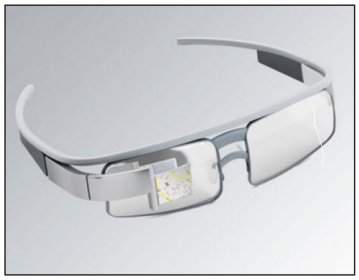
Texas Instruments DLP® Display & Projection Chipset Selection Guide

This document can help product developers select a DLP chipset for display and projection applications. An overview of all DLP projection and display chipsets is presented first followed by more detailed product information for DLP Pico™ digital micromirror devices (DMDs) as well as DLP Standard DMDs. Product developers interested in DLP technology for advanced light control applications should visit DLP Advanced Light Control Products or visit DLP Automotive Products for automotive qualified devices.

DLP Pico chipsets are designed for display applications that demand small form factor and low power consumption. A few example applications are smartphones and tablets, battery-powered pico projectors and mobile smart TVs, augmented reality (AR)/virtual reality (VR) wearable displays, and smart home displays.



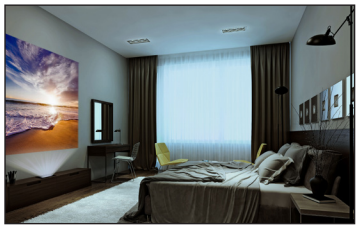



DLP Pico chipsets

Designed for small form factor, low power display applications

Chipset (DMD part number)	Micromirror array size (diagonal)	Display resolution
DLP2000	0.2”	640x360 (nHD)
DLP2010	0.2”	854x480 (WVGA)
DLP230GP	0.23”	960x540 (qHD)
DLP230KP	0.23”	1280x720 (720p)
DLP230NP	0.23”	1920x1080 (1080p)
DLP3010	0.3”	1280x720 (720p)
DLP3310	0.33”	1920x1080 (1080p)
DLP4501	0.45”	1280x800 (WXGA)
DLP4710	0.47”	1920x1080 (1080p)
DLP470TP	0.47”	3840x2160 (4K UHD)

DLP Standard chipsets are designed for display applications that demand the highest brightness and performance. Example applications include laser TV, digital signage, and business and education displays.




DLP Standard chipsets

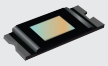
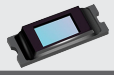
Designed for high brightness, large screen size display applications

Chipset (DMD part number)	Micromirror array size (diagonal)	Display resolution
DLP470NE	0.47”	1920x1080 (1080p)
DLP470TE	0.47”	3840x2160 (4K UHD)
DLP480RE	0.48”	1920x1200 (WUXGA)
DLP550JE	0.55”	1024x768 (XGA)
DLP650LE	0.65”	1280x800 (WXGA)
DLP650NE	0.65”	1920x1080 (1080p)
DLP660TE	0.66”	3840x2160 (4K UHD)

DLP Pico Chipsets

Selection guide for display applications

This selection guide can be used to compare DLP Pico chipsets for display applications. A DLP Pico chipset consists of two types of components: a DMD and a display controller. Most DLP Pico chipsets are also supported by a dedicated power management IC (PMIC) with an integrated illumination driver. Related technical resources include Getting Started with TI DLP® Display Technology, TI DLP® System Design: Brightness Requirements and Tradeoffs, and TI DLP® Pico™ System Design: Optical Module Specifications.

