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OKI electronic components

OCM1□2, 1□3 SERIES

Low ON-resistance Type Optical MOS Relay For DC Load Only

GENERAL DESCRIPTION

The OCM1□2 and OCM1□3 Series are optical MOS relays for DC load only. 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

- Infinitesimally small control voltage
- 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)

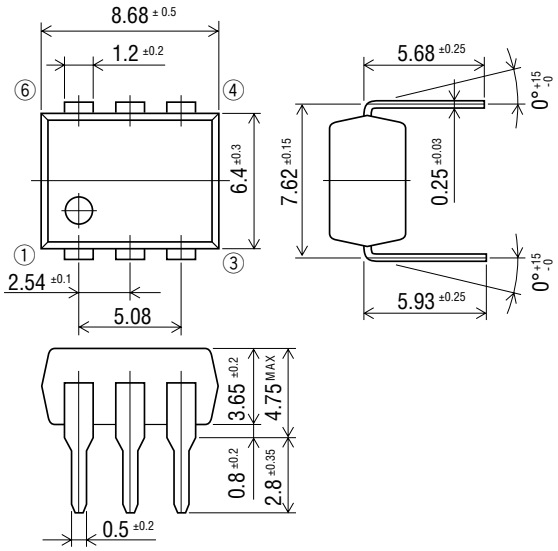
APPLICATIONS

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

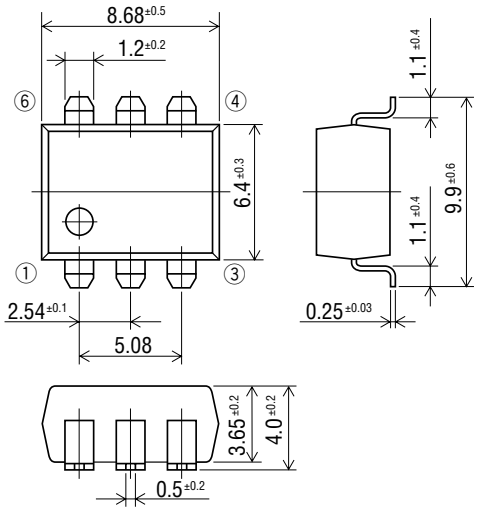
PIN CONFIGURATION

(Unit: mm)

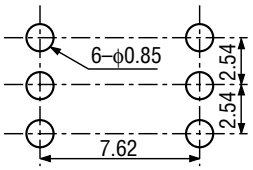
• DIP Type



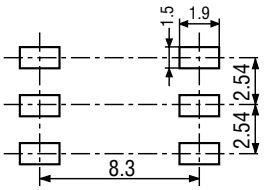
• SMD Type (gull-wing)



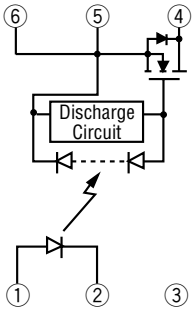
• Through hole (Bottom view)



• Mounting pad (Top view)



• Pin Connection Diagram



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

ABSOLUTE MAXIMUM RATINGS

(Ambient temperature Ta=25°C)

	Product Name				OCM102 OCM103	OCM112 OCM113	OCM122 OCM123	OCM142 OCM143
	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	100	200	400
	Load Current	I_{ON}		mA	500	450	350	200
	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	3.5			1.5
	Power Dissipation	P_D		mW	300			
	Total Power Dissipation	P_{tot}		mW	325			
	Isolation Voltage	V_{IO}		V(rms)	1500			
					OCM102	OCM112	OCM122	OCM142
					4000			
					OCM103	OCM113	OCM123	OCM143
	Operating Temperature	T_{opr}		°C	–40 to +85			
	Storage Temperature	T_{stg}		°C	–40 to +100			

