# GAPTEC®
## GREEN TECHNOLOGY

## LOS_6.0 Series
Wide Input Non-Isolated & Regulated, Single Positive/Negative Output

<div style="background:green;color:white">Switching Regulator</div>

- Efficiency up to 94%
- Operating temperature range: -40°C ~ +85°C
- Short circuit protection (SCP)
- Input under-voltage lockout
- SIP package
- Compliant to RoHs directive 2002/95/EC

The LOS-6 series are high efficiency switching regulators. The product is featured with high efficiency, low loss, short circuit protection and no heat sink requirement.

They are widely used in wireless networks, Telecom/Datacom, distributed power architectures, industry control systems, semiconductor equipment, microprocessor power applications, etc.

### Common specifications

| | |
|---|---|
| Short circuit protection: | Hiccup, automatic recovery |
| Temperature rise at full load: | 25°C MAX, 15°C TYP |
| Cooling: | Free air convection |
| Operation temperature range: | -40°C~+85°C (with derating) |
| Storage temperature range: | -55°C ~+125°C |
| Thermal shock: | MIL-STD-810F |
| Over temperature protection: | 135°C TYP |
| Operating case temperature: | 100°C |
| Storage humidity range: | < 95%RH |
| MTBF (+25°C MIL-HDBK-217F): | $3.247 \times 10^6$ hours TYP |
| Weight: | 2.8g |

### Input specifications

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Voltage tolerance | • 05 series Vo (set) | 2.4 | 5 | 5.5 | VDC |
| | • 12 series Vo (set) | 8.3 | 12 | 14 | VDC |
| Input current | Vin = Vin(min); Io = Io (max) | | | 6 | A |
| Input filter* | C filter | | | | |
| No Load Current | • Vo (set) = 0.75VDC, Vin = 5 | | 20 | | mA |
| | • Vo (set) = 0.75VDC, Vin = 12 | | 19 | | mA |
| | • Vo (set) = 3.3VDC Vin = 5 | | 45 | | mA |
| | • Vo (set) = 5.0VDC Vin = 12 | | 100 | | mA |
| Under Voltage Lockout | Start-up Voltage | | | | |
| | • Vin = 5 | | 2.2 | | V |
| | • in = 12 | | 4.5 | | V |
| | Shutdown Voltage | | | | |
| | • Vin = 5 | | 2 | | V |
| | • in = 12 | | 3.8 | | V |
| Input reflected ripple current | 5~20MHz, 1uH source impedance | | 35 | | mAp-p |

\* It's necessary to equip the external input capacitors at the input of the module. The capacitors should connect as close as possible to the input terminals that ensuring module stability. The external Cin is 2×150µF low-ESR polymer capacitors // 2×47µF ceramic capacitors at least.

### Output specifications

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Output current | | | | 6 | A |
| Voltage tolerance | Full load and Vin(nom.) | | | ±2 | % |
| Minimum load | | | | 0 | % |
| Line regulation | Vin = Vin (min) to Vin (max) at Full Load | | ±0.3 | | % |
| Load regulation | 0% to 100% load | | ±0.5 | | % |
| Ripple + Noise* | 20MHz Bandwidth | | | 20 | mVrms |
| | | | | 60 | mVp-p |
| Temperature coefficient | | | ±0.4 | | %/°C |
| Dynamic load response* | Load change step (50% to 100% or 100% to 50% of Io (max) Setting time (Vo<10% peak deviation) | | 25 | | mS |
| Peak deviation | ΔIo/Δt = 2.5A/uS, Vin(nom) | | 200 | | mV |
| Dynamic load response** | Load change step (50% to 100% or 100% to 50% of Io (max) Setting time (Vo<10% peak deviation) | | 50 | | mS |
| Peak deviation | ΔIo/Δt = 2.5A/uS, Vin(nom) | | 50 | | mV |
| Output current limit | | | 220 | | % |
| External load capacitance | • ESR≥1mΩ | | | 1000 | uF |
| | • ESR≥10mΩ | | | 3000 | uF |
| Switching frequency | | 300 | | | KHz |
| Output voltage overshoot-startup | Vin = Vin (min) to Vin (max); F.L. | | 1 | | % |
| Voltage adjustability | (see fig.1) | | | | |
| | • 05 series | 0.7525 | | 3.3 | V |
| | • 12 series | 0.7525 | | 5 | V |

\*  External with Cout = 1µF ceramic//10µF tantalum capacitors.
\*\* External with Cout = 2×150µF polymer capacitors.

