G3VH

High-load-voltage SiC MOSFET Relay

SiC MOSFET Based MOSFET Relay with High-load-voltage of 1,000 V or More

- **Load voltage: 1,800 V, or 3,300 V**
- **Low on-resistance**

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

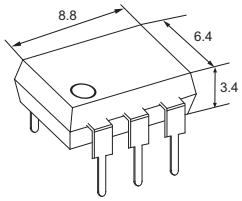
■Application Examples

- **Semiconductor test equipment**
- **BMS (Battery Management System), etc.**

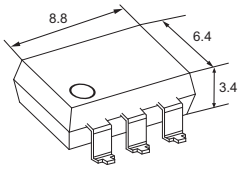
■Package

(Unit : mm, Average)

DIP 6-pin PCB Terminals



DIP 6-pin Surface-mounting Terminals



■Model Number Legend

G3VH-□□ □ □
1 2 3

1. Load Voltage
18: 1,800 V
33: 3,300 V

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

3. Package
B: DIP 6-pin PCB Terminals
E: DIP 6-pin Surface-mounting Terminals

■Ordering Information

Package	Contact form	Load voltage (peak value) *	Continuous load current (peak value) *	Stick packaging			Tape packaging	
				Model		Minimum package quantity	Model	Minimum package quantity
				PCB Terminals	Surface-mounting Terminals		Surface-mounting Terminals	
DIP6	1a (SPST-NO)	1,800 V	30 mA	**G3VH-181B**	**G3VH-181E**	50 pcs.	**G3VH-181E(TR)**	1,000 pcs.
		3,300 V	300 mA	**G3VH-331B**	**G3VH-331E**		**G3VH-331E(TR)**	

* The AC peak and DC value are given for the load voltage and continuous load current.
Note 1. To order tape packaging for Relays, add "(TR)" to the end of the model number.
2. Stick products are packaged without humidity resistance. Use manual soldering to mount them.

■Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	G3VH-181B G3VH-181E	G3VH-331B G3VH-331E	Unit	Measurement conditions
Input	Input forward current	I_F	50		mA	
	LED forward pulse current	I_{FP}	500		mA	t=10 ms, duty=1/100
	LED forward current reduction rate	ΔI_F/°C	−0.5		mA/°C	Ta≥25°C
	Input reverse voltage	V_{RIN}	5		V	I_R=10μA
	Connection temperature	T_J	125		°C	
Output	Load voltage (AC peak/DC)	V_{OFF}	1,800	3,300	V	
	Continuous load current (AC peak/DC)	I_O	30	300	mA	
	Pulse ON current	Iop	80	900	mA	t=100 ms, duty=1/10
	ON current reduction rate	ΔI_O/°C	−0.25	−2.0	mA/°C	Ta≥25°C
	Connection temperature	T_J	150		°C	
Total power consumption		P_T	500	600	mW	
Dielectric strength between I/O *1		V_{I-O}	5,000		Vrms	AC for 1 min
Ambient operating temperature		Ta	−40 to +105	−40 to +85	°C	With no icing or condensation
Ambient storage temperature		Tstg	−40 to +125	−40 to +105	°C	
Soldering temperature		−	260		°C	10 s

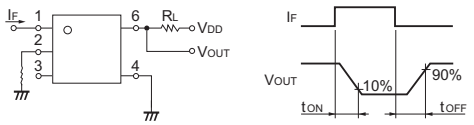
Note: In terms of its structure, this product is sensitive to static electricity. Therefore, be sure to take measures against static electricity for the workbenches, people, soldering irons, solder mounting equipment, etc.

