

### Features & Benefits

- Non-isolated, regulated DC-DC buck converter
- Up to 140 W, 7 A continuous
- 98% peak efficiency
- Input voltage range 18.6 – 36 V<sub>DC</sub>
- Short-Circuit protection
- Overcurrent protection
- Undervoltage protection
- Conformal coated

### Typical Applications

- Defense
- Aerospace
- Communications Systems
- Medical

### Product Ratings

| Product Ratings          |              |
|--------------------------|--------------|
| VIN = 28 V (18.6 – 36 V) | POUT = 140 W |
| VOOUT = 20 V             | IOOUT = 7 A  |

### Product Description

GDK1005 is a 140 W DC/DC non-isolated point-of-load converter that operates at nominal 28 Vdc input and generates 20 Vdc output.

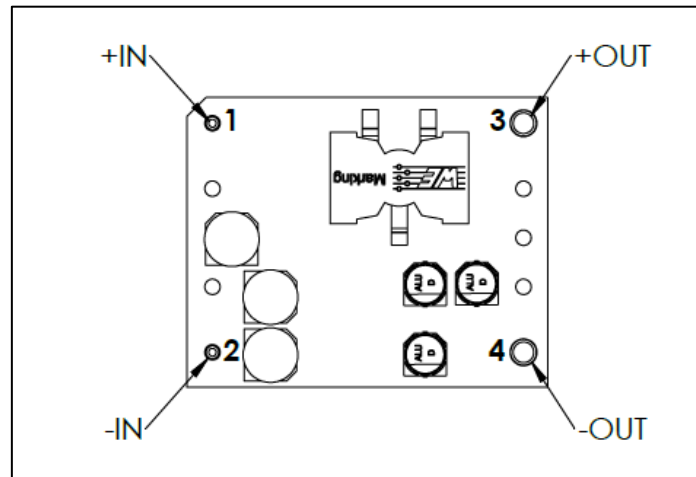
GDK1005 has a synchronous buck converter topology and due to this, it has a very high efficiency across all line and load conditions.



### Size:

56 x 45 x 18.75 mm

## Pin Configuration



## Pin Descriptions

| Power Pins |             |                                |
|------------|-------------|--------------------------------|
| Pin Number | Signal Name | Type                           |
| 1          | + IN        | Positive input power terminal  |
| 2          | - IN        | Negative input power terminal  |
| 3          | + OUT       | Positive output power terminal |
| 4          | - OUT       | Positive output power terminal |

## Absolute Maximum Ratings

The absolute maximum ratings below are stress ratings only. Operation at or beyond these maximum ratings can cause permanent damage to the device.

| Parameter             | Comments   | Min | Max | Unit |
|-----------------------|------------|-----|-----|------|
| Input Voltage         | DC voltage | 0   | 50  | VDC  |
| Operating Temperature |            | -40 | 100 | °C   |
| Storage Temperature   |            | -40 | 100 | °C   |

## Electrical Characteristics

All data at nominal line and nominal load unless otherwise specified.

### Module Input Specifications

| Power Input Specifications |      |      |      |      |                                         |
|----------------------------|------|------|------|------|-----------------------------------------|
| Parameter                  | Min  | Typ  | Max  | Unit | Notes                                   |
| Operating Input Voltage    | 18.6 | 28   | 36   | VDC  | Output tracks input voltage below 20 V. |
| Under voltage Turn-on      | 18.3 | 18.5 | 18.7 | VDC  |                                         |
| Under voltage Turn-off     | 17.4 | 17.7 | 18   | VDC  |                                         |
| No-Load Specifications     |      |      |      |      |                                         |
| Disabled Power Dissipation |      |      | 3.7  | mW   |                                         |
| Enabled Power Dissipation  | 43.7 | 47.6 | 122  | mW   |                                         |

