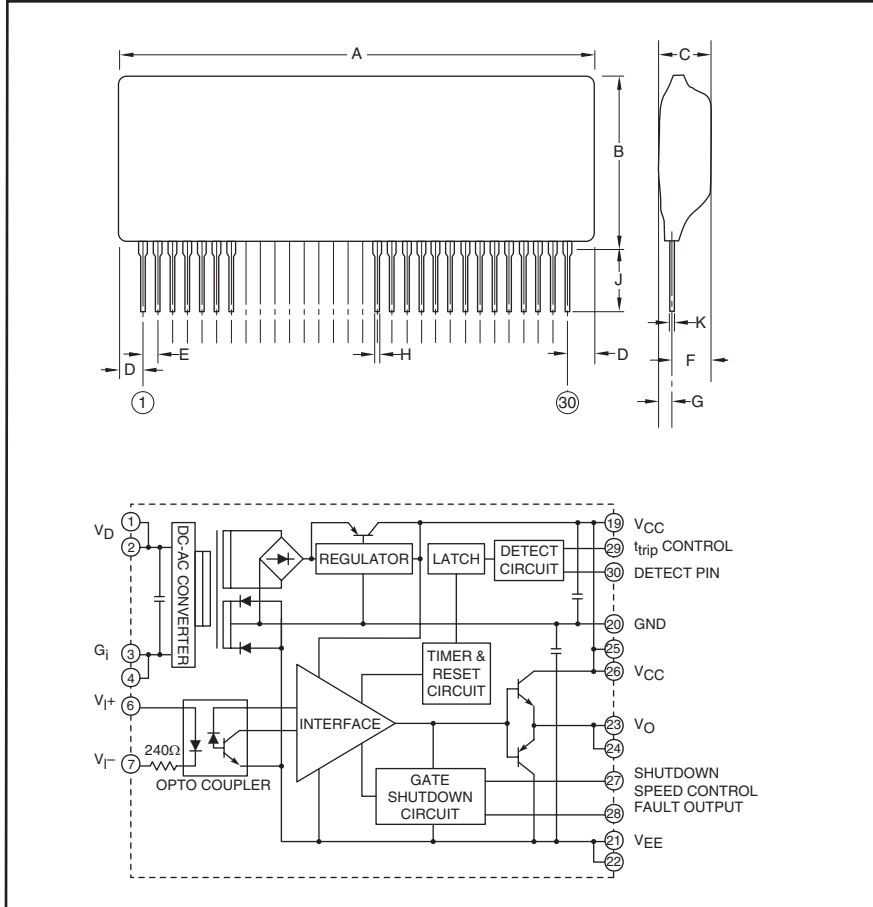
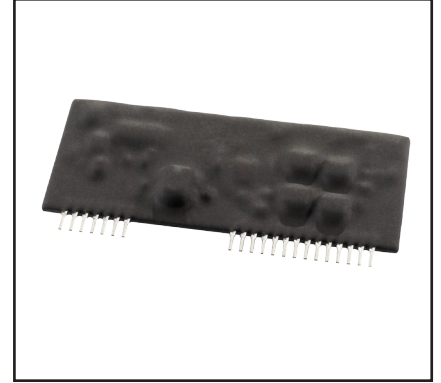


Hybrid IC IGBT Gate Driver + DC/DC Converter



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_{rms} for 1 Minute)
- ☐ CMOS, TTL Compatible Input

Application:

To Drive IGBT modules for general industrial use apparatus.

Recommended IGBT Modules:

V_{CES} = 600V Series Up to 600A
V_{CES} = 1200V Series Up to 3600A
V_{CES} = 1700V Series Up to 3600A

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

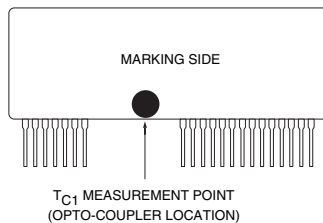
Absolute Maximum Ratings, $T_a = 25^\circ\text{C}$ unless otherwise specified

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 μ 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_a = 25°C unless otherwise specified, V_D = 15V, R_G = 1Ω, CL = 1.6μF, f = 3kHz

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

*Length of wiring from C_{trip} to Pins 21, 22, and 29 must be less than 5cm.