

MOS FET Relay

G3VM-S2/S3

Relay Incorporating a MOS FET Optically Coupled with an Infrared LED in a Miniature Out-line Package

- MOS FET of the output circuit has a high dielectric strength.
- Ideal replacement for the dial-pulse relay or hook relay of each modem or facsimile machine.
- Ideal for application to the line interface blocks of PBX and telephone exchange systems.
- Thin, flat, and extremely compact.
- Can be applied to hybrid IC circuits and card-type modems conforming to PCMCIA standards to make them even more compact and lightweight.
- Approved standards : UL1577 (File No. E80555)



Ordering Information

■ Appearance



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

Contact form	Terminals	Load voltage (peak value)	Model	Number per stick	Number per tape
SPST-NO	Surface-mounting terminals (see note)	350 VAC	G3VM-S2	100	2,500
			G3VM-S3	75	

Application Examples

- PBX subscriber interfaces
- Multi-functional telephones
- PC card modems
- Card-type modems and fax modems
- Gauging systems

Specifications

■ General Specifications

- Output dielectric strength: 350 V min.
- Trigger LED current: 3 mA max.
- Continuous load current: 120 mA max. (connected to normally open contact)
- Output ON resistance: 35 Ω max. (connected to normally open contact)
- Insulation resistance between I/O pins: 1,500 V_{rms} min.

■ Absolute Maximum Ratings (Ta = 25°C)

<G3VM-S2>

Item		Symbol	Rating	Unit
Input	LED forward current	I_F	50	mA
	Repetitive peak LED forward current (Duty: 1% max.; pulse-width: 100 μ s max.)	I_{FP}	1	A
	LED reverse voltage	V_R	5	V
Output	Output dielectric strength	V_{BO}	DC or AC peak value: –350 to 350 DC: 0 to 350	V
	Continuous load current (see note 1)	I_O	120	mA
	Dielectric strength between I/O terminals (AC for 1 min) (see note 2)	V_{I-O}	1,500	V_{rms}
Operating temperature (with no icing or condensation)		T_a	–40 to 85	°C
Storage temperature (with no icing or condensation)		T_{stg}	–55 to 125	°C
Soldering temperature (10 s)		---	260	°C

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

2. The dielectric strength was checked by applying voltage between each pairing of input and output pins.

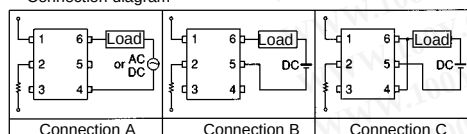
<G3VM-S3>

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, 100 pps)		I _{FP}	1	A
	LED reverse voltage		V _R	5	V
	Input permissible loss		P _{in}	50	mW
	Connection temperature		T _j	125	°C
Output	Load voltage (AC peak)		V _{OFF}	350	V
	Continuous load current (see note 1)	Connection A	I _O	120	mA
		Connection B			
		Connection C			
	Peak load current		I _{peak}	0.35	A
	Output permissible loss		P _{out}	454	mW
	ON current reduction rate	Connection A	Δ I _{ON} /°C	−1.2	mA/°C
		Connection B			
		Connection C			
Total permissible loss		P _T	504	mW	
Dielectric strength between I/O terminals (AC for 1 min) (see note 2)		V _{I-O}	1,500	V _{rms}	
Insulation resistance (V _S = 500; operating ambient humidity ≦ 60%)		R _{I-O}	5 × 10 ¹⁰	Ω	
Storage temperature		T _{stg}	−55 to +125	°C	
Operating temperature		T _a	−40 to +85	°C	

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

2. The dielectric strength was checked for each connection by applying a voltage between each pairing of pins 1, 2, and 3 and pins 4, 5, and 6.

Connection diagram

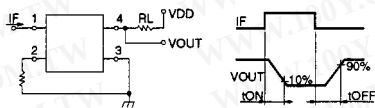


■ Electrical Characteristics (Ta = 25°C)

<G3VM-S2>

Item	Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions
Output ON resistance	R_{ON}	---	---	35	Ω	$I_F=5\text{ mA}$, $I_{ON}=120\text{ mA}$
Current leakage when the relay is closed	I_{LEAK}	---	---	1.0	μA	$V_{ON}=V_{BO}$
LED forward current	I_F	---	---	1.3	V	$I_F=10\text{ mA}$
Capacity between input and output terminals	C_{I-O}	---	0.8	---	pF	$f=1\text{ MHz}$
Insulation resistance between I/O terminals	R_{I-O}	5×10^{10}	---	---	Ω	$V_{I-O}=500\text{ VDC}$
Operating time	T_{ON}	---	---	1	ms	$I_F=5\text{ mA}$, $V_{DD}=20\text{ V}$, $R_L=200\text{ }\Omega$ (see note)
Release time	T_{OFF}	---	---	1	ms	$I_F=5\text{ mA}$, $V_{DD}=20\text{ V}$, $R_L=200\text{ }\Omega$ (see note)

