RAJ2930004AGM Preliminary Short Datasheet

Gate Driver IC for IGBTs and SiC MOSFETs

1. Description

The RAJ2930004AGM is a gate driver IC for IGBT and SiC MOSFET gate-drive in high voltage inverter applications. Integrated 3750Vrms micro-isolators provide data transfer with high voltage isolation between the primary circuit (MCU side) and the secondary circuit (IGBT side). In addition, it boasts superior CMTI (Common Mode Transient Immunity) performance over 150 V/ns, providing reliable communication and increased noise immunity while meeting the high voltages and fast switching speeds required in inverter systems.

  This device contains Gate drive circuit, Miller clamp circuit, and Soft turn-off circuit as well as several types of protection circuits such as Overcurrent detection.

2. Features

- On-chip Micro Isolator (isolated circuit)
  - High voltage isolation: 3750Vrms, 1min
  - High CMTI (Common Mode Transient Immunity): over 150V/ns
- High output gate drive circuit
  - Gate drive output peak current (Source / Sink): 10A typ. / 10A typ.
  - On-chip active miller clamp
  - Soft turn-off function
- Various on-chip protection circuits
  - Over current detection by DESAT (Desaturation Protection): 8.9V typ.
  - On-chip under voltage lockout circuit (UVLO)
    VCC1 (5 V system): 4.1V typ.
    VCC2 (15 V system): 10V typ.
  - Fault Alarm outputs on FOB pin and the latched fault status can be reset by RSTB pin
- Operating temperature: - 40 to 125 °C (Junction temperature: 150 °C max)
- AEC-Q100 Qualified (Grade 1)

3. Applications

- Traction inverters for EV/HEV in automotive applications
- DC-DC converters for EV/HEV in automotive applications
- On-board charger for EV in automotive applications
- Inverters and converters for industrial instruments, etc.

  Note: The information contained in this document is the one that was obtained when the document was issued and may be subject to change.

Preliminary Short Datasheet Rev0.2

Contents

4. Pin Configuration

Figure 1 Pin assignment

Table 1 Pin assignment and Functions

No.	Pin Name	I/O	Functions
1	VEE	P	Negative power supply input. Connect to GND2 for Unipolar supply application.
2	DESAT	I	DESAT input
3	GND2	P	Secondary side GND. Connect to IGBT Emitter
4	OUTH	O	Gate drive output (Positive)
5	VCC2	P	Secondary power supply input (15 V typ.)
6	OUTL	O	Gate drive output (Negative)
7	CLAMP	I/O	Active Miller clamp input / output
8	VEE	P	Negative power supply input. Connect to GND2 for Unipolar supply application.
9	GND1	P	Primary side GND
10	INA	I	Non-inverted gate drive input
11	INB	I	Inverted gate drive input
12	RDY	O	Power-good output
13	FOB	O	Inverted fault output (L level output at error)
14	RSTB	I	Reset input. Apply a low pulse to reset fault (FOB) latch.
15	VCC1	P	Primary side power supply input (5 V typ.)
16	GND1	P	Primary side GND

5. Specification

Table 2 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
VCC1	VCC1 – GND1	-0.3	6	V
VCC2	VCC2 – GND2	-0.3	36	V
VEE	VEE – GND2	-17.5	0.3	V
VMAX	VCC2 – VEE	-0.3	36	V
INA, INB, RSTB	DC	GND1-0.3	VCC1+0.3	V
DESAT	Reference to GND2	GND2-0.3	VCC2+0.3	V
OUTH, OUTL, CLAMP	DC	VEE-0.3	VCC2+0.3	V
IOUTH	Peak source current	-15		A
IOUTL	Peak sink current		15	A
RDY, FOB		GND1-0.3	VCC1+0.3	V
IFOB, IRDY	FOB, and RDY pin input current		20	mA
T_J	Junction temperature range	-40	150	°C
T_{stg}	Storage temperature range	-55	150	°C
VCC1SR1	Slew rate of VCC1 for no destruction		20	V/us
VCC2SR1	Slew rate of VCC2 for no destruction		20	V/us
VEESR1	Slew rate of VEE for no destruction	-20		V/us

Table 3 Recommended Operating Conditions

Recommended operating conditions unless otherwise noted.