*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		G3VH-181B G3VH-181E	G3VH-331B G3VH-331E	Unit	Measurement conditions
Input	LED forward voltage	V_F	Minimum	1.0		V	I_F=10 mA
			Typical	1.33			
			Maximum	1.5			
	Reverse current	I_R	Maximum	5.0		μA	V_R=5 V
	Capacitance between terminals	C_T	Typical	30		pF	V=30 mVAC, f=1 MHz
	Trigger LED forward current	I_{FT}	Typical	2.0	2.4	mA	I_O=Continuous load current ratings
			Maximum	5.0			
	Release LED forward current	I_{FC}	Minimum	0.2		mA	I_{OFF}=10 μA
Output	Maximum resistance with output ON	R_{ON}	Typical	120	3.5	Ω	I_F=10 mA, I_O=Continuous load current ratings t<1 s
			Maximum	200	5		
	Current leakage when the relay is open	I_{LEAK}	Maximum	10 (1)	1	μA	V_{OFF}=Continuous load current ratings 181B/181E, () indicates V_{OFF}=1,500 V
	Capacitance between terminals	C_{OFF}	Typical	10	220	pF	V=0, f=1 MHz, t<1 s
Capacitance between I/O terminals		C_{I-O}	Typical	1.3		pF	V_S=0 V, f=1 MHz
Insulation resistance between I/O terminals		R_{I-O}	Minimum	10^9	10^{10}	Ω	V_{I-O}=500 VDC
Turn-ON time		t_{ON}	Typical	0.2	1	ms	I_F=10 mA, I_O=Continuous load current ratings
			Maximum	1	2		
Turn-OFF time		t_{OFF}	Typical	0.06	0.05		
			Maximum	0.2	0.2		

* Turn-ON and Turn-OFF Times



■Recommended Operating Conditions

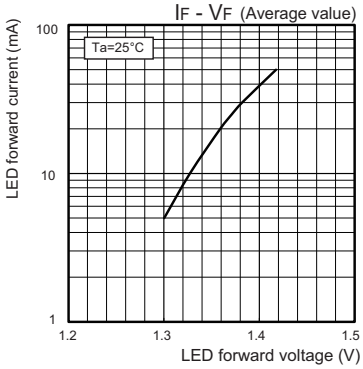
For usage with high reliability, Recommended Operation Conditions is a measure that takes into account the derating of Absolute Maximum Ratings and Electrical Characteristics.

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

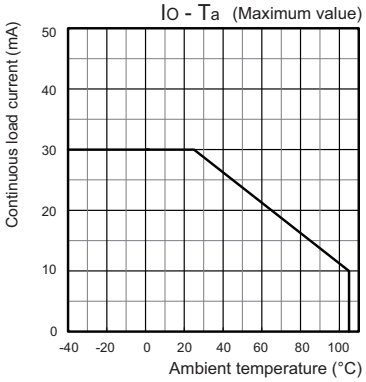
Item	Symbol		G3VH-181B G3VH-181E	G3VH-331B G3VH-331E	Unit
Load voltage (AC peak/DC)	V_{DD}	Maximum	1,500	2,640	V
Operating LED forward current	I_F	Minimum	10		mA
		Maximum	25		mA
Continuous load current (AC peak/DC)	I_O	Maximum	24	240	mA
Ambient operating temperature	Ta	Minimum	−20		°C
		Maximum	85		

■Engineering Data

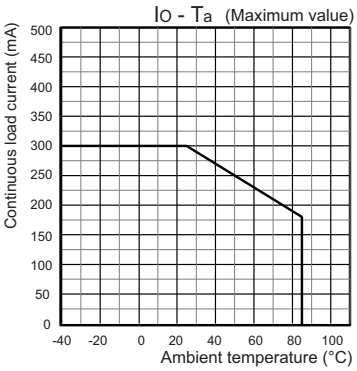
●Input forward current vs. Input forward voltage G3VH-181□/331□



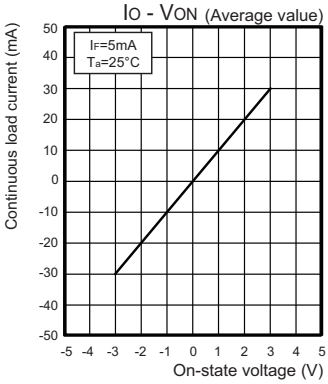
●Continuous load current vs. Ambient temperature G3VH-181□