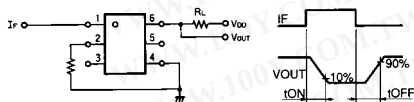
Note: Switching Time Measuring Circuit



<G3VM-S3>

Item		Symbol	Minimum	Typical	Maximum	Unit	Measurement conditions
Input	LED forward voltage	V_F	1.0	1.15	1.3	V	$I_F=10\text{ mA}$
	Reverse current	I_R	---	---	10	μA	$V_R=5\text{ V}$
	Capacity between terminals	C_T	---	30	---	pF	$V=0$, $f=1\text{ MHz}$
Output	Maximum resistance with output ON	Connection A R_{ON}	---	22	35	Ω	$I_{ON}=120\text{ mA}$, $I_F=5\text{ mA}$
		Connection B	---	---	25		
		Connection C	---	---	15		
	Current leakage when the relay is open	I_{LEAK}	---	---	1	μA	$V_{OFF}=350\text{ V}$
Operating time		T_{ON}	---	0.3	1	ms	$R_L=200\text{ }\Omega$, $V_{DD}=20\text{ V}$, $I_F=5\text{ mA}$ (see note)
Release time		T_{OFF}	---	0.1	1	ms	
Floating capacity between I/O terminals		C_{I-O}	---	0.8	---	pF	$V_S=0$, $f=1\text{ MHz}$

Note: Switching Time Measuring Circuit



■ Recommended Operating Conditions

<G3VM-S2>

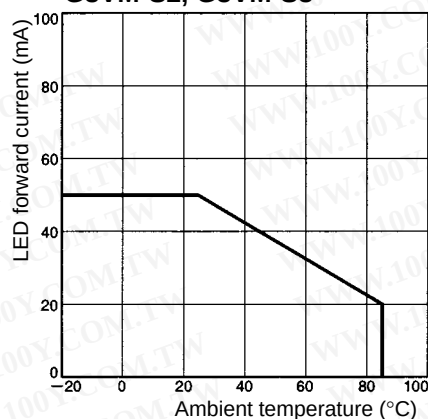
Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V_{DD}	---	---	280	V
Forward current	I_F	5	7.5	25	mA
ON current	I_{ON}	---	---	100	mA
Operating temperature	T_{OPR}	-20	---	65	°C

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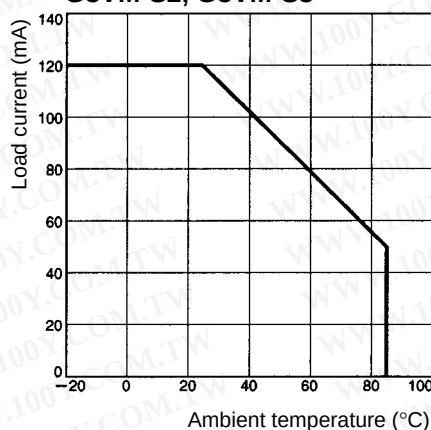
Item	Symbol	Minimum	Typical	Maximum	Unit
Operating voltage	V_{DD}	---	---	280	V
Forward current	I_F	5	10	25	mA
Continuous load current	I_O	---	---	100	mA
Operating temperature	T_{opr}	-20	---	65	°C

Engineering Data

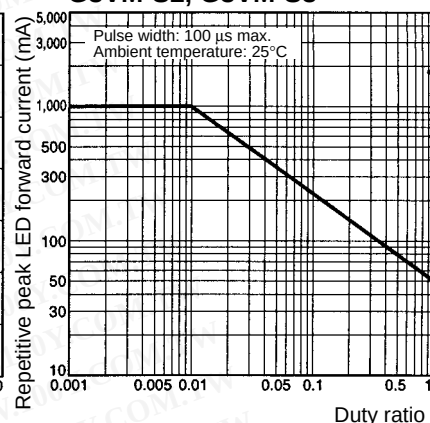
LED Forward Current vs. Ambient Temperature
G3VM-S2, G3VM-S3



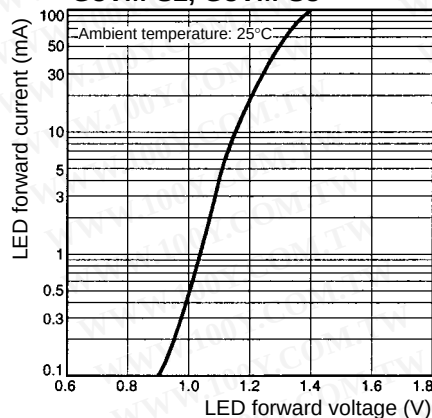
Load Current vs. Ambient Temperature
G3VM-S2, G3VM-S3



