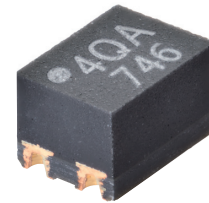


G3VM-21QR□/41QR□□/61QR□

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

- 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



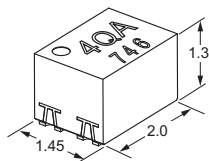
Note: The actual product is marked differently from the image shown here.

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

5. Other informations

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

4. Additional functions

- R: Low On-resistance

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.

■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

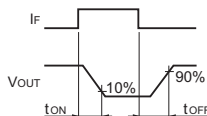
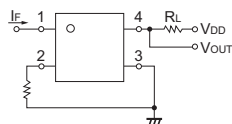
*1. The dielectric strength between the input and output was checked by applying voltage between all pins as a group on the LED side and all pins as a group on the light-receiving side.

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

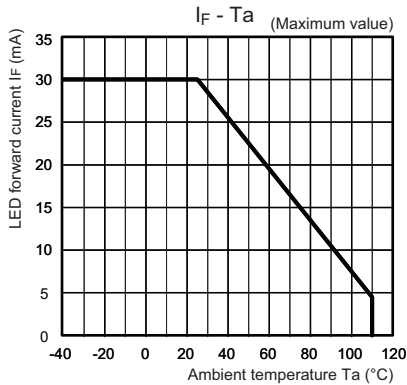
For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics.

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

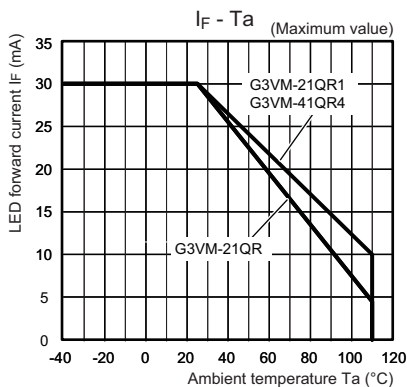
Item	Symbol	G3VM-21QR	G3VM-21QR1	G3VM-41QR4	G3VM-41QR10	G3VM-61QR	G3VM-61QR3	Unit	
Load voltage (AC peak/DC)	V _{DD}	Maximum 16			32		48	V	
Operating LED forward current	I _F	Minimum	5						mA
		Typical	7.5						
		Maximum	20						
Continuous load current (AC peak/DC)	I _O	Maximum 160	450	250	120	400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

Engineering Data

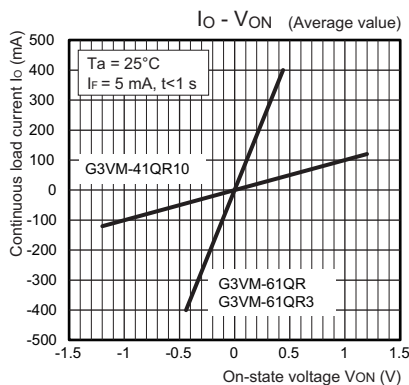
LED forward current vs. Ambient temperature G3VM-41QR10/61QR/61QR3



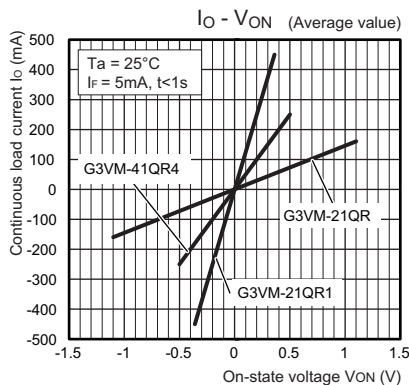
G3VM-21QR/21QR1/41QR4



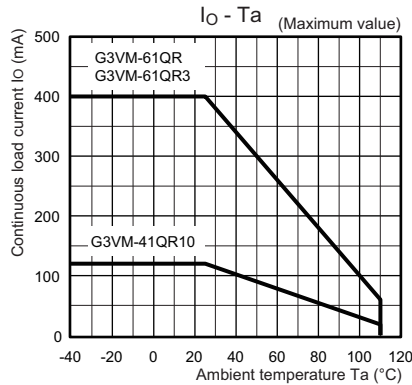
Continuous load current vs. On-state voltage G3VM-41QR10/61QR/61QR3



