18W Primary Side Regulated Flyback LED Driver for T8 Fixtures

PMP7672
CONTENTS

Contents

I. INTRODUCTION .................................................................................................................................................................... 3
II. DESCRIPTION........................................................................................................................................................................ 3
III. BLOCK DIAGRAM ............................................................................................................................................................ 3
IV. SPECIFICATIONS.............................................................................................................................................................. 3
V. TEST SETUP ........................................................................................................................................................................... 4
VI. Performance Plots................................................................................................................................................................ 4
   a. Efficiency ............................................................................................................................................................................. 5
   b. Regulation ............................................................................................................................................................................ 5
   c. Power Factor .................................................................................................................................................................... 6
   d. Total Harmonic Distortion ............................................................................................................................................... 6
VII. WAVEFORMS (Constant Load of 13 (3.3V) LEDs) ........................................................................................................ 7
   e. Drain Voltage Vin = 120VAC .............................................................................................................................................. 7
   b. Output Diode Characteristics ............................................................................................................................................... 9
   c. Input Waveforms ............................................................................................................................................................... 11
   d. Startup waveform ............................................................................................................................................................... 13
   e. Output Ripple Current ........................................................................................................................................................ 14
   f. OverVoltage/Open LED protection .................................................................................................................................. 15
   g. Short Circuit Protection ..................................................................................................................................................... 16
   h. EMI Test ............................................................................................................................................................................ 17
IX. SCHEMATIC .................................................................................................................................................................... 18
X. BOARD ASSEMBLY DRAWINGS ..................................................................................................................................... 19
XI. BILL OF MATERIALS..................................................................................................................................................... 20
XII. CONCLUSION .................................................................................................................................................................. 21
XIII. APPENDIX ........................................................................................................................................................................ 22
I. INTRODUCTION

The following document is a compilation of test results of the PMP7672, an 18W LED driver using TPS92314A in flyback configuration. The test results are taken over an input voltage range of 90VAC – 275VAC, driving a single string of 13 (3.3V) LEDs at 420mA.

II. DESCRIPTION

The PMP7672 is a reference design on the TPS92314A controller IC. The design is targeted at T8 fixtures, as a replacement to conventional tube lights. The PMP7672 has an operating efficiency of over 87%, with PFC over 95% at all conditions. THD is maintained to <18%.

III. BLOCK DIAGRAM

[Diagram showing the block diagram of the PMP7672 design]

IV. SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td>90V-275V AC</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>38V-42V DC</td>
</tr>
<tr>
<td>Output Current</td>
<td>420mA</td>
</tr>
<tr>
<td>Efficiency</td>
<td>&gt;87%</td>
</tr>
<tr>
<td>Current Regulation</td>
<td>± 9%</td>
</tr>
<tr>
<td>PF</td>
<td>&gt;0.95</td>
</tr>
<tr>
<td>THD</td>
<td>&lt;18%</td>
</tr>
<tr>
<td>SURGE &amp; EFT</td>
<td>4KV- IEC61000</td>
</tr>
<tr>
<td>EMC</td>
<td>CISPR22-ClassB-CE</td>
</tr>
</tbody>
</table>

February 26th, 2014
V. TEST SETUP

Input conditions:
Vin – 90V – 275VAC Set Input current limit to 1A

Output:
Single string of 13 (3.3V) LEDs at 420mA

Equipment Used:
1. Isolated AC Power Supply California Instruments 1251P
2. Digital CRO LeCroy WAveSurfer 44Xs
3. Multimeters- Fluke 87 V TrueRMS meter
4. Power Analyzer PM100 Voltech
5. 2W LED strings load
6. PMM7010 All-in-one EMI Receiver for CISPR 22 Class B standards
7. EM test UCS500N for Surge and EFT tests

Procedure:
1. Connect input terminals of the PMP7672 reference board to the AC power supply
2. Connect output terminals with the LED string, maintaining correct polarity
3. Set a current limit of 1A on the power supply, and gradually increase the input voltage from 0V to Turn on voltage
4. Take necessary measurements across relevant testing points

