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OKI electronic components

OCM1□4, 1□5 SERIES

Low Output-capacitance Type Optical MOS Relay For DC Load Only

GENERAL DESCRIPTION

The OCM1□4 and OCM1□5 Series are optical MOS relays for DC load only that provide high-speed response and are capable of handling high-frequency signals. The input portion is an infrared light emitting diode. The output portion uses a combination of low-capacitance 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
- Excellent high-frequency characteristics (>30 dB isolation at 10 MHz)
- High-speed response (t_{ON} and t_{OFF} is 200 μs or less)
- Low leak current
- No chattering or swich bounces
- No mechanical switching noises
- Small size and easy mounting (6-Pin plastic DIP or SMD-type [gull-wing] package)

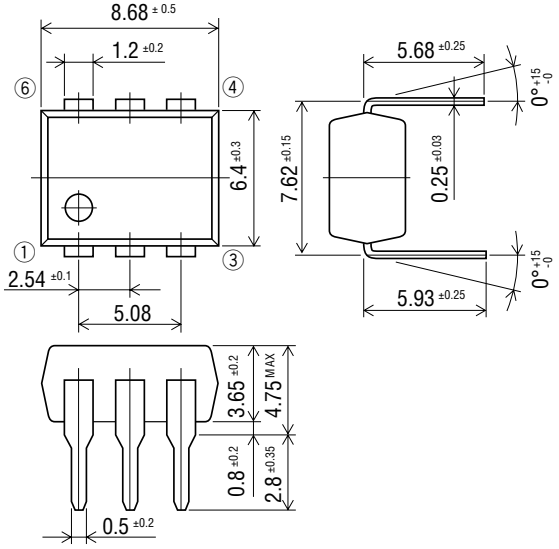
APPLICATIONS

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

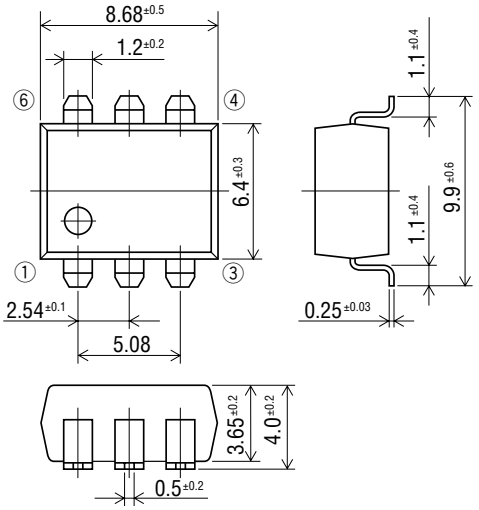
PIN CONFIGURATION

(Unit: mm)

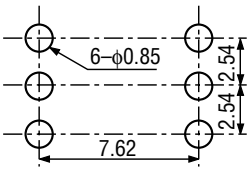
• DIP Type



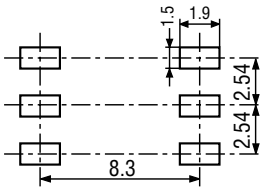
• SMD Type (gull-wing)



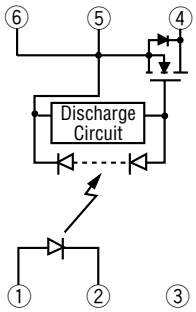
• Through hole (Bottom view)



• 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				OCM104	OCM114	OCM124	OCM144
	Parameter	Symbol	Condition	Unit	OCM105	OCM115	OCM125	OCM145
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 10 ms 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	100	70	50	20
	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	0.1		0.07	0.025
	Power Dissipation	P_D		mW	300			
	Total Power Dissipation	P_{tot}		mW	325			
	Isolation Voltage	V_{IO}		V(rms)	1500			
					OCM104	OCM114	OCM124	OCM144
					4000			
					OCM105	OCM115	OCM125	OCM145
	Operating Temperature	T_{opr}		°C	–40 to +85			
	Storage Temperature	T_{stg}		°C	–40 to +100			

