### **MOS FET Relays**

# G3VM-401BY/EY

## Analog-switching MOS FET Relay with Dielectric Strength of 5 kVAC between I/O Using Optical Isolation.

- Switches minute analog signals.
- Leakage current of 1 μA max. when output relay is open.
- · RoHS Compliant.

#### ■ Application Examples

- Electronic automatic exchange systems
- Measurement devices
- FA systems



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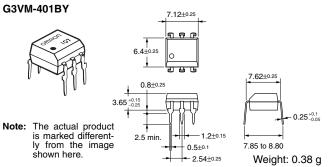
Note: The actual product is marked differently from the image shown here.

#### **■** List of Models

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape	
SPST-NO	PCB terminals	400 VAC	G3VM-401BY	50		
Surface-mounti			G3VM-401EY			
	terminals		G3VM-401EY(TR)		1,500	

#### ■ Dimensions

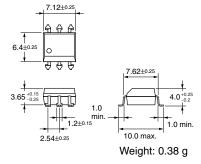
Note: All units are in millimeters unless otherwise indicated.





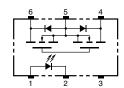


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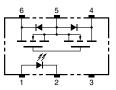


#### ■ Terminal Arrangement/Internal Connections (Top View)

G3VM-401BY

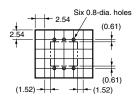


#### G3VM-401EY



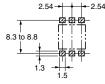
#### **■ PCB Dimensions (Bottom View)**

G3VM-401BY



#### Actual Mounting Pad Dimensions (Recommended Value, Top View)

G3VM-401EY

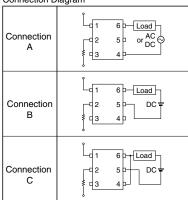


### ■ Absolute Maximum Ratings (Ta = 25°C)

	Item		Symbol	Rating	Unit	Measurement conditions
Input	LED forward current		I <sub>F</sub>	50	mA	
	Repetitive peak LED forward current		I <sub>FP</sub>	1	A	100 μs pulses, 100 pps
	LED forward current reduction rate		Δ I <sub>F</sub> /°C	-0.5	mA/°C	Ta ≥ 25°C
	LED reverse voltage  Connection temperature		$V_R$	5	V	
			T <sub>j</sub>	125	°C	
Output	t Load voltage (AC peak/DC)		$V_{OFF}$	400	V	
-	Continuous load current	Connection A	I <sub>o</sub>	120	mA	
		Connection B		120		
		Connection C		240		
	ON current reduction rate	Connection A	$\Delta$ $I_{ON}/^{\circ}C$	-1.2	mA/°C	Ta ≥ 25°C
		Connection B		-1.2		
		Connection C		-2.4		
	Connection temperature		$T_j$	125	°C	
Dielectric strength between input and output (See note 1.)		V <sub>I-O</sub>	5,000	$V_{rms}$	AC for 1 min	
Operating temperature			$T_{\alpha}$	-40 to +85	°C	With no icing or condensation
Storage temperature			$T_{stg}$	-55 to +125	°C	With no icing or condensation
Soldering temperature (10 s)				260	°C	10 s

Note: 1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.

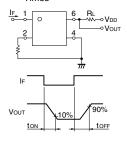
Connection Diagram



#### ■ Electrical Characteristics (Ta = 25°C)

Item			Symbol	Mini- mum	Typical	Maxi- mum	Unit	Measurement conditions
Input	t LED forward voltage		$V_F$	1.0	1.15	1.3	٧	I <sub>F</sub> = 10 mA
	Reverse current		I <sub>R</sub>			10	μΑ	V <sub>R</sub> = 5 V
	Capacity between terminals		C <sub>T</sub>		30		pF	V = 0, f = 1 MHz
	Trigger LED forward current		I <sub>FT</sub>			3	mA	I <sub>O</sub> = 120 mA
	Maximum resistance with output ON	Connection A	R <sub>ON</sub>		17	35	Ω	I <sub>F</sub> = 5 mA, I <sub>O</sub> = 120 mA
		Connection B			11	20	Ω	I <sub>F</sub> = 5 mA, I <sub>O</sub> = 120 mA
		Connection C			6	10	Ω	I <sub>F</sub> = 5 mA, I <sub>O</sub> = 240 mA
	Current leakage when the relay is open		I <sub>LEAK</sub>		0.0004	1.0	μΑ	V <sub>OFF</sub> = 400 V
Capacity between terminals A Connection		C <sub>OFF</sub>		40		pF	V = 0, f = 1MHz	
Capacity between I/O terminals		C <sub>I-O</sub>		0.8		pF	f = 1 MHz, V <sub>s</sub> = 0 V	
Insulation resistance		R <sub>I-O</sub>	1,000			ΜΩ	$\begin{aligned} &V_{\text{I-O}} = 500 \text{ VDC}, \\ &R_{\text{oH}} \leq 60\% \end{aligned}$	
Turn-ON time		t <sub>ON</sub>		0.3	1.0	ms	$I_F = 5 \text{ mA}, R_L = 200 \Omega,$	
Turn-OFF time		t <sub>OFF</sub>		0.1	1.0	ms	$V_{DD} = 20 \text{ V (See note 2.)}$	

Note: 2. Turn-ON and Turn-OFF Times



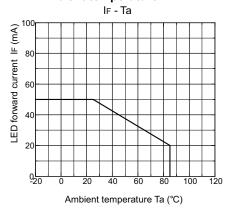
### **■** Recommended Operating Conditions

Use the G3VM under the following conditions so that the Relay will operate properly.

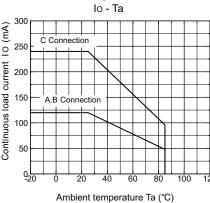
Item	Symbol	Minimum	Typical	Maximum	Unit
Load voltage (AC peak/DC)	$V_{\Delta\Delta}$			320	V
Operating LED forward current	$I_{\Phi}$	5	7.5	25	mA
Continuous load current (AC peak/DC)	Io			120	mA
Operating temperature	$T_{\alpha}$	- 20		65	°C

#### **■** Engineering Data

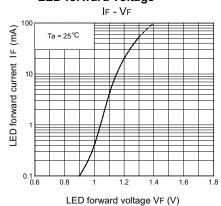
## LED forward current vs. Ambient temperature



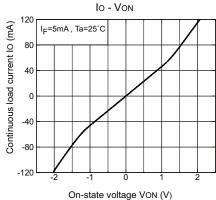
#### Continuous load current vs. Ambient temperature



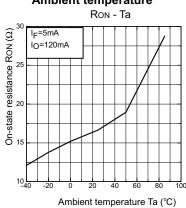
### LED forward current vs. LED forward voltage



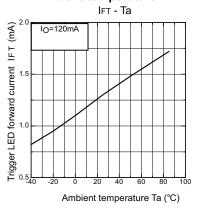
### Continuous load current vs. On-state voltage



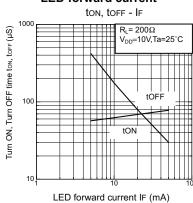
### On-state resistance vs. Ambient temperature



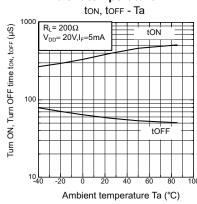
### Trigger LED forward current vs. Ambient temperature



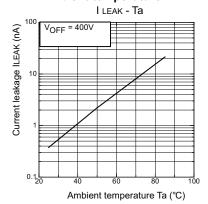
### Turn ON, Turn OFF time vs. LED forward current



### Turn ON, Turn OFF time vs. Ambient temperature



### Current leakage vs. Ambient temperature





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