### Module Output Specifications

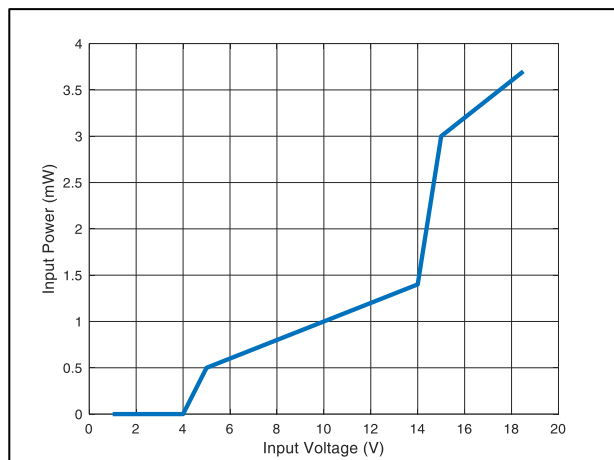
| Parameter                | Min   | Typ   | Max   | Unit | Notes                            |
|--------------------------|-------|-------|-------|------|----------------------------------|
| Output Voltage           | 19.98 | 20.00 | 20.10 | VDC  | at Input Voltage over 20 VDC     |
| Output Voltage Set Point |       |       | ±0.5  | %    | Full load, 25 °C, Nominal Input  |
| Rated Output Power       |       |       | 140   | W    |                                  |
| Line Regulation          |       | ±0.02 | ±0.20 | %    | Low line to high line, Full load |
| Efficiency               | 97.20 | 98.00 | 99.00 | %    | Full load                        |
| Ripple and Noise         |       | 65    | 74    | mV   | Full load, Nominal Input         |
| Load Regulation          |       | ±0.20 | ±0.25 | %    | Low line to high line, Full load |
| Load Current             |       |       | 7     | A    |                                  |
| Current Limit            |       |       | 16.66 | A    |                                  |

## General Characteristics

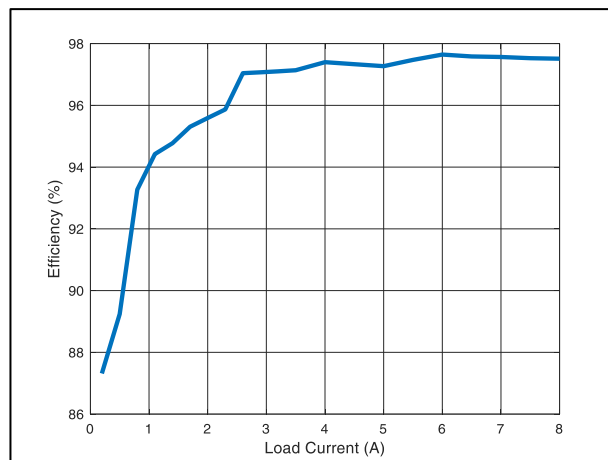
| Attribute                          | Symbol | Conditions/Notes                                                                    | Min | Typ   | Max | Unit |
|------------------------------------|--------|-------------------------------------------------------------------------------------|-----|-------|-----|------|
| <b>Mechanical</b>                  |        |                                                                                     |     |       |     |      |
| Length                             | L      |                                                                                     |     | 56    |     | mm   |
| Width                              | W      |                                                                                     |     | 45    |     | mm   |
| Height                             | H      |                                                                                     |     | 22.75 |     | mm   |
| Weight                             | W      |                                                                                     |     | -     |     | g    |
| Pin Material                       |        | Brass                                                                               |     |       |     |      |
| Pin Finish                         |        | Tin over Nickel                                                                     | 5   |       | 40  | μm   |
| <b>Thermal</b>                     |        |                                                                                     |     |       |     |      |
| Operating Temperature              | Top    |                                                                                     | -40 |       | 70  | °C   |
| Storage Temperature                | Tst    |                                                                                     | -40 |       | 90  | °C   |
| Board Max. Component Temp. @ 25 °C |        |                                                                                     |     |       | 53  | °C   |
| <b>Safety</b>                      |        |                                                                                     |     |       |     |      |
| MTBF                               |        | MIL-HDBK-217Plus Parts Count-25°C<br>Ground Benign, Stationary,<br>Indoors/Computer |     | TBD   |     | MHrs |
| <b>Assembly</b>                    |        |                                                                                     |     |       |     |      |
| Pin Soldering Temperature          | °C     | <4 sec., hand soldering                                                             |     | 390   |     | °C   |
|                                    |        |                                                                                     |     |       |     |      |