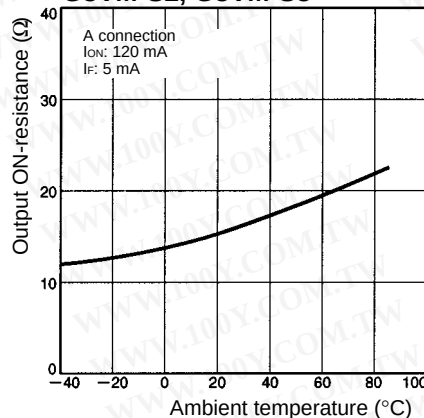
Repetitive Peak LED Forward Current vs. Duty Ratio
G3VM-S2, G3VM-S3



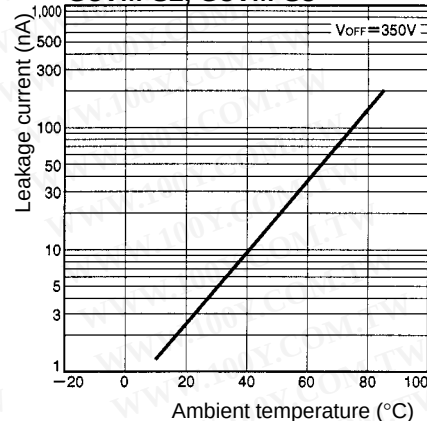
LED Forward Current vs. LED Forward Voltage
G3VM-S2, G3VM-S3



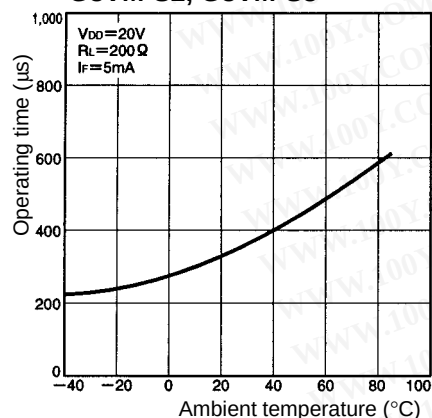
Output ON-resistance vs. Ambient Temperature
G3VM-S2, G3VM-S3



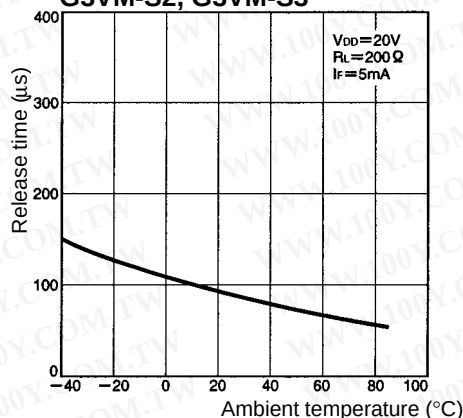
Leakage Current vs. Ambient Temperature
G3VM-S2, G3VM-S3



Operating Time vs. Ambient Temperature
G3VM-S2, G3VM-S3



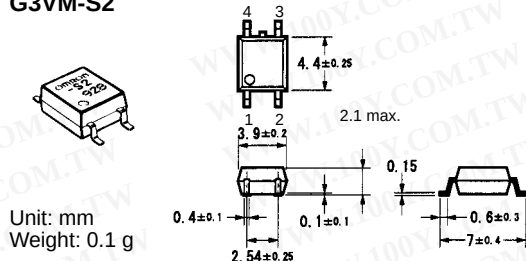
Release Time vs. Ambient Temperature
G3VM-S2, G3VM-S3



Dimensions

Note: All units are in millimeters unless otherwise indicated.

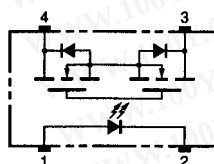
G3VM-S2



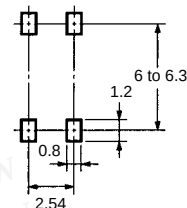
Unit: mm
Weight: 0.1 g

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

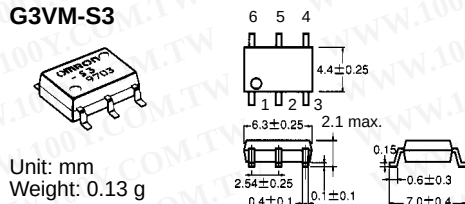
**Terminal Arrangement/
Internal Connections
(Top View)**



**Actual Mounting Pad Dimensions
(Recommended Value, Bottom View)**



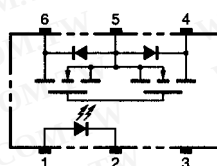
G3VM-S3



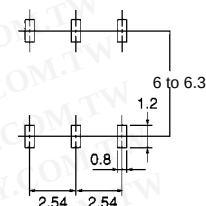
Unit: mm
Weight: 0.13 g

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

**Terminal Arrangement/
Internal Connections
(Top View)**



**Actual Mounting Pad Dimensions
(Recommended Value, Bottom View)**



- 1: Anode
- 2: Cathode
- 4: Drain D1
- 5: Source
- 6: Drain D2

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 voltage	0 V	---	0.8 V

Note: Refer to page 48 for precautions common to all G3VM models.

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