

OKI electronic components

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

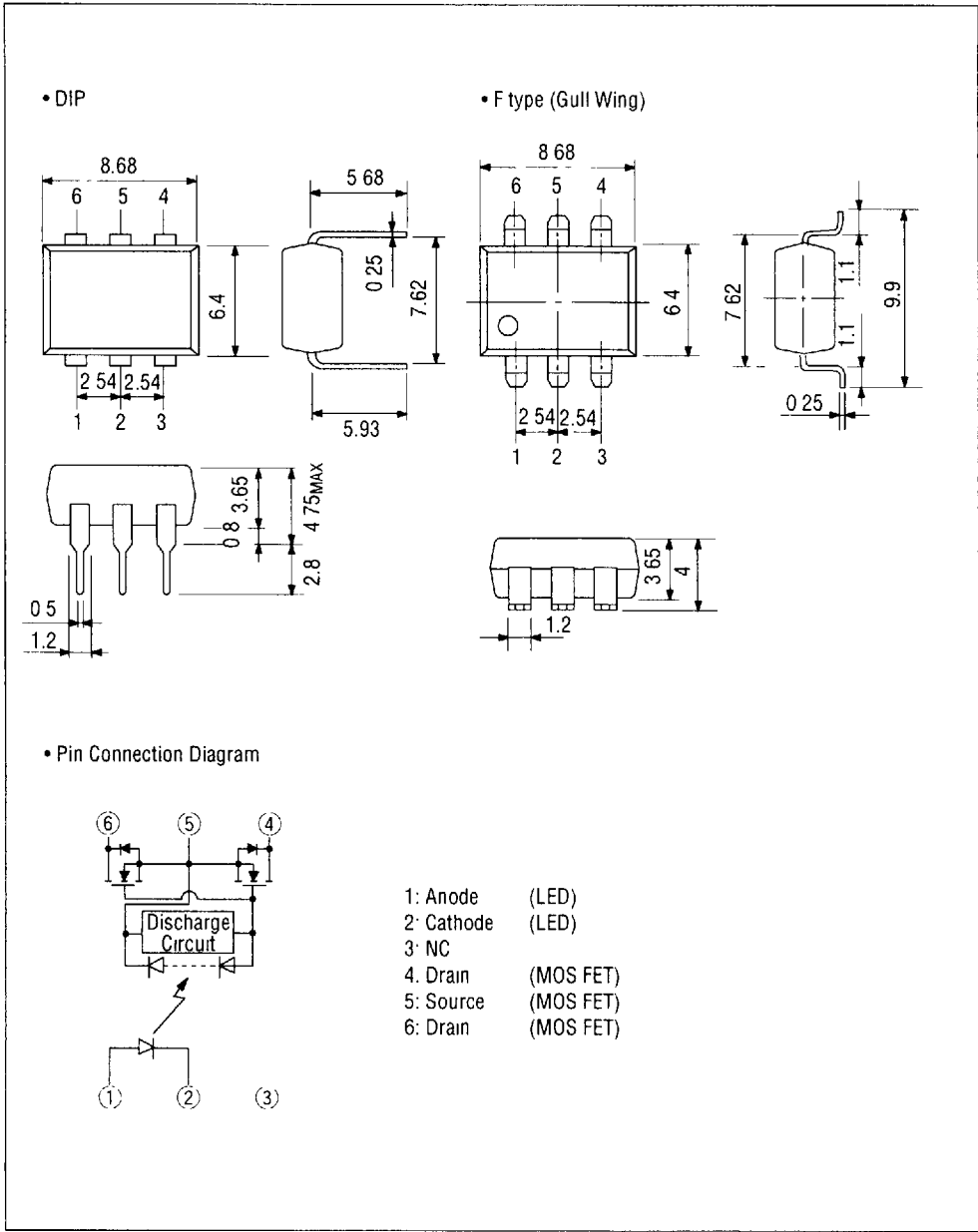
- Low offset voltage
- Large range of current control
- Non-contact, optical operation
- Electronic circuit compatibility
- No chattering or switch bounces
- No mechanical switching noises
- Small size
- Low "on" resistance
- Low drive current of 5 mA or less
- High isolation voltage (4 kV for the OCM2X7)

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)



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		0.7	
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
		OCM227, OCM247			
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

