

OCM 2X6, 2X7 SERIES

Bidirectional Optical MOS Relay

GENERAL DESCRIPTION

The OCM2X6 and OCM2X7 Series are bidirectional (AC) optical MOS relays that are lower in cost than the OCM2X0/2X1 Series. The input portion is a GaAs infrared light emitting diode. The output portion uses a combination of silicon VDMOS (Vertical Diffusion MOS) FETs and silicon photovoltaic devices. An integrated optical coupler performs the isolated I/O switching action; a 5-mA or 10-mA low-level input can control the device's on/off function. The device is encased in an extremely small 6-pin plastic DIP or F-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

- Low offset voltage
- Large range of current control
- Non-contact, optical operation
- Electronic circuit compatibility
- No chattering or switch bounces
- No mechanical switching noises
- Small size
- Low "on" resistance
- Low drive current of 5 mA or less
- High isolation voltage (4 kV for the OCM2X7)

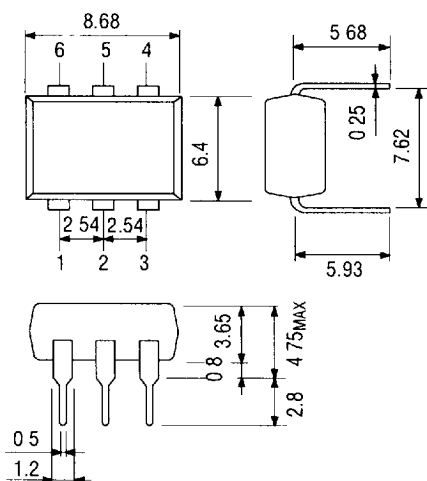
APPLICATIONS

- Computer cards and portable computing applications (such as PCMCIA cards)
- Telecommunications equipment
- Measurement equipment
- Home electronics
- Automatic meter reading equipment
- Other applications requiring small size or high performance
- Other applications requiring non-contact switches

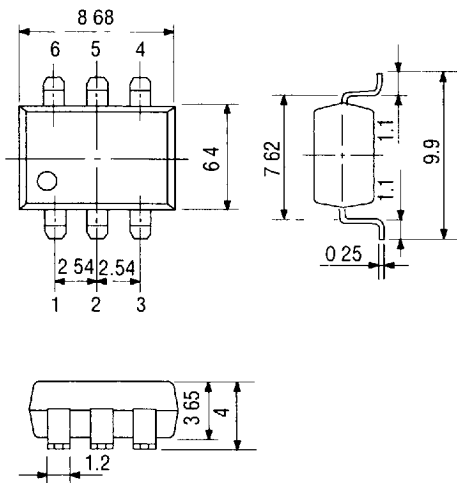
PIN CONFIGURATION

(Unit: mm)

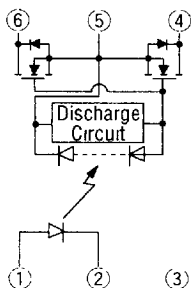
• DIP



• F type (Gull Wing)



• 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 Ta=25°C)

Parameter			Symbol	Rating	Unit
LED	Forward Current		I _F	50	mA
	Derating		—	See characteristics curve	mA/°C
	Peak Forward Current *1		I _{FM}	0.5	A
	Reverse Voltage		V _R	5	V
	Power Dissipation		P _{DL}	75	mW
FET	Load Voltage	OCM206, OCM207	V _D	60	V
		OCM216, OCM217		100	
		OCM226, OCM227		200	
		OCM246, OCM247		400	
	Continuous Load Current	OCM206, OCM207	I _D	350	mA
		OCM216, OCM217		300	
		OCM226, OCM227		200	
		OCM246, OCM247		120	
	Derating		—	See characteristics curve	mA/°C
	Surge Load Current *2	OCM206, OCM207	I _{SUG}	1.0	A
		OCM216, OCM217			
		OCM226, OCM227			
		OCM246, OCM247			
Power Dissipation		P _D	450	mW	
Total Power Dissipation			P _{TOT}	500	mW
Isolation Voltage	OCM206, OCM216	V _{I-O}	1500	V	
	OCM226, OCM246				
	OCM207, OCM217		4000	V	
Operating Temperature			T _{opr}	−40 to +85	°C
Storage Temperature			T _{stg}	−40 to +100	°C

*1 Pulse width 100 μs, cycle 10 ms

*2 Pulse width 1 ms, 1 shot

ELECTRICAL CHARACTERISTICS

(Ambient Temperature Ta=25°C)

