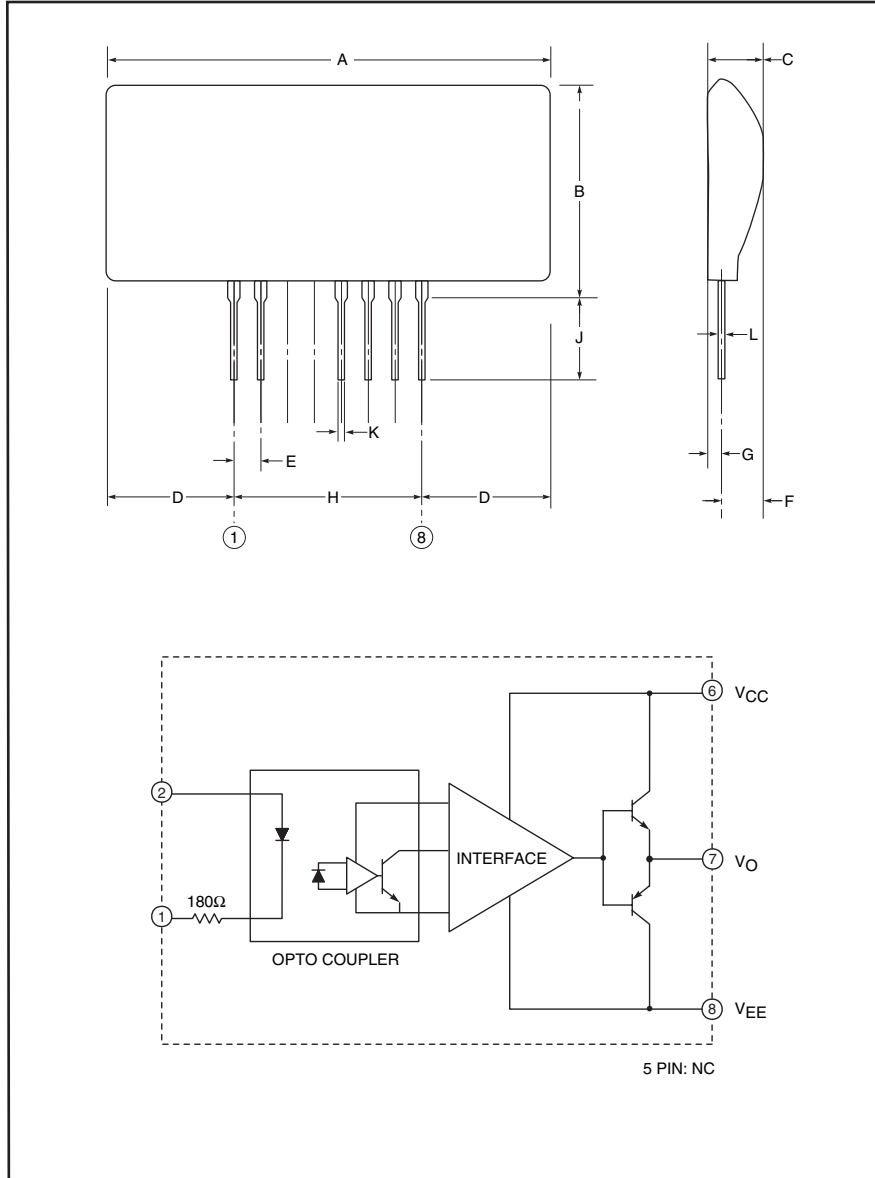
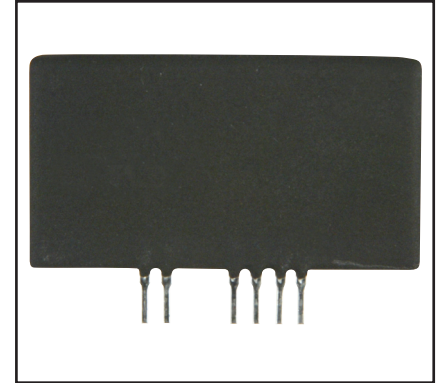