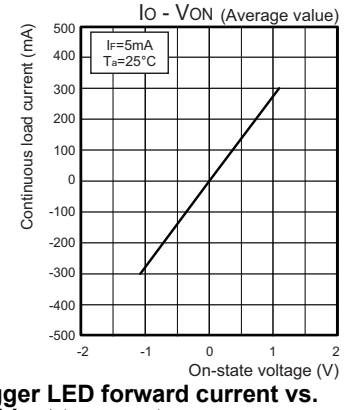
●Continuous load current vs. Ambient temperature G3VH-331□



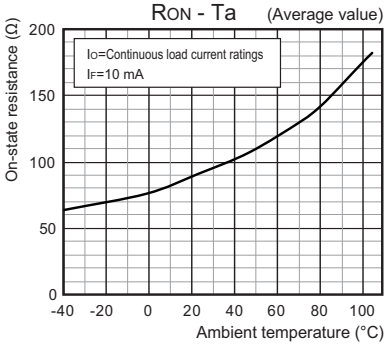
●Continuous load current vs. On-state voltage G3VH-181□



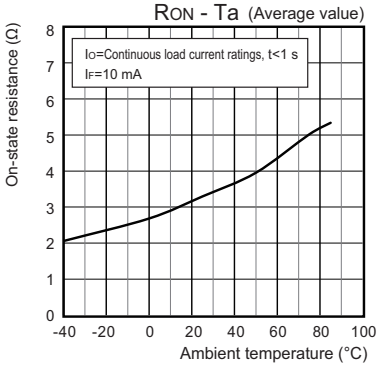
●Continuous load current vs. On-state voltage G3VH-331□



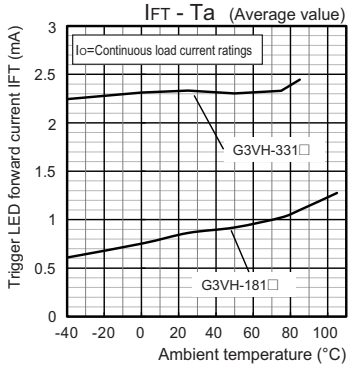
●On-state resistance vs. Ambient temperature G3VH-181□



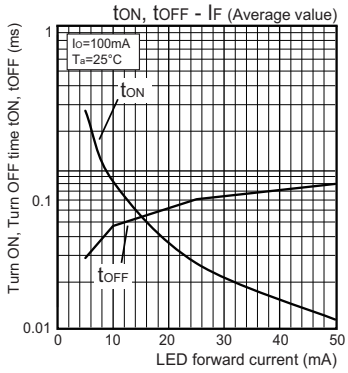
●On-state resistance vs. Ambient temperature G3VH-331□



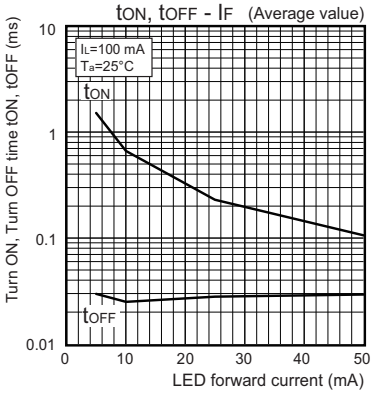
●Trigger LED forward current vs. Ambient temperature



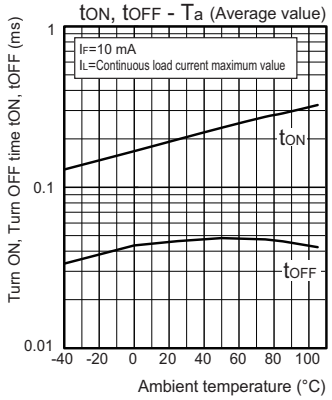
●Turn ON, Turn OFF time vs. LED forward current G3VH-181□