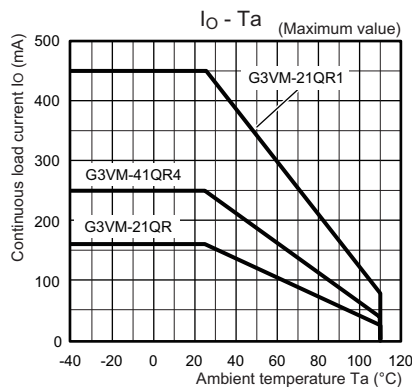
G3VM-21QR/21QR1/41QR4



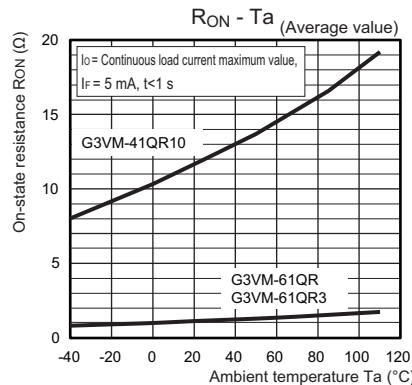
Continuous load current vs. Ambient temperature G3VM-41QR10/61QR/61QR3



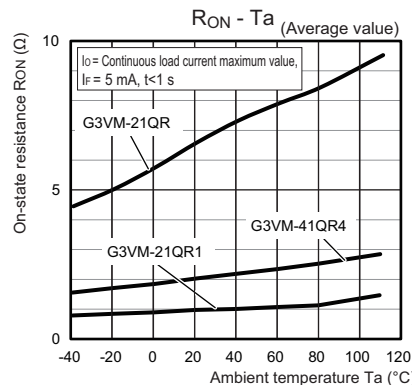
G3VM-21QR/21QR1/41QR4



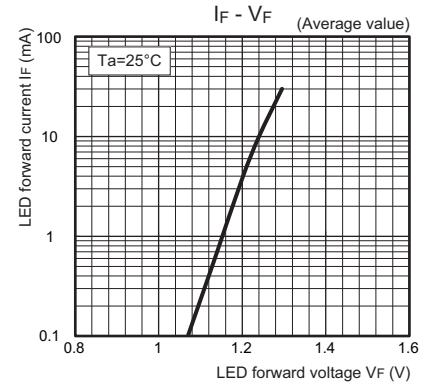
On-state resistance vs. Ambient temperature G3VM-41QR10/61QR/61QR3



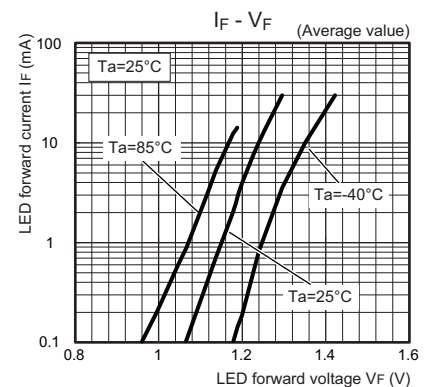
G3VM-21QR/21QR1/41QR4



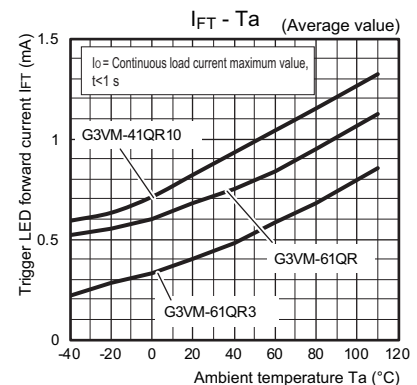
LED forward current vs. LED forward voltage G3VM-41QR10/61QR/61QR3