VI. Performance Plots

Tabulation –

<table>
<thead>
<tr>
<th>Vin(V)</th>
<th>PF</th>
<th>THD(%)</th>
<th>Pin(W)</th>
<th>Vout(V)</th>
<th>Iout(mA)</th>
<th>Pout(W)</th>
<th>Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.00</td>
<td>0.999</td>
<td>2.9</td>
<td>16.35</td>
<td>39.4</td>
<td>347</td>
<td>13.68</td>
<td>83.68</td>
</tr>
<tr>
<td>100.00</td>
<td>0.999</td>
<td>3.4</td>
<td>16.64</td>
<td>39.5</td>
<td>357</td>
<td>14.10</td>
<td>84.74</td>
</tr>
<tr>
<td>120.00</td>
<td>0.997</td>
<td>6.5</td>
<td>17.01</td>
<td>39.6</td>
<td>372</td>
<td>14.73</td>
<td>86.63</td>
</tr>
<tr>
<td>140.00</td>
<td>0.994</td>
<td>7.5</td>
<td>17.16</td>
<td>39.6</td>
<td>380</td>
<td>15.04</td>
<td>87.63</td>
</tr>
<tr>
<td>160.00</td>
<td>0.991</td>
<td>9.1</td>
<td>17.37</td>
<td>39.6</td>
<td>387</td>
<td>15.33</td>
<td>88.26</td>
</tr>
<tr>
<td>180.00</td>
<td>0.987</td>
<td>10.1</td>
<td>17.62</td>
<td>39.7</td>
<td>392</td>
<td>15.55</td>
<td>88.23</td>
</tr>
<tr>
<td>200.00</td>
<td>0.981</td>
<td>12.5</td>
<td>17.78</td>
<td>39.7</td>
<td>396</td>
<td>15.71</td>
<td>88.35</td>
</tr>
<tr>
<td>220.00</td>
<td>0.975</td>
<td>13.6</td>
<td>18.02</td>
<td>39.7</td>
<td>401</td>
<td>15.92</td>
<td>88.36</td>
</tr>
<tr>
<td>240.00</td>
<td>0.967</td>
<td>14.9</td>
<td>18.49</td>
<td>39.8</td>
<td>411</td>
<td>16.34</td>
<td>88.38</td>
</tr>
<tr>
<td>260.00</td>
<td>0.958</td>
<td>15.9</td>
<td>18.73</td>
<td>39.8</td>
<td>414</td>
<td>16.48</td>
<td>87.97</td>
</tr>
<tr>
<td>275.00</td>
<td>0.952</td>
<td>16.6</td>
<td>18.88</td>
<td>39.8</td>
<td>417</td>
<td>16.60</td>
<td>87.91</td>
</tr>
</tbody>
</table>
a. Efficiency

![Efficiency Graph]

b. Regulation

![Regulation Graph]
c. Power Factor

![Graph showing Power Factor vs Vin (V)]


d. Total Harmonic Distortion

![Graph showing THD vs Vin (V)]
VII. WAVEFORMS (Constant Load of 13 (3.3V) LEDs)

e. Drain Voltage $V_{in} = 120V_{AC}$

Vin – 180VAC
Vin = 220VAC

Vin = 270VAC
b. Output Diode Characteristics

Vin = 120VAC

Vin = 180VAC
Vin = 220VAC

Vin = 270VAC
c. Input Waveforms

Vin = 120VAC

Vin = 180VAC
Test Report - PMP 7672 Design

Vin = 220VAC

Vin = 270VAC
d. **Startup waveform**

Vin = 230VAC
e. Output Ripple Current

Vin = 120VAC

Vin = 220VAC
f. OverVoltage/Open LED protection

When an Open LED condition is detected, the device is not turned off. It continuously checks if the output has been brought under limits.
g. Short Circuit Protection

When a short circuit condition occurs, the controller goes into a hiccup mode and reverts back once the short condition is removed.
h. EMI Test

Input Voltage: 230VAC
This test was conducted per CISPR22 Class B standard. Quasi peak and Average values were measured for both the lines (Line and Neutral). The settings for the test are seen in the tabular column in the figure below.
IX. SCHEMATIC

Schematic for PMP7672

Input Voltage: 90Vac to 300Vac

Output: 38 to 42Vdc, 420mA
X. BOARD ASSEMBLY DRAWINGS

<table>
<thead>
<tr>
<th>SIZE</th>
<th>QTY</th>
<th>SYM</th>
<th>PLATED</th>
<th>TOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>40</td>
<td>☑</td>
<td>NO</td>
<td>+/-0.0</td>
</tr>
<tr>
<td>30</td>
<td>18</td>
<td>☑</td>
<td>NO</td>
<td>+/-0.0</td>
</tr>
<tr>
<td>50</td>
<td>4</td>
<td>☑</td>
<td>NO</td>
<td>+/-0.0</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
<td>☑</td>
<td>NO</td>
<td>+/-0.0</td>
</tr>
</tbody>
</table>

