

Automotive Revision:
Rev E1: Automotive Engineering Revision 1
Rev E2: Automotive Engineering Revision 2

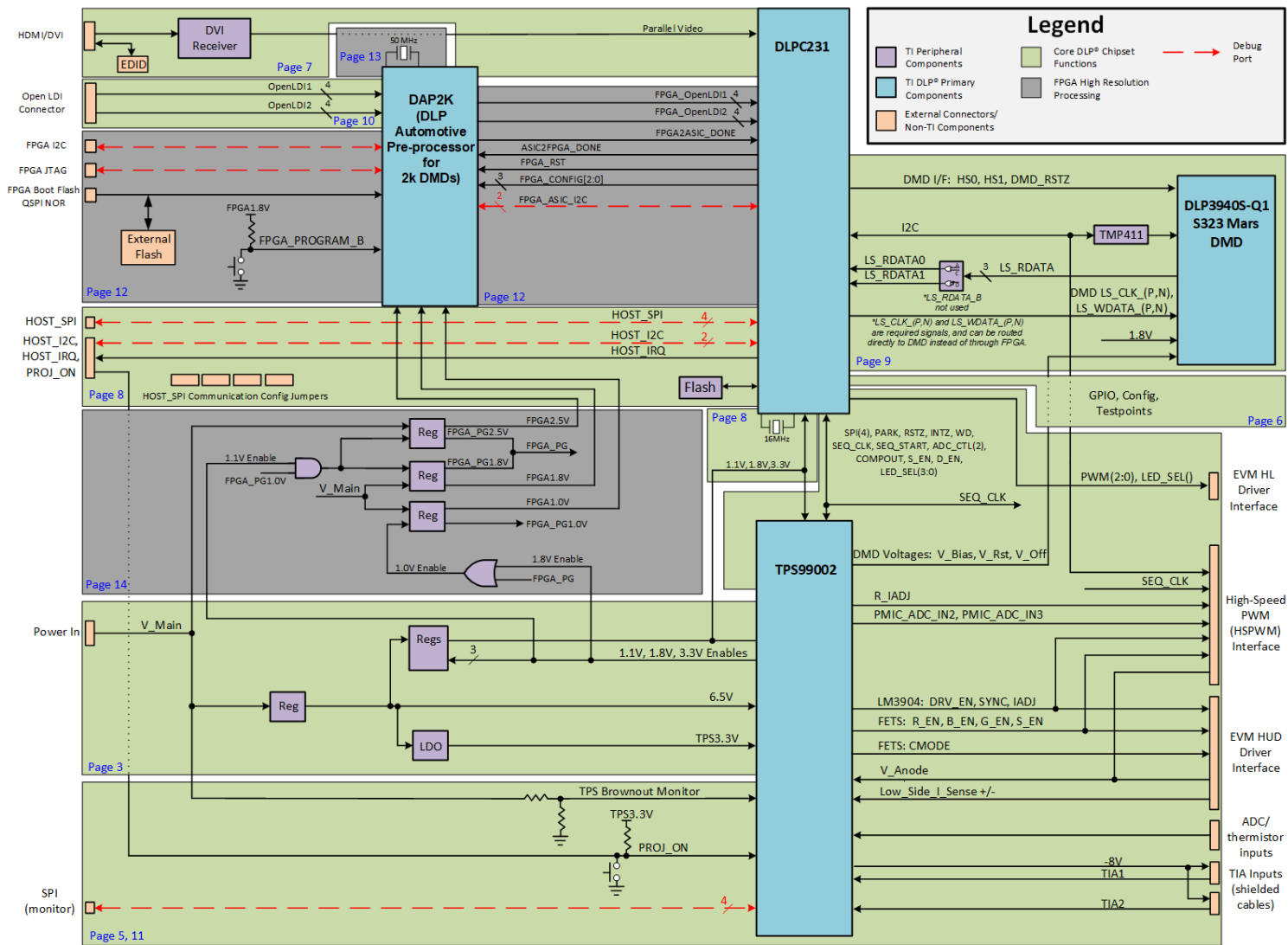
DLP121 - DLPC231SQ1FHDEV

