



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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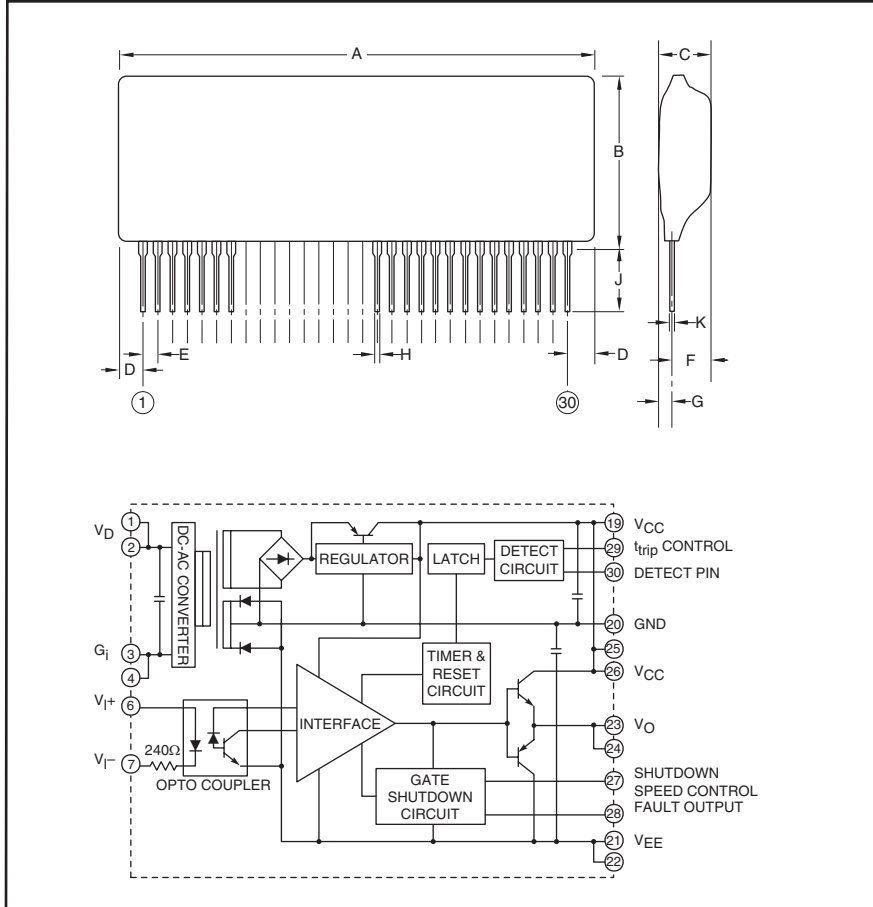
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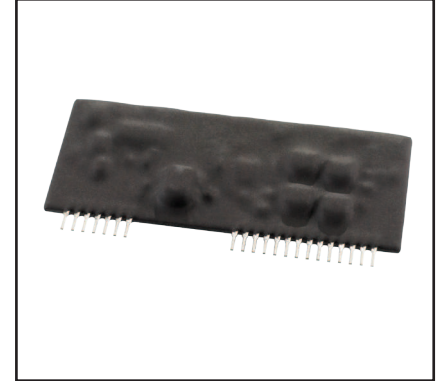


### Hybrid IC IGBT Gate Driver + DC/DC Converter



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	3.46 Max.	88.0 Max.
B	1.65 Max.	42.0 Max.
C	0.67 Max.	17.0 Max.
D	0.31 Max.	8.0 Max.
E	0.1	2.54
F	0.45 Max.	11.5 Max.
G	0.24 Max.	6.0 Max.
H	0.03±0.004	0.75±0.1
J	0.14±0.04	3.5±1.0
K	0.028 Max.	0.7 Max.



#### Description:

VLA539-01R is a hybrid integrated circuit designed for driving IGBT modules. This device is a fully isolated gate drive circuit consisting of an optically isolated gate drive amplifier and an isolated DC-to-DC converter. The gate driver provides an over-current protection function based on desaturation detection.

#### Features:

- Built-in Isolated DC-DC Converter for Gate Drive
- SIP Outline Allows More Space on Mounting Area
- Built-in Short Circuit Protection (With a Pin for Fault Output)
- Variable Fall Time on Short-Circuit Protection
- Electrical Isolation Voltage Between Input and Output (4000 V<sub>rms</sub> for 1 Minute)
- CMOS, TTL Compatible Input

#### Application:

To Drive IGBT modules for general industrial use apparatus.

