

DUAL SIC & IGBT DRIVER HIGH NOISE IMMUNITY DIFFERENTIAL INPUT SIGNAL ($\pm 15A$)



DUAL SIC DIFFERENTIAL INPUT DRIVER ($\pm 15A$)

- Optimized for use with 34 & 64 Half- Bridge Power Modules
- High-Frequency, Ultra-Fast Switching Operation
- Onboard 2 W Isolated Power Supplies
- Dead band settable
- Primary OVLO and Reverse Polarity Protection
- Differential Inputs for Increased Noise Immunity
- Increased over current trip level versatility
- Low Power dual channel driver 2X1 Watt Output Power
- Up to 2100V DC BUS
- Active shut down
- 4A Internal Active Miller clamp function
- 400-mA soft turn-off when fault happens
- 5.7 KV rms isolation
- Switching frequency up to 100 KHz
- Less than 130 ns propagation delay time
- Primary/Sec. Supply under voltage lockout
- Vce monitoring for short circuit protection
- 200 ns response time fast DESET protection
- Isolated analog sensor with PWM output for -
 1. Temperature sensing with NTC, PTC or thermal diode
 2. DC Bus bar voltage sensing

ADVANTAGE

- On board isolated DC-DC converter - No need of separate SMPS.
- Interface for 3.3V...5 V logic level - Direct compatible with any Controller.
- Common fault feedback signal to interface with controller - Avoid Extra component.
- Field configurable blocking time - Flexibility in your hand, use any make SIC.
- User Selectable Rg-on & off

APPLICATIONS

- Drives
- EV Charger/Battery Charger
- Converter - Inverter
- UPS
- Solar Inverter
- Medical X-Ray

FEATURES

GATE DRIVER ELECTRICAL CHARACTERIZATION (T_{VJ} = 25 °C unless otherwise specified)

Parameter	Symbol	Min.	Typ	Max.	Unit	Test Conditions
Supply Voltage	VDC	14.25	15	15.75	V	
Secondary Under Voltage Lockout	VUVLO		13.5			
Secondary UVLO Hysteresis	VHYS		0.06			
Over Voltage Clamping	VOVLO	18	20	22		
High Level Logic Input Voltage	VIH	3.5		5.5		Single-Ended Inputs
Low Level Logic Input Voltage	VIL	0		1.5		
Differential Input Common Mode Range	VIDCM		±2.5	±7		Differential Inputs
Positive-going input threshold voltage, differential input	VIT+			0.2	V	VID=VPos-Line-VNeg-Line
Negative-going input threshold voltage, differential input	VIT-	-0.2				
Differential Output Magnitude	VOD	2	3.7		V	RL=100Ω
High level Output Voltage	VGATE,HIGH		+15			
Low level Output Voltage	VGATE,LOW		-5			
Working Isolation Voltage	VIOWM		2100			VRMS
Isolation Capacitance	VISO		4.9		pF	Per Channel
Common Mode Transient Immunity	CMTI	100			kV/μs	VCM=1500V
Output Resistance ¹	RG(IC)-ON		0.48	0.98	Ω	Gate Driver Buffer Tested at 1A
	RG(IC)-OFF		0.47	0.81		
External Turn-On Resistance ²	RG(EXT)-ON		1			ExternalSMDResistor2512(6432Metric)
External Turn-Off Resistance ²	RG(EXT)-OFF		1			
Output Rise Time	tON		223		ns	RG(EXT)=1Ω,CLOAD=47nF From10%to90%
Output Fall Time	tOFF		208			
Propagation Delay(Turn-Off)	tPHL		120			RG(EXT)=1Ω,CLOAD=0nF From50%to50%
Propagation Delay(Turn-On)	tPHL		125			
Over-current Blanking Time	tBlank		600			RG(EXT)=1Ω,CLOAD=47nF
Over-current Propagation Delay to FAULT Signal Low	tPD-FAULT		1.3		μs	Does Not Include Blanking
Soft-Shutdown Time	tSS		1.3			RG(EXT)=1Ω,CLOAD=47nF
Soft-Shutdown Resistance ³	RSS		5		Ω	Tested at 25mA
Miller Clamp Resistance	RMC		1.1	2.75		Tested at 100mA