Parameter			Symbol	Test Condition	Min.	Typ.	Max.	Unit	Note
LED	Forward Voltage		V _F	I _F =10 mA	1.0	—	1.3	V	—
	Reverse Current		I _R	V _R =5 V	—	—	10	μA	—
FET	ON Resistance	OCM206, OCM207	R _{ON}	I _F =10 mA I _D =100 mA	1.0	2.0	3.0	Ω	Time to flow current is within one second
		OCM216, OCM217			2.0	3.0	4.0		
		OCM226, OCM227			4.0	7.0	10.0		
		OCM246, OCM247			10.0	22.0	33.0		
	Leakage Current *1	OCM206, OCM207	I _{LEAK}	V _D =60 V	—	—	1.0	μA	—
		OCM216, OCM217		V _D =100 V					
		OCM226, OCM227		V _D =200 V					
		OCM246, OCM247		V _D =400 V					
	Output Capacitance	OCM206, OCM207	C _{OUT}	V _D =50 V f=1 MHz	—	35	—	pF	—
		OCM216, OCM217			—	25	—		
		OCM226, OCM227			—	15	—		
		OCM246, OCM247			—	10	—		
Coupled	Operating LED Current *2		I _{F ON}	I _D =100 mA	—	—	5	mA	—
	Returning LED Current	OCM206, OCM207	I _{F OFF}	V _D =60 V I _D =100 μA	0.2	—	—	mA	—
		OCM216, OCM217		V _D =100 V I _D =100 μA					
		OCM226, OCM227		V _D =200 V I _D =100 μA					
		OCM246, OCM247		V _D =400 V I _D =100 μA					
	I/O Capacitance		C _{I-O}	f=1 MHz	—	1.3	—	pF	—
	Turn ON Time *3		t _{ON}	I _F =10 mA I _D =10 mA	—	0.3	1.0	ms	—
Turn OFF Time *3		t _{OFF}	R _L =100 Ω	—	0.2	1.0	ms	—	

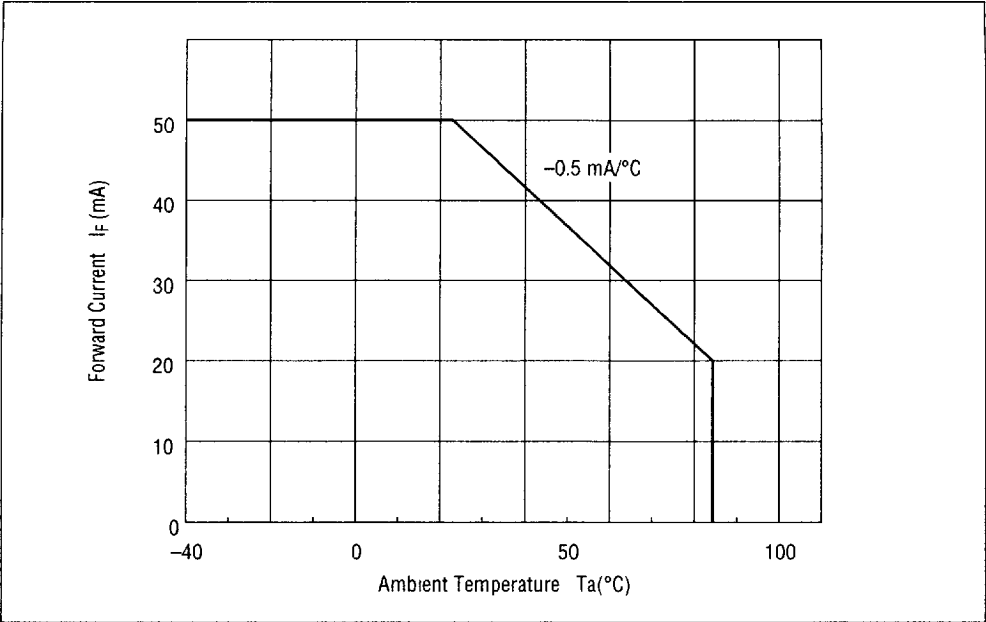
*1 Can correspond to special specification $I_{LEAK} < 1.0\text{ nA}$

*2 Can correspond to special specification $I_{FON} < 3.0\text{ mA}$

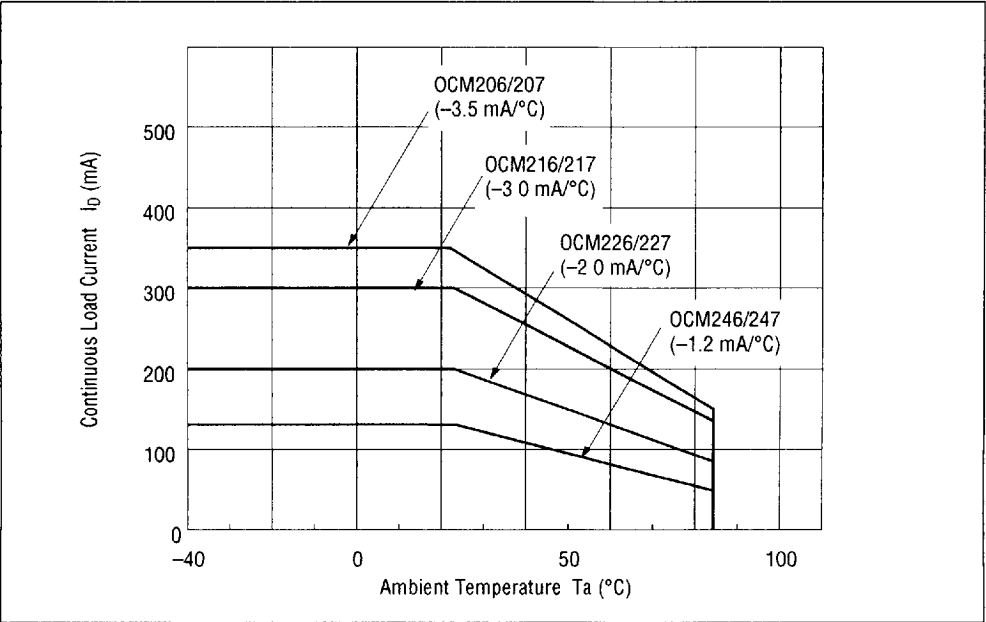
*3 Can correspond to special specification $t_{ON-OFF} < 0.5\text{ ms}$

