

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 μ s or less)
- Low leak current
- No chattering or switch bounces
- No mechanical switching noises
- Small size and easy mounting (6-Pin plastic DIP or SMD-type [gull-wing] package)

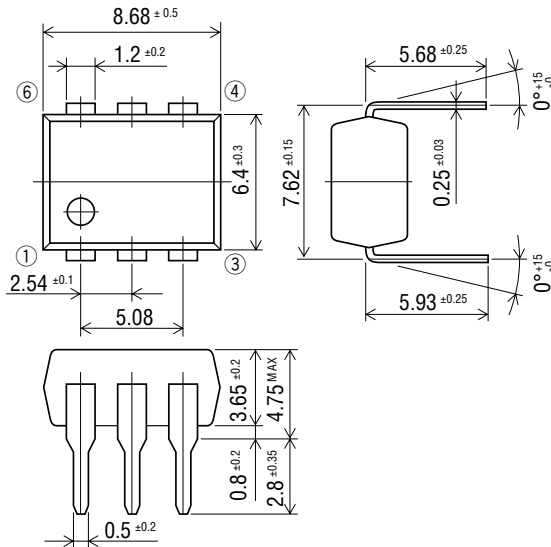
APPLICATIONS

- 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

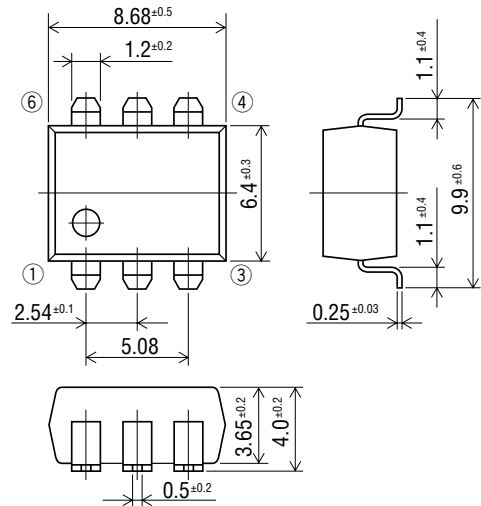
PIN CONFIGURATION

(Unit: mm)

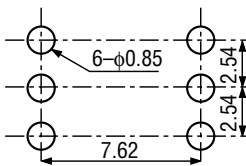
• DIP Type



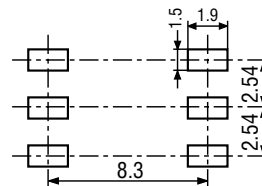
• SMD Type (gull-wing)



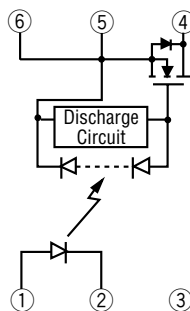
• Through hole (Bottom view)



• 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

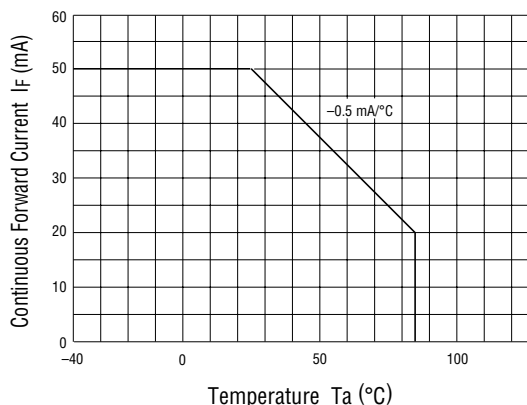
(Ambient temperature Ta=25°C)