Miller Clamp Voltage Threshold	VMC	1.75	2	2.25	V	Referenced to Source
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- 1 Output resistance of gate driver IC.
- 2 Additional output resistance is added with SMD resistors .Separate resistors to turn-on and turn-off allowing.
- 3 Soft-Shutdown network will safely turn off the gate in the event an over current is detected

INPUT CONNECTOR INFORMATION

Pin Number	Parameter	Description
1	V _{DC}	Power supply input pin(+15V Nominal Input)
2	Common	Common
3	HS_P_PWM	Positive line of 5V differential high-side PWM signals pair. Terminated into 120Ω
4	HS_N_PWM	Negative line of 5V differential high-side PWM signal pair. Terminated into 120Ω
5	LS_P_PWM	Positive line of 5V differential low-side PWM signals pair. Terminated into 120Ω
6	LS_N_PWM	Negative line of 5V differential low-side PWM signal pair. Terminated into 120Ω
7	FAULT-P(*)	Positive line of 5V differential fault condition signal pair. Drive strength 20mA. A low state on FAULT indicates when a desaturation & power supply fault has occurred. The presence of a fault precludes the gate drive output from going high.
8	FAULT-N(*)	Negative line of 5V differential fault condition signal pair. Drive strength 20mA.
9	RTD_P	Positive line of 5V differential fault condition signal pair. Drive strength 20mA
10	RTD_N	Negative line of 5V differential fault condition signal pair .Drive strength20mA.
11	NC	Unused, do not connect
12	Common	Common
13	PWM-EN	Pull down to disable PWM input logic. Pull up or leave floating to enable. Gate driver output will be held low through turn-off gate resistor if power supplies are enabled.
14	Common	Common
15	Reset	When a fault exists, bring this pin high 5V to clear the fault.
16	Common	Common

* Inputs 3-8 are differential pair

LOGICAL INPUTS & OUTPUTS

<ul style="list-style-type: none"> Interface Logic level : 3.3 to 5.0 V 	<ul style="list-style-type: none"> 3.3 TO 5.0 V
<ul style="list-style-type: none"> Fault output for Deset and Power supply failure 	<ul style="list-style-type: none"> Active Low (0V) for Fault and Normal for Active High (5v)
<ul style="list-style-type: none"> External Reset 	<ul style="list-style-type: none"> Reset by active high (5V) Before use external reset please remove R48 & 49 mention in driver at bottom side. By default auto reset available
<ul style="list-style-type: none"> Enable 	<ul style="list-style-type: none"> Active high (5V) when normal else active low Enable and both PWM disable
<ul style="list-style-type: none"> RTD_Output (Isolated temperature Reading of device) 	<ul style="list-style-type: none"> 0.6 to 1.6V (25° to 135°C)

SHORT CIRCUIT PROTECTION

VCE MONITORING THRESHOLD	9.2 V (Internally fix)
AVAILABLE RESPONSE TIME	1 µSec (User selectable)
MINIMUM RESPONSE TIME	1.0 µSec
MINIMUM BLOCKING TIME	1.0 µSec

POWER SUPPLY

POWER SUPPLY & MONITORING	MIN.	TYPE	MAX.
SUPPLY VOLTAGE VCC TO GND(V)	14.25	15	16.5
SUPPLY CURRENT VCC (WITH LOAD)	100mA		

TIMING CHARACTERISTIC

TURN ON DELAY-T	185 ns
TURN OFF DELAY-T	185 ns
OUTPUT RISE TIME T	35 ns MAX
OUTPUT FALL TIME T	35 ns MAX
TRANSMISSION DELAY OF FAULT	330 ns

PROTECTION AVAILABLE ON DRIVER MODE

- Primary/Secondary Under voltage monitoring.
- Power supply short circuit & reverse polarity protection.
- Vce monitoring for circuit protection
- Schmitt trigger at the Input stage, highly susceptible to noise
- Interlocking when both pulse high
- Soft Shut down for Over Voltage Protection

OUTPUT VOLTAGE / CURRENT / POWER

TURN ON VOLTAGE , V	14.5 - 15.5V, any load condition
TURN OFF VOLTAGE , V	-4 to – 5.5V, No load
GATE PEAK CURRENT I _{out}	+15 A source -15 A sink
INTERNAL GATE RESISTANCE	0.0Ω
EXTERNAL GATE RESISTANCE	1.5 Ω-10 Ω
SWITCHING FREQUENCY , F	100Khz
OUTPUT POWER	2.4 W @105°C
GATE AVERAGE CURRENT I _{avg}	100ma

