G3VM-21QR□/41QR□□/61QR□

MOSFET Relays S-VSON(L) 4-pin, Low-output-capacitance and Low-ON-resistance Type (with Low C × R)

Compact S-VSON(L) package MOSFET Relays with Low Output Capacitance and Low ON Resistance



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

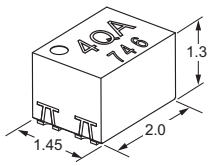
- **A compact L2.0 × W1.45 × H1.3 mm S-VSON(L) 4-pin package helps to reduce the space required by circuit boards**
- **Load voltage 20 V/40 V/60 V**
- **Low C × R provides excellent output characteristics in the high-frequency domain**
  G3VM-21QR: Low C × R = 4.08 pF/Ω (standard)
  G3VM-21QR1: Low C × R = 5.2 pF/Ω (standard)
  G3VM-41QR4: Low C × R = 13 pF/Ω (standard)
  G3VM-41QR10: Low C × R = 4.95 pF/Ω (standard)
  G3VM-61QR/61QR3: Low C × R = 13.2 pF/Ω (standard)
- **Rapid response**
  G3VM-61QR3: Operation time of 0.25 ms (max.), recovery time of 0.2 ms (max.)
  G3VM-21QR: Operation time of 0.08 ms (max.), recovery time of 0.12 ms (max.)
  G3VM-21QR1/41QR4: Operation time of 0.15 ms (max.), recovery time of 0.1 ms (max.)
- **High Ambient operating temperature: -40°C to +110°C**

■Application Examples

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

■Package (Unit: mm, Average)

S-VSON(L) 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
2: 20 V
4: 40 V
6: 60 V

2. Contact form
1: 1a (SPST-NO)

3. Package type
Q: S-VSON(L) 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 type	Contact form	Terminals	Load voltage (peak value) *1	Continuous load current (peak value) *1	Packing/Tape cut		Packing/Tape & reel	
					Model	Minimum package quantity	Model	Minimum package quantity
S-VSON(L)4	1a (SPST-NO)	Surface-mounting Terminals	20 V	160 mA	G3VM-21QR	1 pc.	G3VM-21QR (TR05)	500 pcs.
				450 mA	G3VM-21QR1		G3VM-21QR1 (TR05)	
			40 V	120 mA	G3VM-41QR10		G3VM-41QR10 (TR05)	
				250 mA	G3VM-41QR4		G3VM-41QR4 (TR05)	
			60 V	400 mA	G3VM-61QR		G3VM-61QR (TR05)	
					G3VM-61QR3		G3VM-61QR3 (TR05)	

*1. The AC peak and DC value are given for the load voltage and continuous load current.
Note: Taping cut products are packaged without humidity resistance. Use manual soldering to mount them.

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■Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	G3VM-21QR	G3VM-21QR1	G3VM-41QR4	G3VM-41QR10	G3VM-61QR	G3VM-61QR3	Unit	Measurement conditions
Input	LED forward current	I_F	30						mA	
	LED forward current reduction rate	ΔI_F/°C	-0.3	-0.235			-0.3		mA/°C	Ta≥25°C
	LED reverse voltage	V_R	6						V	
	Junction temperature	T_J	125						°C	
Output	Load voltage (AC peak/DC)	V_{OFF}	20		40		60		V	
	Continuous load current (AC peak/DC)	I_O	160	450	250	120	400		mA	
	ON current reduction rate	ΔI_O/°C	-1.6	-4.5	-2.5	-1.2	-4		mA/°C	Ta≥25°C
	Pulse ON current	I_{OP}	0.48	1.35	0.75	0.36	1.2		A	t = 100 ms, Duty = 1/10
	Junction temperature	T_J	125						°C	
Dielectric strength between I/O *1		V_{I-O}	500						Vrms	AC for 1 min
Ambient operating temperature		T_a	-40 to +110						°C	With no icing or condensation
Ambient storage temperature		T_{stg}	-40 to +125						°C	
Soldering temperature		---	260						°C	10 s

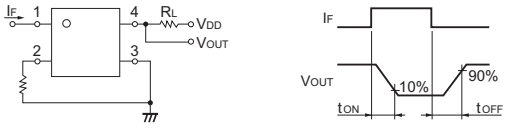
*1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.