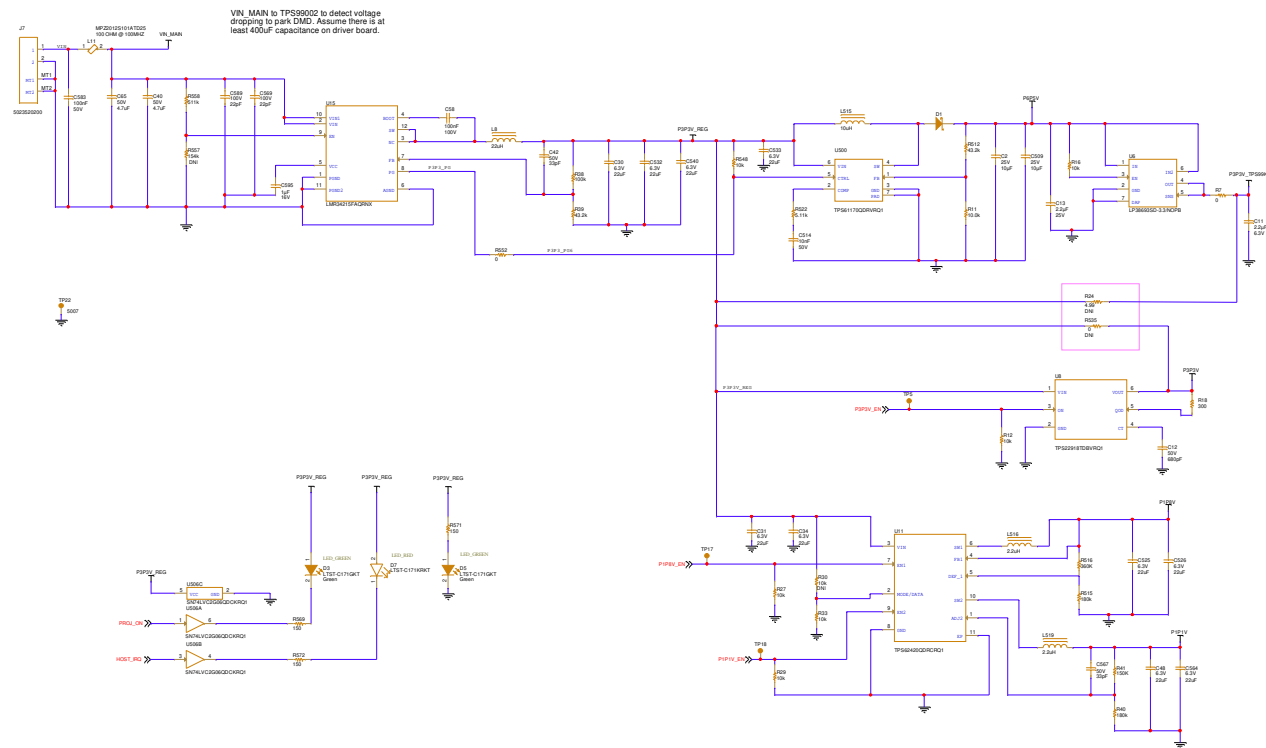
PRELIMINARY

TI Information - Selective Disclosure

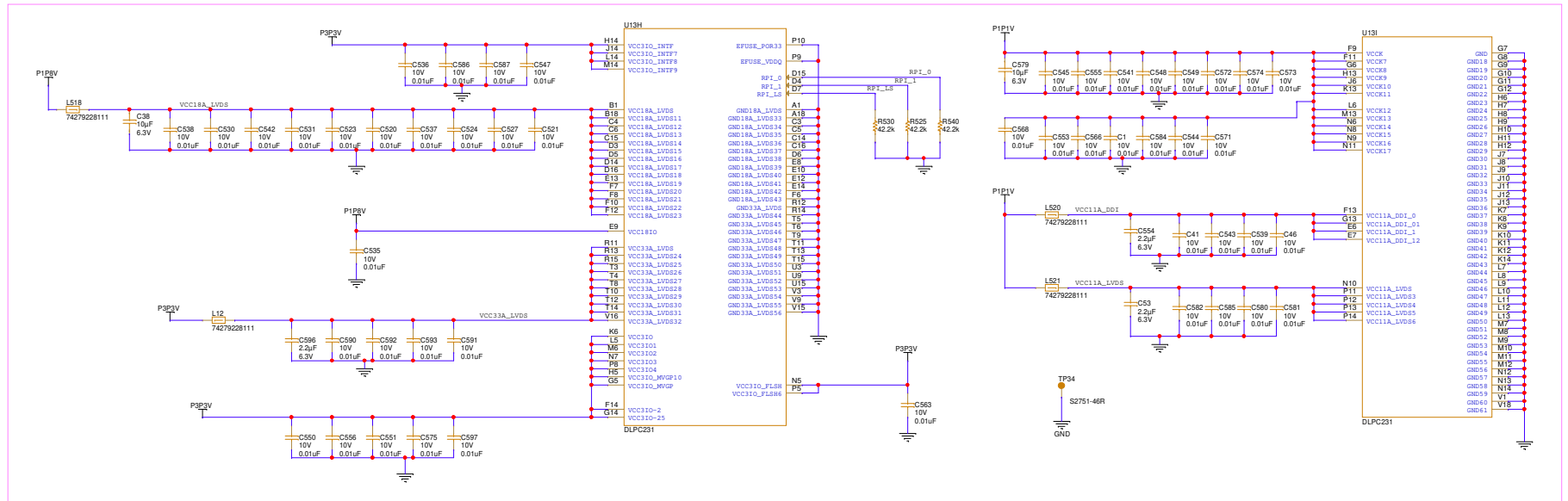
ESD - 2519586
PWB - 2519587
CCA - 2519588