TYPICAL CHARACTERISTICS

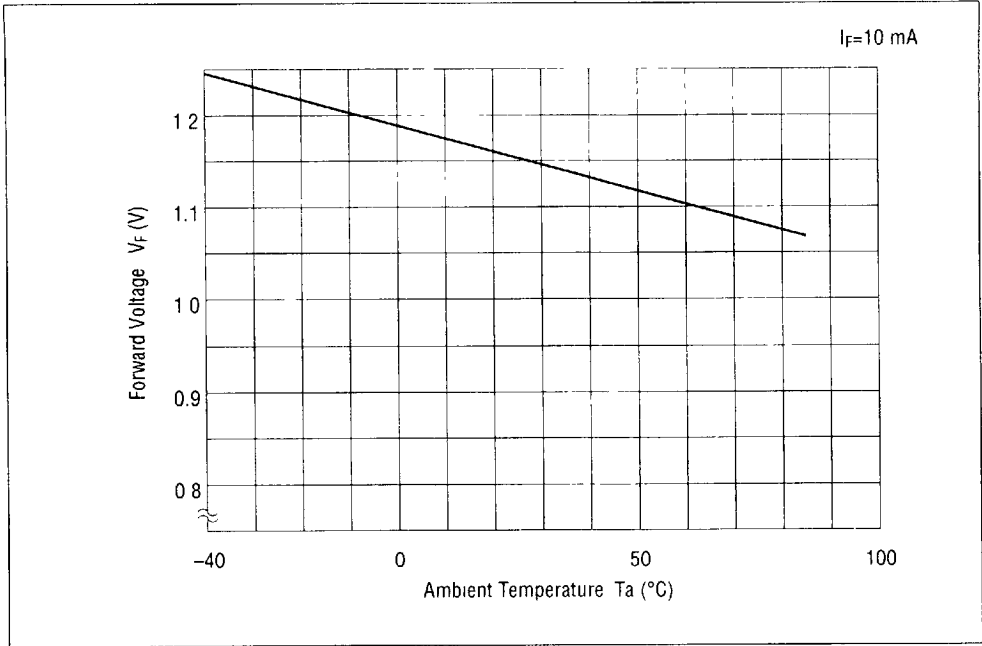
• Forward Current Derating Curve



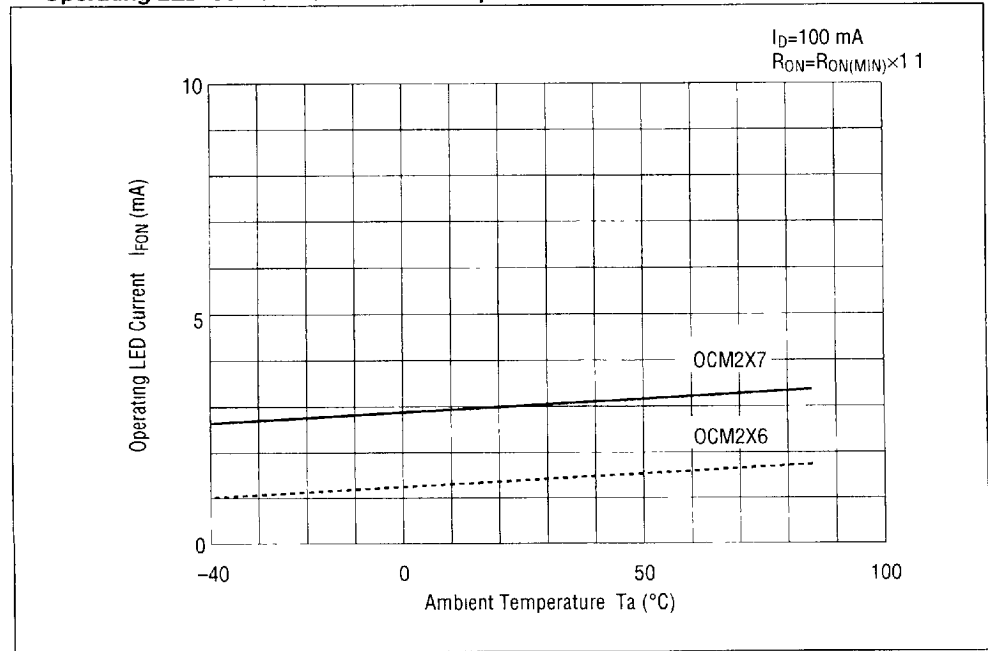
• Continuous Load Current Derating Curve