## Application Characteristics

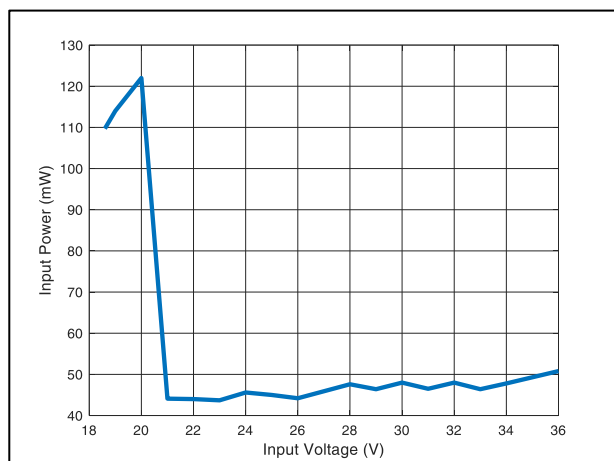
Measurements are taken at nominal conditions (25 °C).



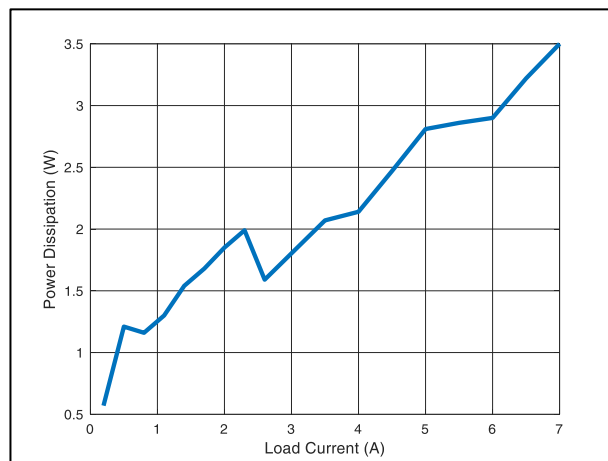
**Figure 1.** Disabled Power Dissipation vs  $V_{IN}$



