OMRON

Preliminary Version

Ultra Small MOSFET Relay

G3VM-LR

World's Tiniest MOSFET Relay

- Measures just 1.8 H x 2 W x 3.8 D mm
- Shrink small outline package (SSOP), suitable for surface mount assembly
- 4-pin SSOP: 1.8 mm high, 1.27 mm pitch
- Small output capacitance allows high frequency applications
- Solid state reliability for automatic test equipment, test and measurement instruments for logic IC and memory

Actual Size

Ordering Information

IC Contact Form	Trigger LED current	Peak OFF-state voltage	ON-state current	ON-state resistance (typical)	Output capacitance (typical)	**Part number**
1 Form A (SPST-NO)	4 mA max.	20 V min.	300 mA max.	1.0 Ω	5.0 pF	**G3VM-21LR1**
		40 V min.	80 mA max.	25.0 Ω	0.6 pF	**G3VM-41LR3**
			250 mA max.	2.0 Ω	5.0 pF	**G3VM-41LR4**
			300 mA max.	1.0 Ω	10.0 pF	**G3VM-41LR5**
			120 mA max.	10.0 Ω	1.0 pF	**G3VM-41LR6**

Specifications

Item			Part number				
			G3VM-21LR1	G3VM-41LR3	G3VM-41LR4	G3VM-41LR5	G3VM-41LR6
LED	Forward current	I_F	50 mA	50 mA	50 mA	50 mA	50 mA
	Reverse voltage	V_R	5 V	5 V	5 V	5 V	5 V
	Junction temperature	T_j	125°C	125°C	125°C	125°C	125°C
Detector	OFF-state output voltage	V_{OFF}	20 V	40 V	40 V	40 V	40 V
	ON-state current (continuous)	I_{ON}	300 mA	80 mA	250 mA	300 mA	120 mA
	Junction temperature	T_j	125°C	125°C	125°C	125°C	125°C
Storage temperature		T_{stg}	-40° to 125°C				
Operating temperature		T_{opr}	-20° to 85°C				
Lead soldering temperature		T_{sol}	260°C for 10 seconds				
Isolation voltage (See note 2)		BVs	1500 Vrms (AC, 1 min., RH ≤ 60%)				

Note: **1.** Maximum ratings at 25°C.

2. Device is considered a two-terminal device: Pins 1 and 2 are shorted together, and pins 3 and 4 are shorted together.

■ Recommended Operating Conditions

Part number			G3VM-21LR1	G3VM-41LR3	G3VM-41LR4	G3VM-41LR5	G3VM-41LR6
Supply voltage	V_{OFF}	Maximum	20 V	32 V	32 V	32 V	32 V
Forward current	I_F	Minimum	10 mA	10 mA	10 mA	10 mA	10 mA
		Maximum	30 mA	30 mA	30 mA	30 mA	30 mA
ON-state current	I_{ON}	Maximum	300 mA	80 mA	250 mA	300 mA	130 mA
Operation temperature	T_{opr}		25° to 60°C	25° to 60°C	25° to 60°C	25° to 60°C	25° to 60°C

■ Individual Electrical Characteristics at 25°C

Part number			Test condition	G3VM-21LR1	G3VM-41LR3	G3VM-41LR4	G3VM-41LR5	G3VM-41LR6
LED	Forward voltage	V_F	I_F = 10 mA	1.0 V min.	1.0 V min.	1.0 V min.	1.0 V min.	1.0 V min.
				1.15 V typical	1.15 V typical	1.15 V typical	1.15 V typical	1.15 V typical
				1.3 V max.	1.3 V max.	1.3 V max.	1.3 V max.	1.3 V max.
	Reverse voltage	I_R	V_R = 5 V	10 μA max.	10 μA max.	10 μA max.	10 μA max.	10 μA max.
	Capacitance	C_T	V = 0, f = 1 MHz	15 pF typical	15 pF typical	15 pF typical	15 pF typical	15 pF typical
Detector	OFF-state current	I_{OFF}	V_{OFF} = 20 V	1 mA max.	1 mA max.	1 mA max.	1 mA max.	1000 pA max.
	Output capacitance	C_{OFF}	V = 0, F = 100 MHz, T < 1 s	5.0 pF typical	0.6 pF typical, 1.4 pF max.	5 pF typical, 7 pF max.	10 pF typical	1.0 pF typical, 2.0 max.