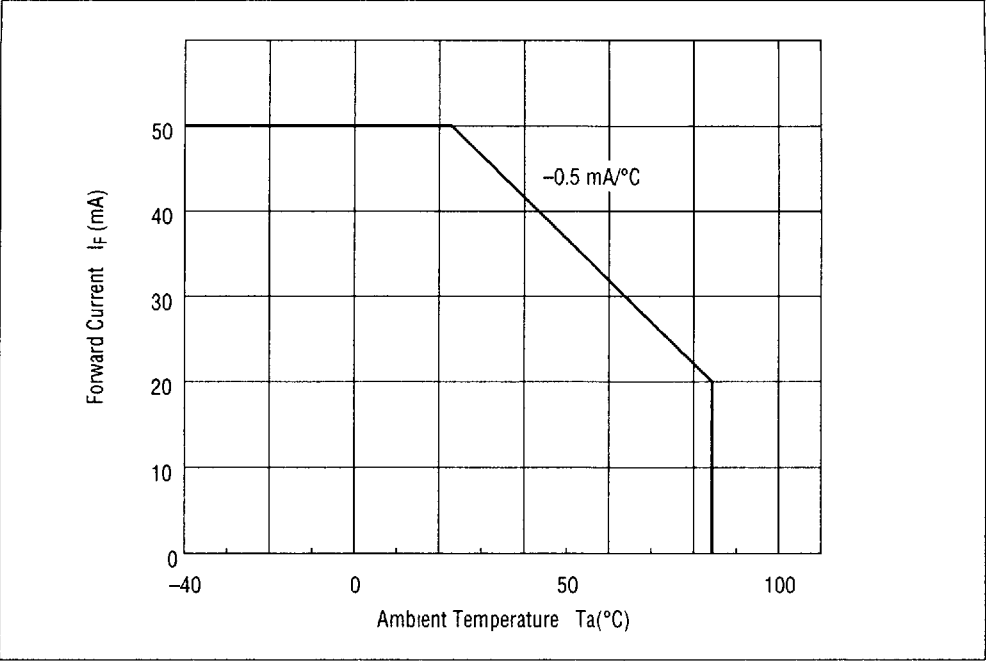
ELECTRICAL CHARACTERISTICS

(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 R _L =100 Ω	—	0.3	1.0	ms	—
Turn OFF Time *3		t _{OFF}		—	0.2	1.0	ms	—	

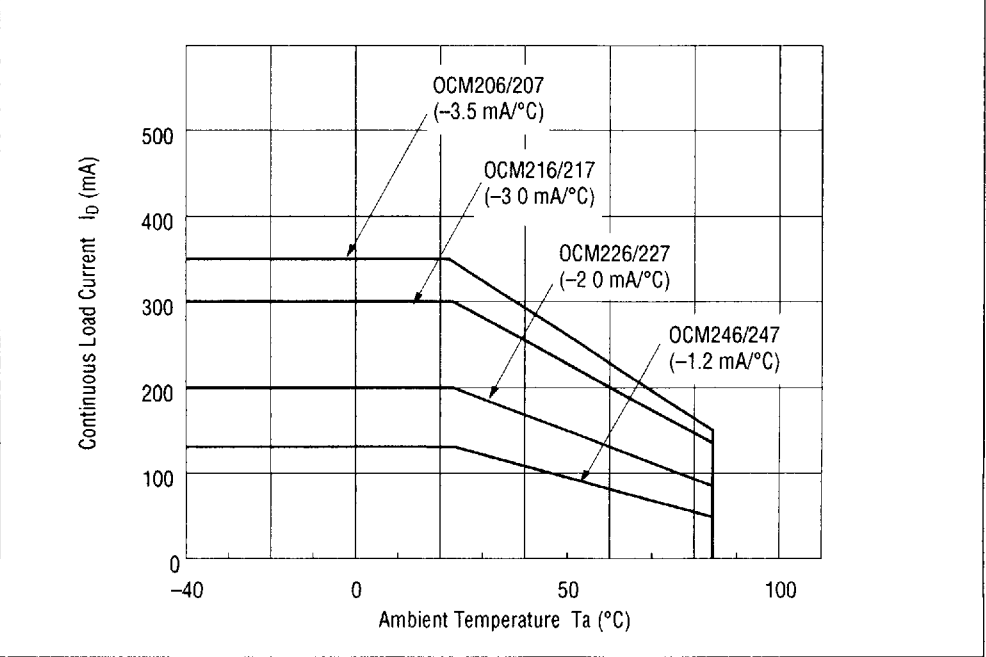
*1 Can correspond to special specification I_{LEAK} < 1.0 nA
*2 Can correspond to special specification I_{FON} < 3.0 mA
*3 Can correspond to special specification t_{ON-OFF} < 0.5 ms