Note: In terms of its structure, this product is sensitive to static electricity. Therefore, be sure to take measures against static electricity for the workbenches, people, soldering iron, solder mounting equipment, etc.

■Electrical Characteristics (Ta = 25°C)

Item		Symbol		G3VM-21QR	G3VM-21QR1	G3VM-41QR4	G3VM-41QR10	G3VM-61QR	G3VM-61QR3	Unit	Measurement conditions
Input	LED forward voltage	V_F	Minimum	1.1						V	I_F = 10 mA
			Typical	1.24			1.21		1.24		
			Maximum	1.4							
	Reverse current	I_R	Maximum	10						μA	V_R = 5 V
	Capacitance between terminals	C_T	Typical	80			30		80	pF	V = 0 V, f = 1 MHz
	Trigger LED forward current	I_{FT}	Typical	0.6	0.5		0.8	---		mA	I_O = 100 mA
			Maximum	3							
	Release LED forward current	I_{FC}	Minimum	0.1						mA	I_{OFF} = 10 μA
Output	Maximum resistance with output ON	R_{ON}	Typical	6.8	0.8	2	11	1.1		Ω	I_F = 5 mA, t<1 s, I_O = Continuous load current maximum value
			Maximum	8.5	1.2	3	14	1.5			
	Current leakage when the relay is open	I_{LEAK}	Maximum	1		1000 (1)	1	1000 (1)		nA	V_{OFF} = Load voltage ratings 61QR/61QR3: (V_{OFF} = 50V) 41QR4: (V_{OFF} = 30V Ta = 50°C)
	Capacitance between terminals	C_{off}	Typical	0.6	6.5		0.45	12		pF	V = 0V, f = 1 MHz, t<1 s G3VM-41QR10/G3VM-61QR only: V = 0V, f = 100 MHz, t<1 s
			Maximum	0.9	8.5		0.8	20			
Capacitance between I/O terminals		C_{I-O}	Typical	0.5	0.6		1	0.9		pF	V_S = 0V, f = 1 MHz
Insulation resistance between I/O terminals		R_{I-O}	Typical	10^8						MΩ	V_{I-O} = 500 VDC, R.H≤60%
Turn-ON time		t_{ON}	Typical	0.015	0.025	0.03	0.08	---	0.1 (0.05)	ms	I_F = 5 mA, R_L = 200 Ω, V_{DD} = 20 V *1 (I_F =10 mA, R_L = 200 Ω, V_{DD} = 20 V) *1 G3VM-21QR/G3VM-21QR1 only: I_F = 5 mA, R_L = 200 Ω, V_{DD} = 10 V *1
			Maximum	0.08	0.15		0.2	0.5 (0.25)	0.25 (0.13)		
Turn-OFF time		t_{OFF}	Typical	0.07	0.045	0.045	0.04	---	0.05 (0.06)	ms	
			Maximum	0.12	0.1		0.3	0.3 (0.3)	0.2 (0.2)		

*1. Turn-ON and Turn-OFF Times



■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.

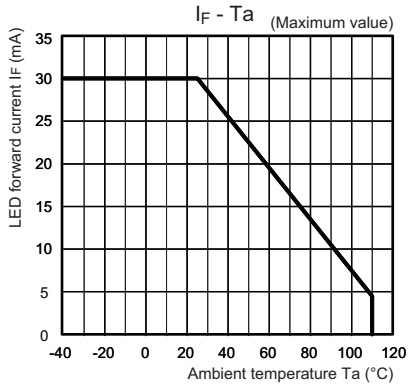
Each item on this list is an independent condition, so it is not simultaneously satisfy several conditions.

