OKI electronic components

OCM2□6LD, 2□7LD SERIES

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

GENERAL DESCRIPTION

The OCM2□6LD and OCM2□7LD 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, optical operation
- No chattering or switch bounces
- No mechanical switching noises
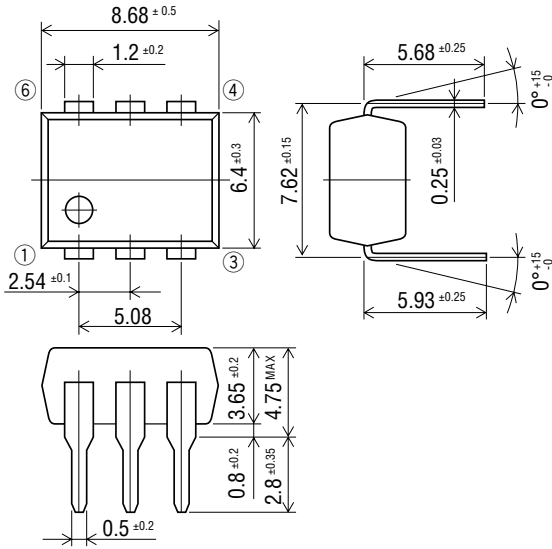- Small size and easy mounting (6-pin plastic DIP or SMD-type [gull-wing] package)

APPLICATIONS

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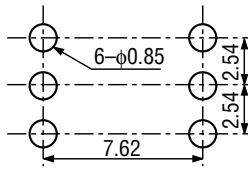- Other applications requiring non-contact switches
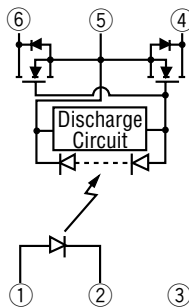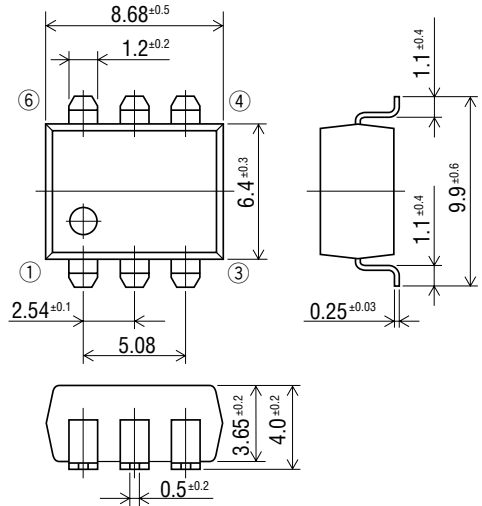
PIN CONFIGURATION

(Unit: mm)

• DIP Type

• SMD Type (gull-wing)

• Through hole (Bottom view)

6–φ0.85

• Mounting pad (Top view)

• Pin Connection Diagram
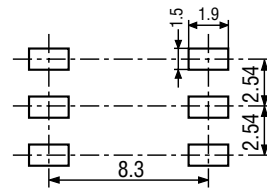
1: Anode   (LED)
2: Cathode   (LED)
3: NC
4: Drain   (MOS FET)
5: Source   (MOS FET)
6: Drain   (MOS FET)

Discharge
Circuit

ABSOLUTE MAXIMUM RATINGS

(Ambient temperature Ta=25°C)