	Ultra-Mobile, Ultra-Low Power (<300 lumens)					
DMD part number	**DLP2000** 	**DLP2010** 	**DLP230GP** 	**DLP230KP** 	**DLP230NP** 	**DLP3010** 
DMD specifications						
Micromirror array diagonal size	0.20”	0.21”	0.23”	0.23”	0.23”	0.31”
Display resolution	640x360 nHD	854x480 WVGA	960x540 qHD	1280x720 720p	1920x1080 1080p	1280x720 720p
Micromirror pitch	7.6µm	5.4µm	5.4µm	5.4µm	5.4µm	5.4µm
Micromirror orientation	Square	Square	Square	Square	Square	Square
DMD package size (mm)	14.1x5.0x3.6	15.9x5.3x4.0	16.8×5.92×3.58	16.8×5.92×3.58	16.8×5.92×3.58	18.2x7.0x3.8
Illumination direction	Corner	Side	Side	Side	Side	Side
DMD 1ku price[1]	$19.99	$40.15	$39.99	$42.98	$47.84	$68.50
Typical optical module specifications (from 3rd party optical module manufacturers)						
Typical brightness (lumens)[2]	Up to 50	Up to 150	Up to 200	Up to 200	Up to 200	Up to 300
Typical image diagonal size[3]	Up to 30”	Up to 50”	Up to 60”	Up to 60”	Up to 60”	Up to 80”
Typical illumination power[4] **consumption**	1-3W	1-10W	1-10W	1-10W	1-10W	1-20W
Optical modules in production	Yes	Yes	Coming Soon	Yes	Coming Soon	Yes
Display controller specifications						
Controller part # and package size	DLPC2607 (7x7mm)	DLPC3430 (7x7mm) DLPC3435 (13x13mm)	DLPC3432 (7x7mm)	DLPC3434 (7x7mm)	DLPC3436 (7x7mm)	DLPC3433 (7x7mm) DLPC3438 (13x13mm)
Frame refresh rate	Up to 60Hz	Up to 240Hz	120 Hz	60 Hz	60 Hz	Up to 120Hz
DLP IntelliBright™ Algorithms		●	●	●	●	●
Keystone correction (1D vertical)		●	●	●	●	●
Evaluation Module (EVM)	Order on TI.com	Order on TI.com				Order on TI.com
TI Reference Design	TIDA-01473	TIDA-00325	TIDA-080002			TIDA-01571
Controller 1ku price[1]	$11.63	$17.82	$17.82	$17.82	$17.82	$18.42
PMIC part numbers, illumination drive current, and compatibility						
DLPA1000 (up to 1A)	●					
DLPA2000 (up to 750mA)		●	●	●	●	●
DLPA2005 (up to 2.4A)		●	●	●	●	●
DLPA3000 (up to 6A)		●	●	●	●	●
DLPA3005 (up to 16A)						●
Example applications and recommended chipsets						
DLP Signage		●	●	●	●	●
Mobile Projector	●	●	●	●	●	●
Mobile Smart TV				●	●	●
Smart Speaker	●	●	●	●	●	●
Smartphone	●	●	●			
Tablet: Multimedia	●	●	●			
VR / AR Headsets & Glasses	●	●	●	●	●	

[1] Suggested Resale Price per unit (USD) for BUDGETARY USE ONLY. For higher volume price quotes, prices in local currency or delivery quotes, please contact your local Texas Instruments Sales Office or Authorized Distributor.

[2] Brightness is measured out of the projection lens. Estimates are based on illumination technology available as of the publication date of this document. Please read the Brightness requirements and tradeoffs app note to learn more.

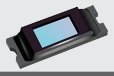
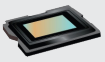
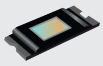
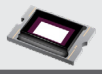
[3] Typical projected diagonal image sizes assume a minimum image brightness level of 50 nits for a dark room and 80% projection surface reflectivity. The required image brightness and image size will vary depending on ambient light levels. Please read the Brightness requirements and tradeoffs app note to learn more.

[4] Illumination power consumption can be adjusted to meet product power consumption constraints. To learn more about optical module specifications, please read TI DLP® Pico™ System Design: Optical Module Specifications.

DLP Pico Chipsets

Selection guide for display applications

This selection guide can be used to compare DLP Pico chipsets for display applications. A DLP Pico chipset consists of two types of components: a DMD and a display controller. Most DLP Pico chipsets are also supported by a dedicated power management IC (PMIC) with an integrated illumination driver. Related technical resources include Getting Started with TI DLP® Display Technology, TI DLP® System Design: Brightness Requirements and Tradeoffs, and TI DLP® Pico™ System Design: Optical Module Specifications.

