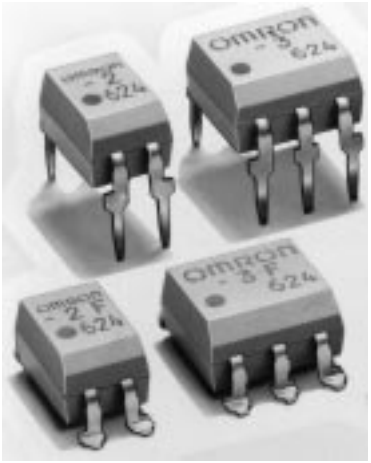
MOS FET Relay

G3VM-2/3

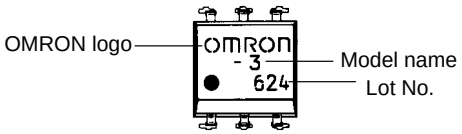
G3VM Low-cost Series with 4 or 6-pin Construction

- New G3VM Series with 350-V-output dielectric strength.
- A 4-pin Relay available with the same terminal-pin position as 4-pin photocouplers.
- Approved Standards: UL1577



Ordering Information

■ Appearance



Note: "G3VM" is not printed on the actual product

■ Model Number Legend

G3VM-□□
1 2

1. Load Voltage
- 2: Load voltage, 350 VDC or 350 VAC max. (small model)
- 3: Load voltage, 350 VDC or 350 VDC max.

2. Terminal
- F: Surface-mounting terminals
- None: PCB terminals

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick
SPST-NO	PCB terminals	350 VAC	G3VM-2	100
			G3VM-3	50
	Surface-mounting terminals (see note)		G3VM-2F	100
			G3VM-3F	50

Note: Surface-mounting terminal models are also available on tape.

Specifications

G3VM-2

■ Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Rating	Unit
Input	LED forward current	I_F	50	mA
	LED forward current reduction rate (Ta≧25°C)	ΔI_F/°C	–0.5	mA/°C
	Repetitive peak LED forward current (100 μs pulse)	I_{FP}	1	A
	LED reverse voltage	V_R	5	V
	Connection temperature	T_j	125	°C
Output	Output dielectric strength	V_{OFF}	350	V
	Continuous load current (see note)	I_O	120	mA
	ON current reduction rate (Ta≧25°C)	ΔI_{ON}/°C	–1.2	mA/°C
	Connection temperature	T_j	125	°C
Storage temperature		T_{stg}	–55 to 100	°C
Operating temperature		T_a	–20 to 85	°C
Soldering temperature (10 s)		T_{sol}	260	°C
Dielectric strength (AC for 1 min with ambient humidity of 60% or less)		V_{I-O}	2,500	V_{rms}

Note: The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

■ Recommended Operating Conditions

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V_{DD}	---	---	280	V
Forward current	I_F	5.0	7.5	25	mA
Continuous load current	I_O	---	---	100	mA
Operating temperature	Ta	–20	---	65	°C

■ Electrical Characteristics (Ta = 25°C)

Item		Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	LED forward current	V_F	I_F=10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R=5 V	---	---	10	μA
	Capacity between terminals	C_T	V=0, , f=1MHZ	---	30	---	pF
Output	Current leakage when the relay is closed	I_{LEAK}	V_{OFF}=350 V	---	---	1	μA

■ Connection Characteristics (Ta = 25°C)

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with output ON	R_{ON}	I_{ON}=100 mA, I_F=10 mA	---	22	35	Ω
		I_{ON}=20 to 100 mA, I_F=10 mA	---	26	40	

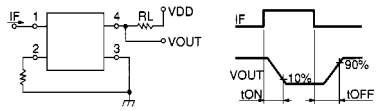
■ Insulation Characteristics (Ta = 25°C)

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C_{I-O}	V_S=0, f=1MH$_Z$	---	0.8	---	pF
Insulation resistance	R_{I-O}	V_S=500 V, operating ambient humidity: ≦60%	5 x 10^{10}	10^{14}	---	Ω
Dielectric strength	V_{I-O}	AC for 1 min	2,500	---	---	V_{rms}
		AC for 1 s in oil	---	5,000	---	
		DC for 1 min in oil	---	5,000	---	V_{dc}

■ Switching Characteristics (Ta = 25°C)

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t_{ON}	R_L=200 Ω V_{DD}=20 V, I_F=10 mA (see note)	---	---	1	ms
Turn-off time	t_{OFF}		---	---	1	

Note: Switching Time Measuring Circuit



G3VM-3

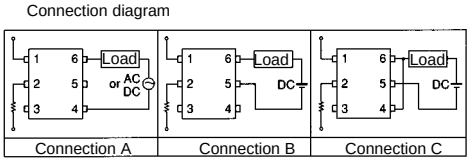
■ Absolute Maximum Ratings (Ta = 25°C)