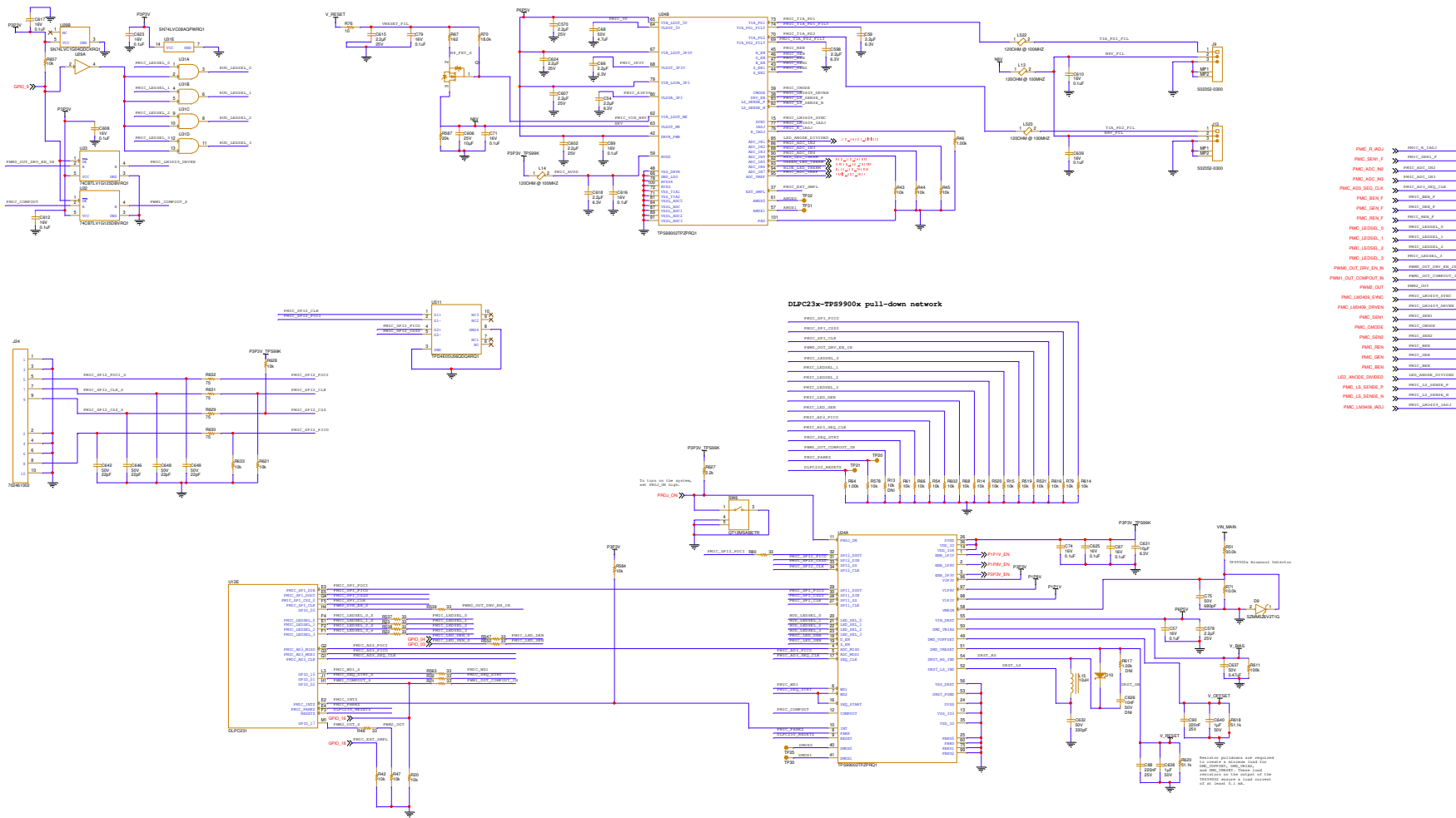
DRN	M. Ballati / M. Ly	DATE	2025/11/07	TEXAS INSTRUMENTS - DLP® Products	
ENGR	Barker / Ballati / Ly	DATE	2025/11/07	(C) COPYRIGHT 2025 Texas Instruments Inc. All Rights Reserved	
SVS		TITLE		ESD, DLP121 - DLPC231SQ1FHDEV	
APVD		DRAWING NO.		2519586	REV E2
QA		TI x17		Sheet Capture 251	SHEET 1 of 19