Product Name						OCM104	OCM114	OCM124	OCM144
Parameter		Symbol	Condition		Unit	OCM105	OCM115	OCM125	OCM145
Input Characteristics	Forward Voltage	V_F	$I_F=10\text{ mA}$	Min.	V	1.0			
				Max.		1.3			
	Reverse Current	I_R	$V_R=5\text{ V}$	Max.	μA	10			
	Input Current *1	I_{FA}	$I_{ON}=\text{Rating}$	Max.	mA	5			
Output Characteristics	Input Current	I_{FR}	$V_{OFF}=\text{Rating}$ $I_{ON}=100\text{ }\mu\text{A}$	Min.	mA	0.2			
	On-resistance Recovery	R_{ON}	$I_F=10\text{ mA}$ $I_{ON}=100\text{ mA}$ 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}	$V_{OFF}=\text{Rating}$	Max.	nA	1.0			
Coupling Characteristics	Output Terminal Capacitance	C_{OUT}	$V_{OFF}=50\text{ V}$ $f=1\text{ MHz}$	Typ.	pF	7			
	Input-to-output Capacitance	C_{IO}	$f=1\text{ MHz}$	Typ.	pF	1.3			
	Turn-on Time	t_{ON}	$I_F=10\text{ mA}$ $I_{ON}=\text{Rating}$	Typ.	μs	30			
				Max.		200			
	Turn-off Time	t_{OFF}	OCM104, 105: 10mA OCM114, 115: 10mA OCM124, 125: 4mA OCM144, 145: 1mA	Typ.	μs	60			
				Max.		200			

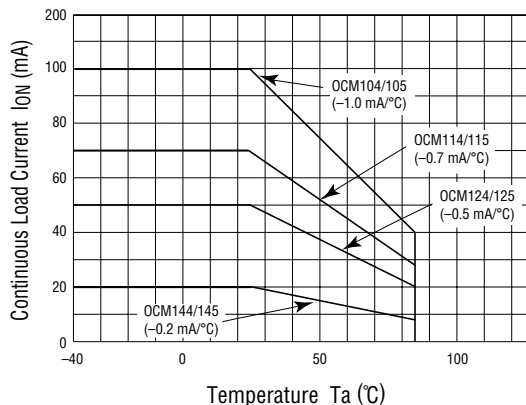
*1 Can correspond to special specification $I_{FA}<3.0\text{ mA}$ *2 Can correspond to special specification $I_{OFF}<0.1\text{ nA}$

TYPICAL CHARACTERISTICS

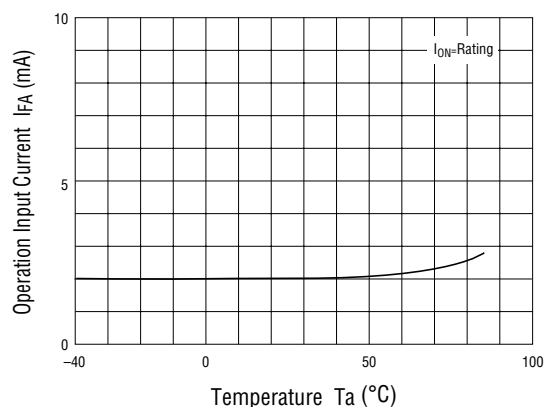
- Derating Factor of Continuous Forward Current