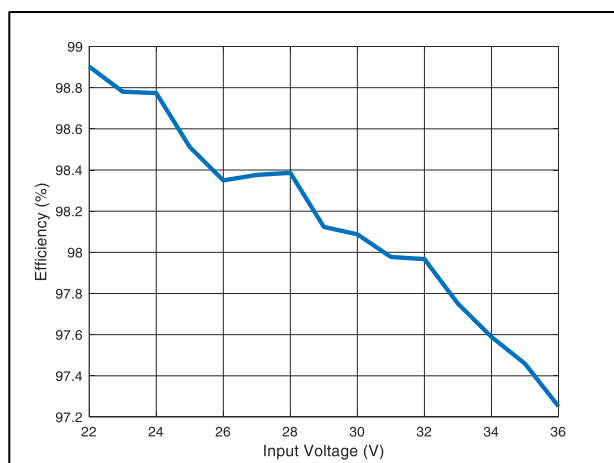
**Figure 4.** Efficiency vs Load



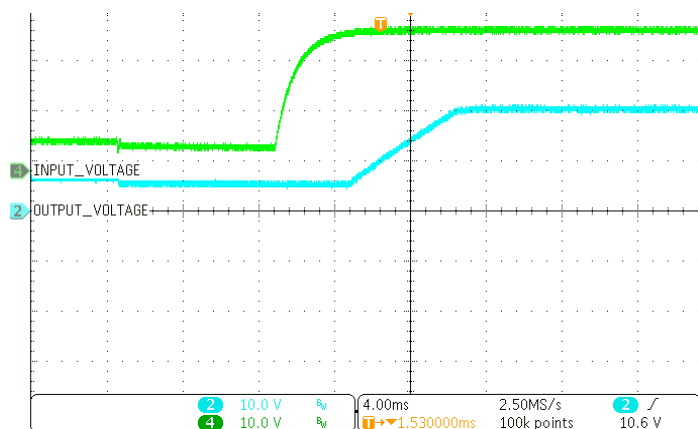
**Figure 2.** Enabled Power Dissipation vs  $V_{IN}$



**Figure 5.** Power Dissipation vs Load



**Figure 3.** Full Load Efficiency vs  $V_{IN}$



**Figure 6.** Input Voltage Start up No Load

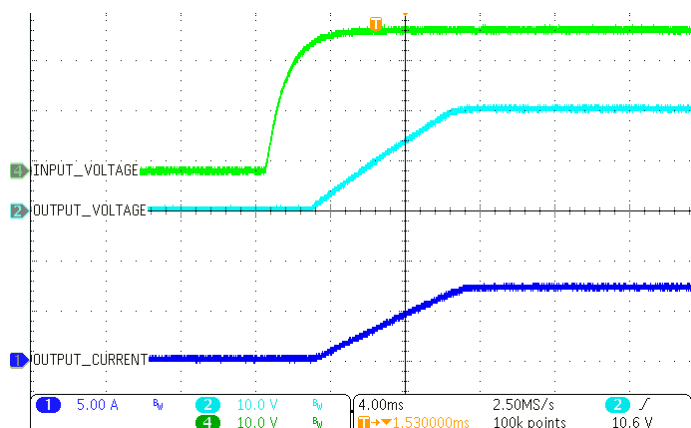


Figure 7. Input Voltage Start up Full Load

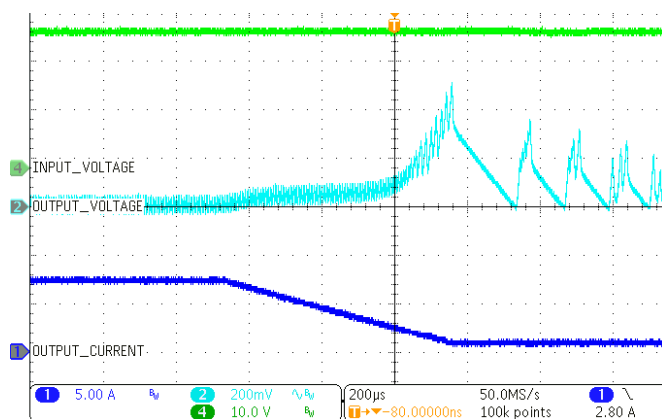
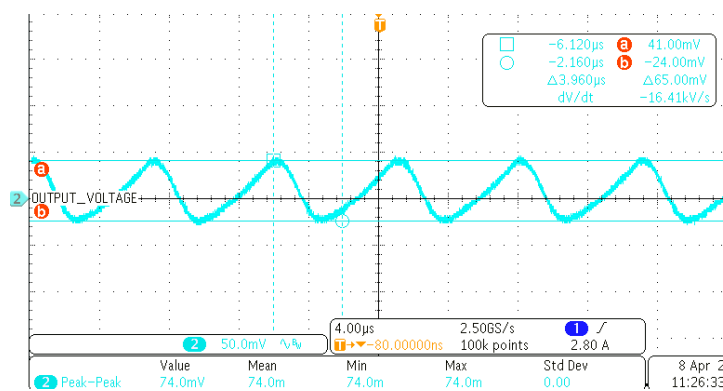
Figure 10. 100-10% Load Transient Response at Nom.  $V_{IN}$ 