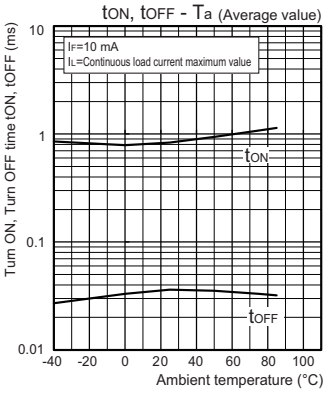
●Turn ON, Turn OFF time vs. LED forward current G3VH-331□



●Turn ON, Turn OFF time vs. Ambient temperature G3VH-181□

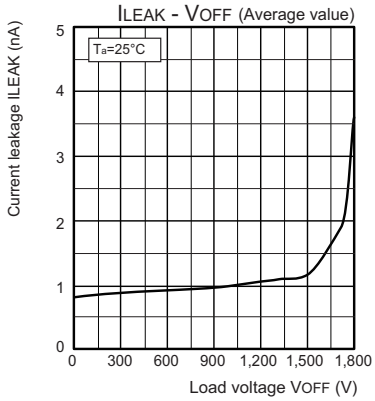


●Turn ON, Turn OFF time vs. Ambient temperature G3VH-331□

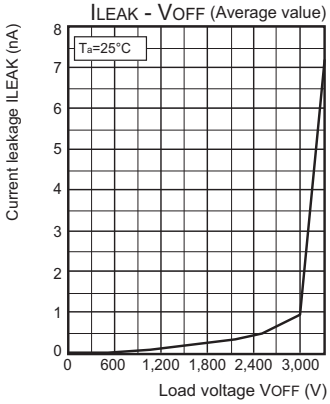


■Engineering Data

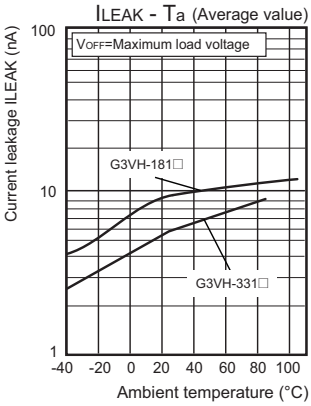
●Current leakage vs. Load voltage
G3VH-181□



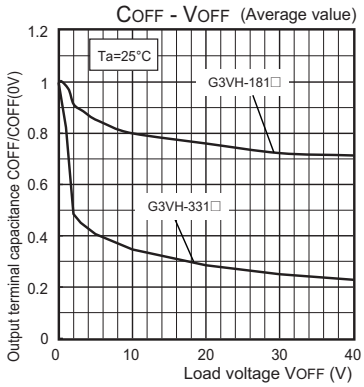
G3VH-331□



●Current leakage vs. Ambient temperature



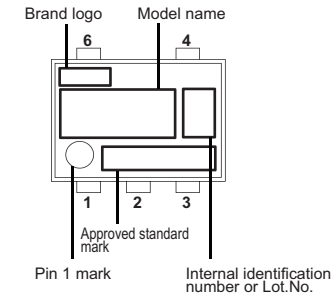
●Output terminal capacitance vs. Load voltage
G3VH-181□/331□



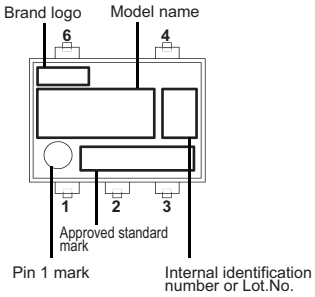
■Appearance / Terminal Arrangement / Internal Connections

●Appearance

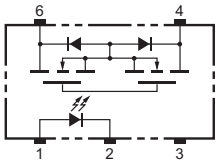
DIP 6-pin PCB Terminals



DIP 6-pin Surface-mounting Terminals



●Terminal Arrangement/ Internal Connections (Top View)

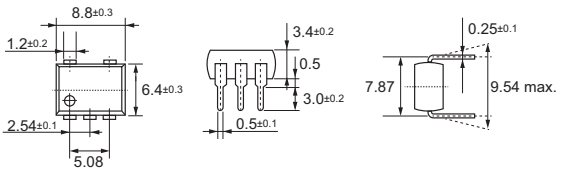


■Dimensions

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.

