

# MOS FET Relays G3VM-51PR

**Smallest Class in market, USOP Package**  
**MOS FET Relay is designed to exhibit a fast rise time and reduce signal degradation.**

- ERT (Equivalent Rise Time): 40 ps (typical), 90 ps (maximum).
- Dielectric strength of 500 Vrms between I/O.
- $C_{OFF} = 12 \text{ pF}$  (typical) and  $R_{ON} = 1 \Omega$  (typical).
- RoHS compliant.

**Application Examples**

- Semiconductor inspection tools
- Measurement devices and Data loggers
- Communication equipment



**NEW**

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

**List of Models**

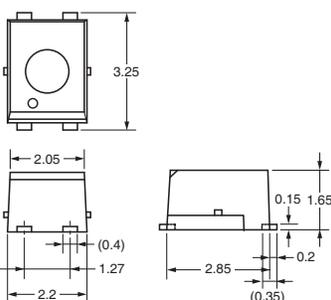
Package Type	Contact form	Terminals	Load voltage (peak value)	Model	Number per tape
USOP4	SPST-NO	Surface-mounting terminals	50 VAC or VDC	G3VM-51PR	---
				G3VM-51PR(TR05)	500
				G3VM-51PR(TR)	1,500

**Note:** Tape-cut USOP's are packaged without humidity resistance. Use manual soldering to mount them. Refer to the common precautions contained in the Technical Users Guide, "MOS FET Relays, Technical Information".

**Dimensions**

**Note:** All units are in millimeters unless otherwise indicated.

**G3VM-51PR**

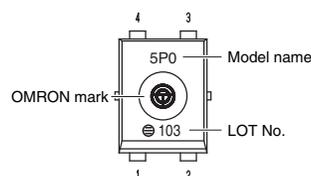
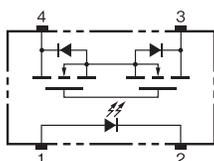


**Note:** The actual product is marked differently from the image shown here.

Weight: 0.03 g

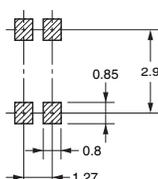
**Terminal Arrangement/Internal Connections (Top View)**

**G3VM-51PR**



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

**G3VM-51PR**



■ Absolute Maximum Ratings (Ta = 25°C)

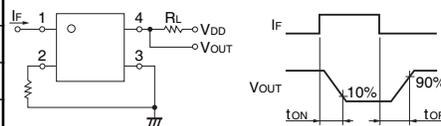
Item		Symbol	Rating	Unit	Measurement Conditions
Input	LED forward current	$I_F$	50	mA	
	LED forward current reduction rate	$\Delta I_F/^\circ\text{C}$	-0.5	mA/°C	$T_a \geq 25^\circ\text{C}$
	LED reverse voltage	$V_R$	5	V	
	Connection temperature	$T_J$	125	°C	
Output	Load voltage (AC peak/DC)	$V_{OFF}$	50	V	
	Continuous load current (AC peak/DC)	$I_O$	300	mA	
	ON current reduction rate	$\Delta I_{ON}/^\circ\text{C}$	-3.0	mA/°C	$T_a \geq 25^\circ\text{C}$
	Pulse ON current	$I_{OP}$	900	mA	$t=100\text{ms, Duty}=1/10$
	Connection temperature	$T_J$	125	°C	
Dielectric strength between input and output (See note 1.)		$V_{I-O}$	500	$V_{rms}$	AC for 1 min
Ambient operating temperature		$T_a$	-40 to +85	°C	With no icing or condensation
Ambient Storage temperature		$T_{stg}$	-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.

