

ISO5452 High-CMTI 2.5-A / 5-A Isolated IGBT, MOSFET Gate Driver with Split Outputs and Active Safety Features

1 Features

- Split Outputs providing 2.5-A Peak Source and 5-A Peak Sink Currents
- Short Propagation Delay: 76 ns (Typ), 110 ns (Max)
- 2-A Active Miller Clamp
- Output Short-Circuit Clamp
- Soft Turn-Off during Short Circuit
- Fault Alarm upon Desaturation Detection is Signaled on $\overline{\text{FLT}}$ and Reset Through $\overline{\text{RST}}$
- Input and Output Under Voltage Lock-Out (UVLO) with Ready (RDY) Pin Indication
- Active Output Pull-down and Default Low Outputs with Low Supply or Floating Inputs
- 2.25-V to 5.5-V Input Supply Voltage
- 15-V to 30-V Output Driver Supply Voltage
- CMOS Compatible Inputs
- Rejects Input Pulses and Noise Transients Shorter Than 20 ns
- 50-kV/ μs Minimum and 100-kV/ μs Typical Common-Mode Transient Immunity (CMTI) at $V_{\text{CM}} = 1500\text{ V}$
- Operating Temperature: -40°C to 125°C Ambient
- Safety and Regulatory Approvals:
 - 8000- V_{PK} V_{IOTM} and 1420- V_{PK} V_{IORM} Reinforced Isolation per DIN V VDE V 0884-10 (VDE V 0884-10):2006-12
 - 5700- V_{RMS} Isolation for 1 Minute per UL 1577
 - CSA Component Acceptance Notice 5A, IEC 60950-1 and IEC 61010-1 End Equipment Standards
 - CQC Certification per GB4943.1-2011
 - All Certifications are Planned

2 Applications

- Isolated IGBT and MOSFET Drives in
 - Industrial Motor Control Drives
 - Industrial Power Supplies
 - Solar Inverters
 - HEV and EV Power Modules
 - Induction Heating

3 Description

The ISO5452 is a 5.7-kV_{RMS}, reinforced isolated gate driver for IGBTs and MOSFETs with split outputs, OUTH and OUTL, providing 2.5-A source and 5-A sink current. The input side operates from a single 2.25-V to 5.5-V supply. The output side allows for a supply range from minimum 15-V to maximum 30-V. Two complementary CMOS inputs control the output state of the gate driver. The short propagation time of 76 ns assures accurate control of the output stage.

An internal desaturation (DESAT) fault detection recognizes when the IGBT is in an overload condition. Upon a DESAT detect, a Mute logic immediately blocks the output of the isolator and initiates a soft-turn-off procedure which disables, OUTH, and reduces the voltage at OUTL over a minimum time span of 2 μs . When OUTL reaches 2 V with respect to the most negative supply potential, $V_{\text{EE}2}$, the gate driver output is driven low to $V_{\text{EE}2}$ potential turning the IGBT immediately off.

When desaturation is active, a fault signal is sent across the isolation barrier pulling the $\overline{\text{FLT}}$ output at the input side low and blocking the isolator input. The $\overline{\text{FLT}}$ output condition is latched and can be reset through a low-active pulse at the $\overline{\text{RST}}$ input.

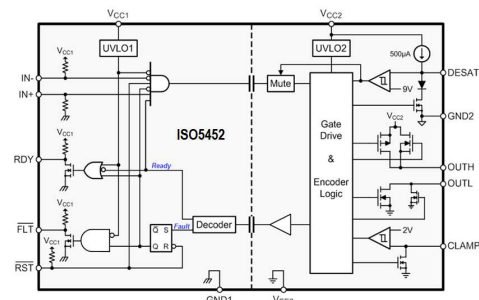
When the IGBT is turned off during normal operation with bipolar output supply, the output is hard clamp to $V_{\text{EE}2}$. If the output supply is unipolar, an active Miller clamp can be used, allowing Miller current to sink across a low impedance path preventing IGBT to be dynamically turned on during high voltage transient conditions.

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
ISO5452	SOIC (16)	10.30 mm x 7.50 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.

Functional Block Diagram



4 Revision History

DATE	REVISION	NOTES
August 2015	*	Initial release.

5 Description (continued)

The readiness for the gate driver to be operated is under the control of two undervoltage-lockout circuits monitoring the input side and output side supplies. If either side has insufficient supply the RDY output goes low, otherwise this output is high.

The ISO5452 is available in a 16-pin SOIC package. Device operation is specified over a temperature range from -40°C to 125°C ambient.