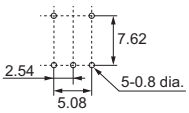
(Unit: mm)

PCB Terminals



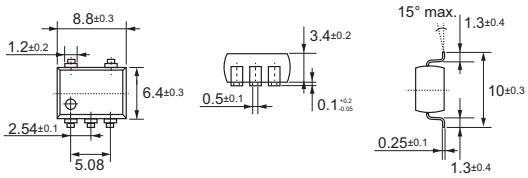
Actual Mounting Pad Dimensions

(Top View)



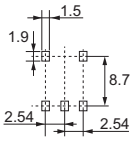
CAD Data

Surface-mounting Terminals



Actual Mounting Pad Dimensions

(Top View)



CAD Data

■Approved Standards

●UL/C-UL recognized

Model	Approved Standards	Contact form	File No.
G3VH-181B G3VH-181E G3VH-331B G3VH-331E	UL (recognized)	1a (SPST-NO)	E80555

■Spacing and Insulation

Item	G3VH-181□ G3VH-331□	Unit
	Minimum	
Creepage distances	7.5	mm
Clearance distances	7.5	
Internal isolation thickness	0.35	

■Safety Precautions

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

■Common precautions for using the G3VH Series

These precautions apply to the G3VH Series only.

Be sure to read “Common Precautions for All MOSFET Relays” for information on other precautions.

<Flow Soldering>

PCB Terminals

(Set Temperature of Flow Bath)

Solder type	Preheating	Soldering	Count
(Lead-free solder) SnAgCu	125°C 25 to 100 s	260°C 10 s max.	Once only

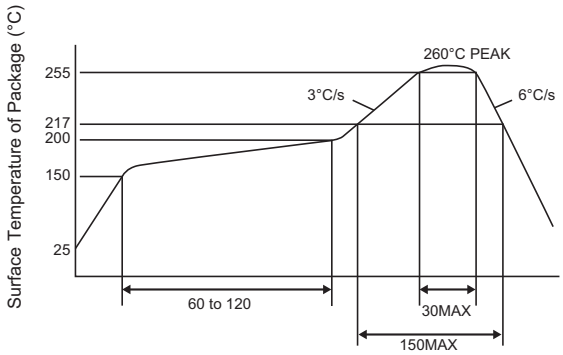
Note: We recommend that you verify the suitability of solder mounting under actual conditions.

Surface-mount Terminals

If you are considering mounting a surface mount pin type by flow soldering, please consult us.

<Reflow Soldering>

(Lead-free solder) SnAgCu recommended profile



Note: 1. We recommend that you verify the suitability of solder mounting under actual conditions.
2. Products marked with (TR) are supplied in tape-wrapped packaging and delivered in moisture-proof packs. Stick packs without a (TR) mark are delivered in non-moisture-proof packaging. Manual-solder when mounting stick products. Products packaged without moisture protection may have absorbed moisture. Accordingly, performing reflow soldering may cause issues such as package cracking due to heat stress.

Manual Soldering (Once Only)

PCB Terminals

350°C for 3 s or less

Surface-mount Terminals

260°C for 10 s or less

●Considerations when handling MSL3 products

Moisture proof package (MSL)	Package
MSL3	DIP (Surface-mount Terminals)

Surface mount products may have a crack when thermal stress is applied during surface mount assembly after they absorb atmospheric moisture. Therefore, please observe the following precautions.