TYPICAL CHARACTERISTICS

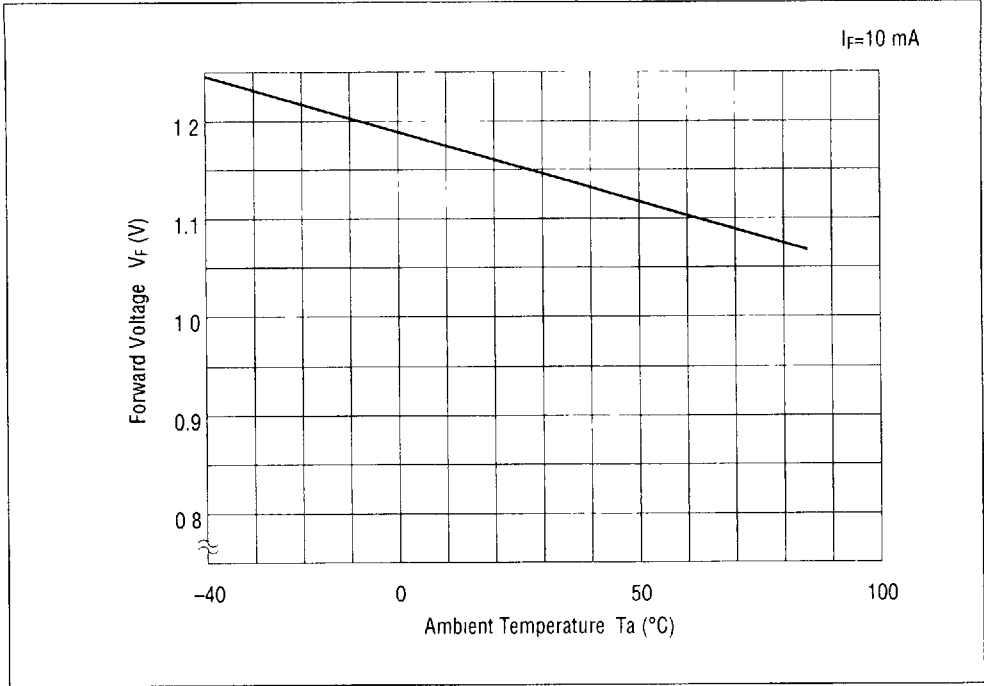
• Forward Current Derating Curve



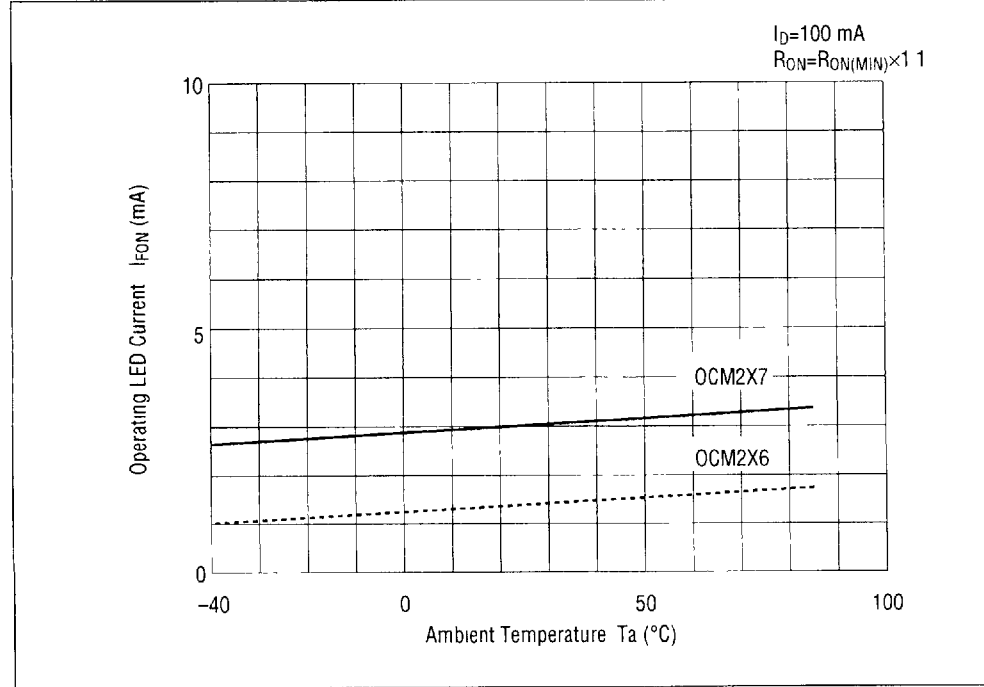
• Continuous Load Current Derating Curve