Item	Symbol		G3VM-21QR	G3VM-21QR1	G3VM-41QR4	G3VM-41QR10	G3VM-61QR	G3VM-61QR3	Unit
Load voltage (AC peak/DC)	V_{DD}	Maximum	16		32		48		V
Operating LED forward current	I_F	Minimum	5						mA
		Typical	7.5						
		Maximum	20						
Continuous load current (AC peak/DC)	I_O	Maximum	160	450	250	120	400		
Ambient operating temperature	T_a	Minimum	-20						°C
		Maximum	85				100		

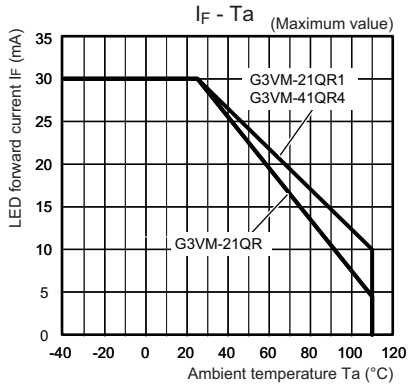
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■Engineering Data

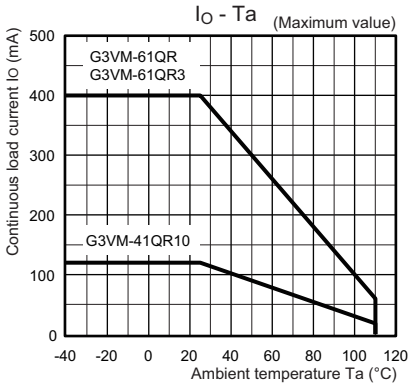
●LED forward current vs. Ambient temperature G3VM-41QR10/61QR/61QR3



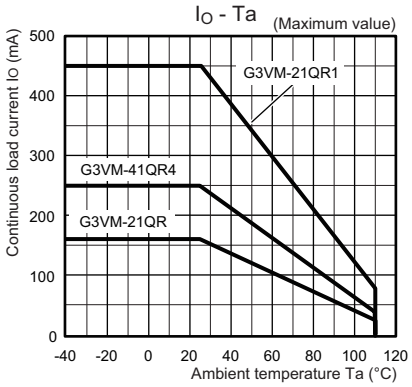
G3VM-21QR/21QR1/41QR4



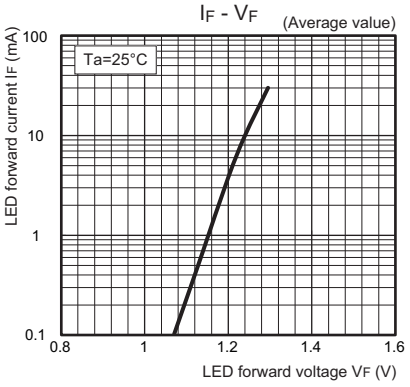
●Continuous load current vs. Ambient temperature G3VM-41QR10/61QR/61QR3



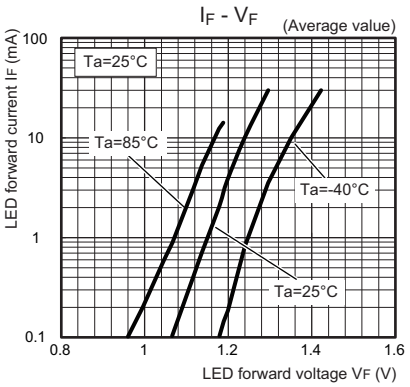
G3VM-21QR/21QR1/41QR4



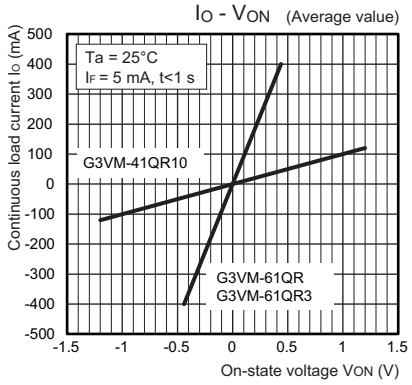
●LED forward current vs. LED forward voltage G3VM-41QR10/61QR/61QR3