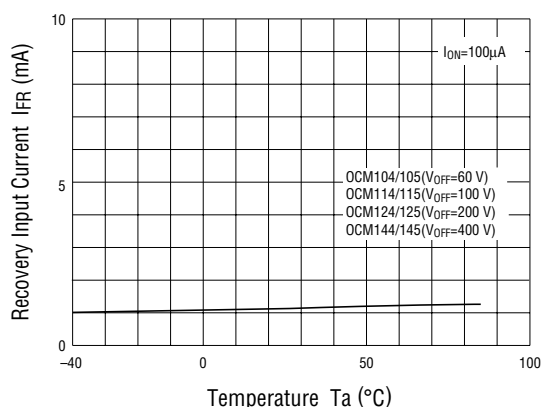
- Derating Factor of Load Current



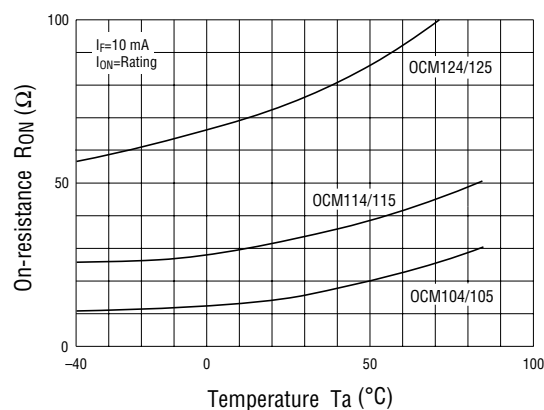
- Operation Input Current vs. Ambient Temperature



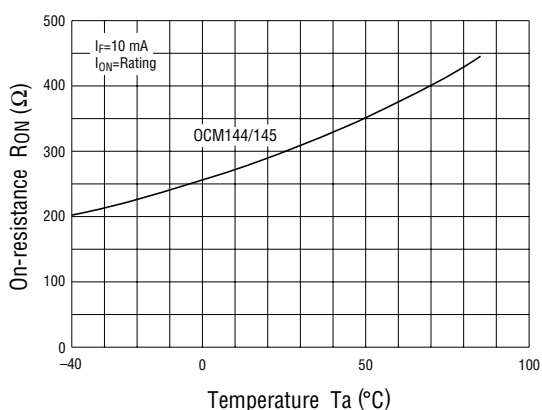
- Recovery Input Current vs. Ambient temperature



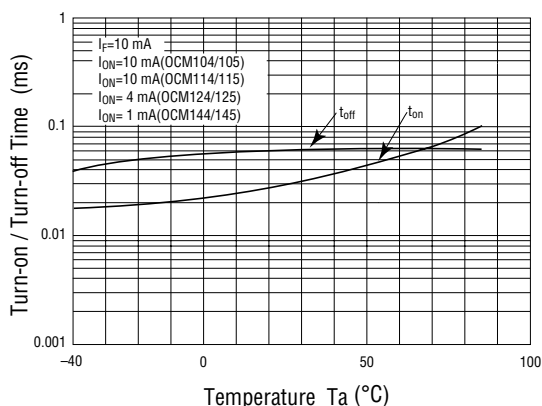
- On-resistance vs. Ambient Temperature 1



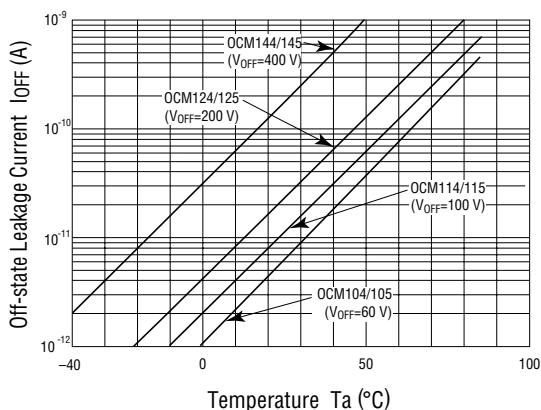
- On-resistance vs. Ambient Temperature 2



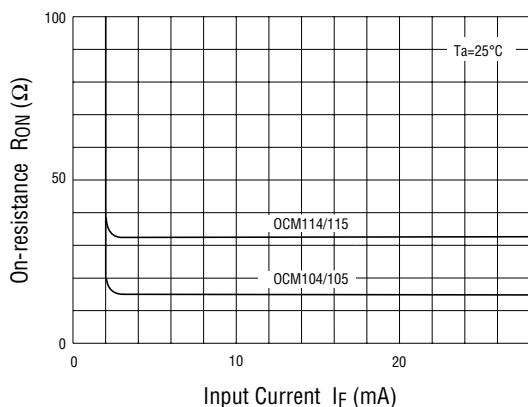
- Turn-on/Turn-off Time vs. Ambient Temperature