Figure 8. Output Ripple Full Load

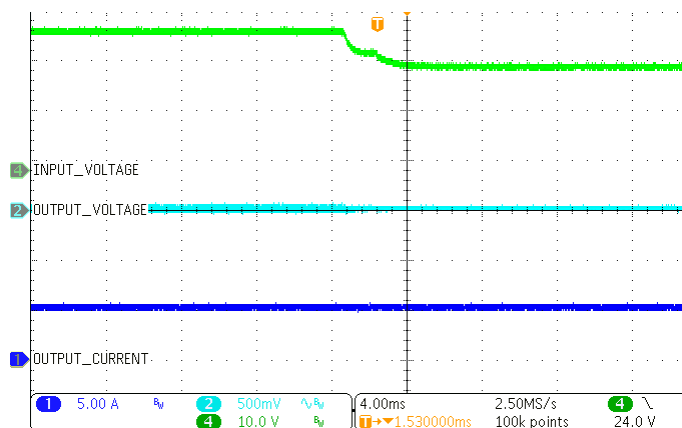


Figure 11. 28V-21V Line Transient Response at 4 ohm Load

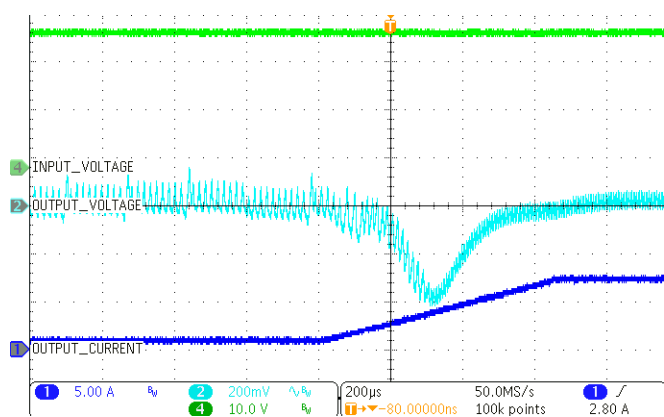
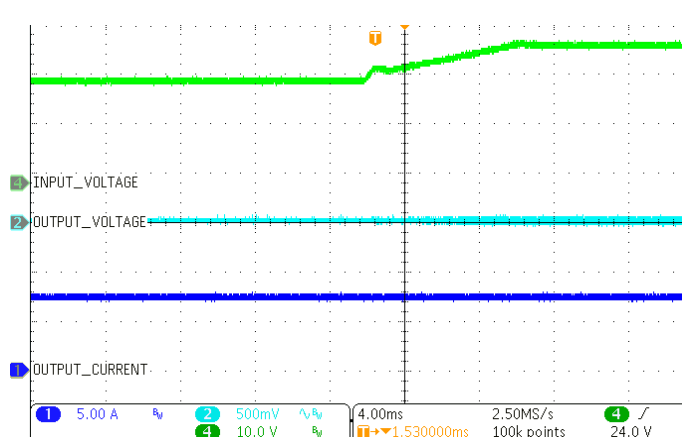
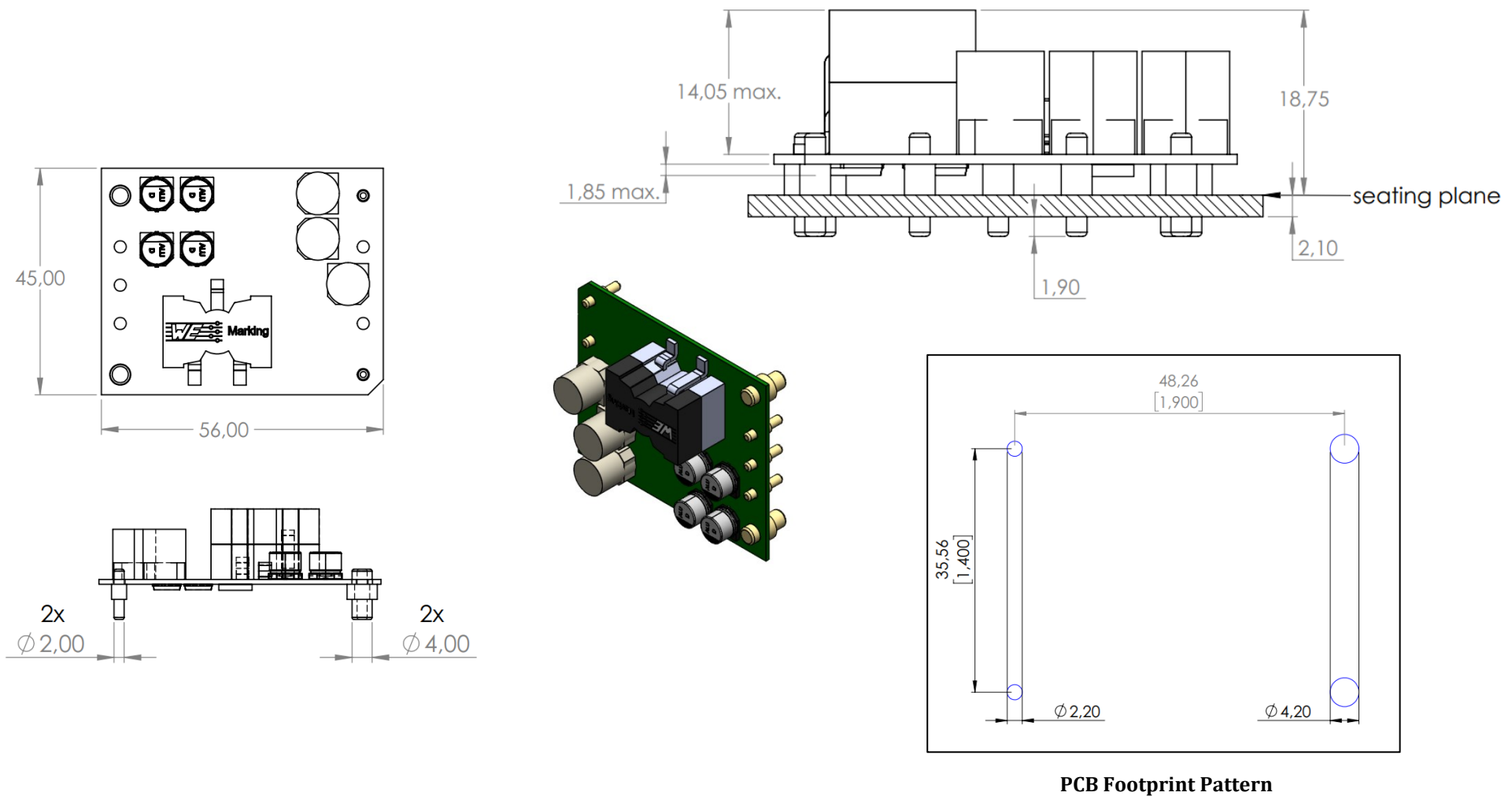
Figure 9. 10-100% Load Transient Response at Nom.  $V_{IN}$ 

Figure 12. 21V-28V Line Transient Response at Full Load

### Mechanical Drawing



## Part Ordering Information

| Manufacturer | Manufacturer Part Number | Option Field |
|--------------|--------------------------|--------------|
| KOLT         | GDK1005                  | -            |

## Revision History

| Revision | Date       | Description     | Page Number(s) |
|----------|------------|-----------------|----------------|
| A-PC1    | 04.04.2020 | Initial Release | N/A            |
| A-PC2    | 09.04.2020 |                 |                |