ELECTRICAL CHARACTERISTICS

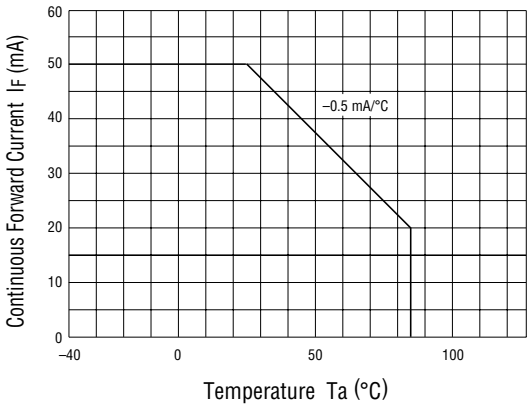
(Ambient temperature Ta=25°C)

	Parameter	Symbol	Condition		Unit	Product Name: OCM102 / OCM103	OCM112 / OCM113	OCM122 / OCM123	OCM142 / OCM143
Input Characteristics	Forward Voltage	V_F	I_F=10 mA	Min.	V	1.0			
				Max.		1.3			
	Reverse Current	I_R	V_R=5 V	Max.	μA	10			
	Operation Input Current *1	I_{FA}	I_{ON}=100 mA	Max.	mA	5			
	Recovery Input Current	I_{FR}	V_{OFF}=Rating I_{ON}=100 μA	Min.	mA	0.2			
Output Characteristics	On-resistance	R_{ON}	I_F=10 mA I_{ON}=100 mA Time to flow current is within one second	Min.	Ω	0.2	0.3	1.0	3.0
				Typ.		0.5	0.7	1.5	4.5
				Max.		0.75	1.0	2.0	6.2
	Off-state Leakage Current*2	I_{OFF}	V_{OFF}=Rating	Max.	mA	1.0			
	Output Terminal Capacitance	C_{OUT}	V_{OFF}=50 V f=1 MHz	Typ.	pF	70	50	35	25
Coupling Characteristics	Input-to-output Capacitance	C_{IO}	f=1 MHz	Typ.	pF	1.3			
	Turn-on Time *3	t_{ON}	I_F=10 mA I_{ON}=100 mA	Typ.	ms	0.3			
				Max.		1.0			
	Turn-off Time *3	t_{OFF}		Typ.	ms	0.2			
				Max.		1.0			

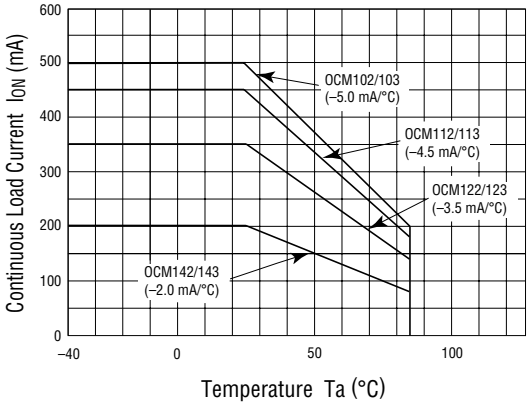
*1 : Can correspond to special specification I_{FA}<3.0 mA
*2 : Can correspond to special specification I_{OFF}<1.0 nA
*3 : Can correspond to special specification t_{ON} / t_{OFF}<0.5 ms

TYPICAL CHARACTERISTICS

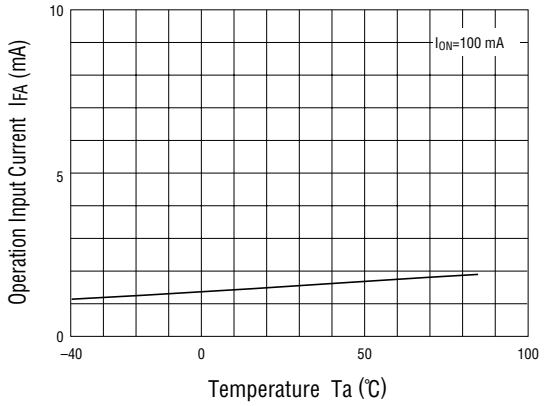
- **Derating Factor of Continuous Forward Current**