Item			Symbol	Rating	Unit
Input	**LED forward current**		I_F	50	mA
	LED forward current reduction rate (Ta≧25°C)		Δ I_F/°C	–0.5	mA/°C
	Repetitive peak LED forward current (100 μs pulse)		I_{FP}	1	A
	LED reverse voltage		V_R	5	V
	Connection temperature		T_j	125	°C
Output	**Output dielectric strength**		V_{OFF}	350	V
	Continuous load current (see note 1)	**Connection A**	I_O	120	mA
		Connection B		120	
		Connection C		160	
	ON current reduction rate (Ta≧25°C)	**Connection A**	Δ I_{ON}/°C	–1.2	mA/°C
		Connection B		–1.2	
		Connection C		–1.6	
	Connection temperature		T_j	125	°C
Storage temperature			T_{stg}	–55 to 100	°C
Operating temperature			T_a	–20 to 85	°C
Soldering temperature (10 s)			T_{sol}	260	°C
Dielectric strength (AC for 1 min with ambient humidity of 60% or less) (see note 2)			V_{I-O}	2,500	V_{rms}

Note: 1. The output load current varies depending on the ambient temperature. Refer to *Engineering Data*.

2. Impose voltage between a group of pins 1, 2, and 3 and that of pins 4, 5, and 6.

Connection diagram



■ Recommended Operating Conditions

Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V_{DD}	---	---	280	V
Forward current	I_F	5.0	7.5	25	mA
Continuous load current	I_O	---	---	120	mA
Operating temperature	Ta	–20	---	65	°C

■ Electrical Characteristics (Ta = 25°C)

Item		Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Input	**LED forward current**	V_F	I_F=10 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R=5 V	---	---	10	μA
	Capacity between terminals	C_T	V=0, , f=1MHZ	---	30	---	pF
Output	**Current leakage when the relay is closed**	I_{LEAK}	V_{OFF}=350 V	---	---	1	μA

■ Connection Characteristics (Ta = 25°C)

Item		Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Maximum resistance with output ON	**Connection A**	R_{ON}	I_{ON}=120 mA, I_F=10 mA	---	22	35	Ω
			I_{ON}=20 to 120 mA, I_F=10 mA	---	26	40	
	Connection B		I_{ON}=120 mA, I_F=10 mA	---	13	23	
	Connection C		I_{ON}=160 mA, I_F=10 mA	---	7	12	

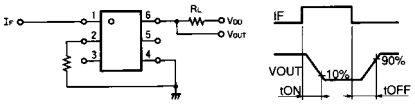
■ Insulation Characteristics (Ta = 25°C)

Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Floating capacity between I/O terminals	C_{I-O}	V_S=0, f=1MH$_Z$	---	0.8	---	pF
Insulation resistance	R_{I-O}	V_S=500, operating ambient humidity: ≦60%	5 x 10^{10}	10^{14}	---	Ω
Dielectric strength	V_{I-O}	AC for 1 min	2,500	---	---	V_{rms}
		AC for 1 s in oil	---	5,000	---	
		DC for 1 min in oil	---	5,000	---	V_{dc}

■ Switching Characteristics (Ta = 25°C)

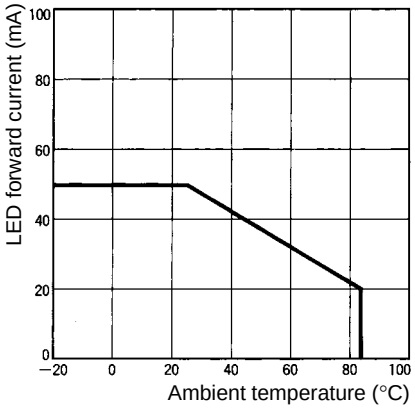
Item	Symbol	Measurement conditions	Minimum	Typical	Maximum	Unit
Turn-on time	t_{ON}	R_L=200 Ω V_{DD}=20 V, I_F=10 mA (see note)	---	---	1	ms
Turn-off time	t_{OFF}		---	---	1	