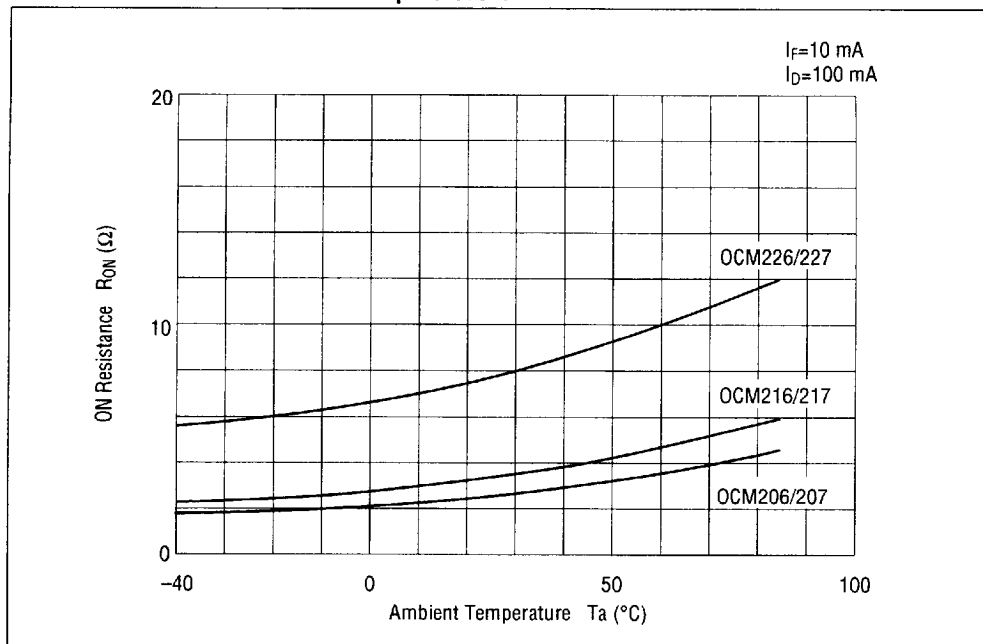
• Forward Voltage vs. Ambient Temperature



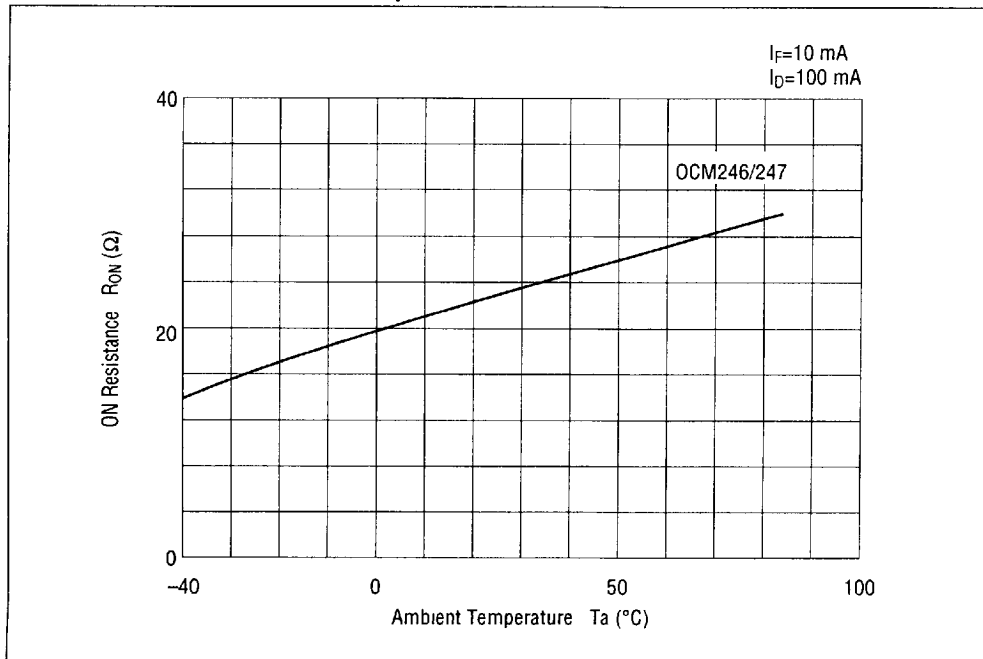
• Operating LED Current vs. Ambient Temperature