DLPC23x Power

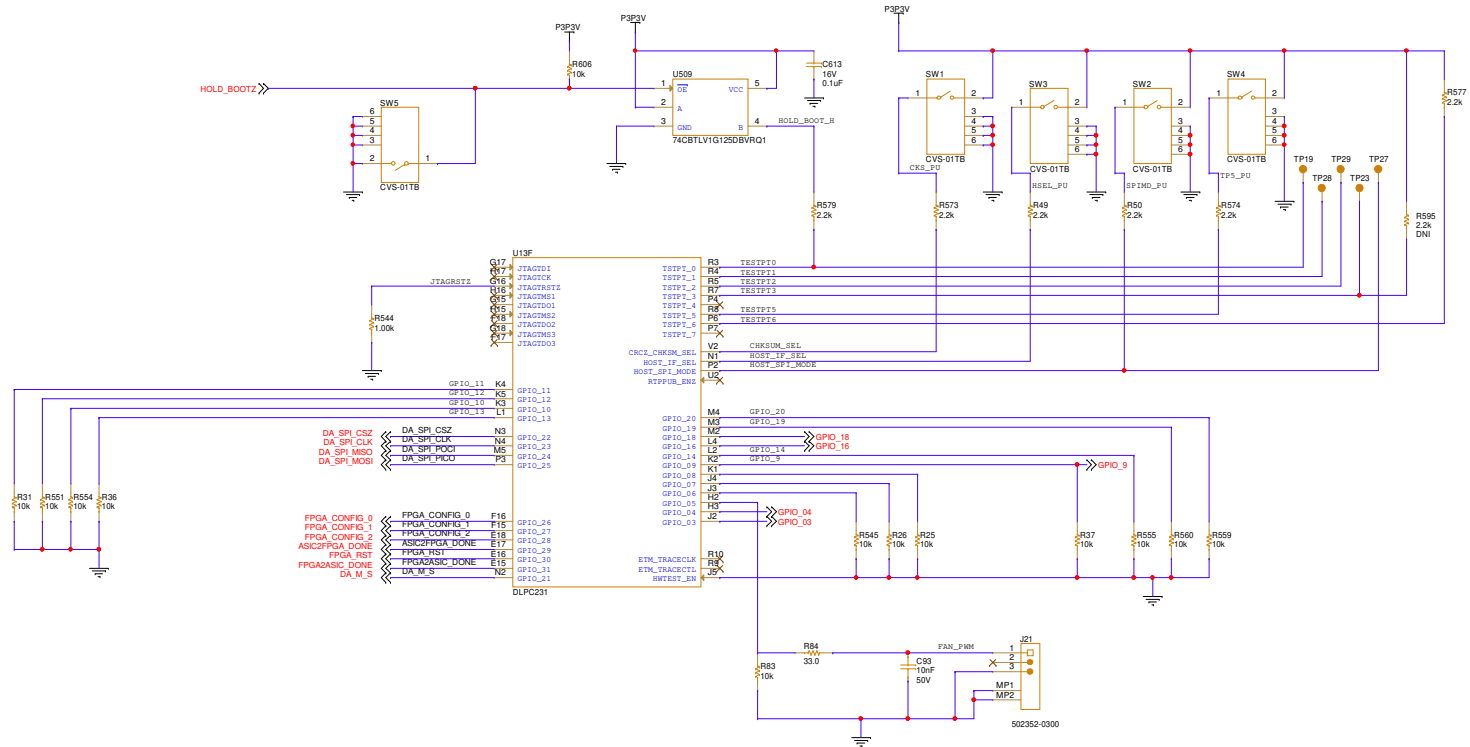


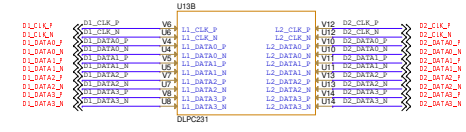
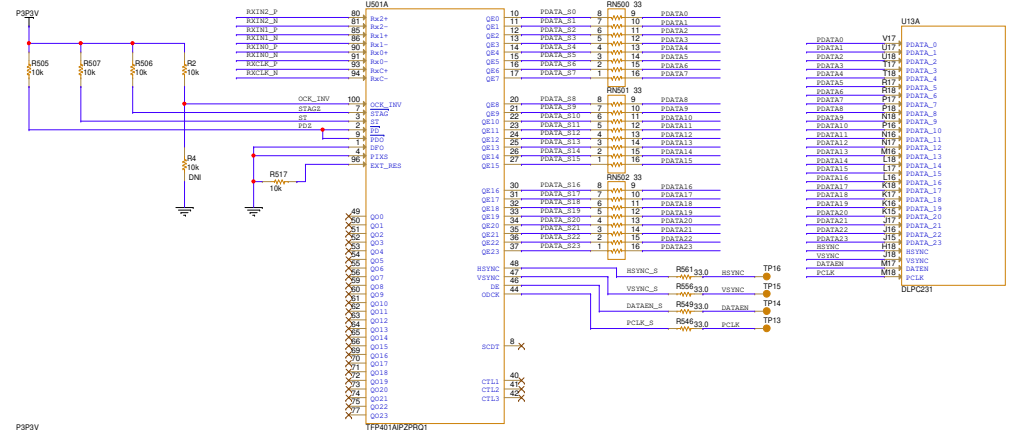
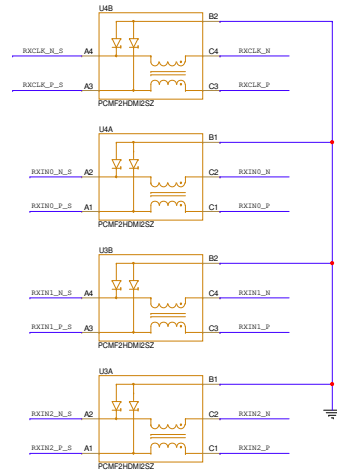


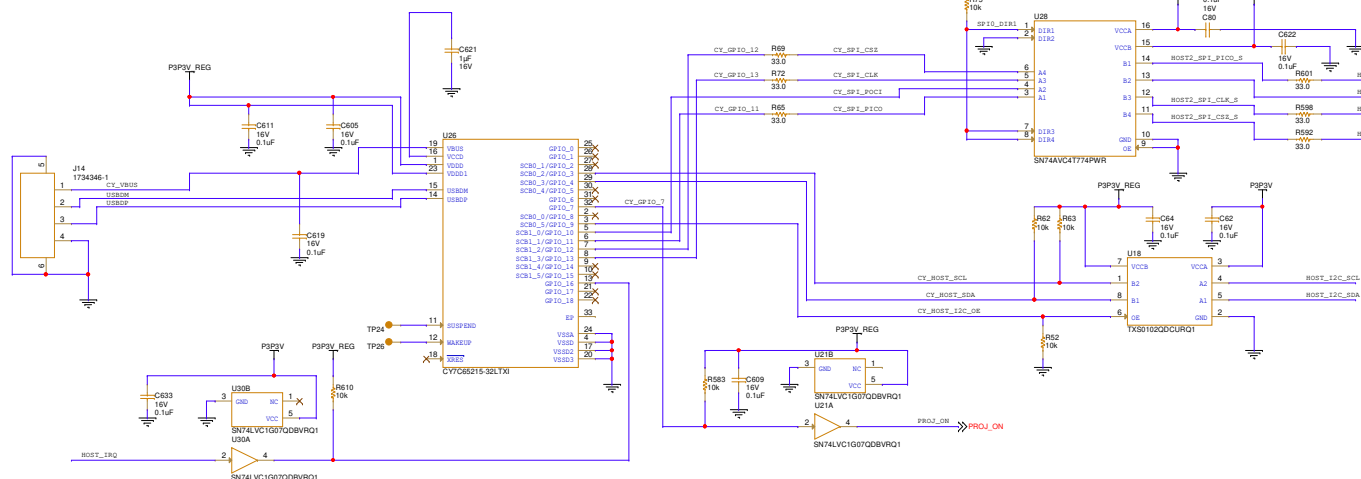
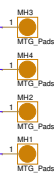
- TSTPT(7:0), CRKSUM_SEL, HOST_IF_SEL, HOST_SPI_SEL are inputs when RESET2 is low and have internal weak pulldown resistors. The states of the inputs are sampled after reset transitions from low to high to determine configuration options. Pin are then set as outputs.