Note: Switching Time Measuring Circuit

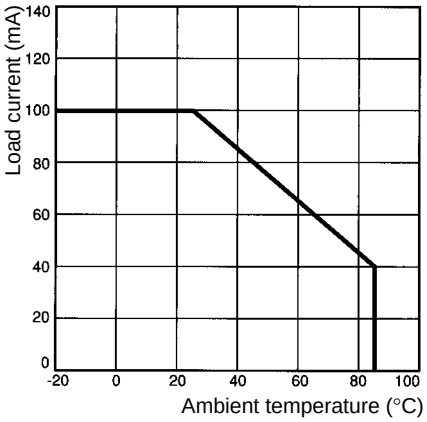


Engineering Data

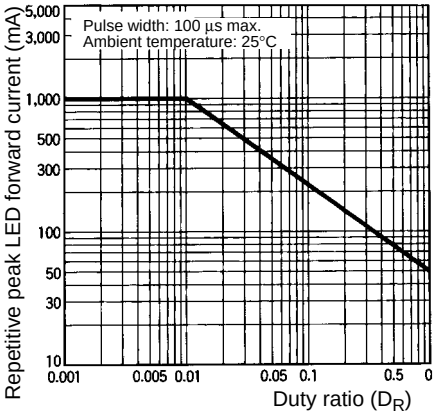
LED Forward Current vs. Ambient Temperature G3VM-2, G3VM-2F



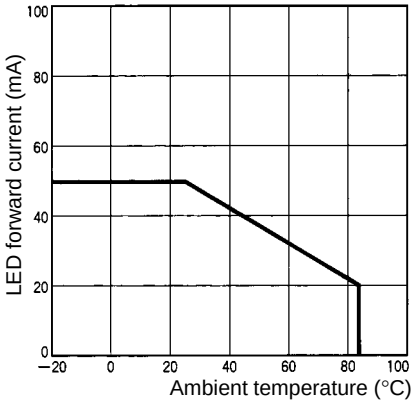
Load Current vs. Ambient Temperature Characteristics G3VM-2, G3VM-2F



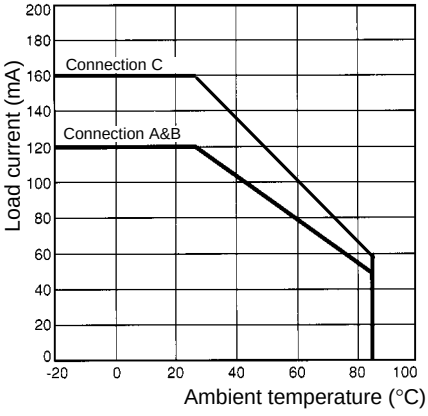
Repetitive Peak LED Forward Current vs. Duty Ratio G3VM-2, G3VM-2F



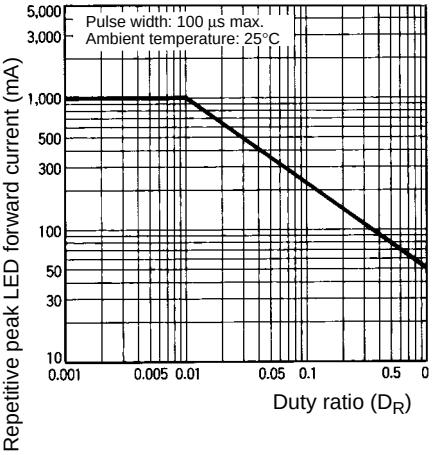
G3VM-3, G3VM-3F



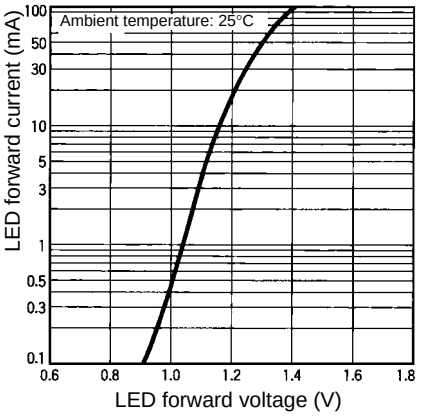
G3VM-3, G3VM-3F



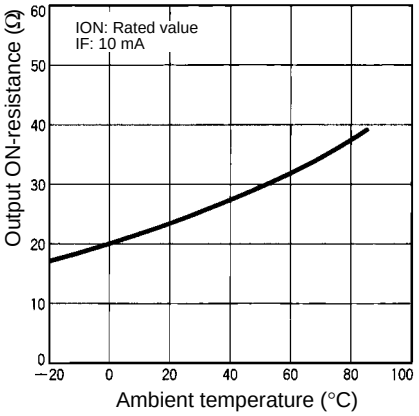
G3VM-3, G3VM-3F



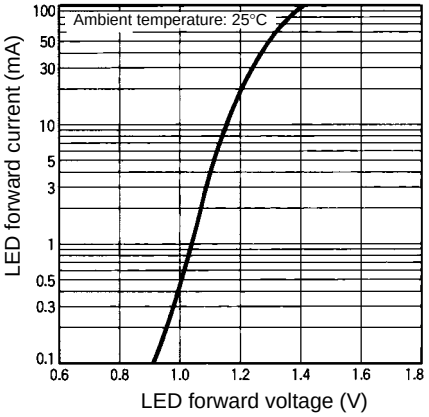
LED Forward Current vs. LED Forward Voltage G3VM-2, G3VM-2F