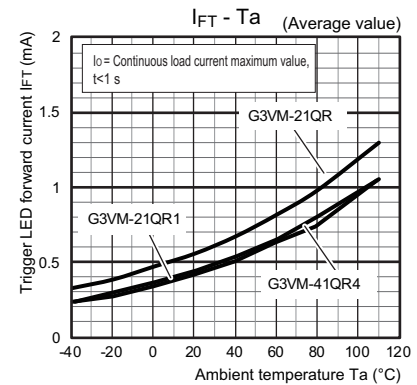
G3VM-21QR/21QR1/41QR4



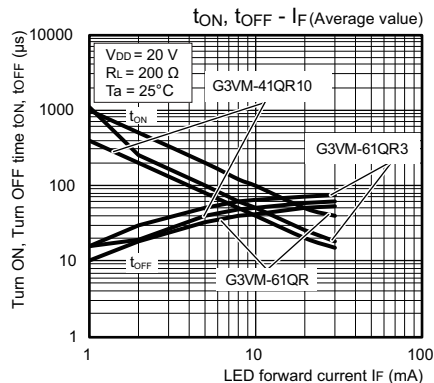
Trigger LED forward current vs. Ambient temperature G3VM-41QR10/61QR/61QR3



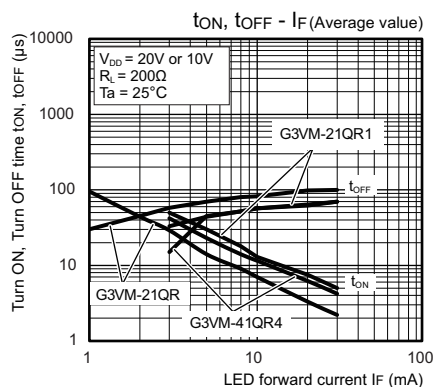
G3VM-21QR/21QR1/41QR4



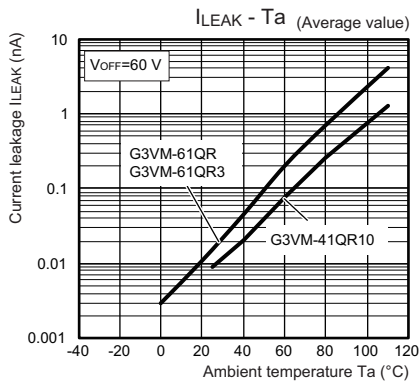
● Turn ON, Turn OFF time vs. LED forward current G3VM-41QR10/61QR/61QR3



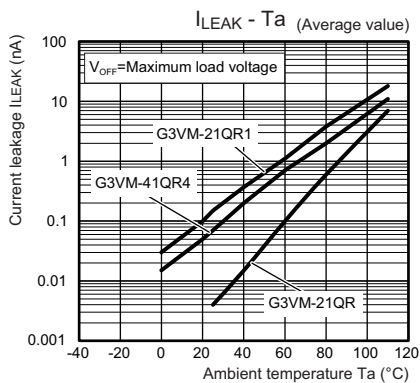
G3VM-21QR/21QR1/41QR4



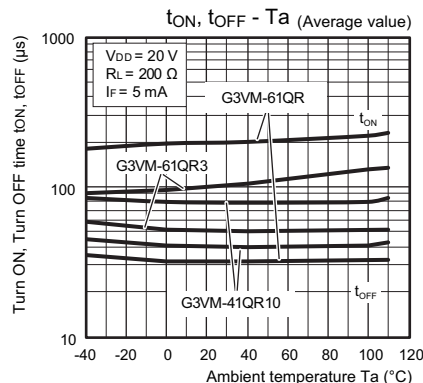
● Current leakage vs. Ambient temperature G3VM-41QR10/61QR/61QR3



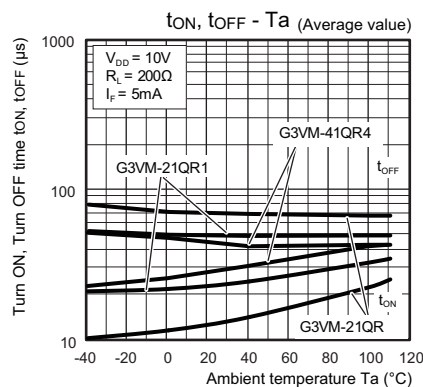
G3VM-21QR/21QR1/41QR4



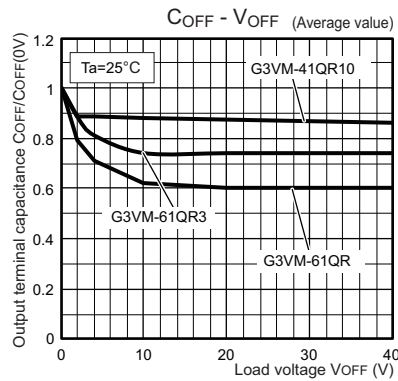
● Turn ON, Turn OFF time vs. Ambient temperature G3VM-41QR10/61QR/61QR3