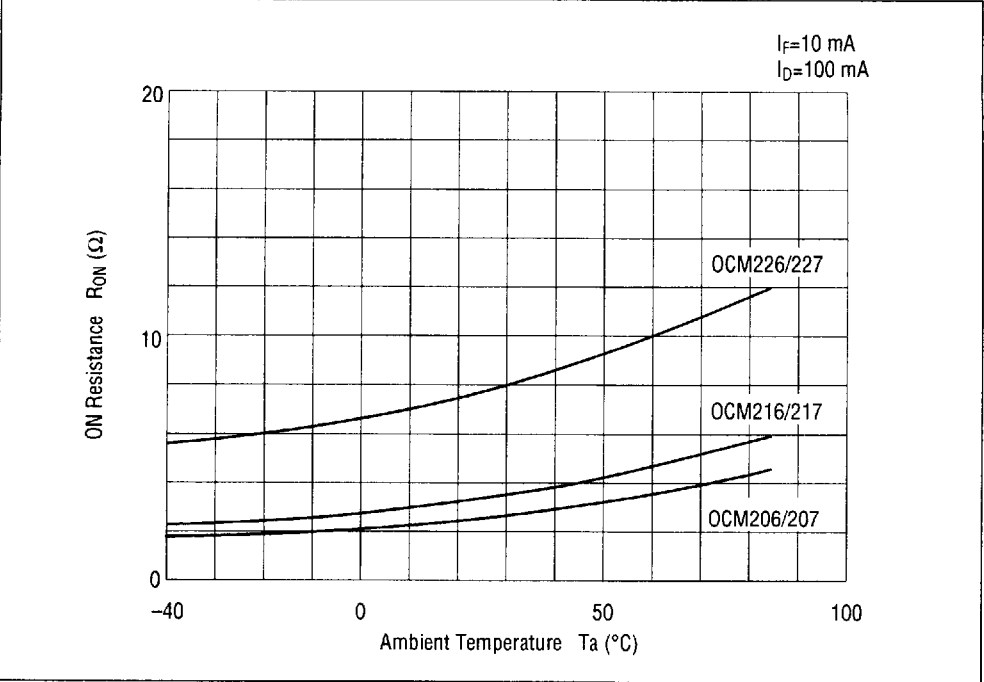
• Forward Voltage vs. Ambient Temperature



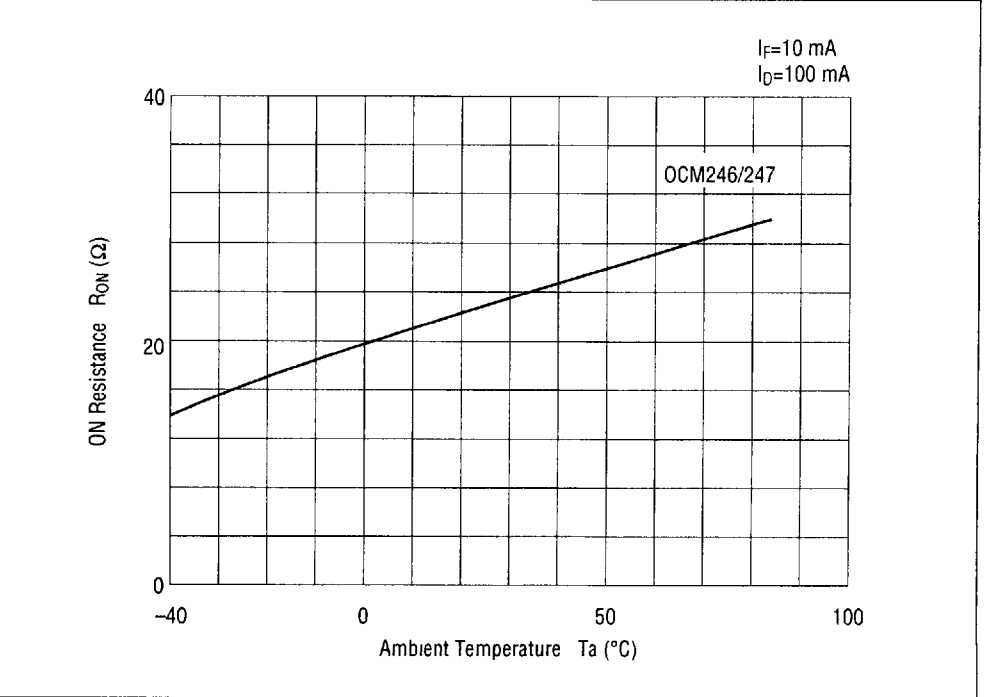
• Operating LED Current vs. Ambient Temperature