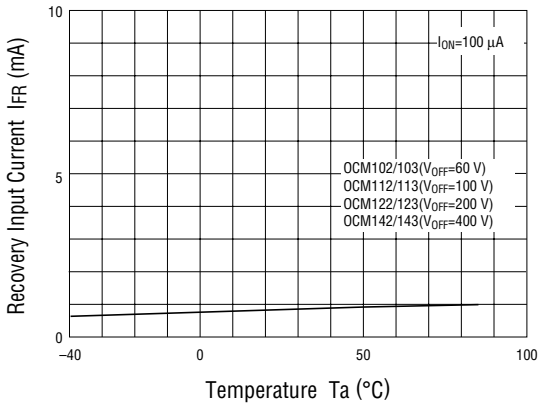
- **Derating Factor of Load Current**



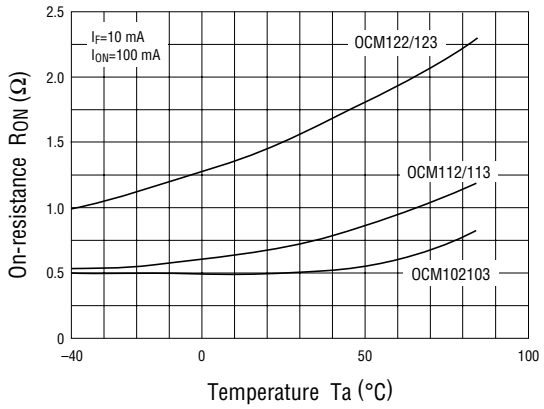
- **Operation Input Current vs. Ambient Temperature**



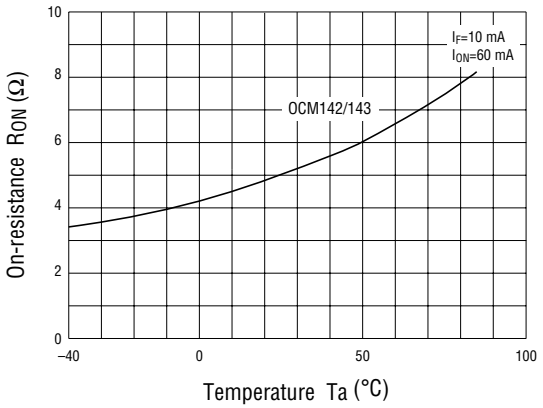
- **Recovery Input Current vs. Ambient Temperature**



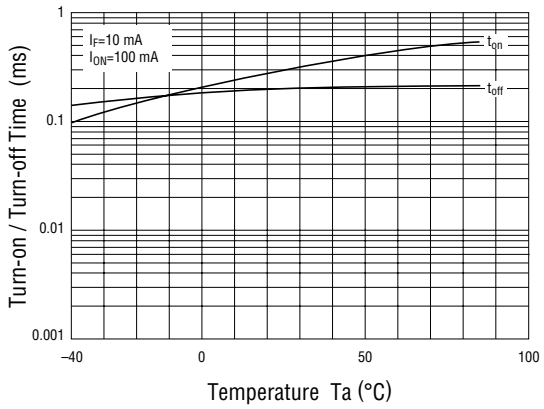
- **On-resistance vs. Ambient Temperature 1**



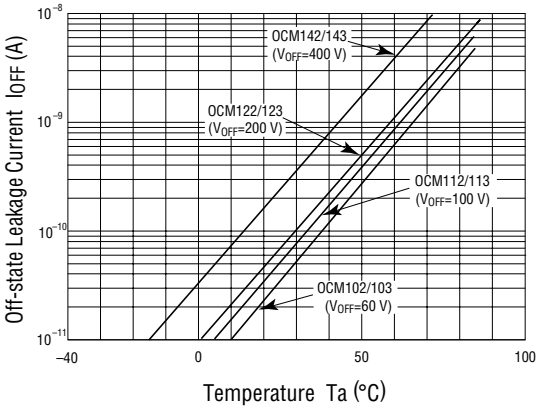
- **On-resistance vs. Ambient Temperature 2**



