

# OKI electronic components

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## OCM2□6, 2□7 SERIES

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### General-purpose Type Optical MOS Relay For AC/DC Load

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#### GENERAL DESCRIPTION

The OCM2□6 and OCM2□7 Series are optical MOS relays for AC/DC load that are lower in cost than the OCM2□0/2□1 Series. The input portion is an infrared light emitting diode. The output portion uses a combination of VD-MOS (Vertical Diffusion MOS) FETs and photodiode arrays. The device is encased in an extremely small 6-pin plastic DIP or SMD-type (gull-wing) package. The optical MOS relay switch may be used in applications that currently use mechanical relay switches, but offers smaller size, noise-free switching, and electronic circuit compatibility because of its non-mechanical operation. Optical MOS relay switches also dissipate less power than equivalent bipolar devices at lower switching frequencies.

#### FEATURES

- Extremely low voltage control
- High reliability due to non-contact and optical operation
- No chattering or switch bounces
- No mechanical switching noises
- Small size and easy mounting (6-pin plastic DIP or SMD-type [gull-wing] package)

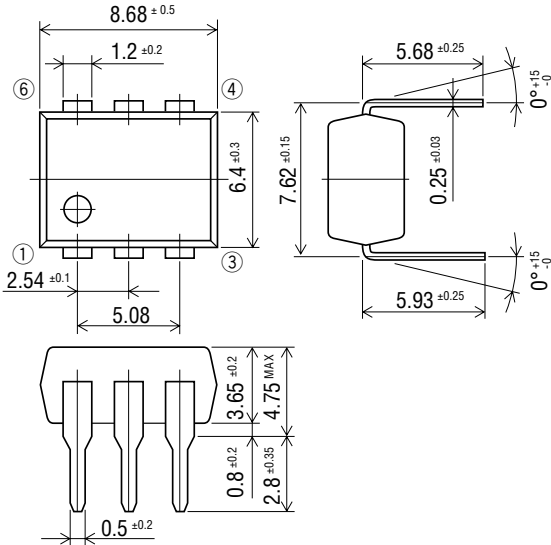
#### APPLICATIONS

- Telecommunications equipment
- Measurement equipment
- Home electronics
- Automatic meter reading equipment
- Other applications requiring small size or high performance
- Other applications requiring non-contact switches

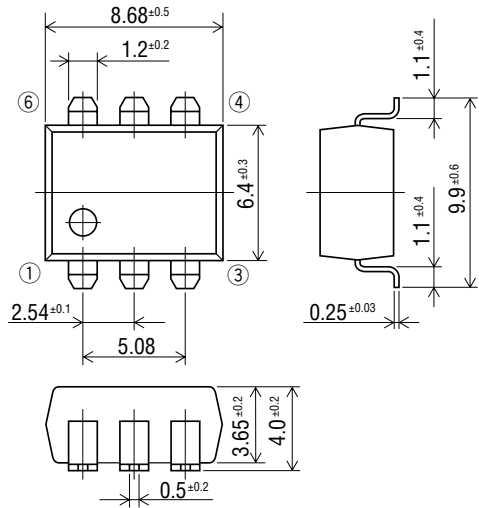
PIN CONFIGURATION

(Unit: mm)

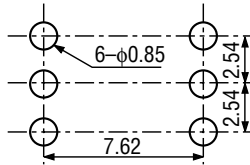
• DIP Type



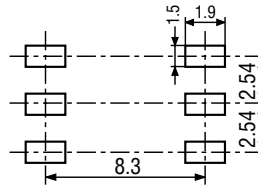
• SMD Type (gull-wing)



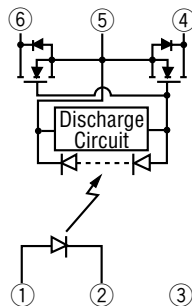
• Through hole (Bottom view)



• Mounting pad (Top view)



• Pin Connection Diagram



- 1: Anode (LED)
- 2: Cathode (LED)
- 3: NC
- 4: Drain (MOS FET)
- 5: Source (MOS FET)
- 6: Drain (MOS FET)