Symbol	Parameter	MIN	MAX	Unit
VCC1	VCC1 – GND1	4.5	5.5	V
VCC2	VCC2 – GND2	12.5	33	V
VMAX	VCC2 – VEE	12.5	33	V
INA, INB, RSTB	Reference to GND1, High level input voltage	0.7×VCC1	VCC1	V
	Reference to GND1, Low level input voltage	0	0.3×VCC1	V
T_A	Ambient Temperature	-40	125	°C
T_J	Junction temperature	-40	150	°C
VCC1SR2	Slew rate of VCC1 for no change parameters		0.5	V/us
VCC2SR2	Slew rate of VCC2 for no change parameters		0.5	V/us
VEESR2	Slew rate of VEE for no change parameters	-0.5		V/us

6 Functions

The internal block of RAJ2930004AGM is shown in Figure 2
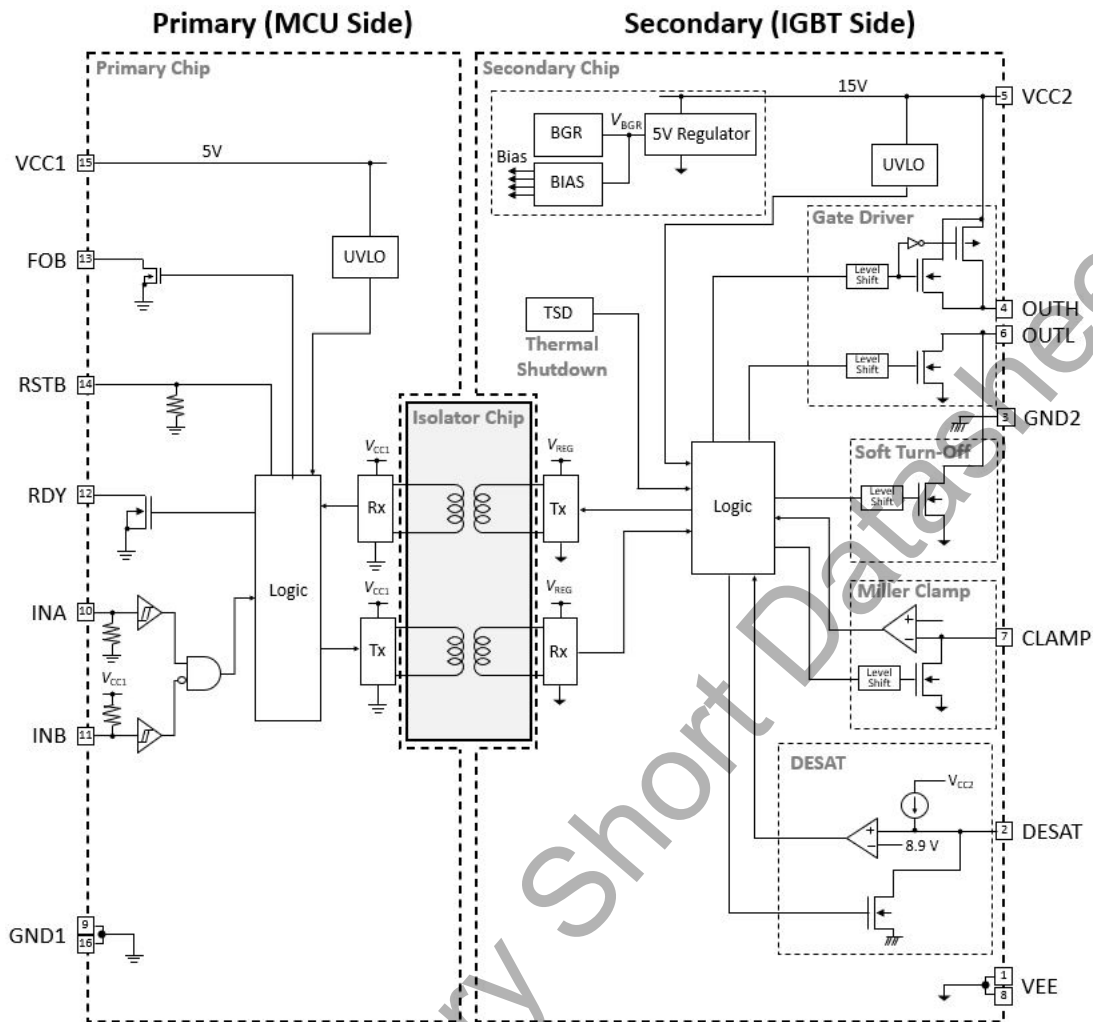
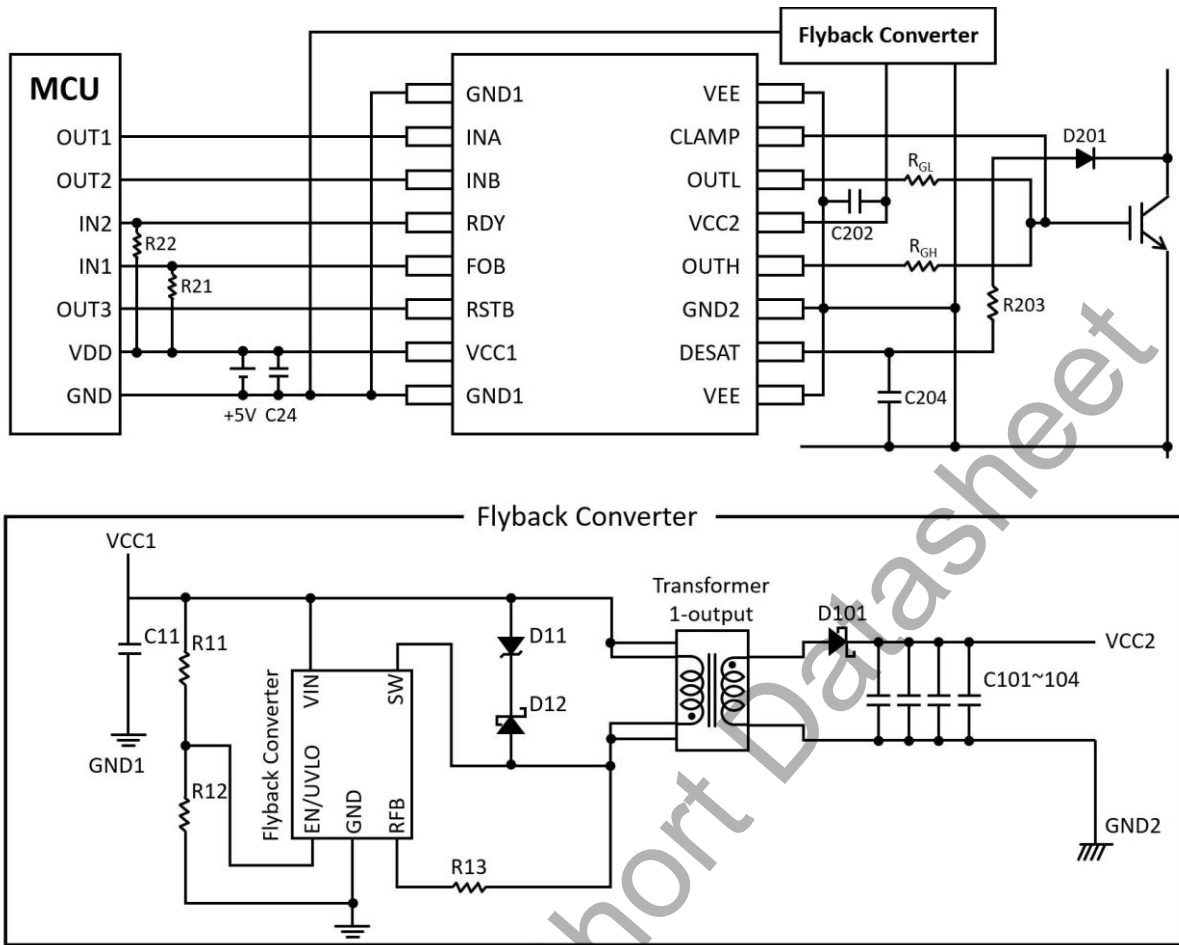**Figure 2 Internal block diagram**