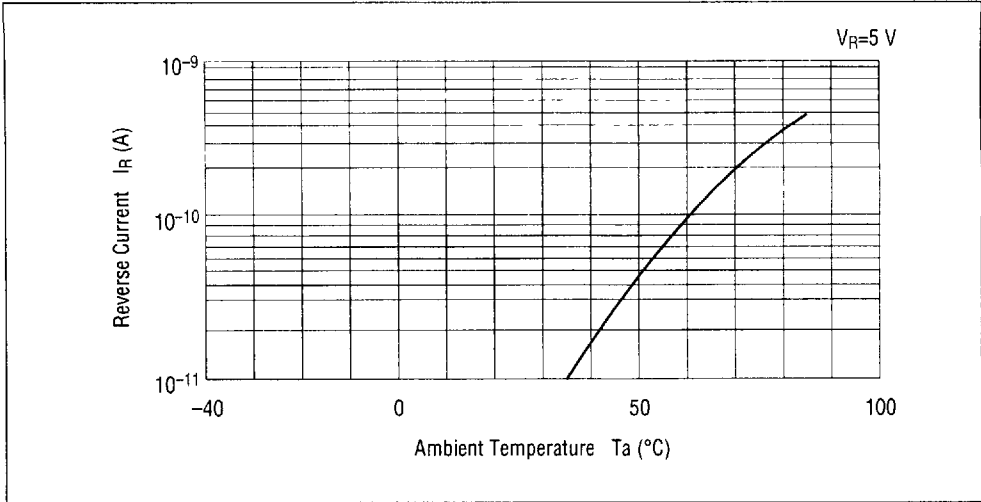
• ON Resistance vs. Ambient Temperature-1



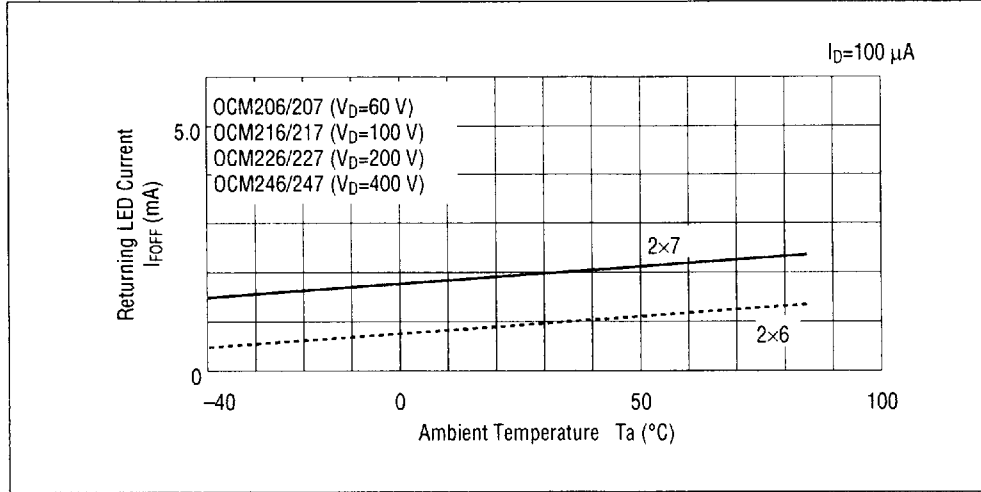
• ON Resistance vs. Ambient Temperature-2



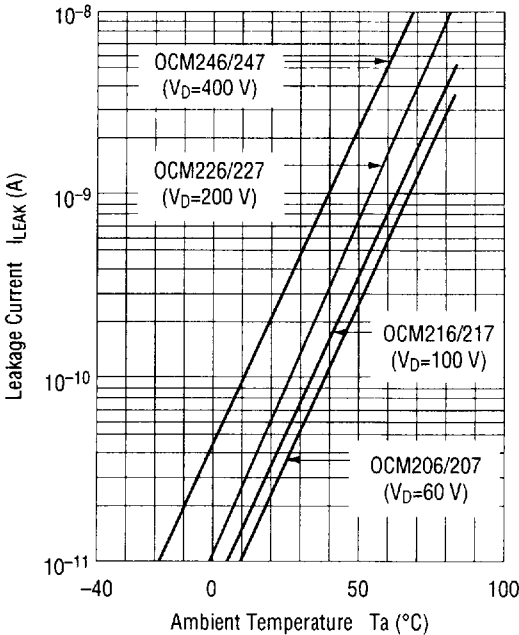
• Reverse Current vs. Ambient Temperature



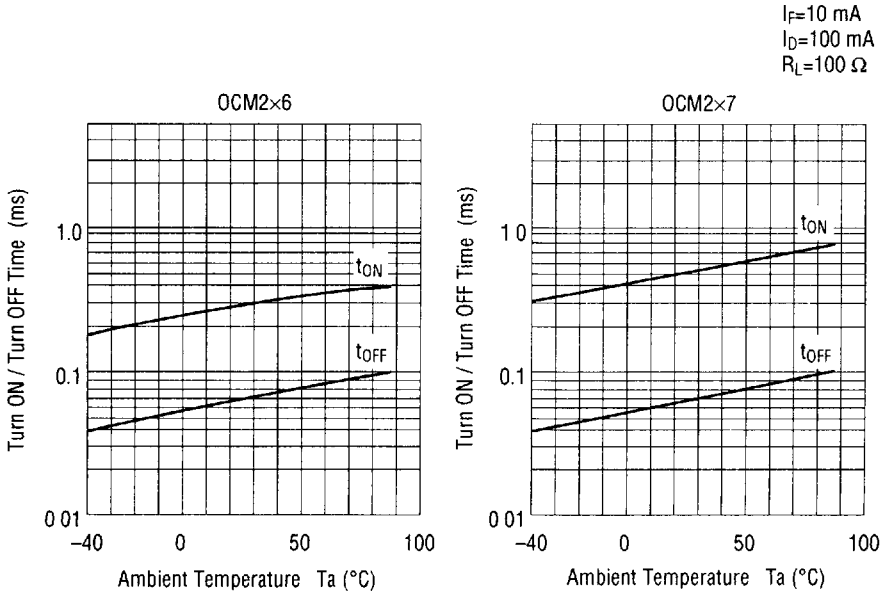
• Returning LED Current vs. Ambient Temperature