Board Dimensions: 282mm x 18mm
## XI. BILL OF MATERIALS

### PMP7672 BOM

<table>
<thead>
<tr>
<th>Qty</th>
<th>Value</th>
<th>RefDes</th>
<th>Part Number</th>
<th>Manufacturer</th>
<th>Description</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.1uF/X2</td>
<td>C1 C2</td>
<td>B32922C3104M</td>
<td>Epcos</td>
<td>CAP FILM 0.1UF 630VDC RADIAL</td>
<td>18mm x 5mm x 10.5mm</td>
</tr>
<tr>
<td>1</td>
<td>220uF/63V</td>
<td>C10</td>
<td>EEU-FC1J221</td>
<td>Panasonic</td>
<td>CAP ALUM 220UF 63V 20% RADIAL,105DegC</td>
<td>12.5mm(dia.)x 22mm (height)</td>
</tr>
<tr>
<td>1</td>
<td>330uF/63V</td>
<td>C11</td>
<td>EEU-FC1J331</td>
<td>Panasonic</td>
<td>CAP ALUM 330UF 63V 20% RADIAL,105DegC</td>
<td>12.5mm(dia.)x20mm (height)</td>
</tr>
<tr>
<td>1</td>
<td>1uF/100v</td>
<td>C12</td>
<td>Std</td>
<td>Std</td>
<td>CAP CER 1UF 100V 20% X7R 1206</td>
<td>1206</td>
</tr>
<tr>
<td>1</td>
<td>DNP</td>
<td>C13</td>
<td>BFC233820104</td>
<td>Vishay</td>
<td>CAP FILM 0.1UF 630VDC RADIAL</td>
<td>Ledged, Size&lt;12mm(L)X6mm(W)x12mm(H), Pin distance: 10mm</td>
</tr>
<tr>
<td>1</td>
<td>0.047uF/310 VAC</td>
<td>C3</td>
<td>BFC233820473</td>
<td>Vishay</td>
<td>CAP FILM 0.047UF 630VDC RADIAL</td>
<td>Ledged, Size&lt;10mm(L)X5mm(W)x10.5mm (H), Pin distance: 7.5mm</td>
</tr>
<tr>
<td>1</td>
<td>3.3nF/630v</td>
<td>C4</td>
<td>FK26X7R2J332K</td>
<td>TDK</td>
<td>Capacitor, Ceramic, 630V, X7R, +/-10%</td>
<td>Ledged, Size&lt;5.5mm(L)x3.5mm(W)x6mm(H), Pin distance: 5mm</td>
</tr>
<tr>
<td>1</td>
<td>DNP</td>
<td>C5</td>
<td>STD</td>
<td>STD</td>
<td>Capacitor, 100pF Ceramic Chip, 50V, +/-10%</td>
<td>0805</td>
</tr>
<tr>
<td>1</td>
<td>10uF/35V</td>
<td>C6</td>
<td>Std</td>
<td>Std</td>
<td>CAP ALUM 10uF 35V 20% RADIAL</td>
<td>5mm(dia.)x7mm (height). Lead spacing 2.5mm</td>
</tr>
<tr>
<td>1</td>
<td>10pF</td>
<td>C7</td>
<td>Std</td>
<td>Std</td>
<td>CAP CER 22pF 16V 10% X7R 0805</td>
<td>0805</td>
</tr>
<tr>
<td>1</td>
<td>6.8uF/16V</td>
<td>C8</td>
<td>Std</td>
<td>Std</td>
<td>CAP CER 6.8uF 16V 10% X7R 0805</td>
<td>0805</td>
</tr>
<tr>
<td>1</td>
<td>2200pF/Y1</td>
<td>C9</td>
<td>Std</td>
<td>Std</td>
<td>Y1 CAP, 2200pF, 250VAC, -25to105DegC, Lead space, 10mm, 11.5mm Dia</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DNP</td>
<td>C14</td>
<td>Std</td>
<td>Std</td>
<td>Capacitor, 0.1uF Ceramic Chip, 50V, +/-10%</td>
<td>0805</td>
</tr>
<tr>
<td>1</td>
<td>1A/600V</td>
<td>D1</td>
<td>DF06S-T</td>
<td>Diodes Inc</td>
<td>Bridge Rectifier, 600V, 1A</td>
<td>DFS-4 Pin SMD Gullwing</td>
</tr>
<tr>
<td>1</td>
<td>0.2A, 200V</td>
<td>D2</td>
<td>BAS20LT1G</td>
<td>ON Semiconductor</td>
<td>DIODE SWITCHING 200V 200MA SOT23</td>
<td>SOT-23-3</td>
</tr>
<tr>
<td>1</td>
<td>1A, 1000V</td>
<td>D3</td>
<td>US1M-E3/61T</td>
<td>Vishay</td>
<td>Diode Ultrafast Rectifier, 1A, 1000V</td>
<td>SMA</td>
</tr>
<tr>
<td>1</td>
<td>SD101CW</td>
<td>D4</td>
<td>BAT54FILM</td>
<td>ST Micro</td>
<td>Diode, Schottky, 300mA, 40V</td>
<td>SOT-23-3</td>
</tr>
<tr>
<td>1</td>
<td>3A,400V</td>
<td>D5</td>
<td>ES3G-E3/57T</td>
<td>Vishay</td>
<td>Diode, ultra fast, 3A/400V</td>
<td>SMC</td>
</tr>
<tr>
<td>1</td>
<td>DNP</td>
<td>D6</td>
<td>1N4007</td>
<td>Std</td>
<td>Diode, General Purpose, 1A, 1000V</td>
<td>DO41</td>
</tr>
<tr>
<td>1</td>
<td>5A/300Vac (T)</td>
<td>F1</td>
<td>F5464CT-ND</td>
<td>Littlefuse</td>
<td>FUSE 5A 300V, SlowBlow, Radial</td>
<td>8.50mm(L) x 4.00mm(W) x 8.00mm(H)</td>
</tr>
<tr>
<td>1</td>
<td>30mH</td>
<td>L1</td>
<td>Custom</td>
<td>Custom</td>
<td>30mH/0.5A</td>
<td>Ei-11.6</td>
</tr>
<tr>
<td>2</td>
<td>6.8mH/0.5A</td>
<td>L2-3</td>
<td>Custom</td>
<td>Custom</td>
<td>6.8mH/0.5A, size: 8mm*10mm</td>
<td>8mmx10mm</td>
</tr>
<tr>
<td>2</td>
<td>320VAC</td>
<td>MOV1-2</td>
<td>V10E300P</td>
<td>LittelFuse</td>
<td>VARISTR 300VRMS 2500A 10MM STRGT</td>
<td>10 mm</td>
</tr>
<tr>
<td>1</td>
<td>4A, 800V</td>
<td>Q1</td>
<td>SPDO4N80C3</td>
<td>ST</td>
<td>MOSFET, N-ch, 800V, 4A</td>
<td>DPAC</td>
</tr>
</tbody>
</table>
### XII. CONCLUSION