ELECTRICAL CHARACTERISTICS

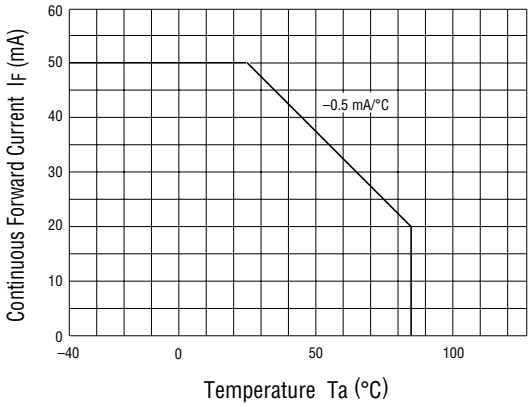
(Ambient temperature Ta=25°C)

	Product Name					OCM104 / OCM105	OCM114 / OCM115	OCM124 / OCM125	OCM144 / OCM145
	Parameter	Symbol	Condition		Unit				
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			
	Input Current *1	I_{FA}	I_{ON}=Rating	Max.	mA	5			
	Input Current	I_{FR}	V_{OFF}=Rating I_{ON}=100 μA	Min.	mA	0.2			
Output Characteristics	On-resistance Recovery	R_{ON}	I_F=10 mA I_{ON}=100 mA Time to flow current is within one second	Min.	Ω	10	20	50	150
				Typ.		15	32.5	75	300
				Max.		20	45	100	450
	Off-state Leakage Current*2	I_{OFF}	V_{OFF}=Rating	Max.	nA	1.0			
	Output Terminal Capacitance	C_{OUT}	V_{OFF}=50 V f=1 MHz	Typ.	pF	7			
Coupling Characteristics	Input-to-output Capacitance	C_{IO}	f=1 MHz	Typ.	pF	1.3			
	Turn-on Time	t_{ON}	I_F=10 mA I_{ON}= OCM104, 105:10mA OCM114, 115:10mA OCM124, 125: 4mA OCM144, 145: 1mA	Typ.	μs	30			
				Max.		200			
	Turn-off Time	t_{OFF}		Typ.	μs	60			
				Max.		200			

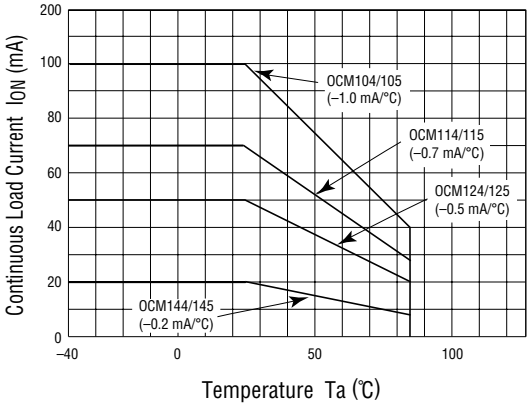
*1 Can correspond to special specification I_{FA}<3.0 mA
*2 Can correspond to special specification I_{OFF}<0.1 nA

TYPICAL CHARACTERISTICS

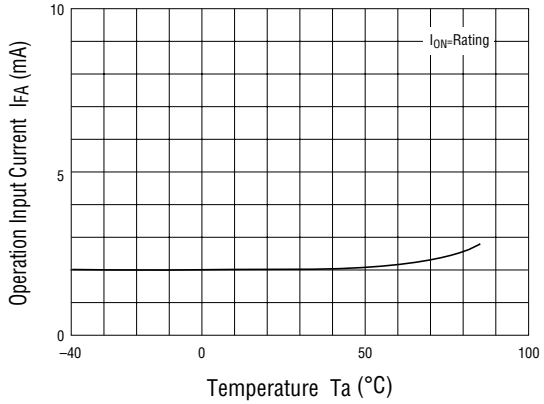
- **Derating Factor of Continuous Foward Current**