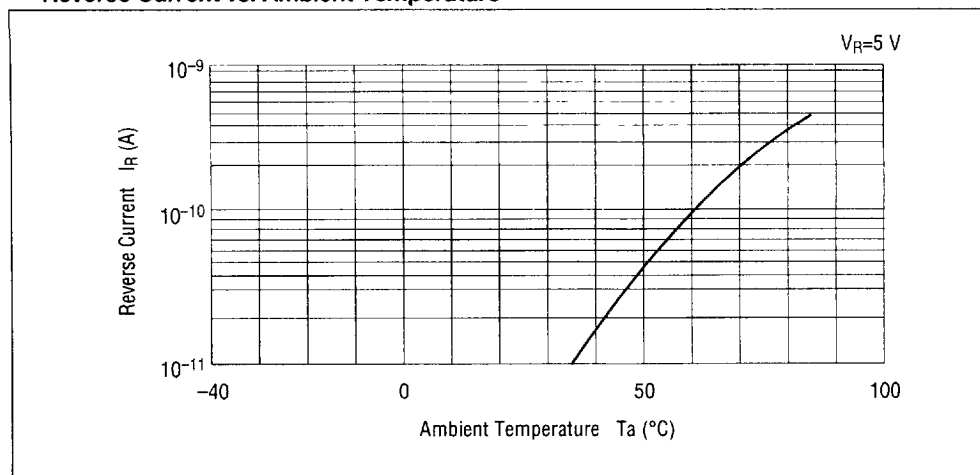
- ON Resistance vs. Ambient Temperature-1



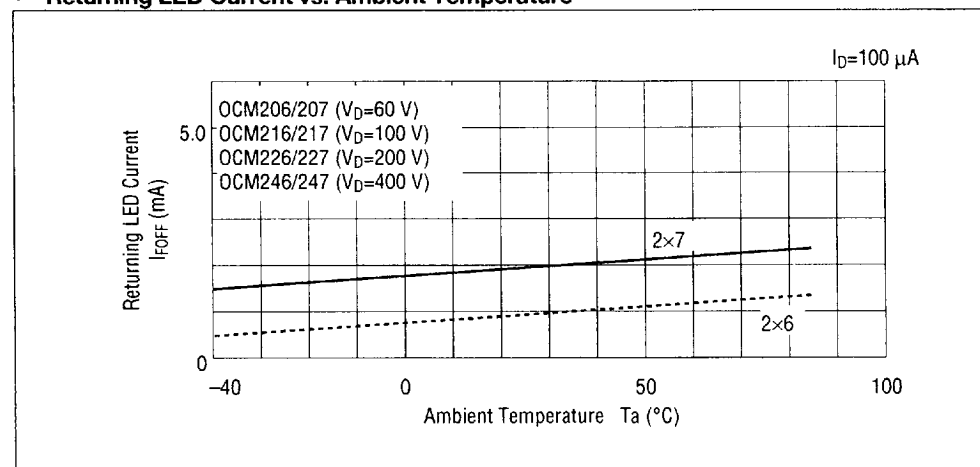
- ON Resistance vs. Ambient Temperature-2



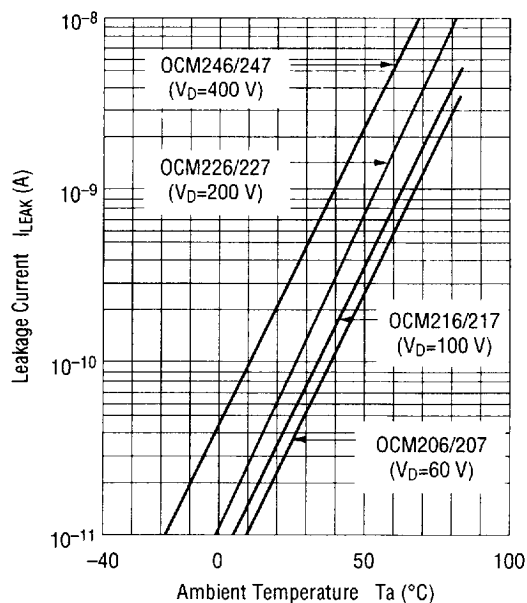
• Reverse Current vs. Ambient Temperature



