

# G3VM-41PR□/51PR

MOS FET Relays USOP, Low-output-capacitance and Low-ON-resistance Type (with Low  $C \times R$ )

## USOP Package with Low Output Capacitance and ON Resistance

- Load voltage: 40 V or 50 V
- G3VM-41PR12: Low  $C \times R = 4.5 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 0.3 pF,  $R_{ON}$  (standard) = 15  $\Omega$
- G3VM-41PR6: Low  $C \times R = 10 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 1 pF,  $R_{ON}$  (standard) = 10  $\Omega$
- G3VM-41PR10: Low  $C \times R = 5.4 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 0.45 pF,  $R_{ON}$  (standard) = 12  $\Omega$
- G3VM-41PR11: Low  $C \times R = 4.9 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 0.7 pF,  $R_{ON}$  (standard) = 7  $\Omega$
- G3VM-41PR5: Low  $C \times R = 10 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 10 pF,  $R_{ON}$  (standard) = 1  $\Omega$
- G3VM-51PR: Low  $C \times R = 12 \text{ pF} \cdot \Omega$ ,  $C_{OFF}$  (standard) = 12 pF,  $R_{ON}$  (standard) = 1  $\Omega$



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

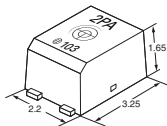
RoHS Compliant

## Application Examples

- Semiconductor test equipment
- Communication equipment
- Test & measurement equipment
- Data loggers

## Package (Unit : mm, Average)

USOP 4-pin



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

## Model Number Legend

G3VM-□□□□

1 2 3 4 5

### 1. Load Voltage

4: 40 V  
5: 50 V

### 2. Contact form

1: 1a (SPST-NO)

### 3. Package

P: USOP 4-pin

### 4. Additional functions

R: Low On-resistance

### 5. Other informations

When specifications overlap, serial code is added in the recorded order.

## Ordering Information

Package	Contact form	Terminals	Load voltage (peak value) *	Continuous load current (peak value) *	Tape cut packaging		Tape packaging	
					Model	Minimum package quantity	Model	Minimum package quantity
USOP4	1a (SPST-NO)	Surface-mounting Terminals	40 V	100 mA	G3VM-41PR12	1 pc.	G3VM-41PR12(TR05)	500 pcs.
				120 mA	G3VM-41PR6		G3VM-41PR6(TR05)	
				140 mA	G3VM-41PR10		G3VM-41PR10(TR05)	
				300 mA	G3VM-41PR11		G3VM-41PR11(TR05)	
				300 mA	G3VM-41PR5		G3VM-41PR5(TR05)	
50 V	300 mA	G3VM-51PR	G3VM-51PR(TR05)					

Note: To order tape packaging for Relays with surface-mounting terminals, add "(TR05)" to the end of the model number.

Tape-cut USOPs are packaged without humidity resistance. Use manual soldering to mount them.

Refer to common precautions.

\* The AC peak and DC value are given for the load voltage and continuous load current.

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

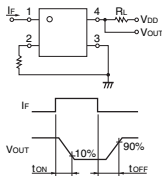
Item		Symbol	G3VM-41PR12	G3VM-41PR6	G3VM-41PR10	G3VM-41PR11	G3VM-41PR5	G3VM-51PR	Unit	Measurement conditions	
Input	LED forward current	IF	50							mA	
	LED forward current reduction rate	$\Delta I/F^{\circ}C$	-0.5							mA/°C	Ta≥25°C
	LED reverse voltage	VR	5							V	
Connection temperature		TJ	125							°C	
Output	Load voltage (AC peak/DC)	VOFF	40				50			V	
	Continuous load current (AC peak/DC)	Io	100	120	140	300			mA		
	ON current reduction rate	$\Delta I_o/^{\circ}C$	-1.0	-1.2	-1.4	-3			mA/°C	Ta≥25°C	
	Pulse ON current	Iop	300	360	420	900			mA	t=100 ms, Duty=1/10	
	Connection temperature	TJ	125							°C	
Dielectric strength between I/O (See note 1.)		VI-O	500							Vrms	AC for 1 min
Ambient operating temperature		Ta	-40 to +85							°C	
Ambient storage temperature		Tstg	-40 to +125							°C	With no icing or condensation
Soldering temperature		-	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.