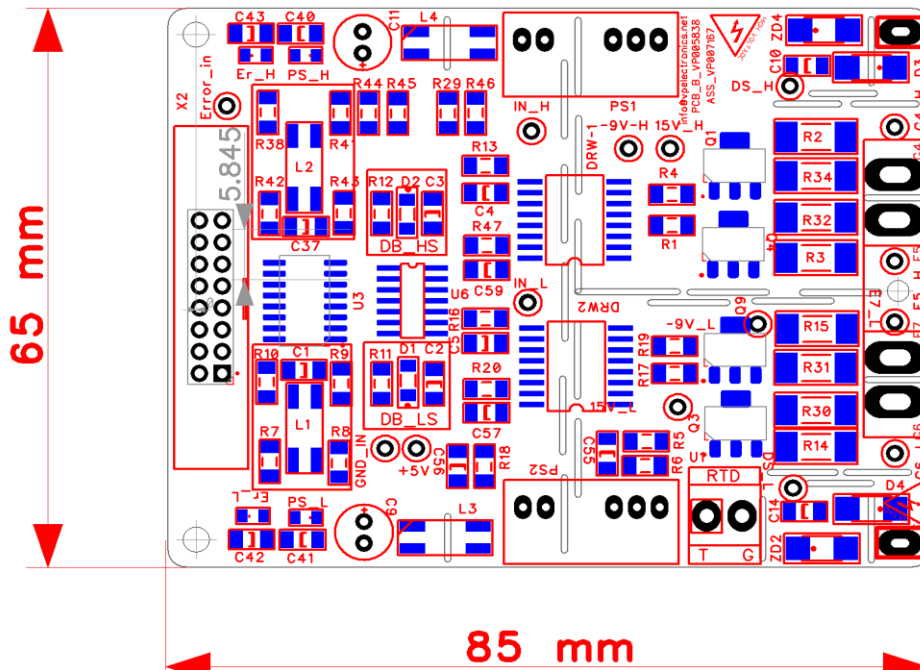
ELECTRICAL ISOLATION

Test Voltage (50HZ/60SEC)

Primary to Secondary side	5.7 KV
Secondary to Secondary side	5.7 KV

MECHANICAL DIMENSION (OPTION 2)

PCB	85 X 65 mm
Mounting Hole	53.5 X 28.5 X 2 mm
Panel Mounted	Direct SIC module mounting
Enclosure	Open Frame
Weight	0.3 Kg
Layer	4 Layer



ENVIRONMENTAL TEMPERATURE

Working temperature	-40 to 105 °C
Storage temperature	-40 to 90 °C

DRIVING CAPABILITY

All usual SIC-MOSFET up to 400A /1700V.

Driving power depends on switching frequency so in case of any doubt during selection process please contact us.