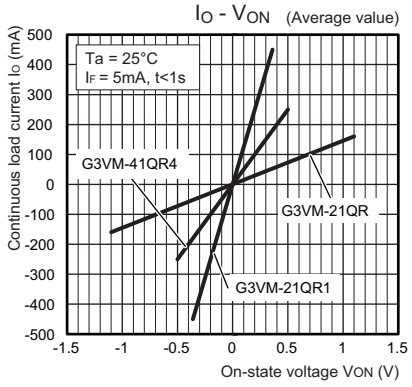
G3VM-21QR/21QR1/41QR4



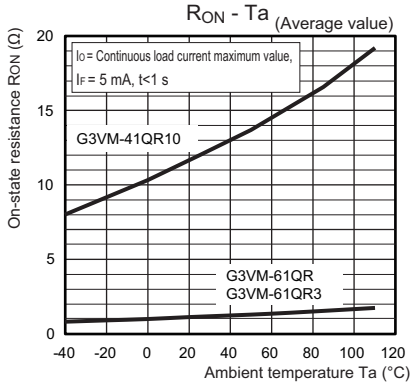
●Continuous load current vs. On-state voltage G3VM-41QR10/61QR/61QR3



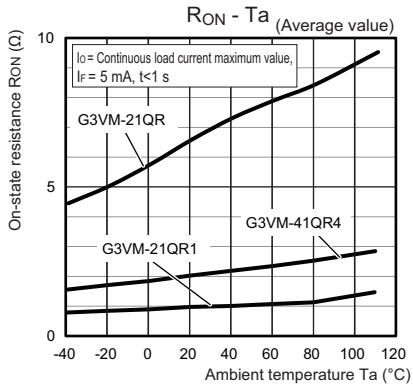
G3VM-21QR/21QR1/41QR4



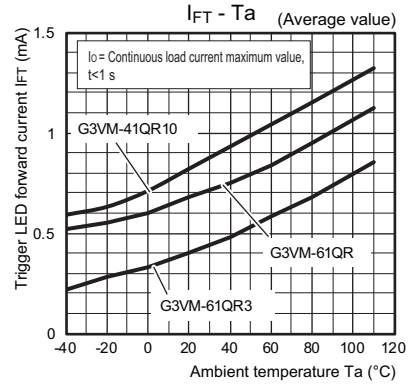
●On-state resistance vs. Ambient temperature G3VM-41QR10/61QR/61QR3