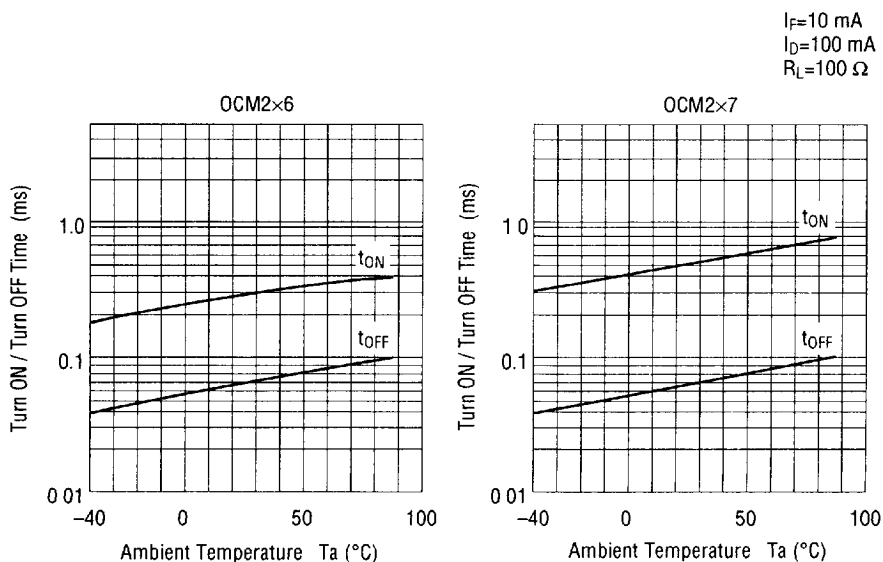
• Returning LED Current vs. Ambient Temperature



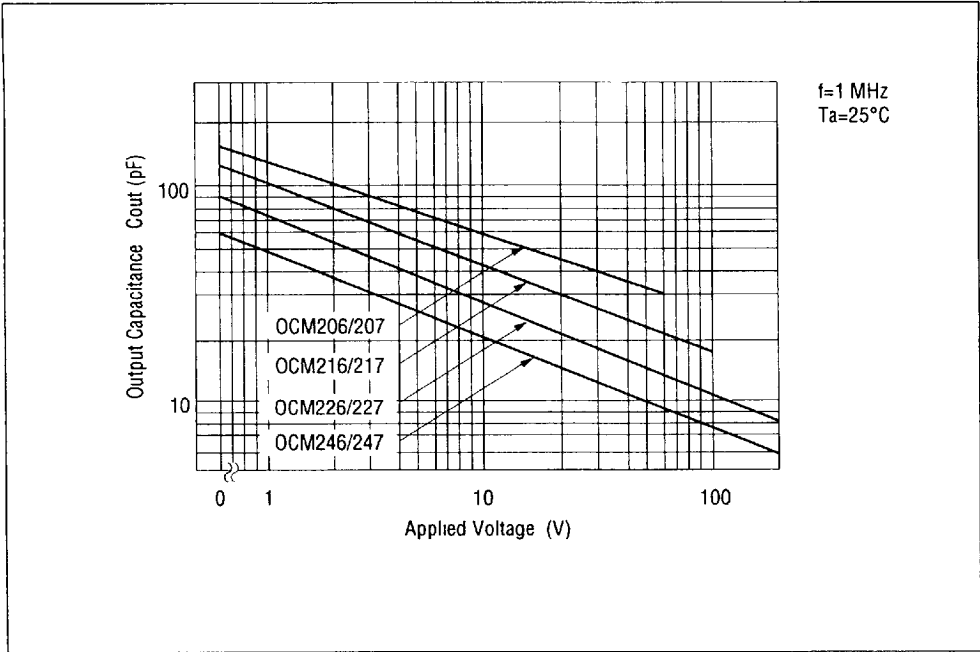
- Leakage Current vs. Ambient Temperature



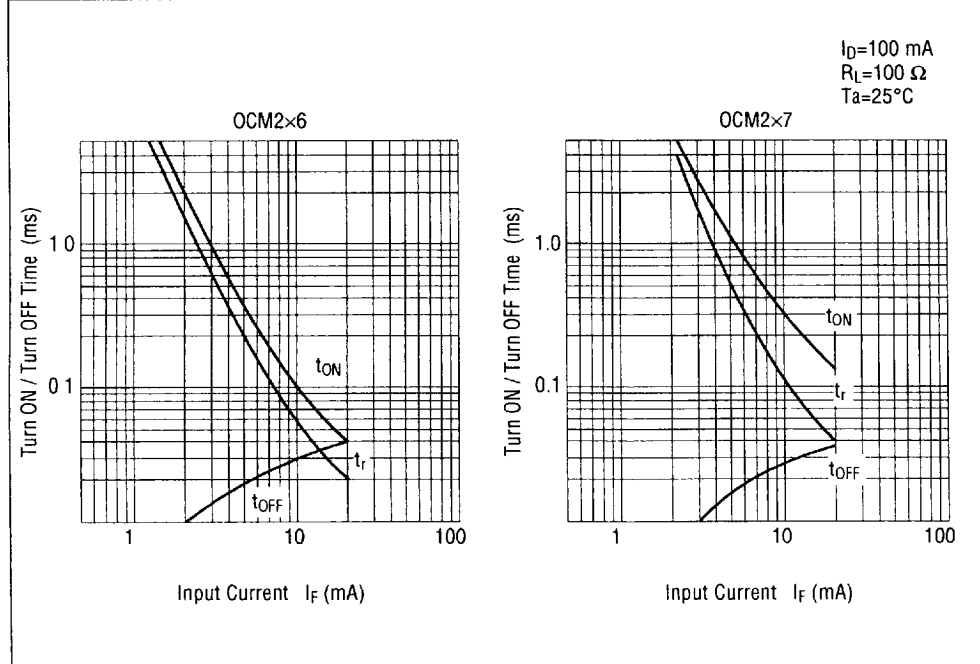
- Turn ON / Turn OFF Time vs. Ambient Temperature