#### Recommended IGBT Modules:

V<sub>CES</sub> = 600V Series Up to 600A  
V<sub>CES</sub> = 1200V Series Up to 3600A  
V<sub>CES</sub> = 1700V Series Up to 3600A

**VLA539-01R**  
**Hybrid IC Gate Driver +**  
**DC/DC converter**

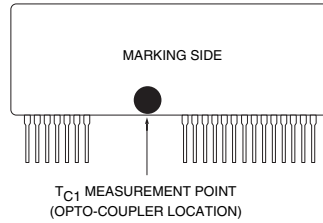
**Absolute Maximum Ratings,  $T_a = 25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	VLA539-01R	Units
Supply Voltage, DC	$V_D$	-1 ~ 16.5	Volts
Input Signal Voltage (Applied between Pin 6-7, 50% Duty Cycle, Pulse Width 1ms)	$V_i$	-1 ~ 7	Volts
Output Current (Pulse Width 3 $\mu$ s)	$I_{OHP}$	-24	Amperes
	$I_{OLP}$	24	Amperes
Isolation Voltage (Sine Wave Voltage 60HZ, for 1 Minute, R.H. <60%)	$V_{ISO}$	4000	$V_{rms}$
Case Temperature1 (Surface Temperature Opto-coupler Location)***	$T_{C1}$	85	$^\circ\text{C}$
Case Temperature2 (Surface Temperature Except Opto-coupler Location)	$T_{C2}$	100	$^\circ\text{C}$
Operating Temperature (No Condensation Allowable)	$T_{opr}$	-20 to 60	$^\circ\text{C}$
Storage Temperature (No Condensation Allowable)	$T_{stg}$	-25 to 100*	$^\circ\text{C}$
Fault Output Current (Applied Pin 28)	$I_{FO}$	20	mA
Input Voltage to Pin 30 (Applied Pin 30)	$V_{R30}$	60	Volts
Gate Drive Current (Average)	$I_{drive}$	210**	mA

\*Differs from temperature cycle condition.

\*\*Refer to  $I_{drive}$  VS.  $T_a$  CHARACTERISTICS (TYPICAL) graph. (Needs Derating)

\*\*\* $T_{C1}$  Measurement Point (opto-coupler location)



**VLA539-01R**  
**Hybrid IC Gate Driver +**  
**DC/DC converter**

**Electrical and Mechanical Characteristics,**

**T<sub>a</sub> = 25°C unless otherwise specified, V<sub>D</sub> = 15V, R<sub>G</sub> = 1Ω, CL = 1.6μF, f = 3kHz**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply Voltage	V <sub>D</sub>	Recommended Range	14.2	15	15.8	Volts
Pull-up Voltage on Input Side	V <sub>IN</sub>	Recommended Range	4.75	5	5.25	Volts
Input Signal Current	I <sub>IH</sub>	Recommended Range	10	12	16	mA
Switching Frequency	f	Recommended Range	—	—	10	kHz
Gate Resistance	R <sub>G</sub>	Recommended Range	0.33	—	—	Ω
Input Signal Current	I <sub>IH</sub>	V <sub>IN</sub> = 5V, HCMOS Drive	—	12	—	mA
Gate Positive Supply Voltage	V <sub>CC</sub>	—	15.2	16.5	17.5	Volts
Gate Negative Supply Voltage	V <sub>EE</sub>	—	-6	-8	-11.5	Volts
Gate Supply Efficiency	E <sub>ta</sub>	Load Current = 210mA E <sub>ta</sub> = (V <sub>CC</sub> +  V <sub>EE</sub>  ) x 0.21 / (15 x I <sub>D</sub> ) x 100	60	75	—	%
"H" Output Voltage	V <sub>OH</sub>	10kΩ Connected Between Pin 23-20	14	15.3	16.5	Volts
"L" Output Voltage	V <sub>OL</sub>	10kΩ Connected Between Pin 23-20	-5.5	-7	-11	Volts
"L-H" Propagation Time	t <sub>PLH</sub>	I <sub>IH</sub> = 12mA	0.5	0.9	1.5	μs
"L-H" Rise Time	t <sub>r</sub>	I <sub>IH</sub> = 12mA	—	0.6	1.2	μs
"H-L" Propagation Time	t <sub>PHL</sub>	I <sub>IH</sub> = 12mA	0.5	1.0	1.5	μs
"H-L" Fall Time	t <sub>f</sub>	I <sub>IH</sub> = 12mA	—	0.3	1.2	μs
Timer	t <sub>timer</sub>	Between Start and Cancel (Under Input Sign "L")	1	—	2	ms
Fault Output Current	I <sub>FO</sub>	Applied Pin 28, R = 4.7kΩ	—	5	—	mA
Controlled Time Detect Short-Circuit 1	t <sub>trip1</sub>	Pin 30 : 15V and More, Pin 29 : Open	—	3.5	—	μs
Controlled Time Detect Short-Circuit 2*	t <sub>trip2</sub>	Pin 30 : 15V and More, Pin 29-21, 22 : 10pF (Connective Capacitance)	—	3.9	—	μs
SC Detect Voltage	V <sub>SC</sub>	Collector Voltage of IGBT	15	—	—	Volts

\*Length of wiring from C<sub>trip</sub> to Pins 21, 22, and 29 must be less than 5cm.