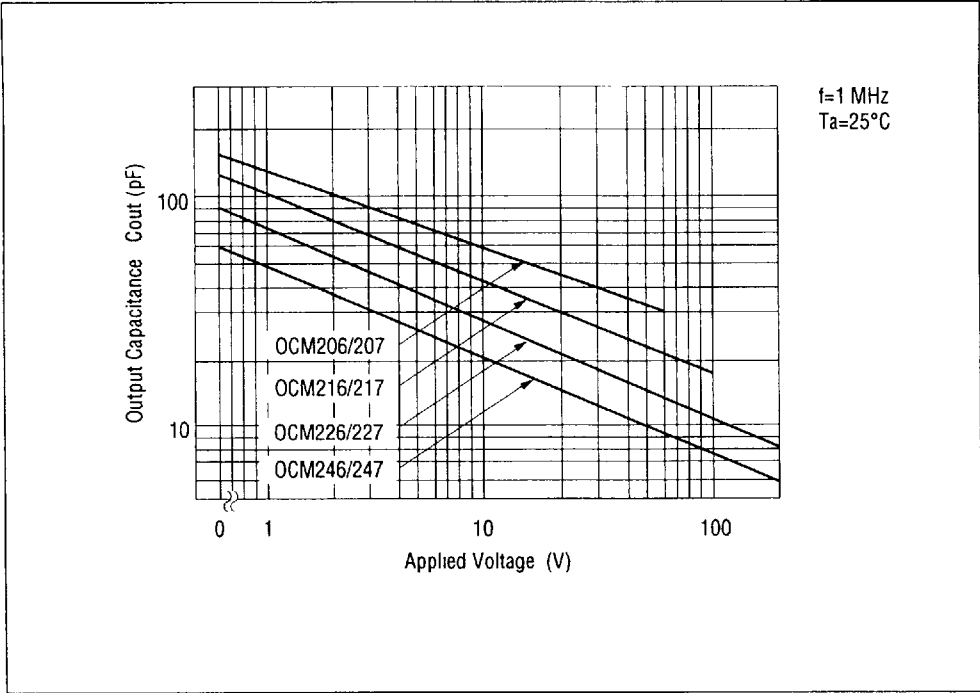
• Leakage Current vs. Ambient Temperature



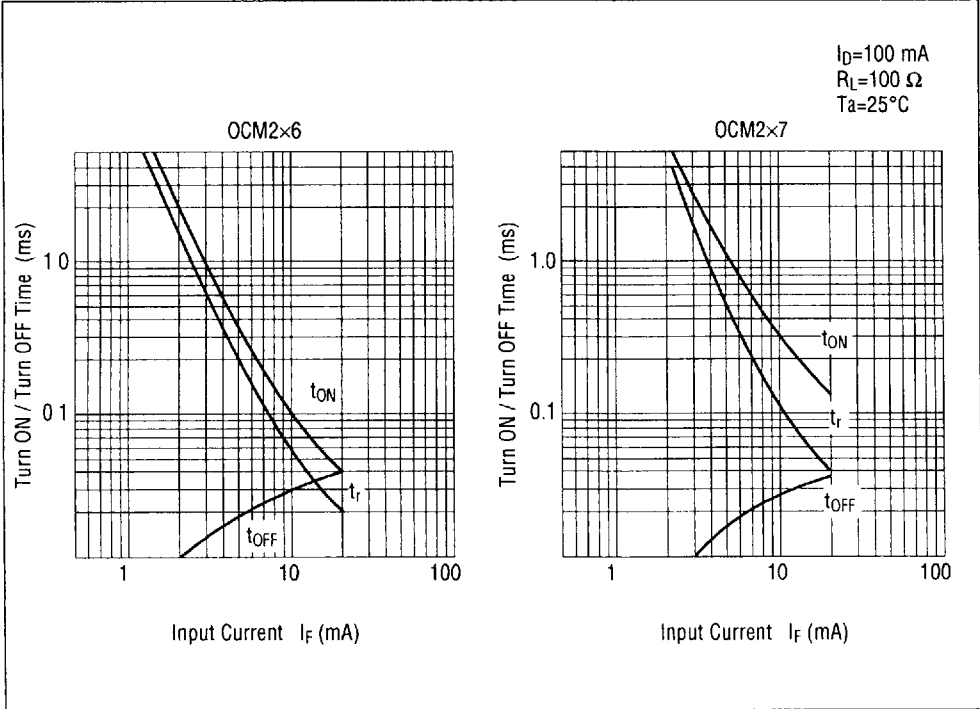
• Turn ON / Turn OFF Time vs. Ambient Temperature