	Mobile, Low Power (<600 lumens)		Compact High Resolution (<1500 lumens)	
DMD part number	**DLP3310** 	**DLP4501** 	**DLP4710** 	**DLP470TP** 
DMD specifications				
Micromirror array diagonal size	0.33”	0.45”	0.47”	0.47”
Display resolution	1920x1080 1080p	1280x800 WXGA	1920x1080 1080p	3840x2160 4K UHD
Micromirror pitch	5.4µm	7.6µm	5.4µm	5.4µm
Micromirror orientation	Square	Diamond	Square	Square
DMD package size (mm)	19.3x7.2x3.8	21.3x11.0x3.3	24.5x11.0x3.8	25.65x16.9x4.1
Illumination direction	Side	Side	Bottom	Bottom
DMD 1ku price[1]	$73.49	$92.00	$148.00	$178.00
Typical optical module specifications (from 3rd party optical module manufacturers)				
Typical brightness (lumens)[2]	Up to 400	Up to 1000	Up to 1500	Up to 1500
Typical image diagonal size[3]	Up to 80”	Up to 120”	Up to 140”	Up to 140”
Typical illumination power[4] **Consumption**	10-30W	10-100W	20-120W	20-120W
Optical modules in production	Yes	Yes	Yes	Yes
Display controller specifications				
Controller part # and package size	DLPC3437 (13x13mm) 2 required	DLPC6401 (23x23mm)	DLPC3439 (13x13mm) 2 required	DLPC6421 (27x27mm) 2 required
Frame refresh rate	Up to 60Hz	Up to 120Hz	Up to 60Hz	Up to 60Hz
DLP IntelliBright™ Algorithms	●		●	
Keystone correction (1D vertical)	●	●		●
Evaluation Module (EVM)	Order on TI.com	Order from 3rd party	Order on TI.com	
TI Reference Design	TIDA-080000	TIDA-00782	TIDA-01226	
Controller 1ku price[1]	$18.42	$20.45	$18.42	$52.20
PMIC part numbers, illumination drive current, and compatibility				
DLPA1000 (up to 1A)				
DLPA2000 (up to 750mA)				
DLPA2005 (up to 2.4A)				
DLPA3000 (up to 6A)	●		●	
DLPA3005 (up to 16A)	●		●	●
Example applications and recommended chipsets				
DLP Signage	●	●	●	●
Mobile Projector	●	●	●	●
Mobile Smart TV	●	●	●	●
Smart Speaker				
Smartphone				
Tablet: Multimedia				
VR / AR Headsets & Glasses				

[1] Suggested Resale Price per unit (USD) for BUDGETARY USE ONLY. For higher volume price quotes, prices in local currency or delivery quotes, please contact your local Texas Instruments Sales Office or Authorized Distributor.

[2] Brightness is measured out of the projection lens. Estimates are based on illumination technology available as of the publication date of this document. Please read the Brightness requirements and tradeoffs app note to learn more.

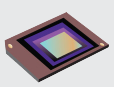
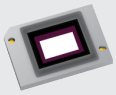
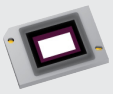
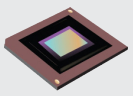
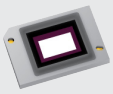
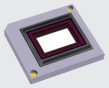
[3] Typical projected diagonal image sizes assume a minimum image brightness level of 50 nits for a dark room and 80% projection surface reflectivity. The required image brightness and image size will vary depending on ambient light levels. Please read the Brightness requirements and tradeoffs app note to learn more.

[4] Illumination power consumption can be adjusted to meet product power consumption constraints. To learn more about optical module specifications, please read TI DLP® Pico™ System Design: Optical Module Specifications.

DLP Standard Chipsets

Selection guide for display applications

This selection guide compares the DLP Standard chipset portfolio for display applications. A DLP Standard chipset consists of three components: a DMD, a DLP controller, and a dedicated power management IC (PMIC). Some chipsets also require an additional micromirror driver. Related technical resources include Getting Started with TI DLP® Display Technology and TI DLP® System Design: Brightness Requirements and Tradeoffs.

	XGA	WXGA	1080p		WUXGA	4K UHD	
DMD part number	**DLP550JE**	**DLP650LE**	**DLP470NE**	**DLP650NE**	**DLP480RE**	**DLP470TE**	**DLP660TE**
							