CONFIGURATION OPTIONS

- TSTPT0 (EXT-IP-BOOT): 0= load main app, 1= stay in boot app
- TSTPT1 (EXT-BOOT-EN): 0= internal boot (must be low)
- TSTPT2 (I2C-MODE-SEL): 0=ds486 (must be low)
- TSTPT3 (ALT-MADR-SEL): 0= load main app 1, 1= load main app 2
- TSTPT4 (BOOT-SPI-MASTER-SL): 0= disabled (must be low)
- TSTPT5 (Spread Spectrum Enable): 0= disabled, 1= enabled
- TSTPT6 (Crystal Frequency): 0= reserved, 1= 10MHz (must be high)
- CRKSUM_SEL: 0= 8 bit CRC, 1= 8 bit checksum
- HOST_IF_SEL: 0= Host SPI, 1= Host I2C
- HOST_SPI_MODE: 0= mode 0 or 3, 1= mode 1 or 2







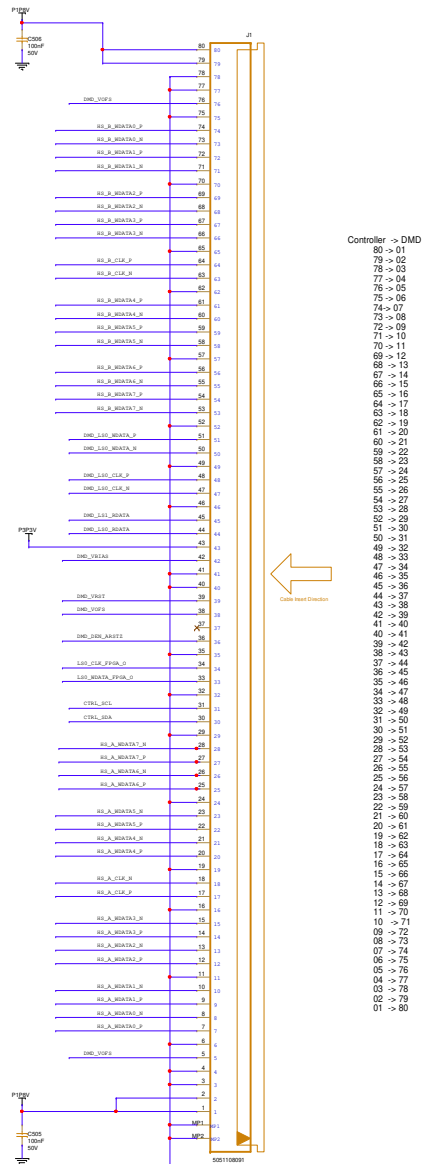
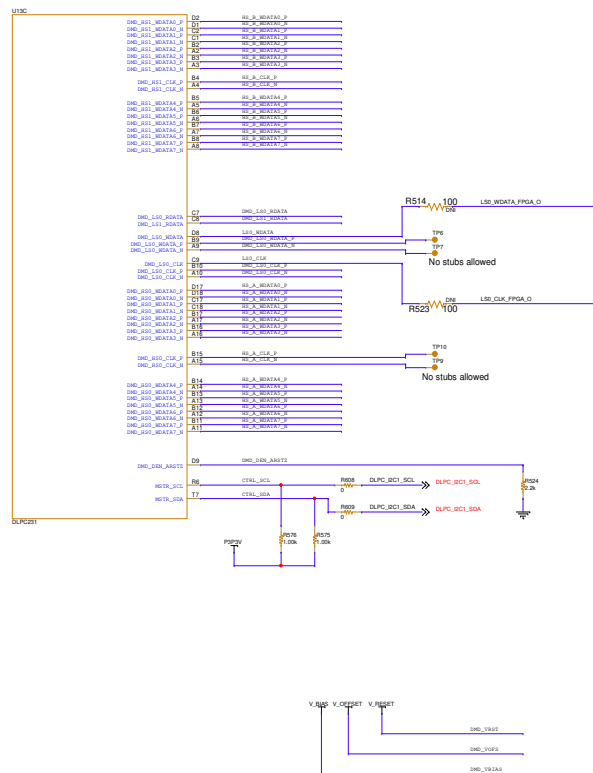
DMD Interface

DMD Interface

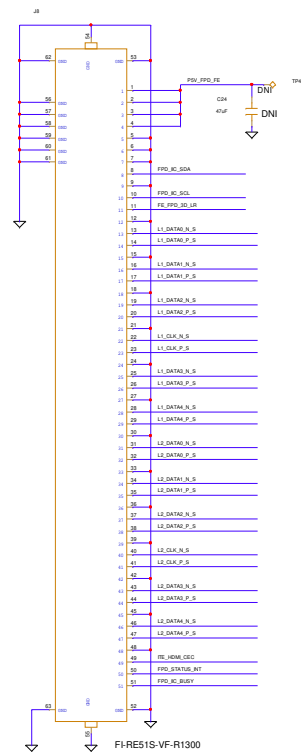
For optimised routing, the DLP2311 can be configured to swap H00 and H01 buses and change the H01 order of data pairs within each bus.