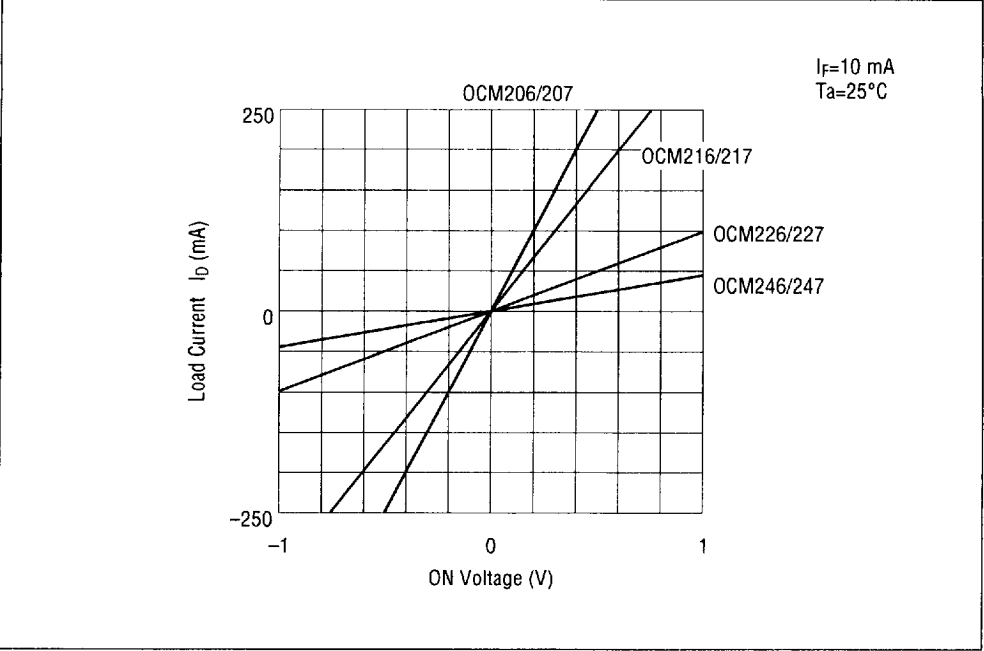
• Output Capacitance vs. Applied Voltage



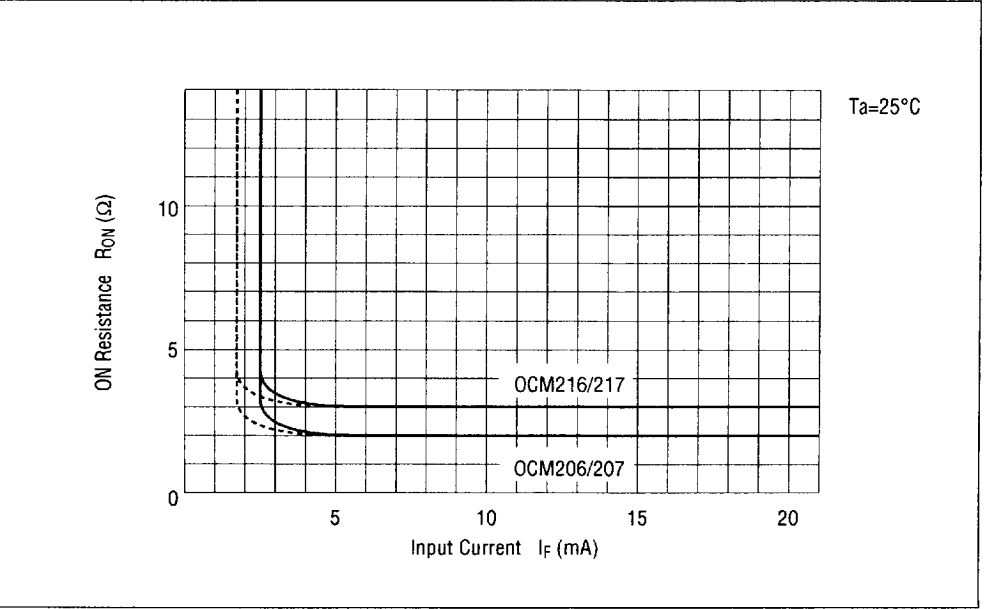
• Turn ON / Turn OFF Time vs. Input Current