## ABSOLUTE MAXIMUM RATINGS

(Ambient temperature  $T_a=25^\circ\text{C}$ )

| Product Name            |   |                 |  | OCM206      | OCM216 | OCM226 | OCM236 | OCM246 |  |     |
|-------------------------|---|-----------------|--|-------------|--------|--------|--------|--------|--|-----|
| Parameter               | Symbol  | Condition       | Unit   | OCM207      | OCM217 | OCM227 | OCM237 | OCM247 |  |     |
| Input Characteristics   | Continuous Forward Current                    | $I_F$           |  | mA          |        |        |        |        | 50   |     |
|                         | Derating Factor of Continuous Forward Current | $\Delta I_F$    |  | mA/°C       |        |        |        |        | Refer to [Derating Factor of Continuous Forward Current] of characteristics data |     |
|                         | Peak Forward Current                          | $I_{FM}$        | Pulse width 100 $\mu\text{s}$<br>Cycle 10 ms | A           |        |        |        |        | 0.5  |     |
|                         | Reverse Voltage                               | $V_R$           |  | V           |        |        |        |        | 5  |     |
|                         | Power Dissipation                             | $P_{DL}$        |  | mW          |        |        |        |        | 75   |     |
| Output Characteristics  | Load Voltage                                  | $V_{OFF}$       |  | 60          | 100    | 200    | 350    | 400    |  |     |
|                         | Load Current                                  | $I_{ON}$        |  | 350         | 300    | 200    | 140    | 120    |  |     |
|                         | Derating Factor of Load Current               | $\Delta I_{ON}$ |  | mA/°C       |        |        |        |        | Refer to [Derating Factor of Load Current] of characteristics data               |     |
|                         | Surge Load Current                            | $I_{SUG}$       | Pulse width 1 ms<br>1shot                    | A           |        |        | 1.0    | 0.8    | 0.7  |     |
|                         | Power Dissipation                             | $P_D$           |  | mW          |        |        |        |        | 300  |     |
| Total Power Dissipation |   |                 |  | $P_{tot}$   |        |        |        |        | mW   | 325 |
| Isolation Voltage       | $V_{IO}$                                      |                 | V(rms)                                       | 1500        |        |        |        |        |  |     |
|                         |   |                 |  | OCM206      | OCM216 | OCM226 | OCM236 | OCM246 |  |     |
|                         |   |                 |  | 4000        |        |        |        |        |  |     |
|                         |   |                 |  | OCM207      | OCM217 | OCM227 | OCM237 | OCM247 |  |     |
| Operating Temperature   | $T_{opr}$                                     |                 | °C   | -40 to +85  |        |        |        |        |  |     |
| Storage Temperature     | $T_{stg}$                                     |                 | °C   | -40 to +100 |        |        |        |        |  |     |

## ELECTRICAL CHARACTERISTICS

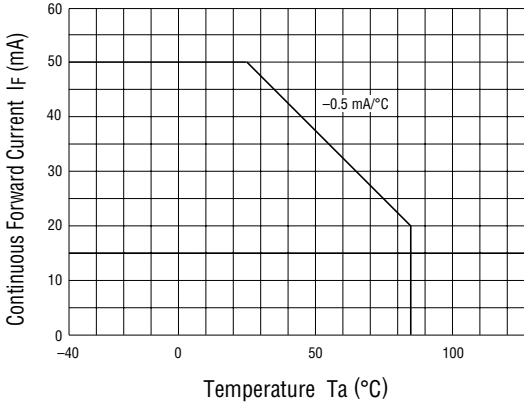
(Ambient temperature Ta=25°C)