7 Example of application diagram
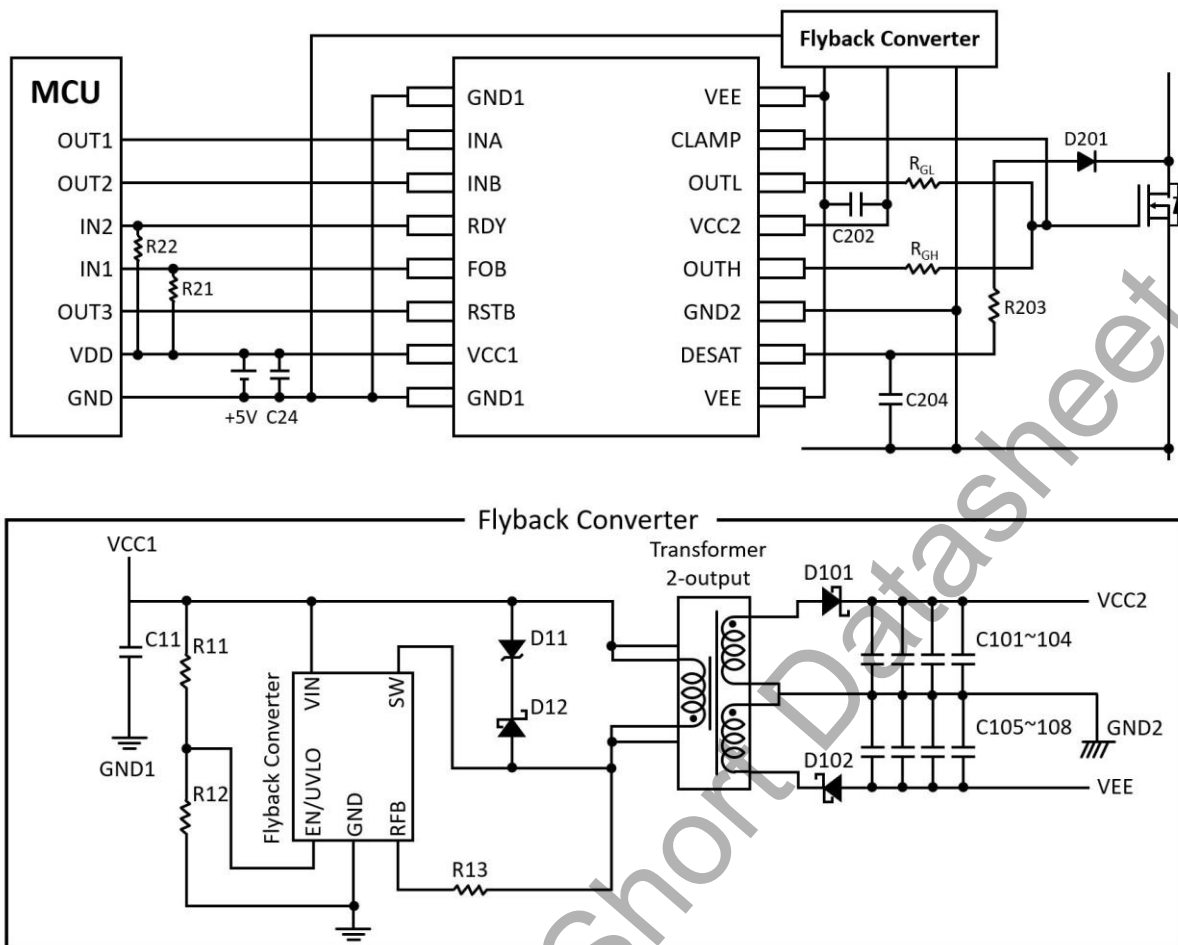
Figure 3 Simplified application diagram for IGBT

Figure 4 Simplified application diagram for SiC MOSFET

8 Package

Outline drawing **SOP (PRSP0016DR-A)**	RDK-G-001717-1
	Renesas Electronics Corporation

JEITA Package code	RENESAS code	MASS(TYP.) [g]
P-SOP16 7.5 × 10.3-1.27	PRSP0016DR-A	0.44[g]