Hybrid IC IGBT Gate Driver



Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|------------|-------------|
| A | 1.85 Max. | 47.0 Max. |
| B | 1.063 Max. | 27.0 Max. |
| C | 0.28 Max. | 7.0 Max. |
| D | 0.59 Max. | 15.0 Max. |
| E | 0.10 | 2.54 |
| F | 0.216 Max. | 5.5 Max. |
| G | 0.08 Max. | 2.0 Max. |
| H | 0.70 | 17.78 |
| J | 0.18±0.06 | 4.5±1.5 |
| K | 0.03 | 0.75 |
| L | 0.02 | 0.5 |



Description:

VLA513-01 is a hybrid integrated circuit designed for driving IGBT modules. This device operates as an isolation amplifier for these modules and provides the required electrical isolation between the input and output with an opto-coupler.

Features:

- Propagation Delay time: 0.2 μ s (Typical)
- Output is ± 5 A maximum
- Two Supply Drive (VCC: 15 Volts, VEE: -10 Volts)
- SIP Outline Allows More Space on Mounting Area
- Electrical Isolation Voltage Between Input and Output (2500 V_{rms} for 1 Minute)
- TTL Compatible Input

Application:

To drive IGBT modules for welding, induction heating, or inverters.

Recommended IGBT Modules:

NFH Series IGBTs –
V_{CES} = 600V & 1200V up to 200A class (f: up to 60kHz),
400A class (f: up to 30kHz)

NF Series IGBTs –
V_{CES} = 600V up to 600A
V_{CES} = 1200V up to 400A

VLA513-01
Hybrid IC IGBT Gate Driver

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

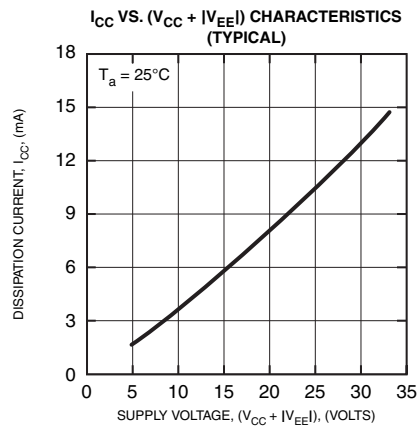
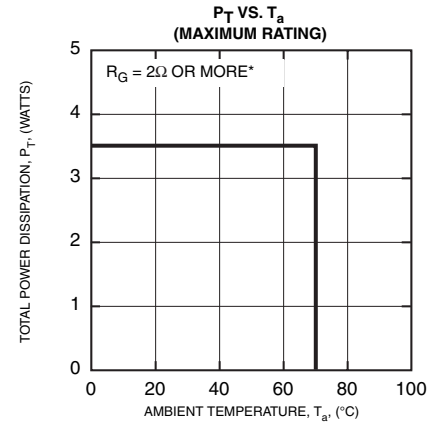
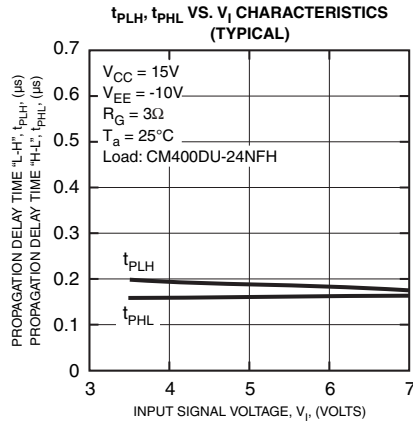
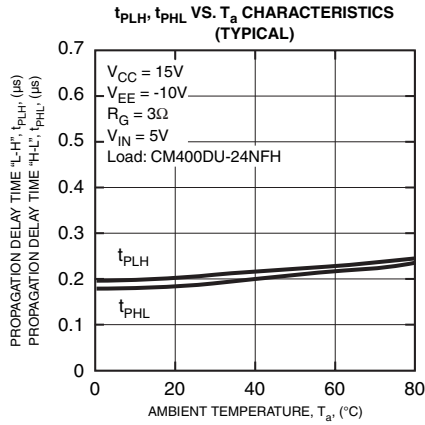
| Characteristics | Symbol | VLA513-01 | Units |
|--|-----------|-------------|------------------|
| Supply Voltage, DC | V_{CC} | 18 | Volts |
| | V_{EE} | -12 | Volts |
| Input Signal Voltage (Applied between Pin 1 - 2, 50% Duty Cycle, Pulse Width 1ms) | V_I | -1 ~ 7 | Volts |
| Output Voltage (When the Output Voltage is "H") | V_O | V_{CC} | Volts |
| Output Current (Pulse Width 2 μ s, $f \leq 20\text{kHz}$) | I_{OHP} | -5 | Amperes |
| | I_{OLP} | 5 | Amperes |
| Isolation Voltage (Sine Wave Voltage 60HZ, for 1 Minute) | V_{ISO} | 2500 | V_{rms} |
| Case Temperature ¹ (Surface Temperature Opto-coupler Location) ^{***} | T_{C1} | 85 | $^\circ\text{C}$ |
| Operating Temperature (No Condensation Allowable) | T_{opr} | -20 to 70 | $^\circ\text{C}$ |
| Storage Temperature (No Condensation Allowable) | T_{stg} | -25 to 100* | $^\circ\text{C}$ |