Product Name				OCM206LD	OCM236LD / OCM237LD	OCM246LD / OCM247LD
Parameter	Symbol	**Condition**	**Unit**			
Input Characteristics — Continuous Forward Current	I_F		mA	50		
Derating Factor of Continuous Forward Current	ΔI_F		mA/°C	Refer to [Derating Factor of Continuous Forward Current] of characteristics data		
Peak Forward Current	I_{FM}	Pulse width 100 μs Cycle 10 ms	A	0.5		
Reverse Voltage	V_R		V	5		
Power Dissipation	P_{DL}		mW	75		
Output Characteristics — Load Voltage	V_{OFF}		V	60	350	400
Load Current	I_{ON}		mA	350	140	120
Derating Factor of Load Current	ΔI_{ON}		mA/°C	Refer to [Derating Factor of Load Current] of characteristics data		
Surge Load Current	I_{SUG}	Pulse width 1 ms 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		
				OCM206LD	OCM236LD	OCM246LD
				4000		
				—	OCM237LD	OCM247LD
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					OCM206LD	OCM236LD OCM237LD	OCM246LD OCM247LD
	Parameter	Symbol	Condition	Unit			
Input Characteristics	Forward Voltage	V_F	I_F=10 mA	V	Min.	1.0		
					Max.	1.3		
	Reverse Current	I_R	V_R=5 V	μA	Max.	10		
	Operation Input Current	I_{FA}	I_{ON}=100 mA	mA	Max.	0.5		
	Recovery Input Current	I_{FR}	V_{OFF}=Rating I_{ON}=100 μA	mA	Min.	0.02		
Output Characteristics	On-resistance	R_{ON}	I_F=10 mA I_{ON}=Rating	Min.	Ω	1.0	7.0	10
				Typ.		2.0	17	22
			Time to flow current is within one second	Max.		3.0	24	33
	Off-state Leakage Current	I_{OFF}	V_{OFF}=Rating	μA	Max.	1.0		
	Output Terminal Capacitance	C_{OUT}	V_{OFF}=50 V f=1 MHz	pF	Typ.	35	12	10
Coupling Characteristics	Input-to-output Capacitance	C_{IO}	f=1 MHz	pF	Typ.	1.3		
	Turn-on Time	t_{ON}	I_F=2 mA I_{ON}=100 mA OCM206LD	ms	Typ.	—	—	—
					Max.	3.0	2.0 (236LD)	2.0 (246LD)
	Turn-off Time	t_{OFF}	I_{ON}=50 mA OCM236LD OCM237LD OCM246LD OCM247LD	ms			4.0 (237LD)	4.0 (247LD)
					Typ.	—		
					Max.	0.5		

TYPICAL CHARACTERISTICS

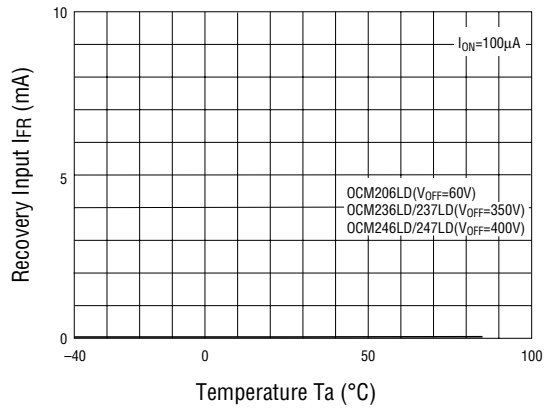- **Derating Factor of Continuous Forward Current**
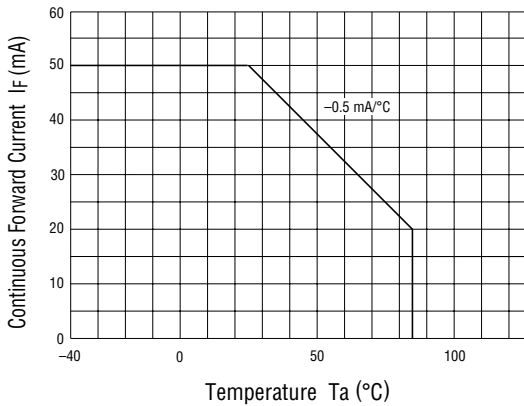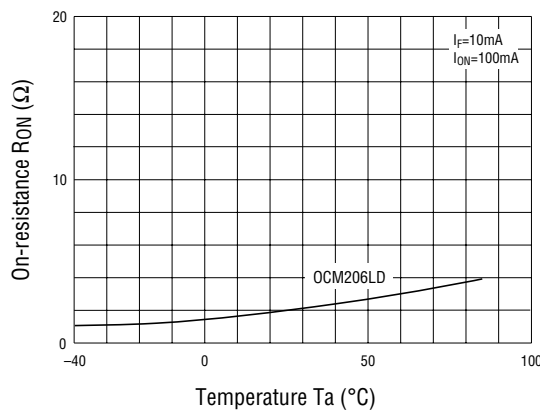