| Product Name                |                           |  |                       | OCM206        | OCM216 | OCM226 | OCM236 | OCM246 |    |
|-----------------------------|---------------------------|--|-----------------------|---------------|--------|--------|--------|--------|----|
| Parameter                   | Symbol                    | Condition  | Unit                  | OCM207        | OCM217 | OCM227 | OCM237 | OCM247 |    |
| Input Characteristics       | Forward Voltage           | $I_F=10\text{ mA}$   | Min.                  | V             | 1.0    |        |        |        |    |
|                             |                           |  | Max.                  |               | 1.3    |        |        |        |    |
|                             | Reverse Current           | $V_R=5\text{ V}$   | Max.                  | $\mu\text{A}$ | 10     |        |        |        |    |
|                             | Operation Input Current*1 | $I_{ON}=100\text{ mA}$   | Max.                  | mA            | 5      |        |        |        |    |
| Recovery Input Current      | $I_{FR}$                  | $V_{OFF}=\text{Rating}$<br>$I_{ON}=100\ \mu\text{A}$   | Min.                  | mA            | 0.2    |        |        |        |    |
| Output Characteristics      | On-resistance             | $I_F=10\text{ mA}$<br>$I_{ON}=\text{Rating}$<br><small>Time to flow current is within one second</small> | Min.                  | $\Omega$      | 1.0    | 2.0    | 4.0    | 7.0    | 10 |
|                             |                           |  | Typ.                  |               | 2.0    | 3.0    | 7.0    | 17     | 22 |
|                             |                           |  | Max.                  |               | 3.0    | 4.0    | 10     | 24     | 33 |
| Off-state Leakage Current*2 | $I_{OFF}$                 | $V_{OFF}=\text{Rating}$  | Max.                  | $\mu\text{A}$ | 1.0    |        |        |        |    |
| Output Terminal Capacitance | $C_{OUT}$                 | $V_{OFF}=50\text{ V}$<br>$f=1\text{ MHz}$  | Typ.                  | pF            | 35     | 25     | 15     | 12     | 10 |
| Input-to-output Capacitance | $C_{IO}$                  | $f=1\text{ MHz}$   | Typ.                  | pF            | 1.3    |        |        |        |    |
| Coupling Characteristics    | Turn-on Time*3            | $I_F=10\text{ mA}$<br>$I_{ON}=100\text{ mA}$   | Typ.                  | ms            | 0.3    |        |        |        |    |
|                             |                           |  | Max.                  |               | 1.0    |        |        |        |    |
|                             | Turn-off Time*3           | $t_{OFF}$  | $I_{ON}=50\text{ mA}$ | Typ.          | ms     | 0.2    |        |        |    |
|                             |                           |  | Max.                  |               | 0.5    |        |        |        |    |

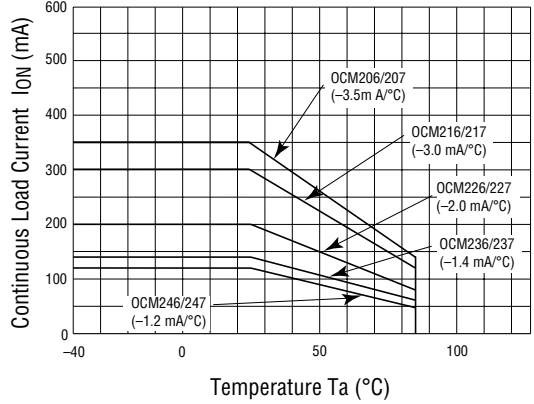
\*1: Can correspond to special specification  $I_{FA}<3.0\text{ mA}$ \*2: Can correspond to special specification  $I_{OFF}<1.0\text{ nA}$ \*3: Can correspond to special specification  $t_{ON} / t_{OFF}<0.5\text{ ms}$

**TYPICAL CHARACTERISTICS**

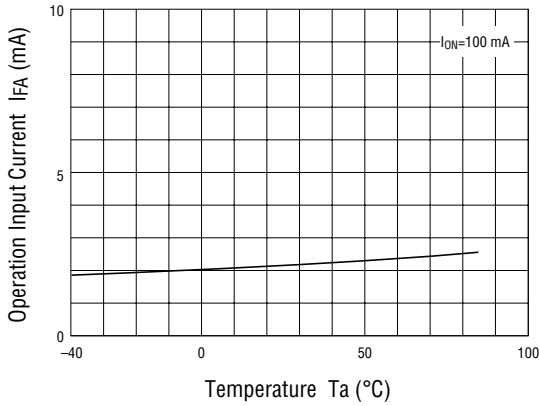
- Derating Factor of Continuous Forward Current