(1) This moisture proof bag may be stored unopened within 12 or 24 months at the following conditions. (Check the expiration date listed on the actual moisture proof bag.)
Temperature: 5°C to 30°C
Humidity: 90% (Max.)

(2) After opening the moisture proof bag, the devices should be assembled within 168 hours in an environment of 5°C to 30°C / 70%RH or below.

(3) If upon opening, the moisture indicator card shows humidity 30% or above (Color of indication changes to pink) or the expiration date has passed, the devices should be baked in taping with reel. After baking, use the baked devices within 72 hours, but perform baking only once.
Baking conditions: 60±5°C. For 64 to 72 hours.
Expiration date: 12 or 24 months from sealing date, which is imprinted on the label affixed. (Check the expiration date listed on the actual moisture proof bag.)

(4) Repeated baking can cause the peeling strength of the taping to change, then leads to trouble in mounting. Furthermore, prevent the devices from being destructed against static electricity for baking of it.

(5) If the packing material of laminate would be broken the hermeticity would deteriorate.
Therefore, do not throw or drop the packed devices.

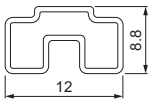
(6) As products purchased in stick form are not packaged in moisture-proof packaging, manual-solder when mounting them. (MSL is not applicable)

●Stick packaging

<Stick shape and dimensions>

Unit: mm

DIP
(Printed circuit board pin/Surface-mount pin)

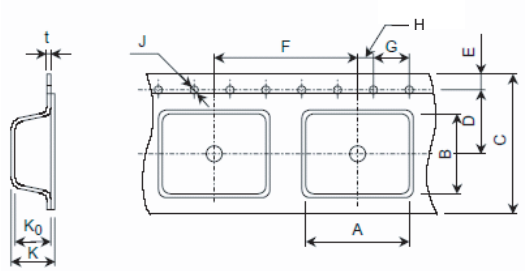


Type of package	DIP6
Pin type	Printed circuit board pin/Surface-mount pin
Number of Relays	50
Height (mm)	8.8
Width (mm)	12
Length (mm)	480

●Tape Packaging

<Tape Form and Dimensions>

Unit: mm

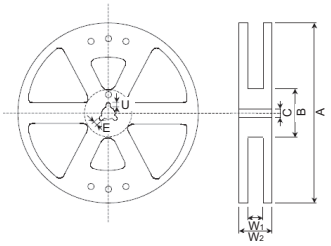


Unit: mm

Type of package			DIP6
Dimension symbol (See figure.)	A	Dimensions	10.4
	B		9.15
	C		16
	D		11.5
	E		1.75
	F		16
	G		4
	H		2
	J		1.5 dia.
	K		4.55
	Ko		4.15
	t		0.3

<Reel Form and Dimensions>

DIP (TR)



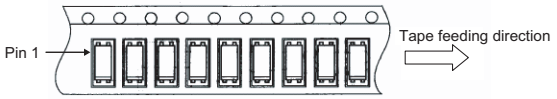
Unit: mm

Type of package			DIP6
Tape name			(TR)
Dimension symbol (See figure.)	A	Dimensions	380
	B		80
	C		13 dia.
	E		2
	U		4
	W1		17
	W2		22

<Taping Direction>

The orientations of the MOSFET Relays in the depressions in the carrier tapes are shown below.

DIP 6 pins



<Number of Relays Per Reel>

Type of package		DIP6
Number of Relays	TR	1,000

Please check each region's Terms & Conditions by region website.

OMRON Corporation
Device & Module Solutions Company

Regional Contact

Americas
https://components.omron.com/us

Europe
https://components.omron.com/eu

Asia-Pacific
https://components.omron.com/ap

China
https://components.omron.com.cn

Korea
https://components.omron.com/kr

Japan
https://components.omron.com/jp

Cat. No. K363-E1-01
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