Pay careful attention to the net name and the DLP2311's pin name. Then, carefully check the net names on the DMD board and the DMD pins afterwards.

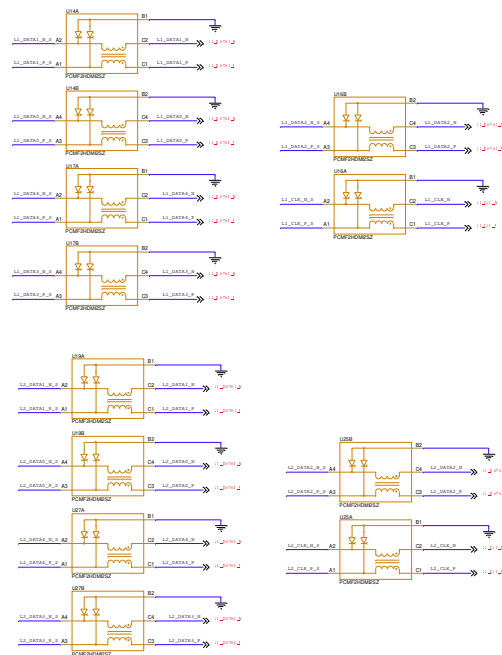
For this design, there is a channel swap: H00 <-> H01.



Open LDI Input Flex Connector
NOTE: OVDD1833 needs to be set to 1.8V on ITE card !



Note:
Keystone White TP



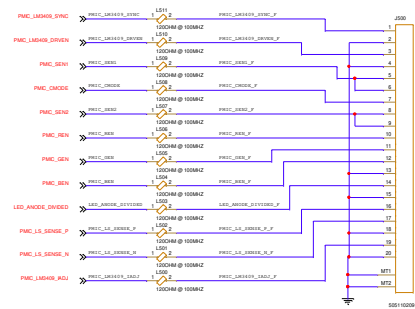
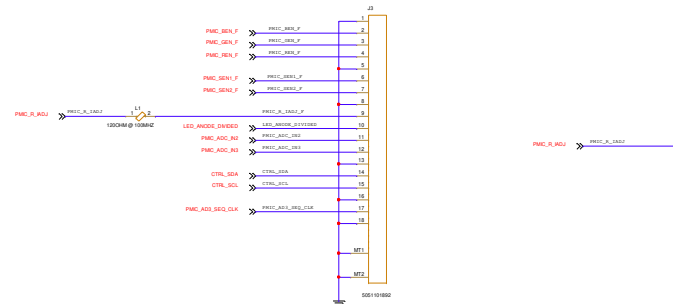
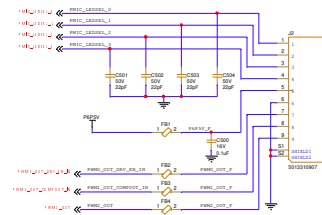
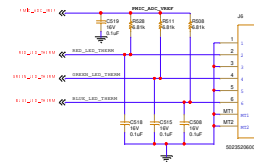
FPD-Link Front-End Connection

TI Confidential - Selective Disclosure

TEXAS INSTRUMENTS		DATE	Revised / by	DATE	11/11/2025	DRAWING NO.	2519586	REV	E2
ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE		ESD DATE	11/11/2025	DATE	11/11/2025	ISSUE	D	SHEET	1 OF 19