**Example:**
**LOS_12-06**
**LO = Series; S = SIP; 12 = Vin (nominal); 06 = Output current: 6A**

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## LOS-6 Series

Wide Input Non-Isolated & Regulated, Single Positive/Negative Output

### Feature specifications

| Item | Test conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Remote ON/OFF Positive logic (option) | ON = (Vin-4)<Vr<Vin (Max) OFF = 0V<Vr<0.3V | | | 10 1 | uA mA |
| Remote ON/OFF Negative logic (standard) | ON = 0V<Vr< 0.3V@IIN OFF = 2.5V<Vr<Vin(Max)@ IIN | | | 10 1 | uA mA |
| Input current of remote control pin | | 0.01 | | 1 | mA |
| Remote off state input current Nominal Vin | | | | 5 | mA |
| Rise time | Time for Vo to rise from 10% to 90%of Vo (set) | | | 6 | ms |
| Turn-on delay time | Case 1 and 2, see notes below | | | 3 | ms |

**Note:**
Case 1: On/Off input is set to logic low (module on) and then input power is applied (delay from instant at which Vin = Vin (min) until Vo = 10% of Vo (set)
Case 2: Input power is applied for at least one second and then the On/Off input is set to logic low (delay from instant at which Von/off=0.3V until Vo = 10% of Vo(set)

**Trim figure:**
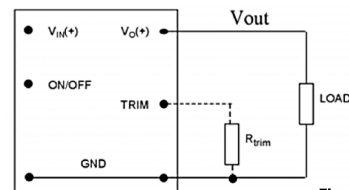


Fig. 1

**Trim table:**

| Vo (set) | R$_{Trim}$ (KΩ) |
|---|---|
| 0.7525 | Open |
| 3.3 | 3.6 |
| 5 | 1.78 |

**Positive remote On/Off figure:**
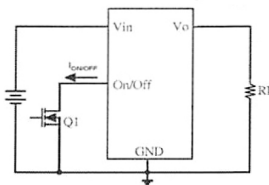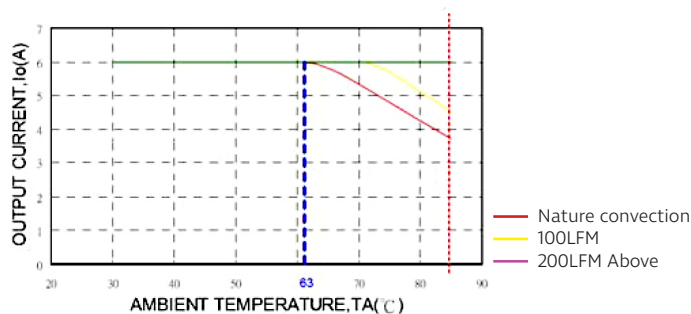


Fig. 2

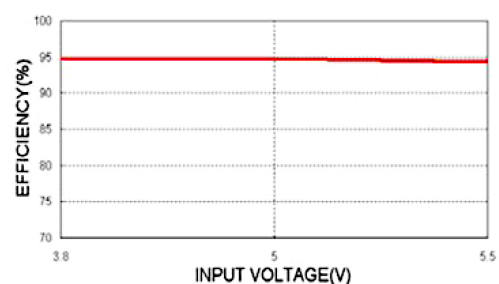| Part Number | ON/OFF logic | Input Voltage [VDC] | Output Voltage [VDC] | Output Current [min/max load; A] | Efficiency [%, typ] |
|---|---|---|---|---|---|
| LOX_05-06 | negative positive (option suffix /PL) | 2.4 ~ 5.5VDC Vin (min) = Vo (Set) +0.5 | 0.75 ~ 3.3 | 0/6 | 94 |
| LOX_12-06 | negative positive (option suffix /PL) | Vo (set) <3.63V Vin = 8.3~14VDC Vo (set) > 3.63V Vin = 8.3~13.2VDC | 0.75 ~ 5.0 | 0/6 | 89 |