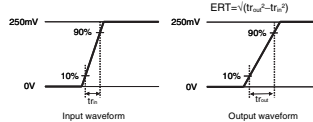
## ■Electrical Characteristics (Ta = 25°C)

Item		Symbol	G3VM-41PR12	G3VM-41PR6	G3VM-41PR10	G3VM-41PR11	G3VM-41PR5	G3VM-51PR	Unit	Measurement conditions		
Input	LED forward voltage	Minimum	1.0						V	IF=10 mA		
		Typical	1.15									
		Maximum	1.3									
	Reverse current	IR	10						μA	VR=5 V		
Capacitance between terminals	CT	Typical	15						pF	V=0, f=1 MHz		
Trigger LED forward current	IFT	Typical	1.0	0.6	0.5	1.0	0.6	0.5	mA	Io=100 mA		
		Maximum	3									
Release LED forward current	IFC	Minimum	0.1						0.2	mA	I <sub>OFF</sub> =10 μA	
Maximum resistance with output ON	ROn	Typical	15	10	12	7	1		Ω	IF=5 mA, t<1 s Io=Continuous load current ratings		
		Maximum	20	15	14	10	1.5					
Current leakage when the relay is open	I <sub>LEAK</sub>	Maximum	1	0.2	1						nA	V <sub>OFF</sub> =Load voltage ratings
Capacitance between terminals	COFF	Typical	0.3	1	0.45	0.7	10	12	pF	V=0, f=100 MHz, t<1 s		
		Maximum	0.6	2	0.8	1.3	14	-				
Capacitance between I/O terminals	CI-O	Typical	0.4						pF	f=1 MHz, V <sub>S</sub> =0 V		
Insulation resistance between I/O terminals	RI-O	Minimum	1000						MΩ	VI-O=500 VDC, RoH±60%		
		Typical	10 <sup>8</sup>									
Turn-ON time	tON	Typical	0.04	0.05	0.03	0.04	0.2		ms	IF=5 mA, RL=200 Ω, V <sub>DD</sub> =20 V (See note.2.)		
		Maximum	0.2									
Turn-OFF time	tOFF	Typical	0.12	0.16	0.2	0.14	0.2	0.1	ms	IF=5 mA, V <sub>DD</sub> =0.25 V, Tr(in)=25 ps (See Note.3)		
		Maximum	0.2	0.3		0.2	0.3	0.4				
Equivalent rise time	ERT	Typical	-						40	ps	IF=5 mA, V <sub>DD</sub> =0.25 V, Tr(in)=25 ps (See Note.3)	
		Maximum	-						90			

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



**Note: 3.** Equivalent Rise Time



## ■Recommended Operating Conditions

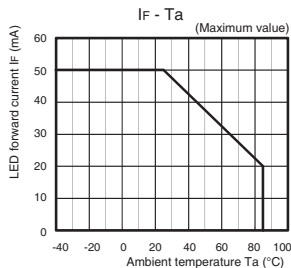
For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics.

Each item on this list is an independent condition, so it is not simultaneously satisfy several conditions.