Thus the board is verified and found to be functionally working for the specifications given in section IV.

The board has passed EFT and Surge up to 4KV per IEC61000 standards and EMC for CISPR22 ClassB. Even though the quasi peak levels show close margin of 6-8 dBuV near 400-500KHZ region, the margin can be increased by further tuning the input filter.
XIII. APPENDIX

EVALUATION BOARD/KIT/MODULE (EVM) WARNINGS, RESTRICTIONS AND DISCLAIMER

For Feasibility Evaluation Only, in Laboratory/Development Environments. The EVM is not a complete product. It is intended solely for use for preliminary feasibility evaluation in laboratory / development environments by technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical / mechanical components, systems and subsystems. It should not be used as all or part of a production unit.

Your Sole Responsibility and Risk. You acknowledge, represent and agree that:

1. You have unique knowledge concerning Federal, State and local regulatory requirements (including but not limited to Food and Drug Administration regulations, if applicable) which relate to your products and which relate to your use (and/or that of your employees, affiliates, contractors or designees) of the EVM for evaluation, testing and other purposes.

2. You have full and exclusive responsibility to assure the safety and compliance of your products with all such laws and other applicable regulatory requirements, and also to assure the safety of any activities to be conducted by you and/or your employees, affiliates, contractors or designees, using the EVM. Further, you are responsible to assure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard.

3. Since the EVM is not a completed product, it may not meet all applicable regulatory and safety compliance standards (such as UL, CSA, VDE, CE, RoHS and WEEE) which may normally be associated with similar items. You assume full responsibility to determine and/or assure compliance with any such standards and related certifications as may be applicable. You will employ reasonable safeguards to ensure that your use of the EVM will not result in any property damage, injury or death, even if the EVM should fail to perform as described or expected.

Certain Instructions. Exceeding the specified EVM ratings (including but not limited to input and output voltage, current, power, and environmental ranges) may cause property damage, personal injury or death. If there are questions concerning these ratings please contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM User’s Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, some circuit components may have case temperatures greater than 60°C as long as the input and output ranges are maintained at nominal ambient operating temperature. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors which can be identified using the EVM schematic located in the EVM User’s Guide. When placing measurement probes near these devices during normal operation, please be aware that these devices may be very warm to the touch.

Agreement to Defend, Indemnify and Hold Harmless. You agree to defend, indemnify and hold TI, its licensors and their representatives harmless from and against any and all claims, damages, losses, expenses, costs and liabilities (collectively, “Claims”) arising out of or in connection with any use of the EVM that is not in accordance with the terms of this agreement. This obligation shall apply whether Claims arise under the law of tort or contract or any other legal theory, and even if the EVM fails to perform as described or expected.

Safety-Critical or Life-Critical Applications. If you intend to evaluate TI components for possible use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, such as devices which are classified as FDA Class III or similar classification, then you must specifically notify TI of such intent and enter into a separate Assurance and Indemnity Agreement.
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 using TI components, TI recommends using 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 use of any 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