X = S : SIP package

## Typical characteristics

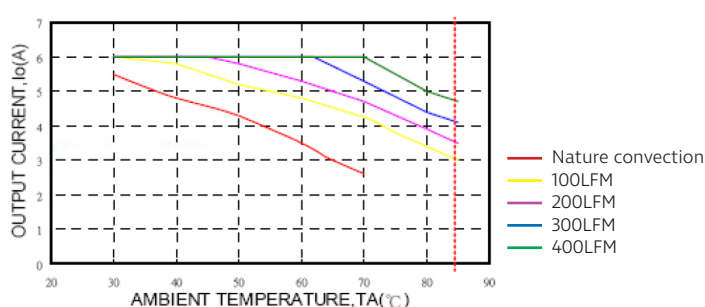Derating Curve, LOS_05-06



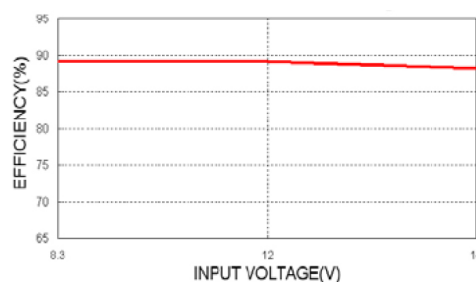Efficiency vs. input voltage, Vo = 3.3V, LOS_05-06



Derating Curve, LOS_12-06
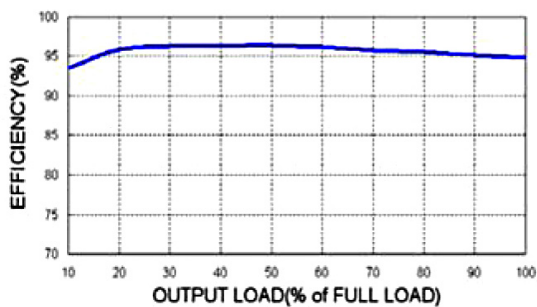


Efficiency vs. input voltage, Vo = 3.3V, LOS_12-06

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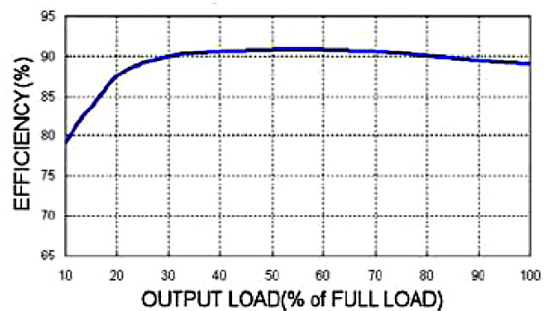Specifications subject to change without notice.

## LOS-6 Series
Wide Input Non-Isolated & Regulated, Single Positive/Negative Output

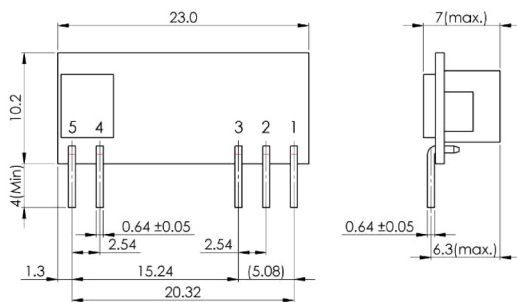## Efficiency

Efficiency vs. output load, Vo= 3.3V, LOS_05-06

Efficiency vs. output load, Vo= 3.3V, LOS_12-06

## Mechanical dimensions

**SIP**

**Note:**
1. The max. capacitive load should be tested within the input voltage range and under full load conditions;
2. Without any special statement, all indexes are only specific to positive output application;
3. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta = 25°C, humidity < 75% when inputting nominal voltage and outputting rated load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact with our technician for specific information;
6. Specifications subject to change without prior notice.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

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