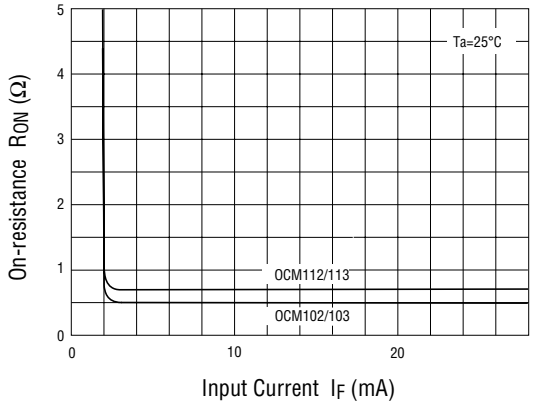
- **Turn-on/Turn-off Time vs. Ambient Temperature**



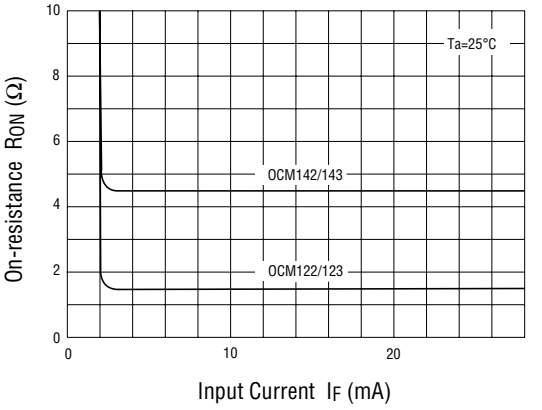
- **Off-state Leakage Current vs. Ambient Temperature**



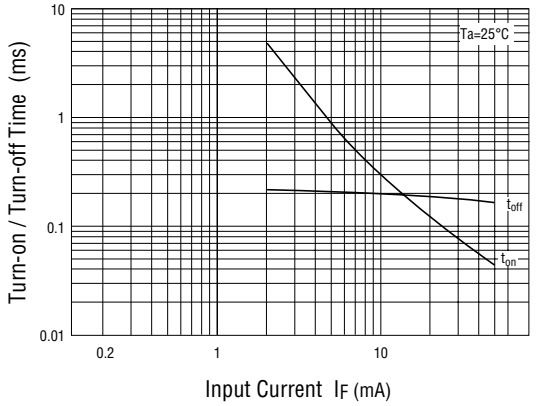
- **Continuous Forward Current vs. On-resistance 1**



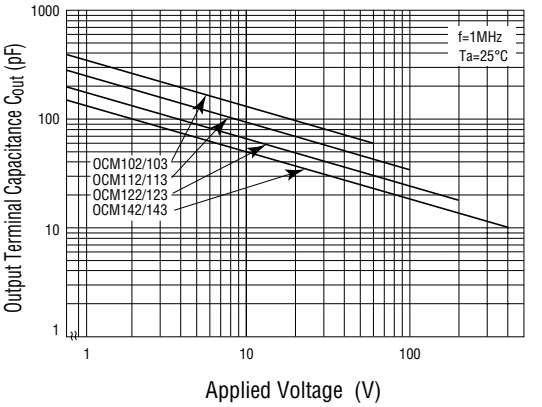
- **Continuous Forward Current vs. On-resistance 2**



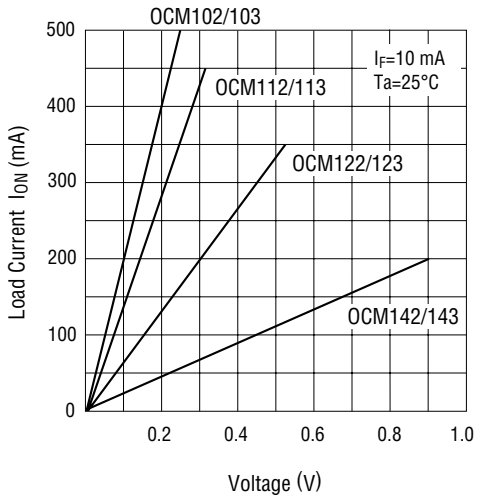
- **Continuous Forward Current vs. Turn-on/Turn-off Time**



- **Output Terminal Capacitance vs. Applied Voltage**



- **Load Current vs. Voltage**



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