- **Derating Factor of Load Current**
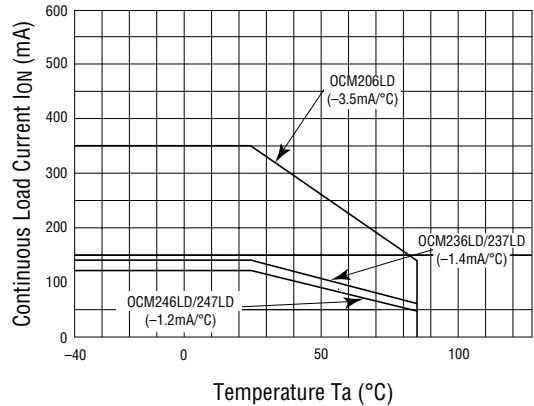
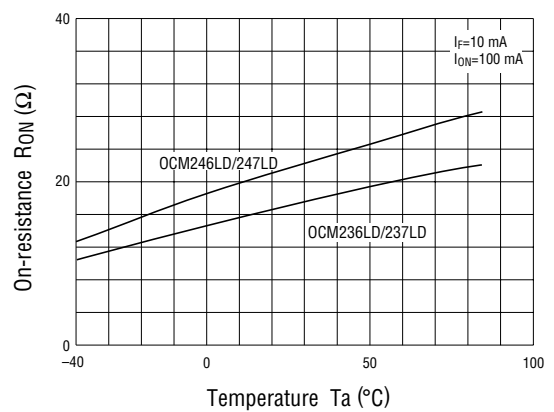- **Operation Input Current vs. Ambient Temperature**
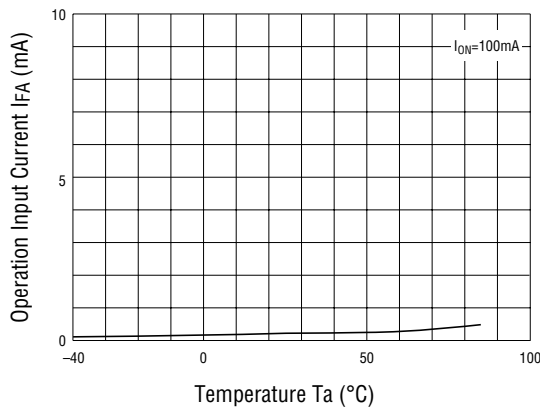
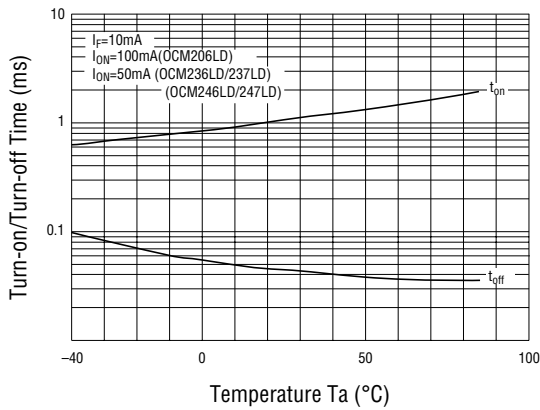- **Recovery Input Current vs. Ambient Temperature**
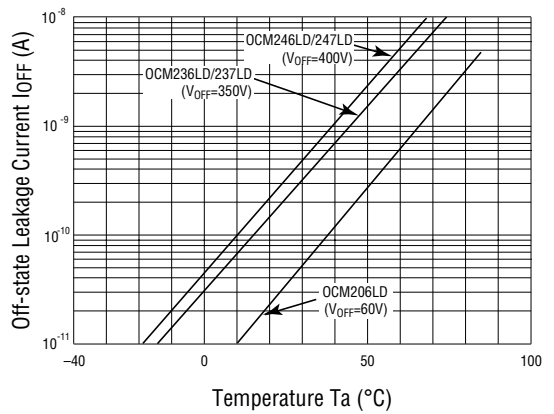

- **On-resistance vs. Ambient Temperature 1**

- **On-resistance vs. Ambient Temperature 2**
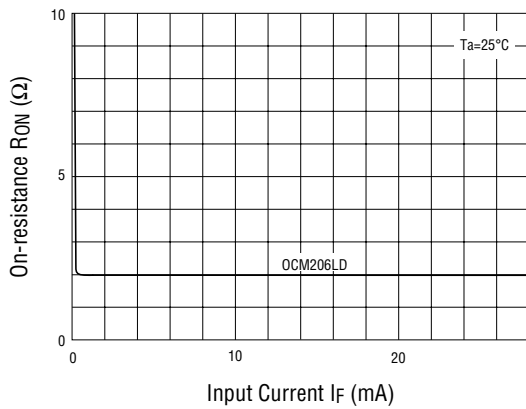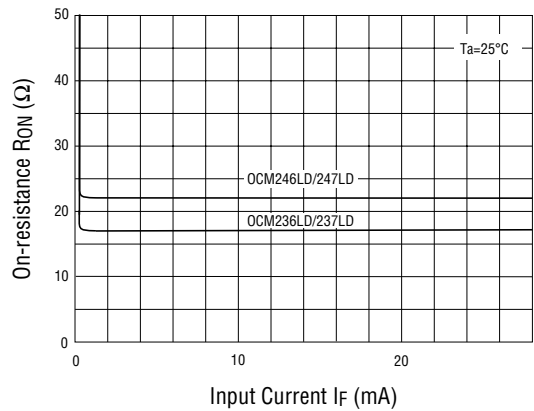
- **Turn-on/Turn-off Time vs. Ambient Temperature**