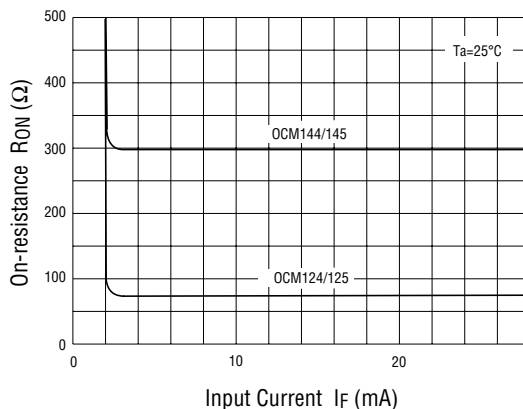
- Off-state Leakage Current vs. Ambient Temperature



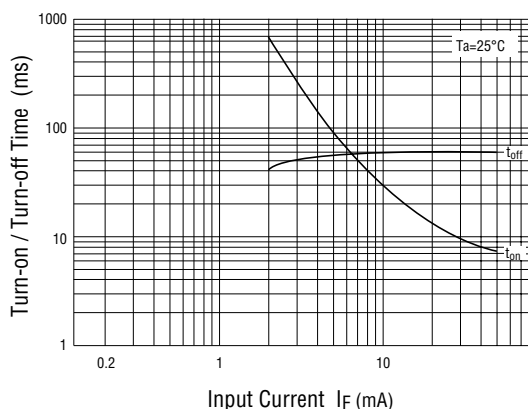
- Continuous Forward Current vs. On-resistance 1



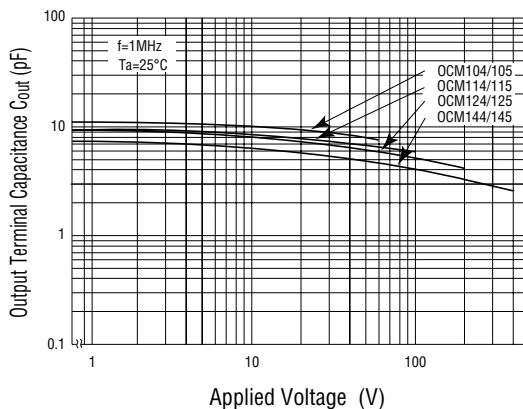
- Continuous Forward Current vs. On-resistance 2



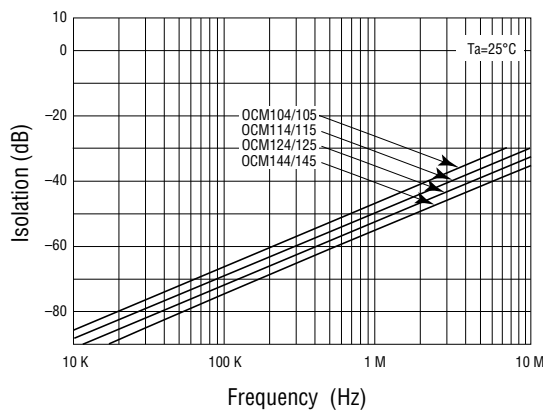
- Continuous Forward Current vs. Turn-on/Turn-off Time



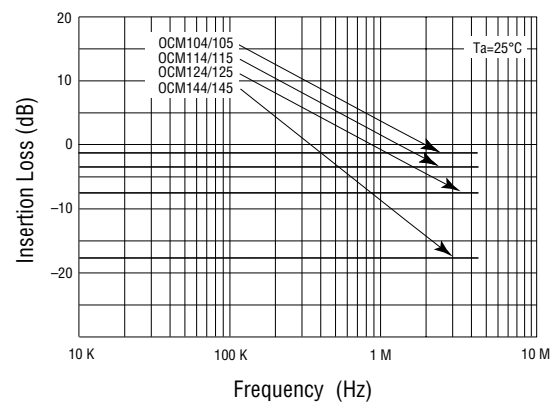
- Output Terminal Capacitance vs. Applied Voltage



• Isolation



• Insertion Loss



• Load Current vs. Voltage