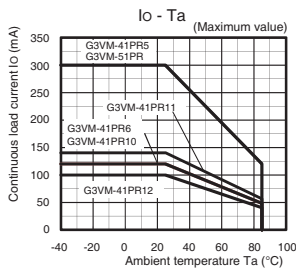
Item		Symbol	G3VM-41PR12	G3VM-41PR6	G3VM-41PR10	G3VM-41PR11	G3VM-41PR5	G3VM-51PR	Unit	
Load voltage (AC peak/DC)	V <sub>DD</sub>	Maximum	32						40	V
		Minimum	5							
Operating LED forward current	IF	Typical	7.5						mA	
		Maximum	20							
		Minimum	-							
Continuous load current (AC peak/DC)	Io	Maximum	100	120		140	300			
Ambient operating temperature	Ta	Minimum	-20						°C	
		Maximum	65							

## Engineering Data

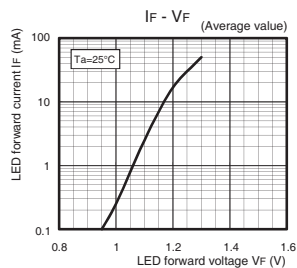
### LED forward current vs. Ambient temperature



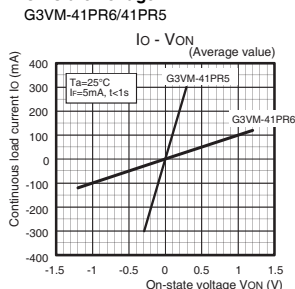
### Continuous load current vs. Ambient temperature



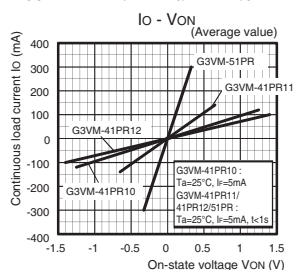
### LED forward current vs. LED forward voltage



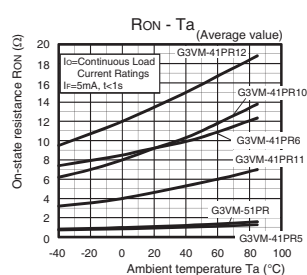
### Continuous load current vs. On-state voltage



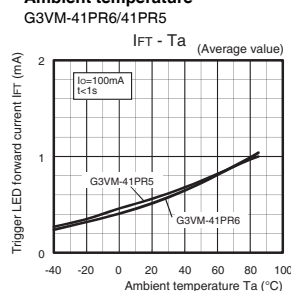
### G3VM-41PR12/41PR10/41PR11/51PR



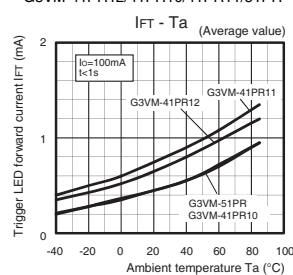
### On-state resistance vs. Ambient temperature



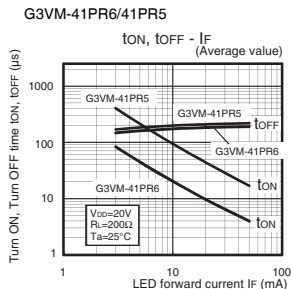
### Trigger LED forward current vs. Ambient temperature



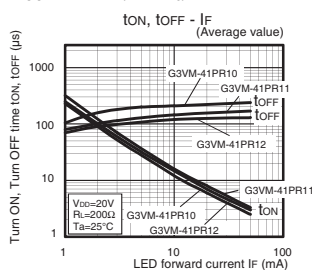
### G3VM-41PR12/41PR10/41PR11/51PR



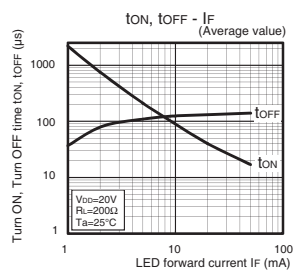
### Turn ON, Turn OFF time vs. LED forward current