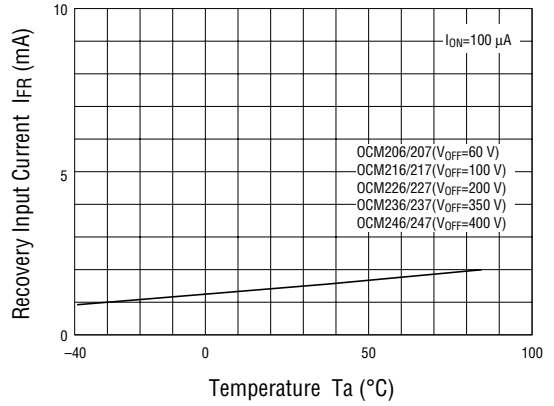
- Derating Factor of Load Current



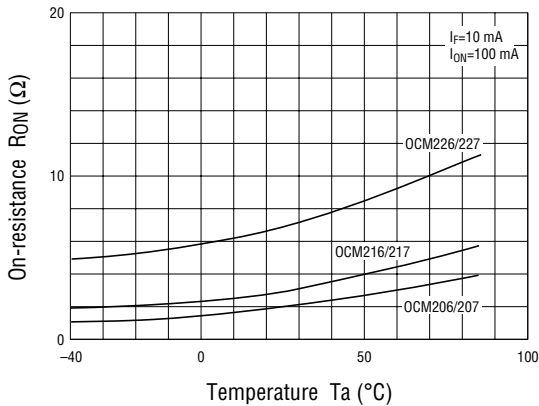
- Operation Input Current vs. Ambient Temperature



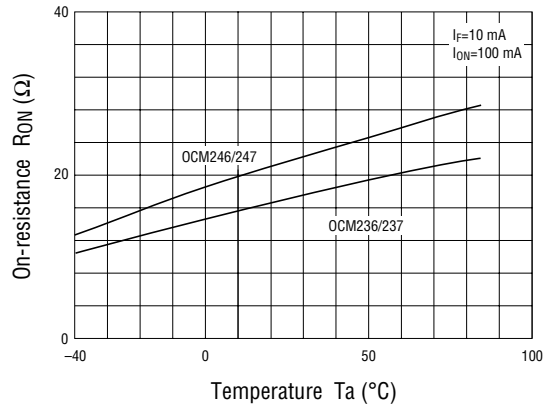
- Recovery Input Current vs. Ambient Temperature



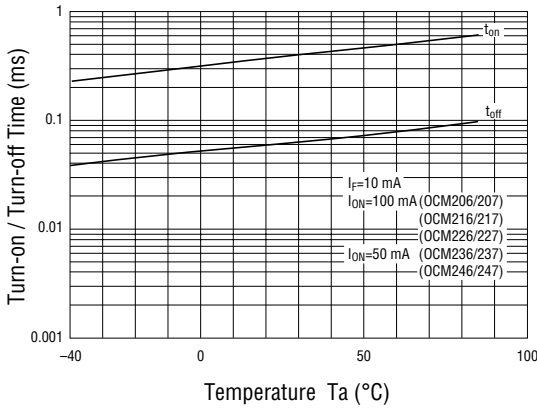
- On-resistance vs. Ambient Temperature 1



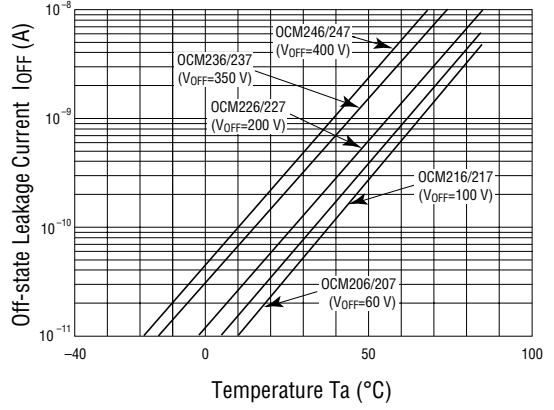
- On-resistance vs. Ambient Temperature 2