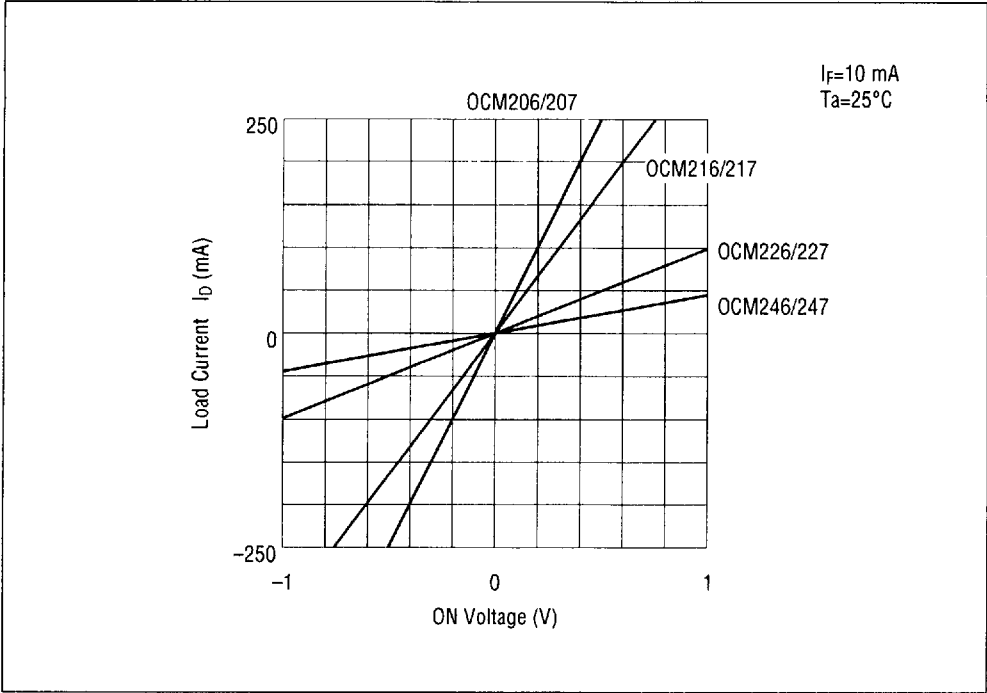
• Output Capacitance vs. Applied Voltage



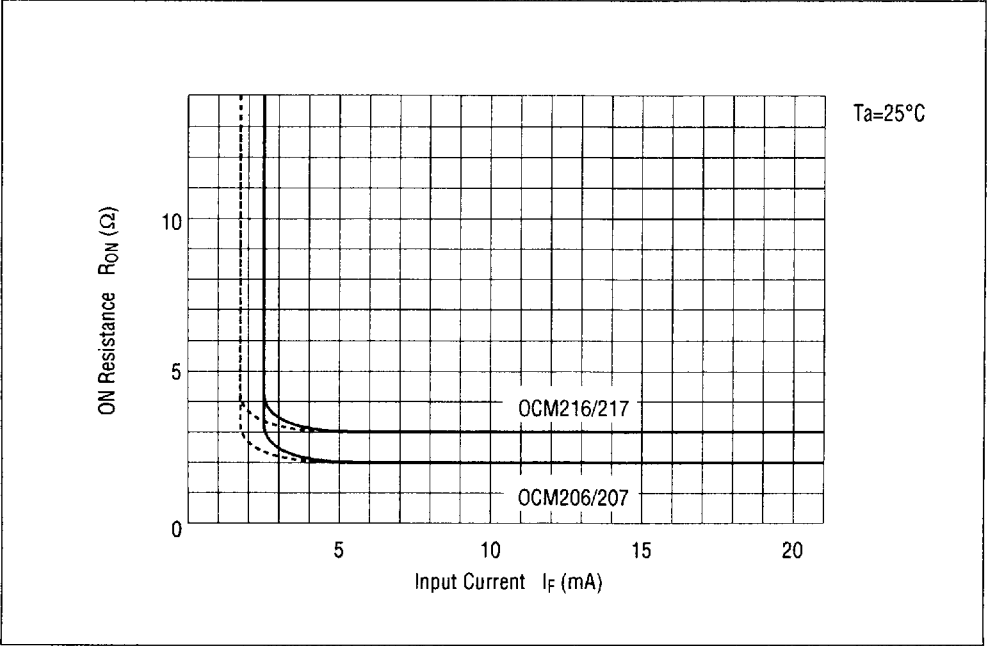
• Turn ON / Turn OFF Time vs. Input Current