TI Information - Selective Disclosure

LED Connectors

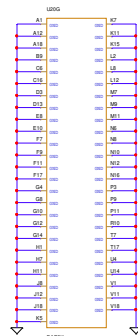
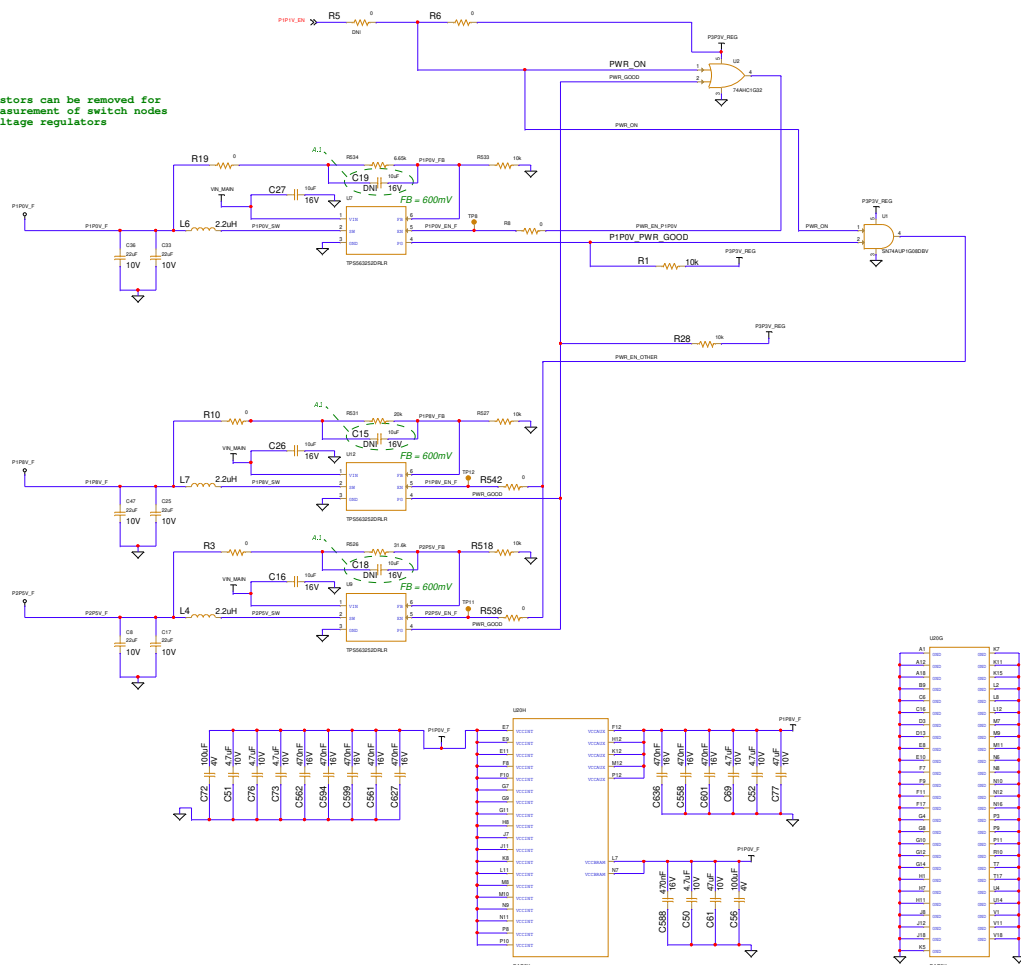


TI Information - Selective Disclosure

TI Confidential - Selective Disclosure

TEXAS INSTRUMENTS (C) COPYRIGHT 2005 TEXAS INSTRUMENTS ALL RIGHTS RESERVED	OWN	DATE	15/11/2005	DRAWING NO	2519586	REV	E2
	Rebdl / Ly	ISSUE DATE	15/11/2005				

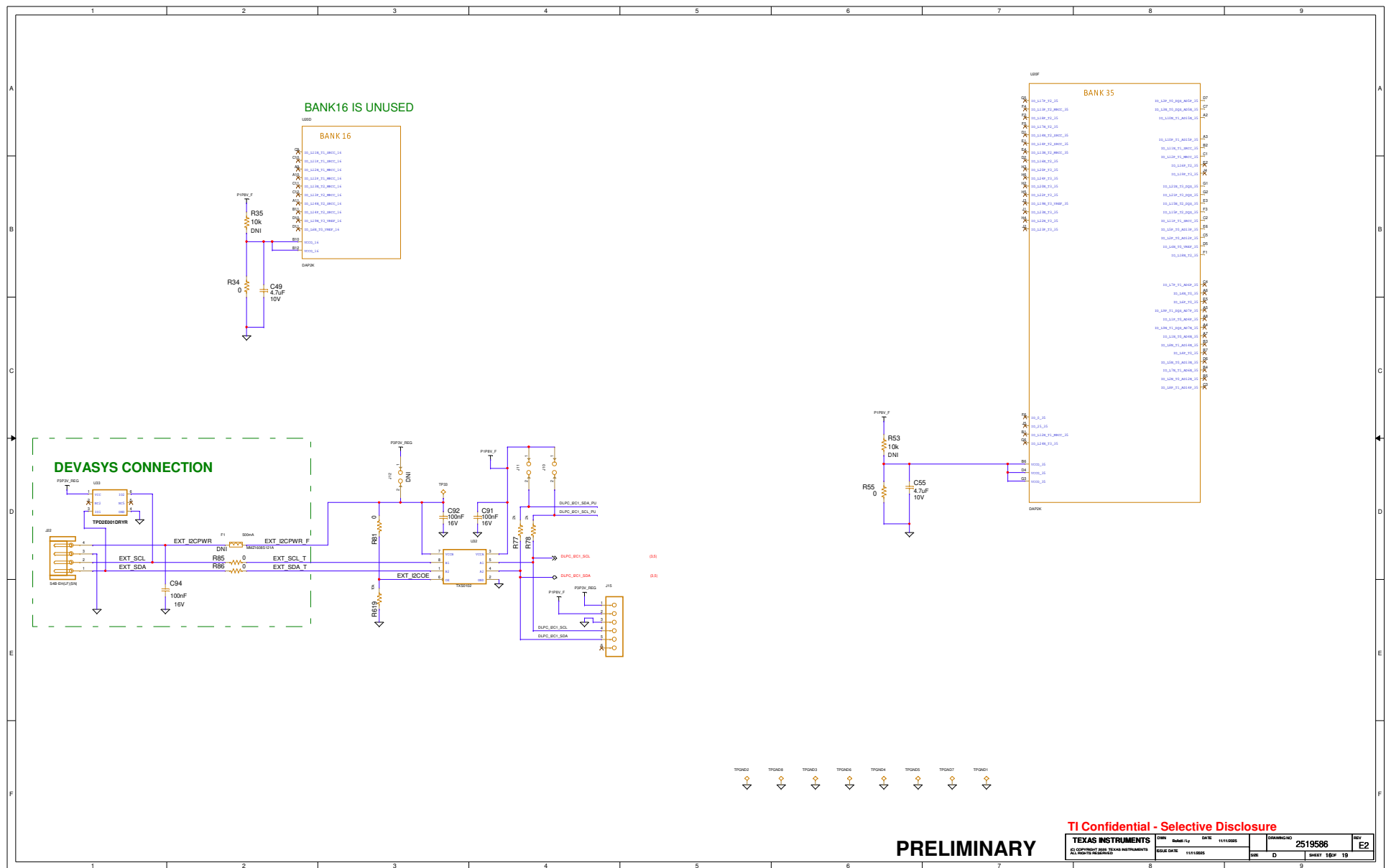
0-ohm resistors can be removed for current measurement of switch nodes on FPGA voltage regulators