*Differs from temperature cycle condition.

Electrical and Mechanical Characteristics, $T_a = 25^\circ\text{C}$ unless otherwise specified, $V_{CC} = 15\text{V}$, $V_{EE} = -10\text{V}$

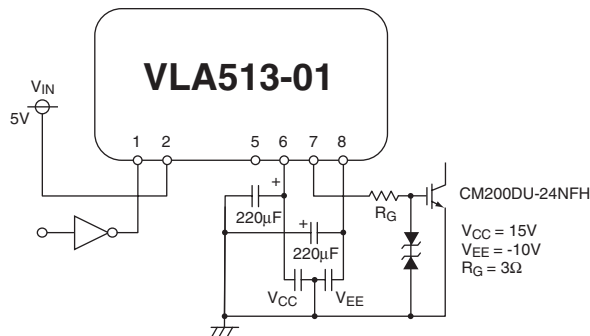
| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|-------------------------------|-----------|------------------------|------|------|------|---------------|
| Supply Voltage | V_{CC} | Recommended Range | 14 | 15 | — | Volts |
| | V_{EE} | Recommended Range | -5 | -8 | -12 | Volts |
| Pull-up Voltage on Input Side | V_{IN} | Recommended Range | 4.75 | 5 | 5.25 | Volts |
| "H" Input Current | I_{IH} | Recommended Range | 9.5 | 10.0 | 14.0 | mA |
| Switching Frequency | f | Recommended Range | — | — | 60 | kHz |
| Gate Resistance | R_G | Recommended Range | 2 | — | — | Ω |
| "H" Input Current | I_{IH} | $V_{IN} = 5\text{V}$ | — | 10 | — | mA |
| "H" Output Voltage | V_{OH} | — | 13 | 14 | — | Volts |
| "L" Output Voltage | V_{OL} | — | -8 | -9 | — | Volts |
| "L-H" Propagation Time | t_{PLH} | $I_{IH} = 16\text{mA}$ | 0.1 | 0.2 | 0.5 | μs |
| "L-H" Rise Time | t_r | $I_{IH} = 16\text{mA}$ | — | 0.3 | 1 | μs |
| "H-L" Propagation Time | t_{PHL} | $I_{IH} = 16\text{mA}$ | 0.05 | 0.2 | 0.5 | μs |
| "H-L" Fall Time | t_f | $I_{IH} = 16\text{mA}$ | — | 0.3 | 1 | μs |

VLA513-01
Hybrid IC IGBT Gate Driver



* The following numerical expression must be satisfied
 $PT > (V_{CC} + |V_{EE}|) * \{(Q_1 + |Q_2|) * f + I_{CC}\}$
 Q_1 : Gate Charge on plus bias
 Q_2 : Gate Charge on minus bias
 f : Switching frequency
 I_{CC} : Constant dissipation current of driver
 Refer to " I_{CC} VS. $(V_{CC} + |V_{EE}|)$ Characteristics"

Application Circuit



Notes:

- (1) Power supply decoupling capacitors should be connected as close as possible to the pins of the gate driver.
- (2) Power supply decoupling capacitors should be good quality, low ESR types.
- (3) Printed circuit layout should minimize wiring lengths and utilize shielding layers to suppress noise.

Switching Time Definitions