DMD specifications							
Micromirror array diagonal size	0.55”	0.65”	0.47”	0.65”	0.48”	0.47”	0.66”
Display resolution	1024x768	1280x800	1920x1080	1920x1080	1920x1200	3840x2160	3840x2160
Micromirror pitch	10.8µm	10.8µm	5.4µm	7.56µm	5.4µm	5.4µm	5.4µm
Micromirror orientation	Square	Square	Square	Square	Square	Square	Square
DMD package size (mm)	32.2x22.3x2.95	32.2x22.3x2.95	32.2x22.3x3.785	35x32.2x2.95	32.2x22.3x3.785	32.2x22.3x3.785	35x32.2x3.81
Illumination direction	Corner	Corner	Bottom	Corner	Bottom	Bottom	Bottom
DMD 1ku price[1]	$159.50	$187.00	$220.00	$285.00	$245.00	$227.37	$495.00
Typical brightness (lumens)[2]	>1500	>1500	>1500	>1500	>1500	>1500	>2000
Typical image diagonal size[3]	>80”	>80”	>80”	>80”	>80”	>80”	>80”
Display controller specifications							
Controller part # and package size	DLPC4422 (27x27mm)	DLPC4422 (27x27mm)	DLPC4422 (27x27mm)	DLPC4422 (27x27mm)	DLPC4422 (27x27mm)	DLPC4422 (27x27mm) 2 required	DLPC4422 (27x27mm) 2 required
Frame refresh rate	Up to 120Hz	Up to 120Hz	Up to 120Hz	Up to 120Hz	Up to 120Hz	Up to 120Hz	Up to 120Hz
Controller power consumption[4]	~3.73W	~3.73W	~3.73W	~3.73W	~3.73W	~3.73W	~3.73W
DLP Brilliant Color™ Algorithms	●	●	●	●	●	●	●
Keystone correction (1D vertical)	●	●	●	●	●	●	●
Controller 1ku price[1]	$60.50	$60.50	$60.50	$60.50	$60.50	$60.50	$60.50
PMIC and driver compatibility							
DLPA100 (PMIC)	●	●	●	●	●	●	●
DLPA200 (Micromirror driver)	●	●					
Example applications and recommended chipsets							
Laser TV			●	●		●	●
Digital signage	●	●	●	●	●	●	●
Portable Home Cinema			●	●		●	●
Business & education	●	●	●	●	●	●	●
Video Conferencing			●	●	●	●	●
Smart Lighting		●	●	●	●	●	●

[1] Suggested Resale Price per unit (USD) for BUDGETARY USE ONLY. For higher volume price quotes, prices in local currency or delivery quotes, please contact your local Texas Instruments Sales Office or Authorized Distributor.

[2] Brightness is measured out of the projection lens. Estimates are based on illumination technology available as of the publication date of this document. Please read the Brightness requirements and tradeoffs app note to learn more.

[3] Typical projected diagonal image sizes assume a minimum image brightness level of 200 nits for a well-lit room and 80% projection surface reflectivity. The required image brightness and image size will vary depending on ambient light levels. Please read the Brightness requirements and tradeoffs app note to learn more.

[4] Power consumption of the DLP chipset varies based on media content, input resolution, and frame rate. The specified power consumption assumes full DMD display resolution and 60hz frame rate.

TI Worldwide Technical Support

Internet

TI Semiconductor Product Information Center Home Page
support.ti.com

TI E2E™ Community Home Page
e2e.ti.com

Product Information Centers

Americas	Phone	+1(512) 434-1560
Brazil	Phone	0800-891-2616
Mexico	Phone	0800-670-7544
	Fax	+1(972) 927-6377
	Internet/Email	support.ti.com/sc/pic/americas.htm

Europe, Middle East, and Africa

Phone

European Free Call	00800-ASK-TEXAS (00800 275 83927)
International	+49 (0) 8161 80 2121
Russian Support	+7 (4) 95 98 10 701

Note: The European Free Call (Toll Free) number is not active in all countries. If you have technical difficulty calling the free call number, please use the international number above.

Fax	+(49) (0) 8161 80 2045
Internet	www.ti.com/asktexas
Direct Email	asktexas@ti.com

Japan

Phone	Domestic	0120-92-3326
Fax	International	+81-3-3344-5317
	Domestic	0120-81-0036
Internet/Email	International	support.ti.com/sc/pic/japan.htm
	Domestic	www.tij.co.jp/pic

Asia

Phone

International	+91-80-41381665
Domestic	Toll-Free Number

Note: Toll-free numbers do not support mobile and IP phones.

Australia	1-800-999-084
China	800-820-8682
Hong Kong	800-96-5941
India	1-800-425-7888
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	+8621-23073686
Email	tiasia@ti.com or ti-china@ti.com
Internet	support.ti.com/sc/pic/asia.htm

B090712

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265