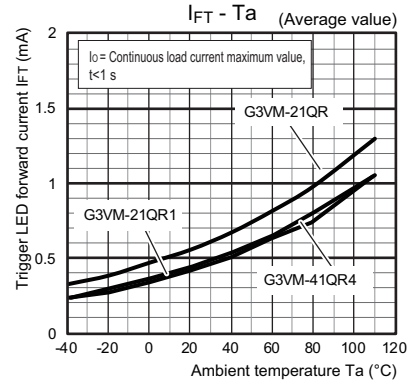
G3VM-21QR/21QR1/41QR4



●Trigger LED forward current vs. Ambient temperature G3VM-41QR10/61QR/61QR3

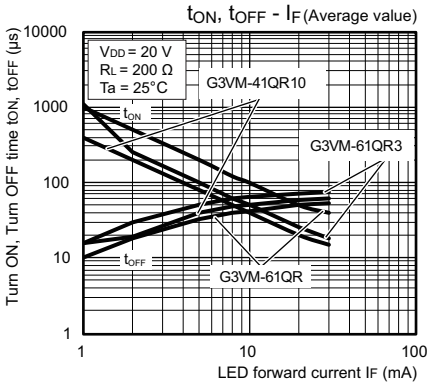


G3VM-21QR/21QR1/41QR4

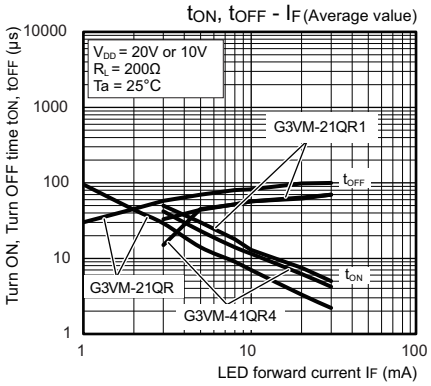


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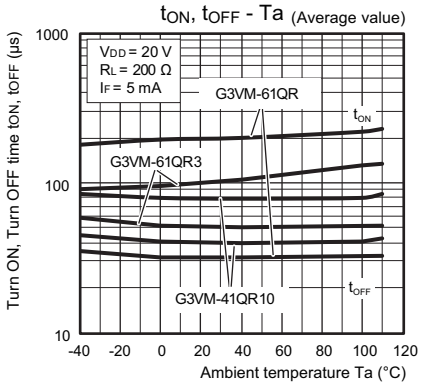
●Turn ON, Turn OFF time vs. LED forward current G3VM-41QR10/61QR/61QR3



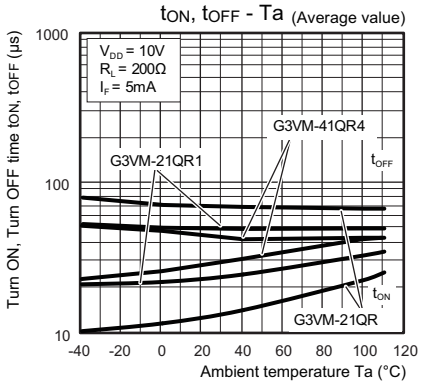
G3VM-21QR/21QR1/41QR4



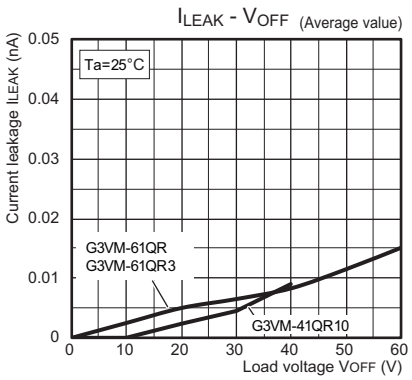
●Turn ON, Turn OFF time vs. Ambient temperature G3VM-41QR10/61QR/61QR3



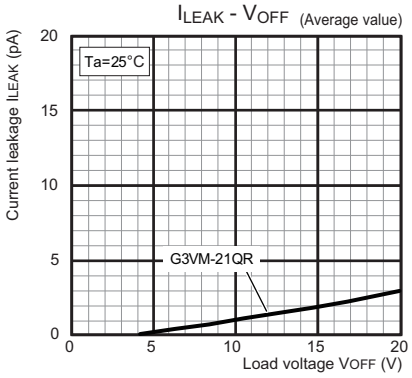
G3VM-21QR/21QR1/41QR4



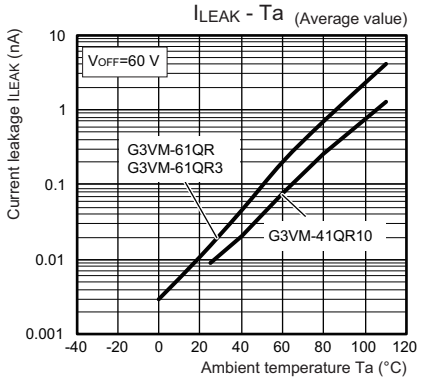
●Current leakage vs. Load voltage G3VM-41QR10/61QR/61QR3



