Panasonic

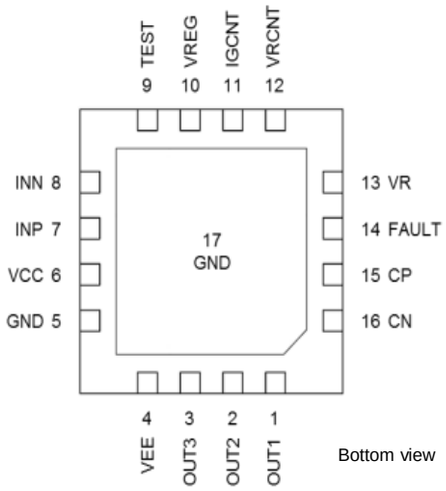
X-GaN

Single-Channel GaN-Tr High-Speed Gate Driver

AN34092B Product Overview

Overview

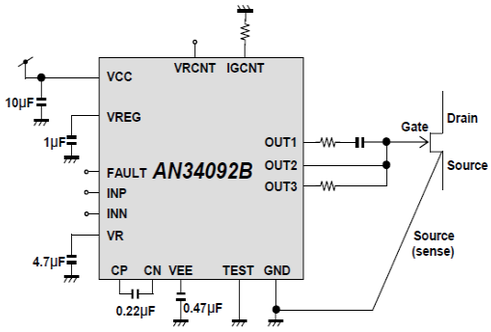
AN34092B is a single-channel high-speed gate driver specialized to driving GaN power transistor (GaN-Tr).

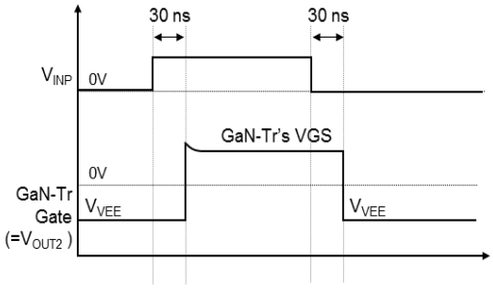


Bottom view

Features

– Able to drive GaN power transistor easily with a small number of external components
– Integrate constant source current circuitry for turn ON. Source current is adjustable with an external resistor (2.5 mA to 25 mA)
– Integrate negative voltage circuitry to avoid erroneous turn ON. Negative voltage is adjustable with an external resistor (– 5.5V to – 3V)
– Turn ON / OFF slew rate is controllable with external resistors
– Integrate active miller clamp function
– 30 ns typical propagation delay
– Gate clamping function during non supply voltage
– TTL / CMOS compatible inputs
– Support both non-inverting and inverting inputs
– Integrate FAULT function which notifies abnormal condition
– 4.75 V to 24 V Supply Range
– Protection : Under Voltage Lockout (UVLO)
VR Pin Voltage Monitoring Circuitry (VRDET)
Negative Voltage Monitoring Circuitry (VEEDET)
Thermal Shutdown (TSD)
– 16 pin Plastic Quad Flat Non-leaded Package Heat Slug Down (QFN type, size 4.0 mm x 4.0 mm, 0.65 mm pitch)





Applications

– Power supply for AC-DC (PFC, Isolated DC-DC)
– Battery charger system
– Photovoltaic power converter, Motor inverter

Absolute Maximum Ratings (Tj=25°C, unless otherwise specified)

Item	Symbol	Ratings	Unit
Supply Voltage	Vcc	28	V
Operating Free-Air Temperature	Topr	-40 to +125	°C
Operating Junction Temperature	Tj	-40 to +150	°C
Storage Temperature	Tstg	-55 to +150	°C