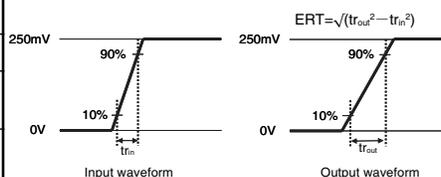
■ Electrical Characteristics (Ta = 25°C)

Item		Symbol	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	$\mu\text{A}$	$V_R = 5 \text{ V}$
	Capacity between terminals	$C_T$	---	15	---	pF	$V = 0, f = 1 \text{ MHz}$
	Trigger LED forward current	$I_{FT}$	---	0.5	3	mA	$I_O = 100 \text{ mA}$
Output	Maximum resistance with output ON	$R_{ON}$	---	1	1.5	$\Omega$	$I_F = 5 \text{ mA}, I_O = 300 \text{ mA}$ $t < 1 \text{ s}$
	Current leakage when the relay is open	$I_{LEAK}$	---	---	1	nA	$V_{OFF} = 50 \text{ V}, T_a = 25^\circ\text{C}$
	Capacity between terminals	$C_{OFF}$	---	12	---	pF	$V = 0, f = 100 \text{ MHz},$ $t < 1 \text{ s}$
Capacity between I/O terminals		$C_{I-O}$	---	0.4	---	pF	$f = 1 \text{ MHz}, V_g = 0 \text{ V}$
Insulation resistance between I/O terminals		$R_{I-O}$	1,000	---	---	M $\Omega$	$V_{I-O} = 500 \text{ VDC},$ $R_{OH} \leq 60\%$
Turn-ON time		$t_{ON}$	---	0.2	0.5	ms	$I_F = 5 \text{ mA}, R_L = 200 \Omega,$ $V_{DD} = 20 \text{ V}$ (See note 2.)
Turn-OFF time		$t_{OFF}$	---	0.1	0.4	ms	
Equivalent rise time		ERT	---	40	90	ps	$I_F = 5 \text{ mA}, V_{DD} = 0.25 \text{ V},$ $Tr(in) = 25 \text{ ps}$ (See note 3.)

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



**Note:** 3. ERT (Equivalent Rise Time)



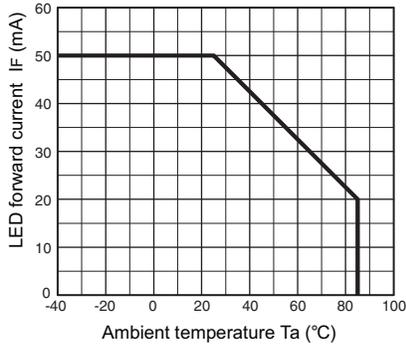
■ Recommended Operating Conditions

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

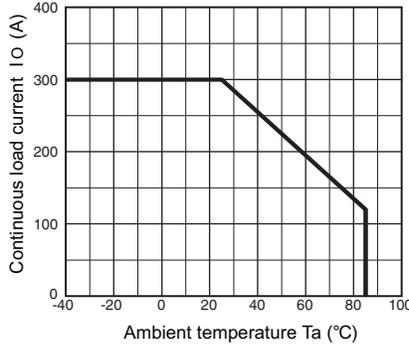
Item	Symbol	Minimum	Typical	Maximum	Unit
Load voltage (AC peak/DC)	$V_{DD}$	---	---	40	V
Operating LED forward current	$I_F$	5	7.5	20	mA
Continuous load current (AC peak/DC)	$I_O$	---	---	300	mA
Ambient Operating temperature	$T_a$	-20	---	65	°C

■ Engineering Data

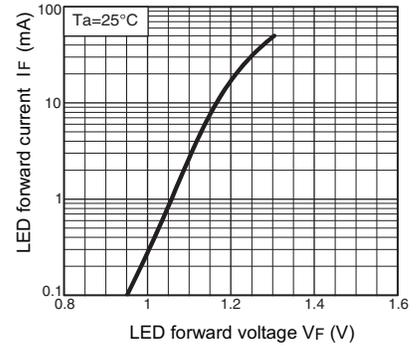
LED forward current vs. Ambient temperature  
IF - Ta



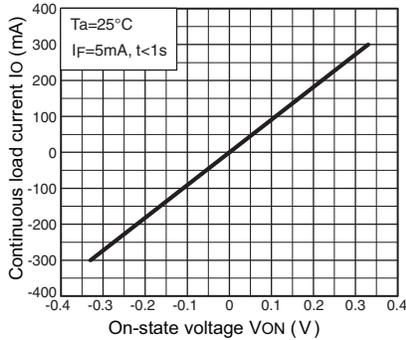
Continuous load current vs. Ambient temperature  
IO - Ta