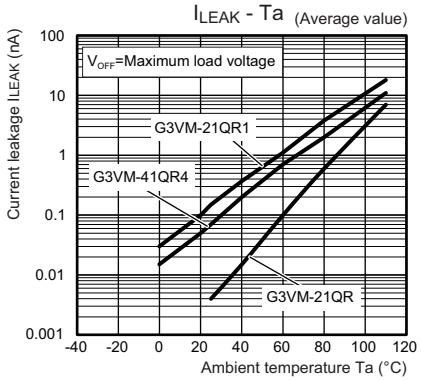
G3VM-21QR



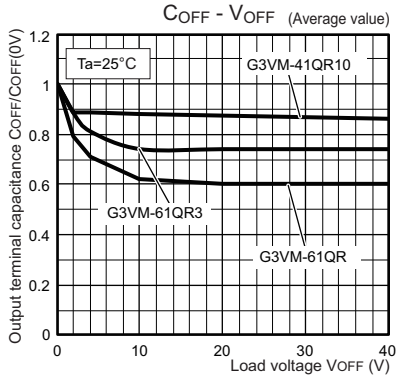
●Current leakage vs. Ambient temperature G3VM-41QR10/61QR/61QR3



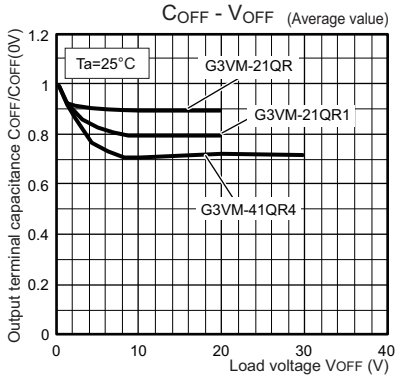
G3VM-21QR/21QR1/41QR4



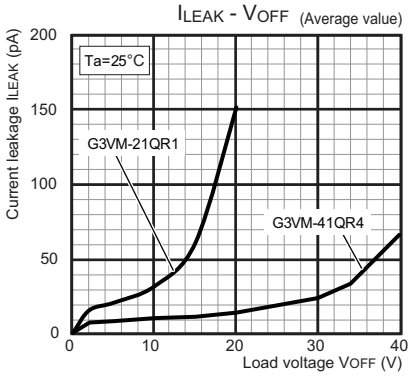
●Output terminal capacitance vs. Load voltage G3VM-41QR10/61QR/61QR3



G3VM-21QR/21QR1/41QR4



G3VM-21QR1/41QR4



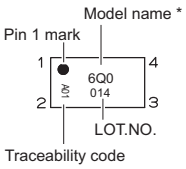
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■Appearance / Terminal Arrangement / Internal Connections

■Appearance

S-VSON (Super-Very Small Outline Non-leaded)

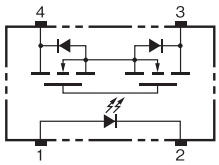
S-VSON(L)4 pin



✻ Actual model name marking for each model

Model	Marking
G3VM-21QR	2Q0
G3VM-21QR1	2Q1
G3VM-41QR4	4Q4
G3VM-41QR10	4QA
G3VM-61QR	6Q0
G3VM-61QR3	6Q3

■Terminal Arrangement/Internal Connections (Top View)



Note 1. The actual product is marked differently from the image shown here.
2. "G3VM" does not appear in the model number on the Relay.

■Dimensions

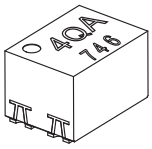
CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

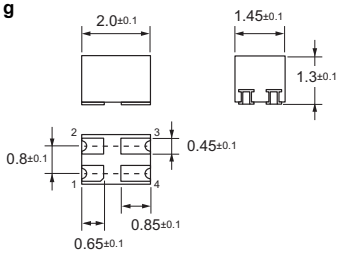
(Unit: mm)

S-VSON(L) 4-pin

Surface-mounting Terminals

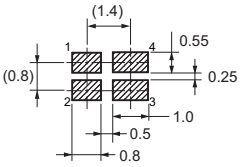
Weight: 0.01 g





Actual Mounting Pad Dimensions

(Recommended Value, Top View)



Note: Unless otherwise specified, the dimensional tolerance is ± 0.1 mm.

CAD Data

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

■Safety Precautions

• Refer to "**MOSFET Relays Common Precautions**" for general precautions.

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