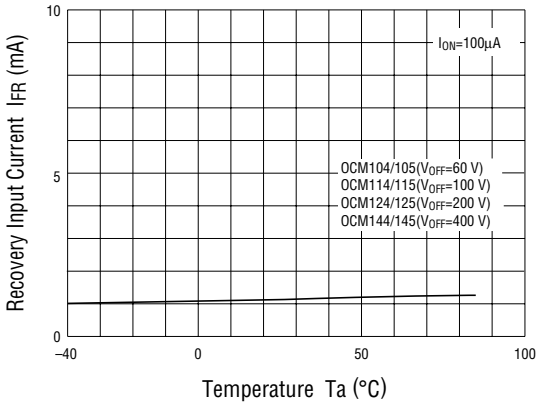
- **Derating Factor of Load Current**



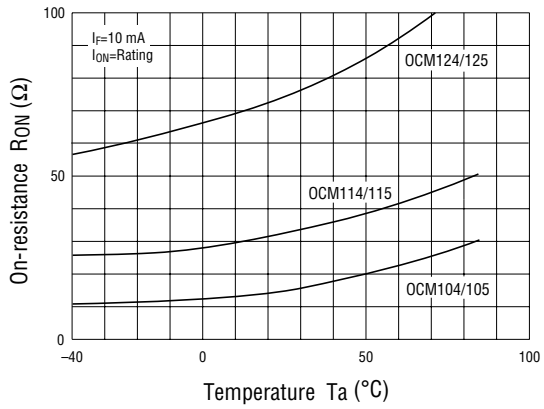
- **Operation Input Current vs. Ambient Temperature**



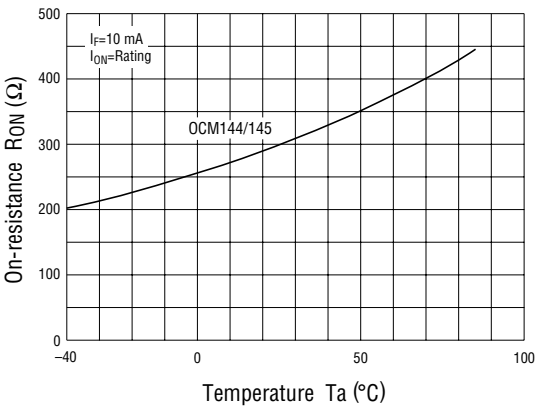
- **Recovery Input Current vs. Ambient temprature**



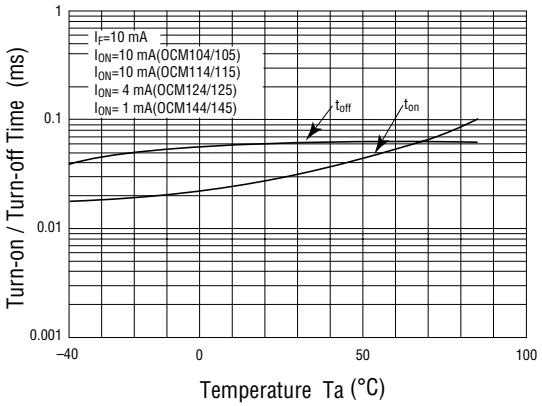
- **On-resistance vs. Ambient Temperature 1**



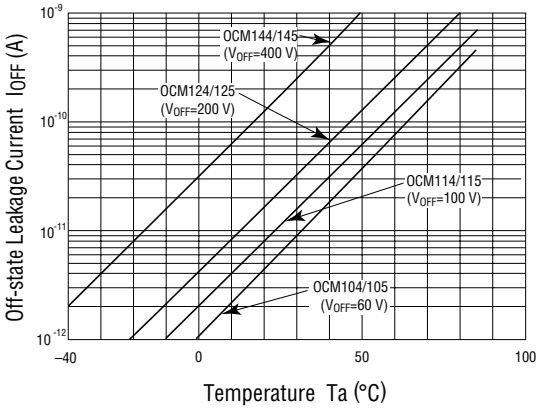
- **On-resistance vs. Ambient Temperature 2**



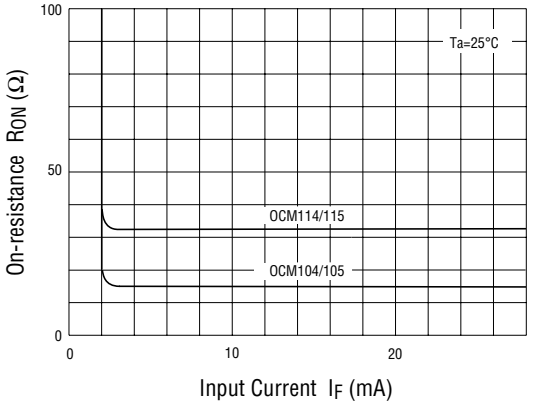
- **Turn-on/Turn-off Time vs. Ambient Temperature**