Unit : mm

Reference	Dimension Millimeters		
Symbol	Min	Non	Max
D	10.15	—	10.41
E	7.44	—	7.59
A2	2.24	—	—
HE	10.01	—	10.63
A2	—	—	2.64
A1	0.10	—	0.29
bp	0.33	—	0.51
c	0.23	—	0.32
θ	0°	—	8°
e	—	1.27	—
y	—	—	0.10
L	0.51	—	1.02
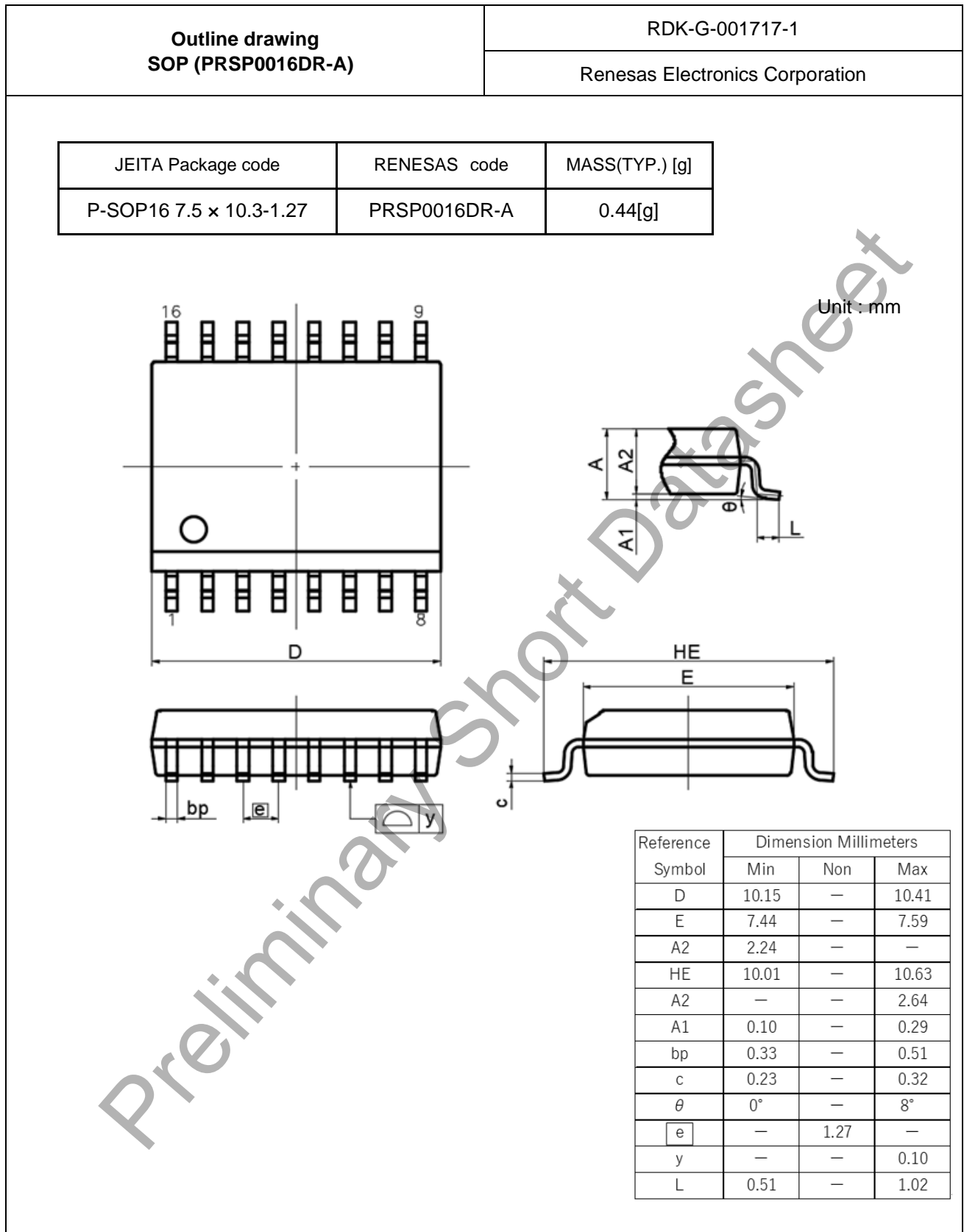
9 Revision history

Revision	Date	Page	Changes
0.1	Jan. 2023		Initial Version
0.2	Feb. 2023	4	Add Recommended operating conditions

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