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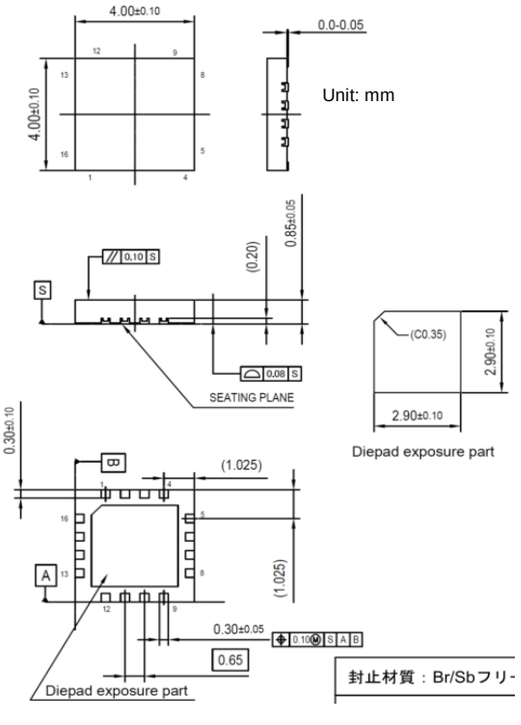
Panasonic
Industrial Devices Sales Company of America
Two Riverfront Plaza, 7th Floor Newark,NJ,07102, United States
800-344-2112
industrial@us.panasonic.com
https://na.industrial.panasonic.com

Panasonic
Semiconductor Solutions Co., Ltd
1 Kotari-yakemachi, Nagaokakyo, Kyoto 617-8520, Japan
81-75-951-8151
https://industrial.panasonic.com/ww/products/semiconductors

Electrical Characteristics (Typical values at Tj=25 °C, unless otherwise specified)

Item	Symbol	Condition	Value	Unit
Standby Current Consumption	I_{STB}	VINP=VINN=0V	1.6	mA
Active Current Consumption	I_{ATV}	VINP=0V ↔ 5V @ 50kHz, VINN=0V OUT1=1nF, OUT2=OUT3=1nF IGCNT=39kohm	5.5	mA
INP/INN Pin Low-Level Input Voltage	V_{INL}	–	< 0.9	V
INP/INN Pin High-Level Input Voltage	V_{INH}	–	> 2.7	V
VEE Output Voltage	V_{EEO}	VINP=VINN=0V, VRCNT=OPEN	- 5	V
UVLO Detect Voltage	V_{UVLODE}	VCC=5V → 0V	4.5	V
INP/INN Pin Propagation Delay	T_{DLY}	–	30	ns
Output Rise Time	T_{RISE}	OUT1=1nF, VOUT1=10% → 90%	7	ns
Output Fall Time	T_{FALL}	OUT3=1nF, VOUT1=90% → 10%	5	ns
OUT1 Pin Peak Source Current	I_{SCPKO1}	OUT1=330pF+3.3ohm VOUT1=–5V → VCC	1.0	A
OUT3 Pin Peak Sink Current	I_{SNPKO3}	OUT3=470pF+1ohm VOUT3=4V → –5V	1.3	A
Thermal Shutdown Threshold	T_{TSDTH}	–	150	°C

Package Outline



Pin Functions

No.	Name	I/O	Description
1	OUT1	O	Quick Gate Charge and Speed-up Capacitor Discharging Output
2	OUT2	O	Sourcing Gate Current and Active Miller Clamp Output
3	OUT3	O	Gate Pull-down Output
4	VEE	O	Negative Voltage Output
5	GND	-	Ground
6	VCC	I	Main Supply Input
7	INP	I	Gate Drive Logic Input (non-inverting input)
8	INN	I	Gate Drive Logic Input (inverting input)
9	TEST	I	Test Pin
10	VREG	O	LDO Regulator Output
11	IGCNT	I	OUT2 Sourcing Current Control Pin
12	VRCNT	I	VR Output Voltage Control Pin
13	VR	O	LDO Regulator Output
14	FAULT	O	FAULT Indicator Pin
15	CP	O	Charge Pump Capacitor Connection Pin
16	CN	O	Charge Pump Capacitor Connection Pin
17	GND	-	Ground for Heat Radiation