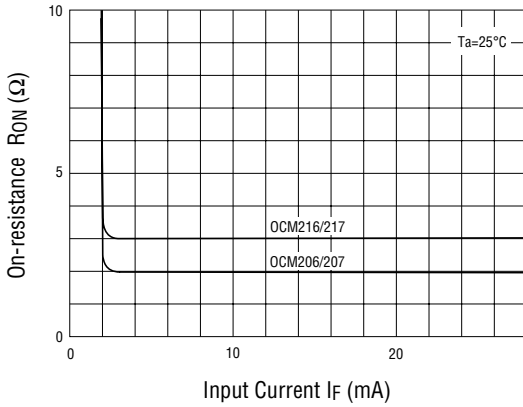
• Turn-on/Turn-off Time vs. Ambient Temperature



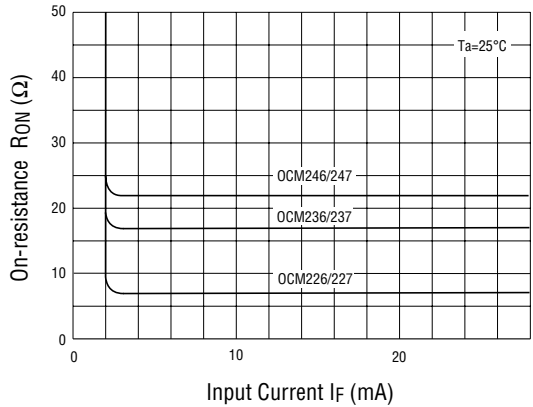
• Off-state Leakage Current vs. Ambient Temperature



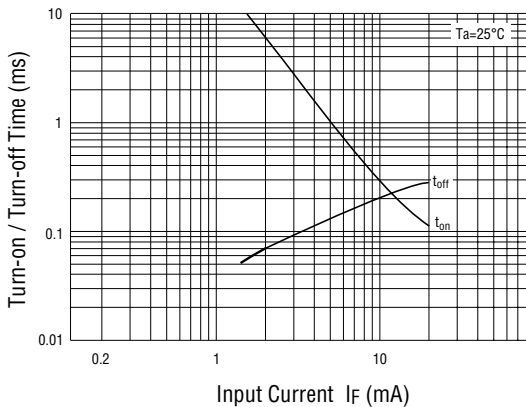
• Continuous Forward Current vs. On-resistance 1



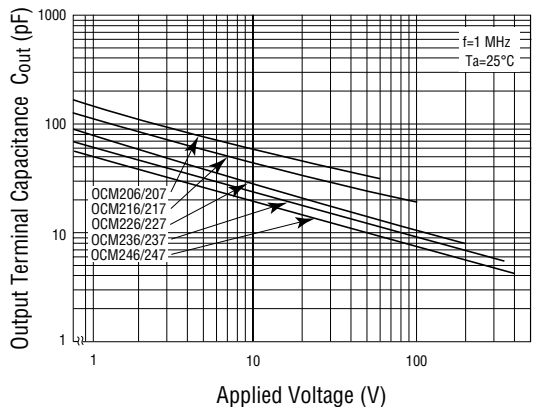
• Continuous Forward Current vs. On-resistance 2



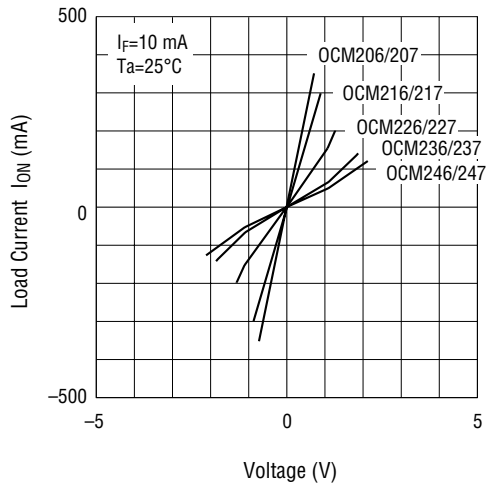
• Continuous Forward Current vs. Turn-on/Turn-off Time



• Output Terminal Capacitance vs. Applied Voltage



• **Load Current vs. Voltage**



• **Example Circuit for Measuring Turn-on/Turn-off Time**

