  | +81-3-3344-5317                 |
| Domestic       | 0120-81-0036                    |
| Internet/Email |                                 |
| International  | support.ti.com/sc/pic/japan.htm |
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