6 Device and Documentation Support

6.1 Documentation Support

6.1.1 Related Documentation

For related documentation see the following:

- *ISO5851 Evaluation Module (EVM) User's Guide*, [SLLU207](#)
- *Digital Isolator Design Guide*, [SLLA284](#)
- *Isolation Glossary* ([SLLA353](#))

6.2 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

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6.3 Trademarks

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6.4 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

6.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PRODUCT PREVIEW

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
ISO5452DW	PREVIEW	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ISO5452	
ISO5452DWR	PREVIEW	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ISO5452	

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

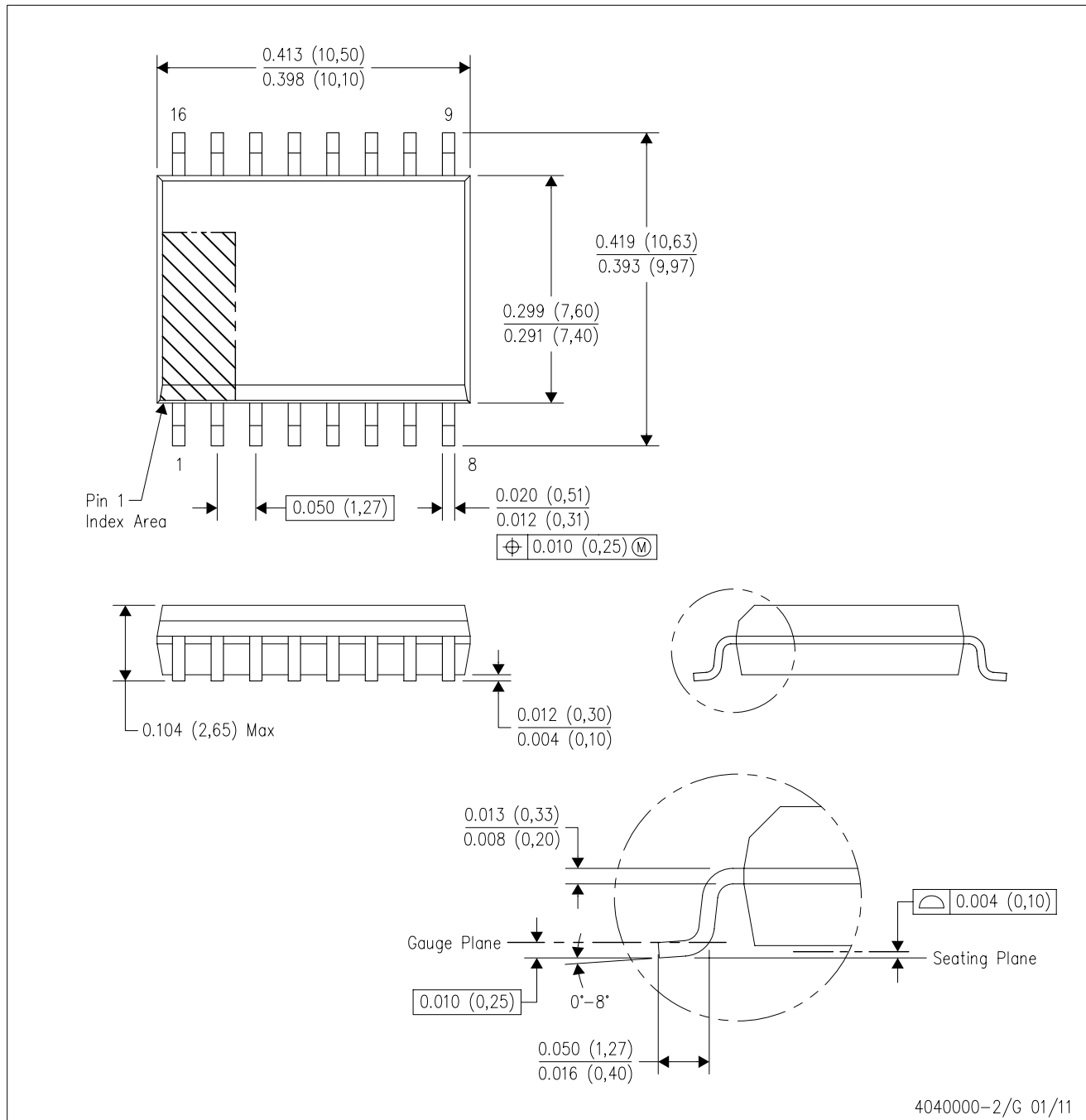
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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DW (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - Falls within JEDEC MS-013 variation AA.

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