System Level reference design for 30W ADAS system with all required Automotive Protections

(ACTIVE) PMP10652.2

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Key Document

- PMP10652 Test Results (PDF 2669 KB)
  10 Aug 2015 298 views

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PMP10652.2 - System Level reference design for 30W ADAS system with all required Automotive Protections - Board (Top view)

Fully assembled board (shown above) developed for testing and performance validation only, not available for sale.

Description

PMP10652 is a System optimized (CISPR 25 Class 3) 30W design for Surround View ADAS system.

The design has various protections such as Load dump through TVS (ISO pulse testing), Reverse Voltage (innovative Smart diode with very low Iq). Battery Disconnect Switch with OVP protection (PFET) and is EMI optimized to meet Conductive EMI limits of CISPR25 Class3 (overall) and Class5 upto 30MHz Range.

Input voltage range is between 4.5V to 30V with OVP at 20V and hence will operate in Cold Cranking conditions.

LM74610 is used for Battery reverse protection which utilizes a charge pump to drive an N-channel FET to provide a resistive path for the bypass current to flow. LM53603Q1 is used as front end DC/DC Buck converter which is 2.2MHz switching. Synchronous rectified Wide Vin Buck Converter which can take transient upto 42V. TPS5711-Q1 is used to provide power to the cores and it is a high current 2.2MHz switching buck converter. LM26420 is a dual 2.2MHz switching buck converter which is used for generating other required supplies.

LM3880 sequencer is used for all the power up and power down sequencing requirements.

Features

- Designed for Cold Crank and Start Stop conditions
- In compliance with the ISO pulse test / CISPR 25 Class 3 conducted emissions standard, passing both AM & FM radio band tests
- All devices Switching frequency at 2.1MHz (AM Band Avoidance)
- Reverse Protection through Smart diode
- Series Fault protection FET with OVP
- Power up and Power Down sequencing through integrated sequencer

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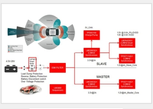
Schematic/Block Diagram

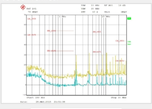
Quickly understand overall system functionality.



Download Schematic

Test Data

Get results faster with test and simulation data that's been verified.



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Design Files

Download ready-to-use system files to speed your design process. Get Viewer.

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Bill of Materials (BOM)

Find the complete list of components in this reference design.

Download BOM

Parametrics

	PMP10652.2
Vin (Min) (V)	4.8
Vin (Max) (V)	30
Vout (Nom) (V)	3.3
Iout (Max) (A)	3
Output Power (W)	9.9
Isolated/Non-isolated	Non-isolated
Input Type	DC
Topology	Buck- Synchronous

TI Devices (8)

Order samples, get tools and find more information on the TI products in this reference design.

Part Number	Name	Product Family	Sample & Buy	Design Kits & Evaluation Modules
LM26420-Q1	Dual 2.0A, High Frequency Synchronous Step-Down DC-DC Regulator	Converter (integrated Switch)	Sample & Buy	View Design Kits & Evaluation Modules
LM3880	Power Supply Sequencer	Power Management	Sample & Buy	View Design Kits & Evaluation Modules
LM53603-Q1	3.5 to 36Vin, 3 Ampere Synchronous DC-DC Converter for Automotive Applications	Converter (integrated Switch)	Sample & Buy	View Design Kits & Evaluation Modules

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CAD/CAE symbols

Part #	Package | Pins	CAD File (.bxl)	STEP Model (.stp)
LM26420-Q1	WQFN (RUM) | 16	Download	Download
LM3880	SOT (DBV) | 6	Download	Download
TLVH431A	SOT (DBZ) | 3	Download	Download
	TO-92 (LP) | 3	Download	Download
	SIP (PK) | 3	Download	-
	SOT (DBV) | 5	Download	Download
	SOT (DCK) | 6	Download	Download
TPS57114-Q1	WQFN (RTE) | 16	Download	-
TPS60150	WSON (DRV) | 6	Download	-
TPS717	SOT (DCK) | 5	Download	Download
	WSON (DRV) | 6	Download	-
	WSON (DSE) | 6	Download	Download

Texas Instruments and Accelerated Designs Inc. have collaborated together to provide TI customers with schematic symbols and PCB layout footprints for TI products.

Step 1: Download and install the Ultra Librarian software ZIP: 62MB

Step 2: Download the Symbol and Footprint .bxl file.

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Technical Documents

User guides (1)

Title	Abstract	Type	Size (KB)	Date	Views	TI Recommends
PMP10652 Test Results		PDF	2669	10 Aug 2015	298	✓

Design files (3)

Title	Abstract	Type	Size (KB)	Date	Views
PMP10652 Gerber		ZIP	279	10 Aug 2015	94
PMP10652 BOM		PDF	27	10 Aug 2015	170
PMP10652 Schematic		PDF	329	10 Aug 2015	534

Related Tools & Software

Reference Designs (6)

Name	Part Number	Tool Type
System Level reference design for 30W ADAS system with all required Automotive Protections	PMP10652.1	TI Designs
System Level reference design for 30W ADAS system with all required Automotive Protections	PMP10652.3	TI Designs
System Level reference design for 30W ADAS system with all required Automotive Protections	PMP10652.4	TI Designs
System Level reference design for 30W ADAS system with all required Automotive Protections	PMP10652.5	TI Designs
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Applications

- Camera - Front Camera
- Camera - Multi Camera System w/ Central Processing
- Camera - Rear Camera
- Radar - Front Long Range Radar
- Ultrasound - Ultrasonic Park Assist

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