PRELIMINARY

TI Confidential - Selective Disclosure

TEXAS INSTRUMENTS	DATE	04/06/14	DATE	10/10/09	CHANGE NO	2519586	REV	E2
© COPYRIGHT 2009, TEXAS INSTRUMENTS	ISSUE DATE	11/11/09	REV	D	SHEET	15 OF 19		



TI Confidential - Selective Disclosure

PRELIMINARY

Revisions:

E1: Initial engineering revision

1. Add automotive-grade FPGA to DLP462x EVM formatter design

E2: Engineering Revision 2

1. Page 02 - Add block diagram
 - Shows differential LS_CLK and differential LS_WDATA connected directly to DMD
2. Page 03 - Fix VIN_MAIN power net to be global power
3. Page 03, 05, 14 - Add the following test point vias:
 - P1P1V_EN
 - P1P8V_EN
 - P3P3V_EN
 - DLPC230_RESETZ
 - PMIC_PARKZ
 - P1P0V_EN_F
 - P1P8V_EN_F
 - P2P5V_EN_F
4. Page 04- Replace C45 with recommended 2.2 uF capacitor
5. Page 05 - Clean up pull-down resistors between DLPC23x and TPS9900x on TPS99002 page
6. Page 05 - Add note on TPS9900x DMD mirror voltage outputs for minimum load requirements
7. Page 06 - Add pulldown resistors for DLPC23x GPIO [8:6]
8. Page 06 - Rename Controller page to Controller Configuration
 - Add notes about DLPC23x TSTPTx pins and how to configure them
 - Add notes on how to configure DIP switches
9. Change FPGA name from PHK1920 to DAP2K (DLP Automotive Pre-processor for 2K DMDs)
10. Page 09 - Add note about differential LS_CLK and differential LS_WDATA connections -- these are required signals for any system regardless of FPGA inclusion!
11. Page 09 - Reroute DMD HSIF for optimal routing and for reverse compatibility with automotive p46 and p55 DMD Board Connections.
12. Page 12 - Fix PB1 momentary switch connections -- previously shorted GND to PROGRAM_B in Rev E1
13. Page 13 - Correct 50 Mhz and 200 Mhz oscillator notes
14. Page 14 - Add resistor for start of FPGA power sequencing. Can select to power from P3P3V_REG or from P1P1V_EN that comes from TPS9900x PMIC
15. Add zero-ohm resistors along switch node of FPGA voltage regulators; these are removed when measuring current
16. Update DMD Connector ordering for optimized routing

PRELIMINARY

T1 Confidential - Selective Disclosure

TEXAS INSTRUMENTS (C) COPYRIGHT 2008 TEXAS INSTRUMENTS ALL RIGHTS RESERVED	OWN	DATE	11/11/2005	DRAWING NO	2519586	REV	E2
	ISSUE DATE	11/11/2005					
	SIZE		D		SHEET 17 OF 19		

	1	2	3	4	5	6	7	8	9
A									
B									
C									
D									
E									
F									

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
Copyright © 2018, Texas Instruments Incorporated

TI Confidential - Selective Disclosure

TI Information - Selective Disclosure

TEXAS INSTRUMENTS © COPYRIGHT 2018, TEXAS INSTRUMENTS ALL RIGHTS RESERVED	CONFIDENTIALITY DATE: 11/11/2018	DRAWING NO 2519586	REV E2
ISSUE DATE: 11/11/2018	SIZE: D	SHEET: 18 OF 19	

IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Buyers") who are developing systems that incorporate TI semiconductor products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products.

TI reference designs have been created using standard laboratory conditions and engineering practices. **TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.** TI may make corrections, enhancements, improvements and other changes to its reference designs.

Buyers are authorized to use TI reference designs with the TI component(s) identified in each particular reference design and to modify the reference design in the development of their end products. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS ARE PROVIDED "AS IS". TI MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. TI DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO TI REFERENCE DESIGNS OR USE THEREOF. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY BUYERS AGAINST ANY THIRD PARTY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON A COMBINATION OF COMPONENTS PROVIDED IN A TI REFERENCE DESIGN. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF TI REFERENCE DESIGNS OR BUYER'S USE OF TI REFERENCE DESIGNS.

TI reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques for TI components are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

Reproduction of significant portions of TI information in TI data books, data sheets or reference designs is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous failures, monitor failures and their consequences, lessen the likelihood of dangerous failures and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in Buyer's safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed an agreement specifically governing such use.

Only those TI components that TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components that have **not** been so designated is solely at Buyer's risk, and Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2014, Texas Instruments Incorporated

TI Confidential - Selective Disclosure

TEXAS INSTRUMENTS		DATE	11/11/2014	REV	E2
ALL RIGHTS RESERVED		ISSUE DATE	11/11/2014	ISSUE	D
		SHOWN TO	2519586	SHOWN TO	19