### G3VM-41PR12/41PR10/41PR11



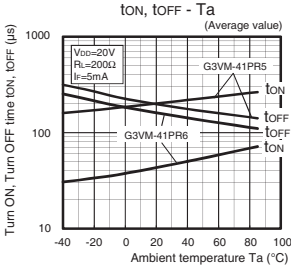
### G3VM-51PR



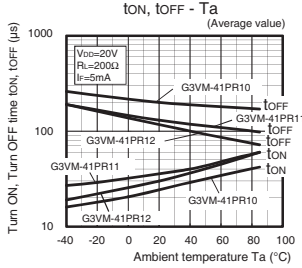
## Engineering Data

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

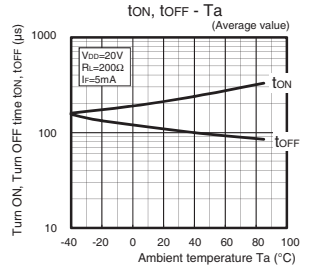
G3VM-41PR6/41PR5



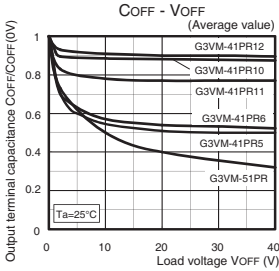
G3VM-41PR12/41PR10/41PR11



G3VM-51PR

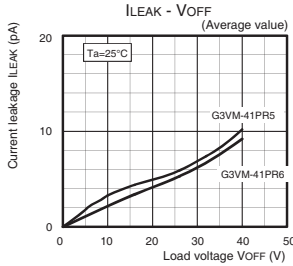


### Output terminal capacitance vs. Load voltage

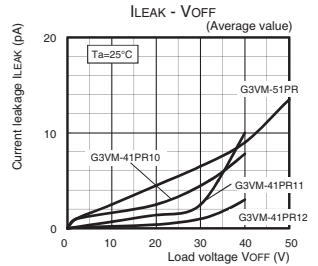


### Current leakage vs. Load voltage

G3VM-41PR6/41PR5



G3VM-41PR12/41PR10/41PR11/51PR



Introduction  
General purpose  
High-side-voltage  
Multi-contact pair (2a, 2b, and 1a1b)  
High-current and Low-ON-resistance  
Small and high dielectric-strength  
High-dielectric strength  
Current-limiting  
Low-leakage and Low-ON-resistance  
Small and High-side-voltage  
Certified models with standard derivation  
DIP  
SOP  
SSOP  
USOP  
VSON

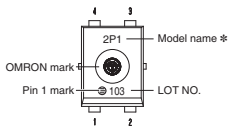
G3VM-41PR□/51PR

## ■ Appearance / Terminal Arrangement / Internal Connections

### ● Appearance

#### USOP (Ultra Small Outline Package)

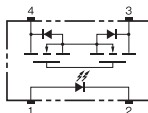
USOP 4-pin



\* Actual model name marking for each model

Model	Marking
G3VM-41PR12	4PC
G3VM-41PR6	4P6
G3VM-41PR10	4PA
G3VM-41PR11	4PB
G3VM-41PR5	4P5
G3VM-51PR	5P0

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



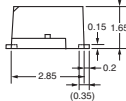
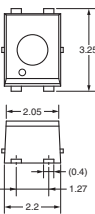
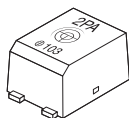
**Note:** 1. The actual product is marked differently from the image shown here.

**Note:** 2. "G3VM" does not appear in the model number on the Relay.

## ■ Dimensions (Unit: mm)

### Surface-mounting Terminals

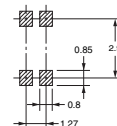
Weight: 0.03 g



Unless otherwise specified, the dimensional tolerance is  $\pm 0.2$  mm.

### Actual Mounting Pad Dimensions

(Recommended Value, Top View)



Unless otherwise specified, the dimensional tolerance is  $\pm 0.2$  mm.

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

## ■ Approved Standards

UL recognized 

Approved Standards	Contact form	File No.
UL recognized	1a (SPST-NO)	E80555

## ■ Safety Precautions

• Refer to the *Common Precautions for All MOS FET Relays* for precautions that apply to all MOS FET Relays.