Turn-on/Turn-off Time (ms) vs. Temperature Ta (°C)

I_F=10mA
I_{ON}=100mA(OCM206LD)
I_{ON}=50mA (OCM236LD/237LD)
(OCM246LD/247LD)

t_{on}
t_{off}

- **Off-state Leakage Current vs. Ambient Temperature**

Off-state Leakage Current I_{OFF} (A) vs. Temperature Ta (°C)

OCM246LD/247LD (V_{OFF}=400V)
OCM236LD/237LD (V_{OFF}=350V)
OCM206LD (V_{OFF}=60V)

- **Continuous Forward Current vs. On-resistance 1**

On-resistance R_{ON} (Ω) vs. Input Current I_F (mA)

Ta=25°C

OCM206LD

- **Continuous Forward Current vs. On-resistance 2**

On-resistance R_{ON} (Ω) vs. Input Current I_F (mA)

Ta=25°C

OCM246LD/247LD
OCM236LD/237LD

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

Turn-on/Turn-off Time (ms) vs. Input Current I_F (mA)

Ta=25°C

t_{off}
t_{on}
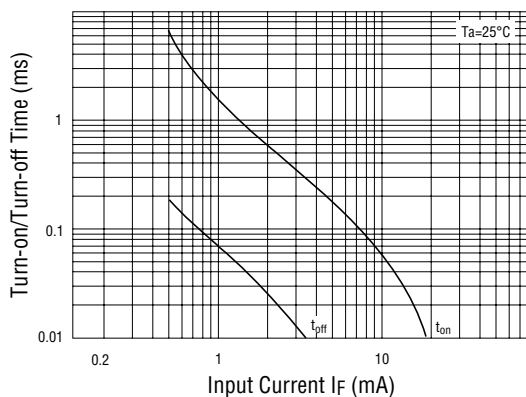
- **Output Terminal Capacitance vs. Applied Voltage**

Output Terminal Capacitance C_{out} (pF) vs. Applied Voltage (V)

f=1MHz
Ta=25°C

OCM206LD
OCM236LD/237LD
OCM246LD/247LD

• **Load Current vs. Voltage**

IF=10mA
Ta=25°C

OCM206LD

OCM236LD/237LD

OCM246LD/247LD
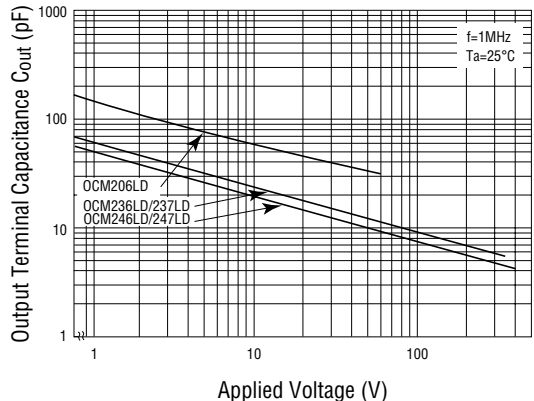
Load Current I_{ON} (mA)

Voltage (V)
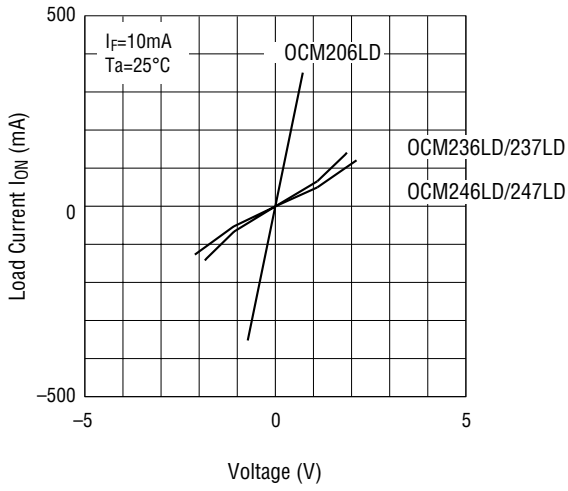
• **Example Circuit for Measuring Turn-on/Turn-off Time**

I_F

t_{on} t_{off}

90%

10%

V_{OUT}

I_F I_{ON}

V_{OUT}

R_L