■ Coupled Electrical Characteristics at 25°C

Part number		G3VM-21LR1	G3VM-41LR3	G3VM-41LR4	G3VM-41LR5	G3VM-41LR6
Trigger LED current	I_{FT}	4 mA max. with I_{ON}= 100 mA				
Close LED current	I_{FC}	0.2 mA min. with I_{OFF} = 100 μA				
		0.75 mA typical				
ON-state resistance	R_{ON}	1 Ω typical	25 Ω typical	2 Ω typical	1.0 Ω typical	10 Ω typical
		1.5 Ω max.	35 Ω max.	3 Ω max.	1.5 Ω max.	15 Ω max.
		I_{ON} = 100 mA, I_{OFF} = 5 μA, T < 1 s	I_{ON} = 80 mA, I_{OFF} = 10 μA, T < 1 s	I_{ON} = 250 mA, I_{OFF} = 10 μA, T < 1 s	I_{ON} = 300 mA, I_{OFF} = 5 mA, T < 1 s	I_{ON} = 100 mA, I_{OFF} = 5 mA, T < 1 s

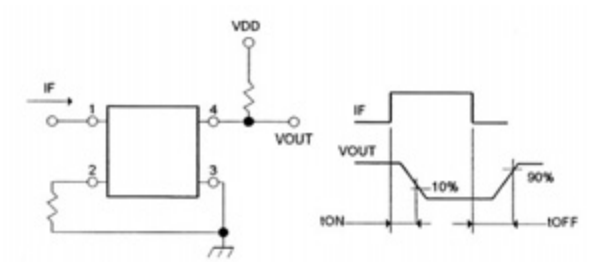
■ Isolation Characteristics at 25° C

Part number		Test condition	G3VM-21LR1	G3VM-41LR3	G3VM-41LR4	G3VM-41LR5	G3VM-41LR6
Capacitance input to output	C_S	V_S = 0 V, f = 1 MHz	0.8 pF typical				
Isolation resistance	R_S	V_S = 500 V, RH ≤ 60%	5×10^{10} Ω min.				
			5×10^{14} Ω typical				
Isolation voltage	BV_S	AC, 1 minute	1500 Vrms min.				
		AC, 1 second in oil	3000 Vrms typical				
		DC, 1 minute in oil	3000 VDC typical				

■ Switching Characteristics at 25°C

Characteristics	Test condition (See note)	Turn-ON time	Turn-OFF time
All G3VM-LR models	R_L = 200 Ω, V_{DD} = 20 V I_F = 10 mA	2 ms	2 ms

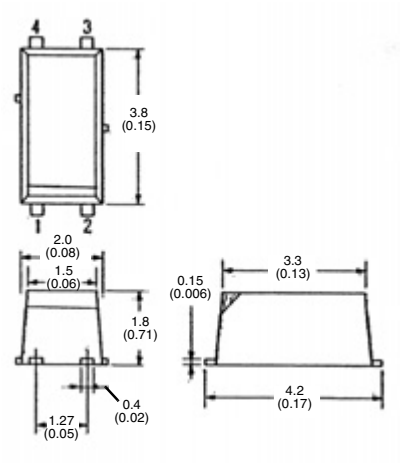
Note: The switching time test circuit is shown below:



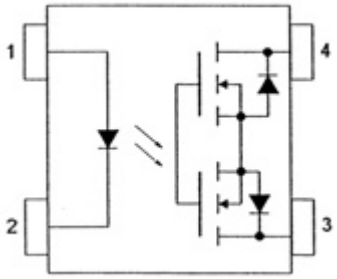
Dimensions

Unit: mm (inch)

■ G3VM-21LR1

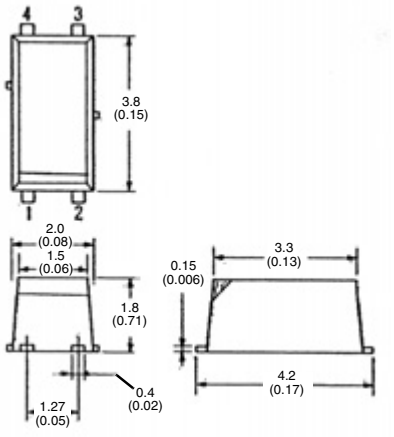


Pin Configuration (Top View)