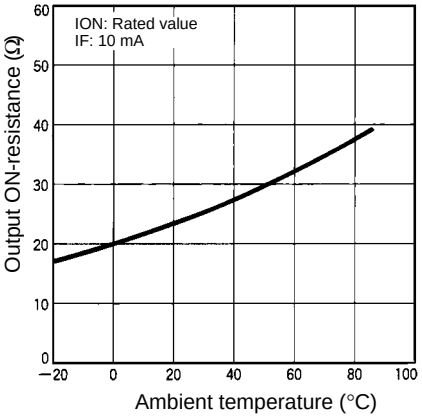
Output ON-resistance vs. Ambient Temperature G3VM-2, G3VM-2F



G3VM-3, G3VM-3F



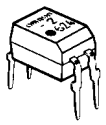
G3VM-3, G3VM-3F (Connection A)



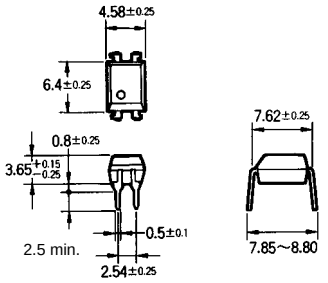
Dimensions

Note: All units are in millimeters unless otherwise indicated.

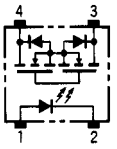
G3VM-2



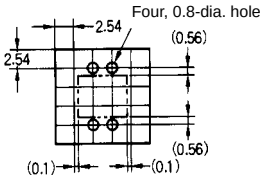
Note: "G3VM" is not printed on the actual product.



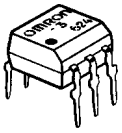
Terminal Arrangement/ Internal Connections (Top View)



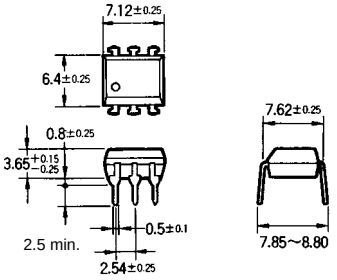
PCB Dimensions (Bottom View)



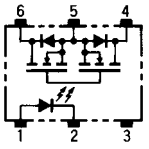
G3VM-3



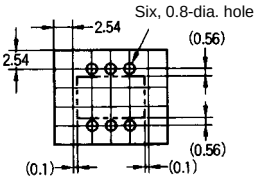
Note: "G3VM" is not printed on the actual product.



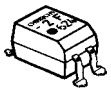
Terminal Arrangement/ Internal Connections (Top View)



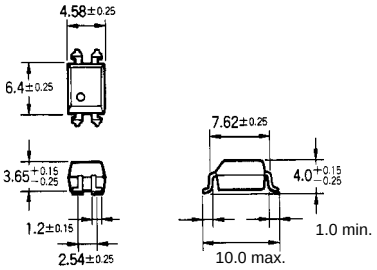
PCB Dimensions (Bottom View)



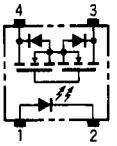
G3VM-2F



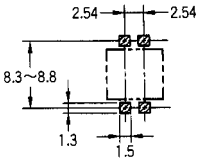
Note: "G3VM" is not printed on the actual product.



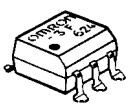
Terminal Arrangement/ Internal Connections (Top View)



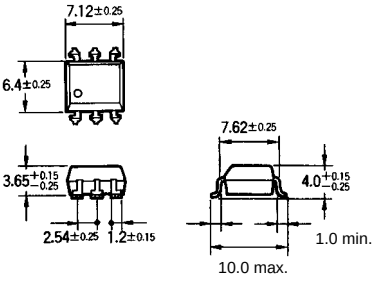
Actual Mounting Pad Dimensions (Recommended Value, Bottom View)



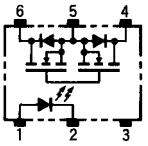
G3VM-3F



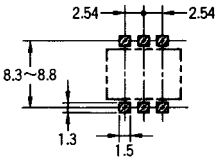
Note: "G3VM" is not printed on the actual product.



Terminal Arrangement/ Internal Connections (Top View)



Actual Mounting Pad Dimensions (Recommended Value, Bottom View)



Precautions

■ Correct Use

Recommended Operating Conditions

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

Item	Min.	Type	Max.
Operating LED forward current	5 mA	7.5 mA	25 mA
Releasing LED forward current	0 V	---	0.8 V

Note: Refer to page 35 for precautions common to all G3VM models.