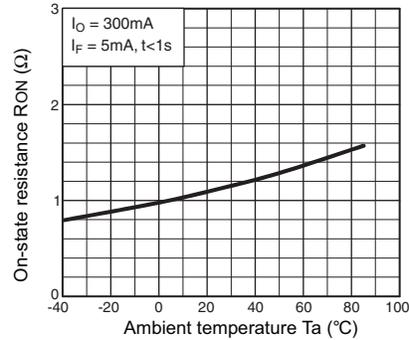
LED forward current vs. LED forward voltage  
IF - VF



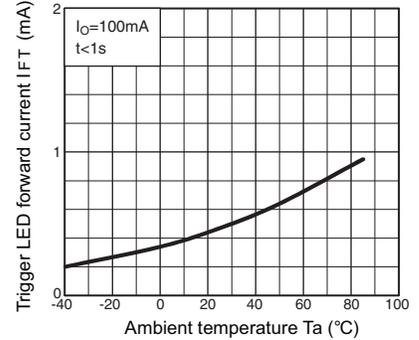
Continuous load current vs. On-state voltage  
IO - VON



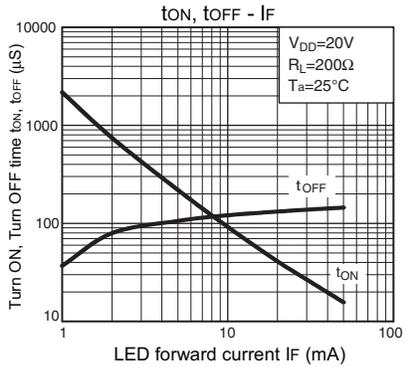
On-state resistance vs. Ambient temperature  
RON - Ta



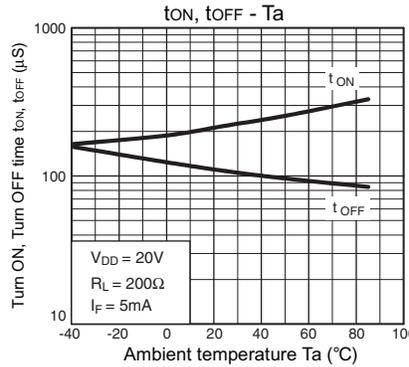
Trigger LED forward current vs. Ambient temperature  
IFT - Ta



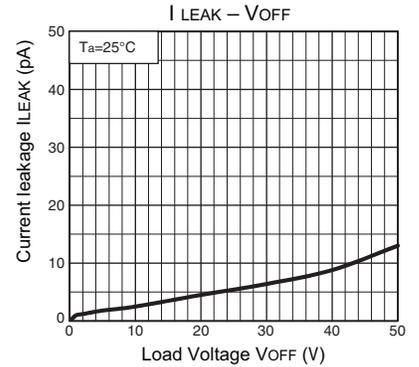
Turn ON, Turn OFF time vs. LED forward current  
tON, tOFF - IF



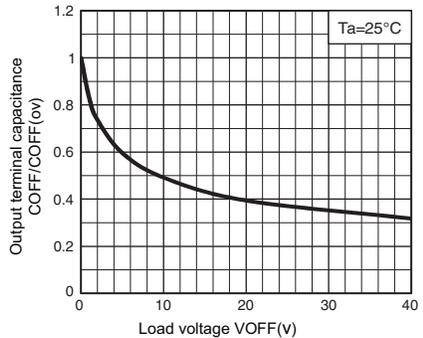
Turn ON, Turn OFF time vs. Ambient temperature  
tON, tOFF - Ta



Current leakage vs. Load voltage  
ILEAK - VOFF



Output terminal capacitance COFF/COFF(ov) vs. Load voltage  
COFF - VOFF



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**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**  
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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