INTERFACING WITH CONTROL UNIT

1. ERROR: High to Low (FLT)

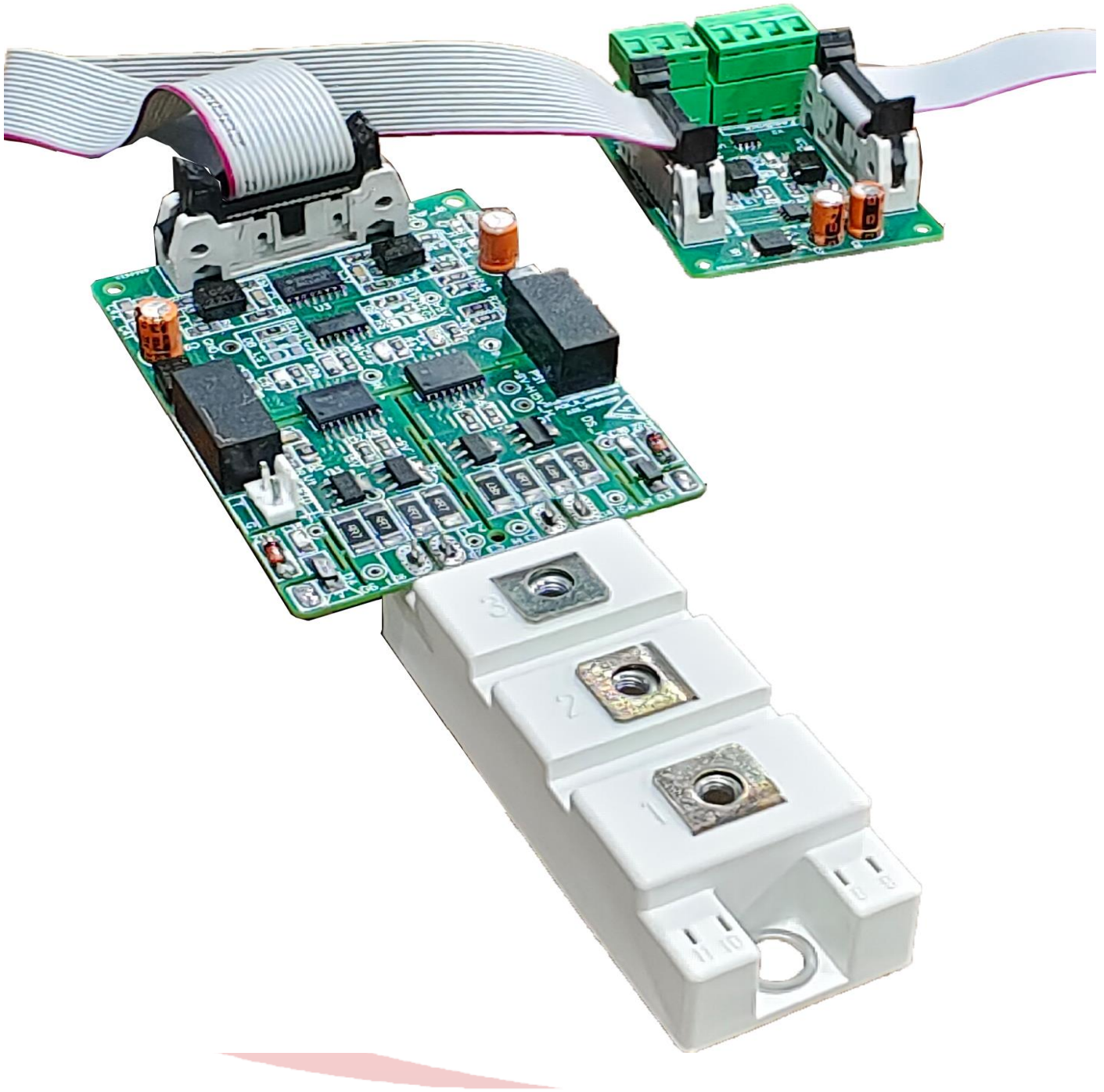
2. Power supply monitoring High to Low. (Rdy)

LED INDICATION

Power ON: Green (Normally OFF, ON during Power supply fault)

ERROR: RED (ON during Under Voltage / DESAT/ IGBT Fault)

Dead Band Tuning	
C2 & C3	DEAD BAND TIME (uSec)
47PF	1
100PF	3
220PF	6
330PF	7



SIC DRIVE WITH HIGH NOISE IMMUNITY WITH DIFFRENTIAL INPUT DRIVER ($\pm 15A$)

SAFETY NOTICE!

ATTENTION PLEASE! THIS DEVICE IS ESD SENSITIVE AND NEEDS TO BE HANDLED WITH CARE. HIGH VOLTAGE CONDITION MAY OCCUR DURING OPERATION OF THE DEVICE, AND HENCE USER IS SOLELY RESPONSIBLE OF EQUIPMENT AND PERSONNEL SAFETY. VP ELECTRONICS SHALL NOT BE HOLD LIABLE FOR ANY DAMAGE TO PERSONNEL AND/OR PROPERTIES AS A RESULT OF USING THIS DEVICE. USER MUST TAKE ADEQUATE STEPS TO ENSURE ELECTRICAL AND MECHANICAL SAFETY OF THE DEVICE IN USE.

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For Further information or purchasing, please go to our web site:

Whatsapp : +91-8851410806

Email :- sales@vpelectronics.net

www.vpelectronics.net

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