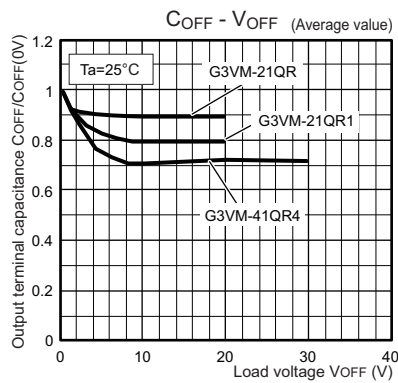
G3VM-21QR/21QR1/41QR4



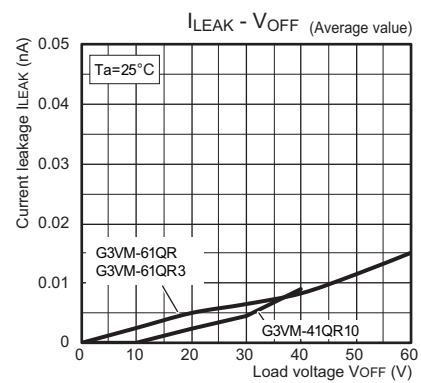
● Output terminal capacitance vs. Load voltage G3VM-41QR10/61QR/61QR3



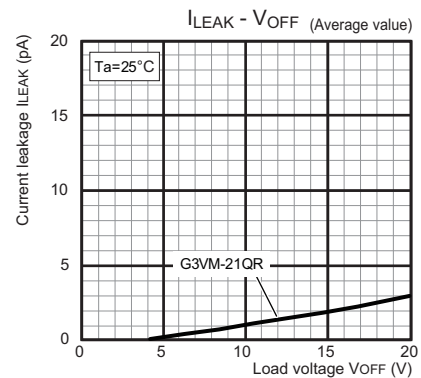
G3VM-21QR/21QR1/41QR4



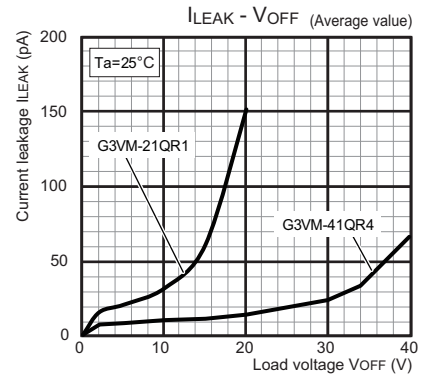
● Current leakage vs. Load voltage G3VM-41QR10/61QR/61QR3



G3VM-21QR



G3VM-21QR1/41QR4

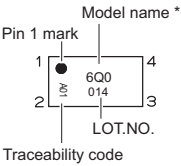


■Appearance / Terminal Arrangement / Internal Connections

■Appearance

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

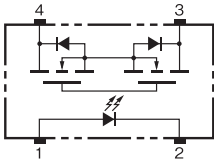
S-VSON(L)4 pin



* 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

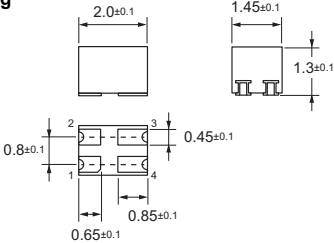
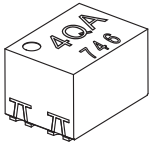
CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

(Unit: mm)

S-VSON(L) 4-pin

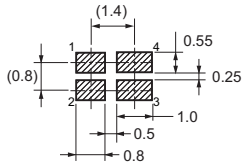
Surface-mounting Terminals

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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