• Load Current vs. Voltage

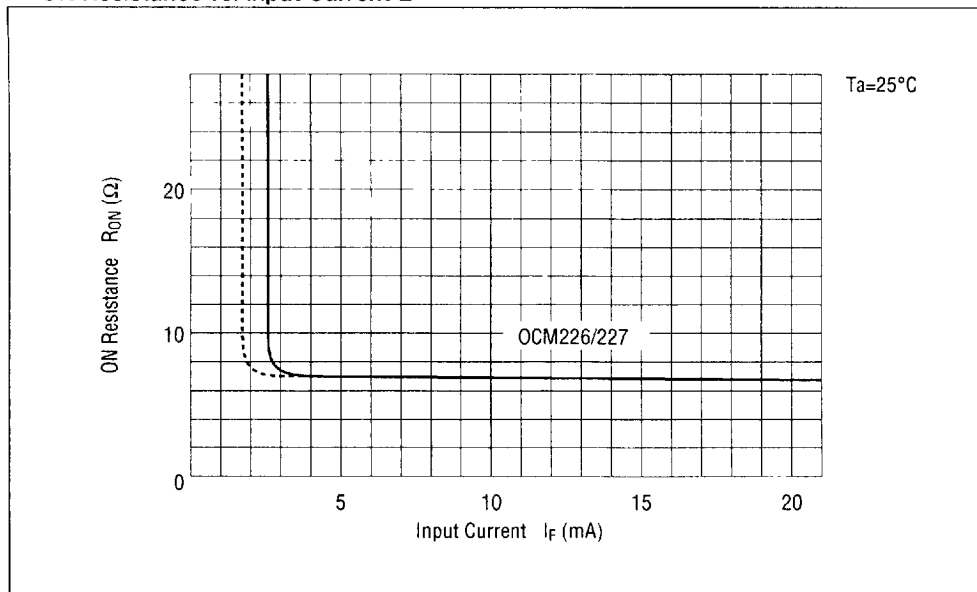


• ON Resistance vs. Input Current-1

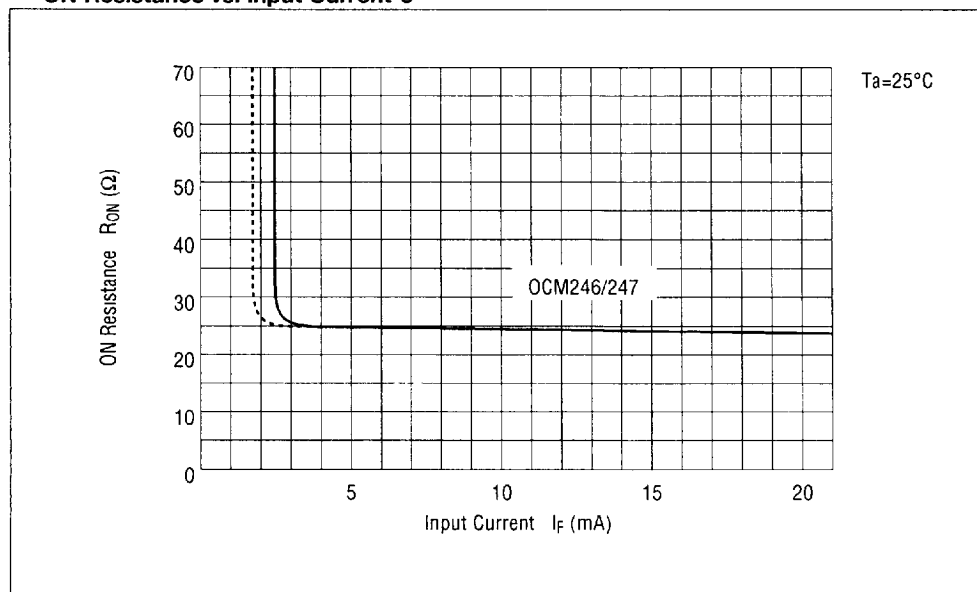


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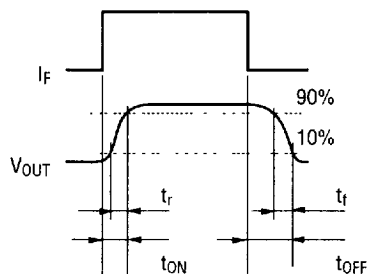
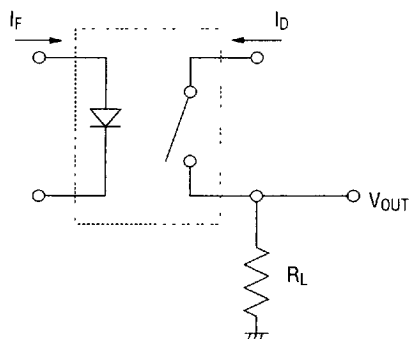
• ON Resistance vs. Input Current-2



• ON Resistance vs. Input Current-3



- Circuit for Measuring Response Characteristics



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