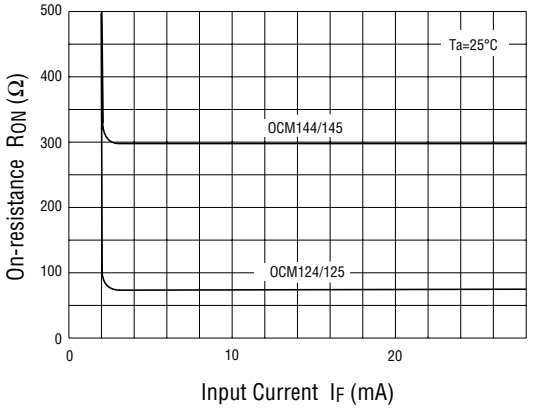
- **Off-state Leakage Current vs. Ambient Temperature**



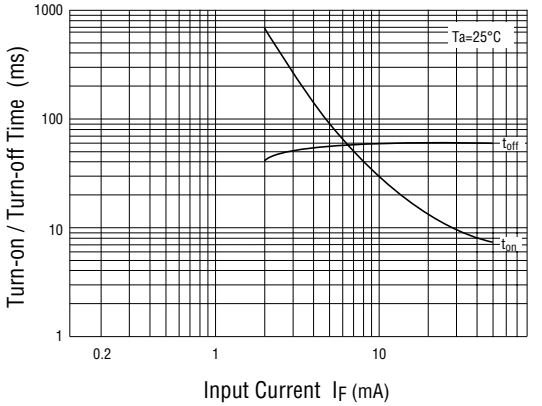
- **Continuous Forward Current vs. On-resistance 1**



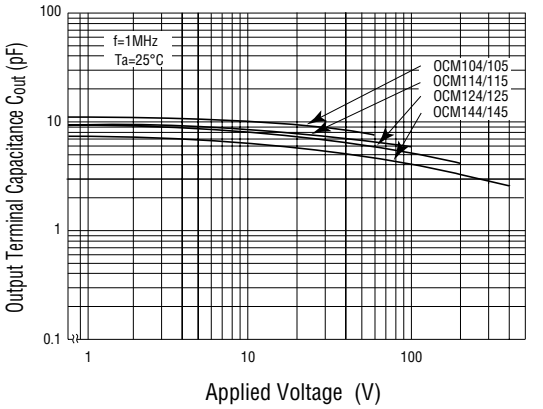
- **Continuous Forward Current vs. On-resistance 2**



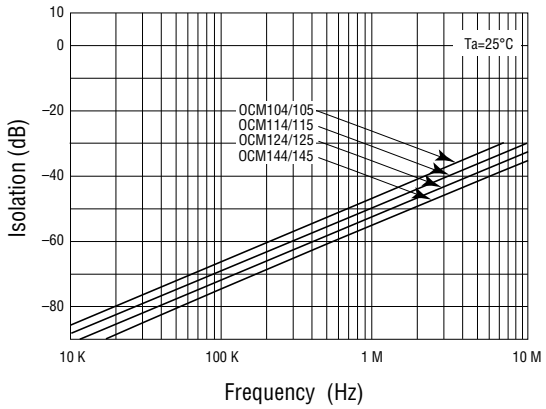
- **Continuous Forward Current vs. Turn-on/Turn-off Time**



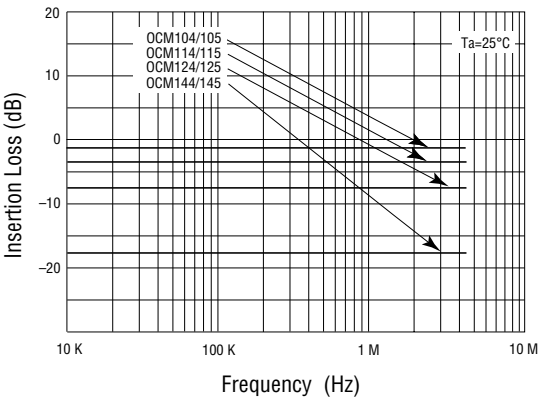
- **Output Terminal Capacitance vs. Applied Voltage**



- **Isolation**



- **Insertion Loss**



- **Load Current vs. Voltage**