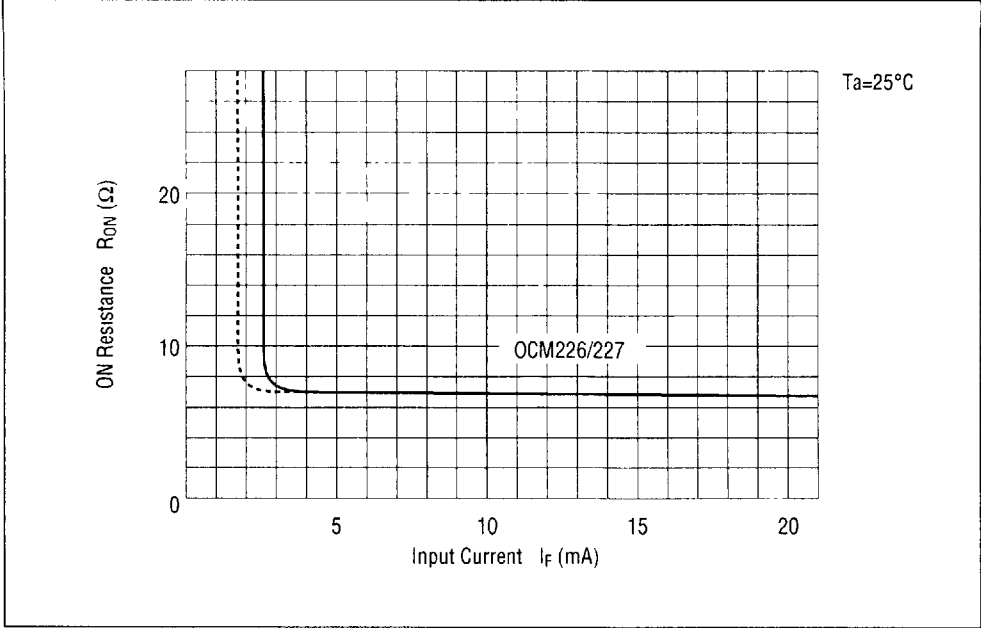
• Load Current vs. Voltage



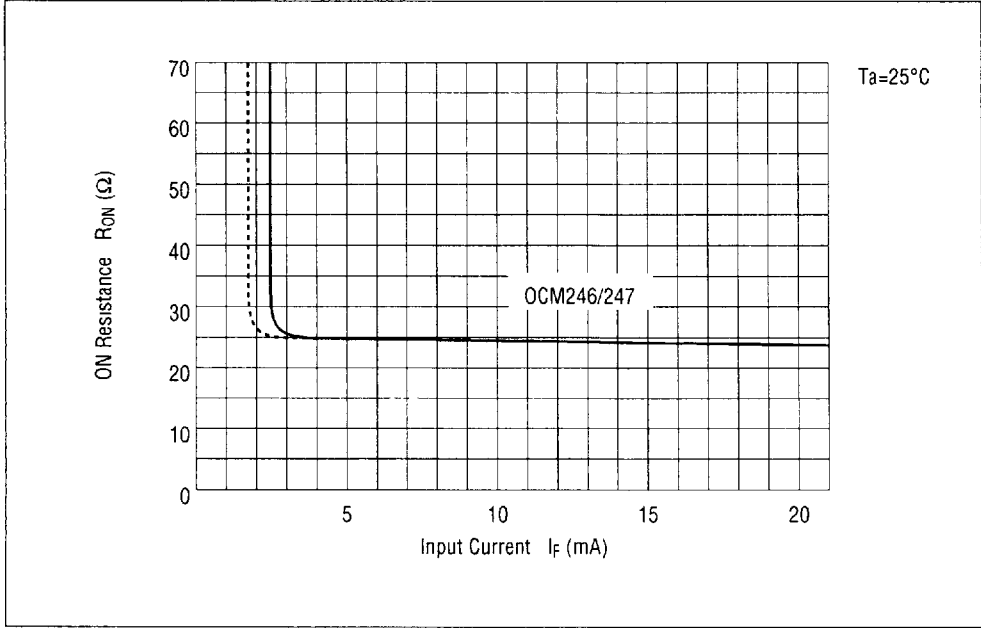
• ON Resistance vs. Input Current-1



• ON Resistance vs. Input Current-2



• ON Resistance vs. Input Current-3



• Circuit for Measuring Response Characteristics