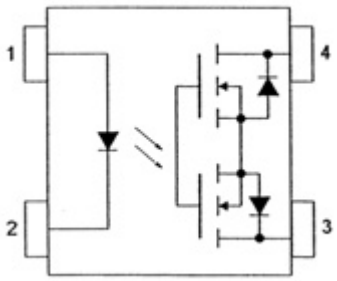


1. ANODE
2. CATHODE
3. DRAIN
4. DRAIN

■ G3VM-41LR3



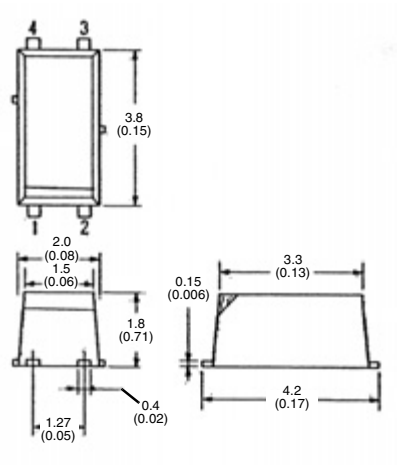
Pin Configuration (Top View)



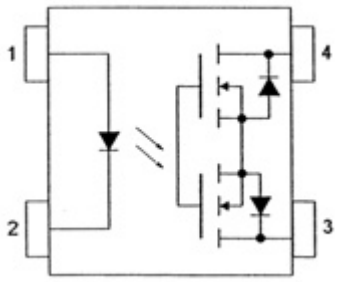
1. ANODE
2. CATHODE
3. DRAIN
4. DRAIN

Unit: mm (inch)

■ G3VM-41LR4

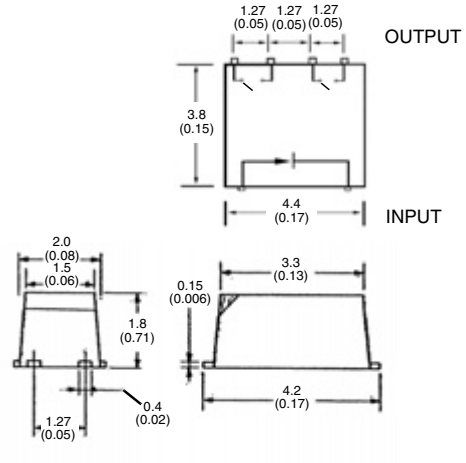


Pin Configuration (Top View)

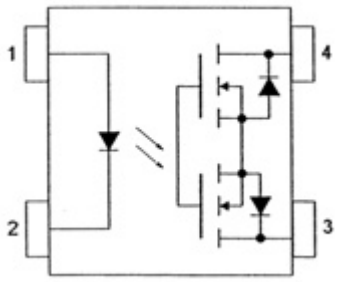


1. ANODE
2. CATHODE
3. DRAIN
4. DRAIN

■ G3VM-41LR5

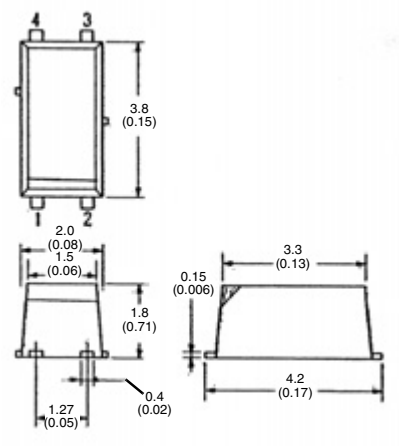


Pin Configuration (Top View)

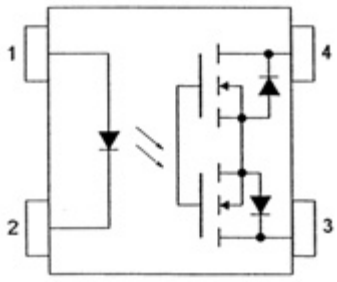


1. ANODE
2. CATHODE
3. DRAIN
4. DRAIN

■ G3VM-41LR6



Pin Configuration (Top View)



1. ANODE
2. CATHODE
3. DRAIN
4. DRAIN

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters into inches, divide by 25.4

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