



**THE DATASHEET OF  
FODM3051R3V**



# FODM3051, FODM3052, FODM3053

## 4-Pin Full Pitch Mini-Flat Package Random Phase Triac Driver Output Optocouplers

### Features

- Compact 4-pin surface mount package (2.4 mm maximum standoff height)
- Peak blocking voltage – 600V
- Guaranteed static dv/dt of 1000 V/μs
- Available in tape and reel quantities of 500 and 2500.
- Applicable to Infrared Ray reflow (230°C max, 30 seconds.)
- BSI, CSA and VDE certifications pending
- UL (File# E90700) certified

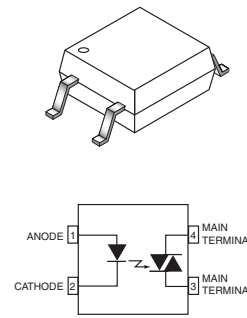
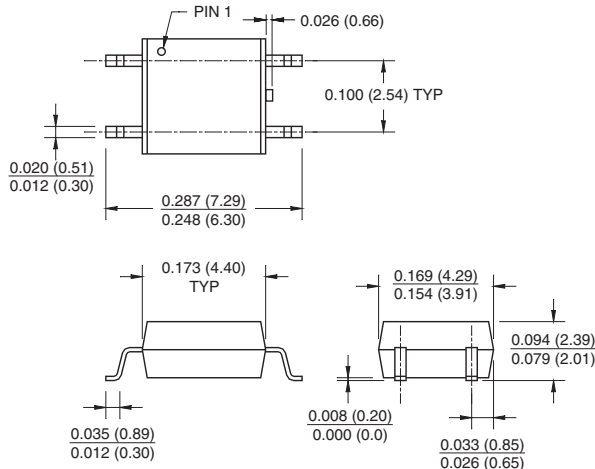
### Applications

- Solenoid/valve controls
- Interfacing microprocessors to 115 and 240 Vac peripherals
- Temperature controls
- Solid state relays
- Lamp ballast
- Static AC power switch
- Motor control
- Incandescent lamp dimmers

### Description

The FODM305X series consists of a gallium arsenide diode driving a silicon bilateral switch housed in a compact 4-pin mini-flat package. The lead pitch is 2.54 mm. The FODM305X series isolates low voltage logic from 115 and 240 Vac lines to provide random phase control of high current triacs or thyristors. It also features greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

### Package Dimensions



### NOTE

All dimensions are in inches (millimeters)

### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Units
<b>TOTAL PACKAGE</b>			
Storage Temperature	$T_{STG}$	-40 to +125	$^\circ\text{C}$
Junction Temperature	$T_J$	125	$^\circ\text{C}$
Operating Temperature	$T_{OPR}$	-40 to +100	$^\circ\text{C}$
<b>EMITTER</b>			
Continuous Forward Current	$I_F$ (avg)	60	mA
Peak Forward Current (1 $\mu\text{s}$ pulse, 300 pps.)	$I_F$ (pk)	1	A
Reverse Input Voltage	$V_R$	3	V
Power Dissipation (No derating required over operating temp. range)	$P_D$	100	mW
<b>DETECTOR</b>			
On-State RMS Current	$I_{T(RMS)}$	70	mA (RMS)
Off-State Output Terminal Voltage	$V_{DRM}$	600	V
Power Dissipation (No derating required over operating temp. range)	$P_D$	250	mW

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ Unless otherwise specified)

#### Individual Component Characteristics

Parameter	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
<b>EMITTER</b>							
Input Forward Voltage	$I_F = 10\text{ mA}$	$V_F$	All		1.20	1.5	V
Reverse Leakage Current	$V_R = 3\text{ V}$	$I_R$	All		0.01	100	$\mu\text{A}$
<b>DETECTOR</b>							
Peak Blocking Current Either Direction	$V_{DRM} = 600\text{V}$ , $I_F = 0$ (note 1)	$I_{DRM}$	All		3	100	nA
Peak On-State Voltage Either Direction	$I_{TM} = 100\text{mA}$ peak	$V_{TM}$	All		2.0	2.5	V
Critical Rate of Rise of Off-State Voltage	$I_F = 0$ (Figure 8, note 2)	$dV/dt$	All	1000			$\text{V}/\mu\text{s}$

### Transfer Characteristics ( $T_A = 25^\circ\text{C}$ Unless otherwise specified)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
LED Trigger Current	Main Terminal Voltage = 3V (note 3)	$I_{FT}$	FODM3051			15	mA
			FODM3052			10	
			FODM3053			5	
Holding Current, Either Direction		$I_H$	All		300		$\mu\text{A}$

### Isolation Characteristics ( $T_A = 25^\circ\text{C}$ Unless otherwise specified)

Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
Steady State Isolation Voltage	$t = 1\text{ Minute}$	$V_{ISO}$	All	3750			V(RMS)

\* All typicals at  $T_A = 25^\circ\text{C}$

#### Note

1. Test voltage must be applied within  $dV/dt$  rating.
2. This is static  $dV/dt$ . See Figure 1 for test circuit. Commutating  $dV/dt$  is function of the load-driving thyristor(s) only.
3. All devices are guaranteed to trigger at an  $I_F$  value less than or equal to max  $I_{FT}$ . Therefore, recommended operating  $I_F$  lies between max  $I_{FT}$  (15 mA for FODM3051, 10 mA for FODM3052, 5 mA for FODM3053) and absolute max  $I_F$  (60 mA).

## Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

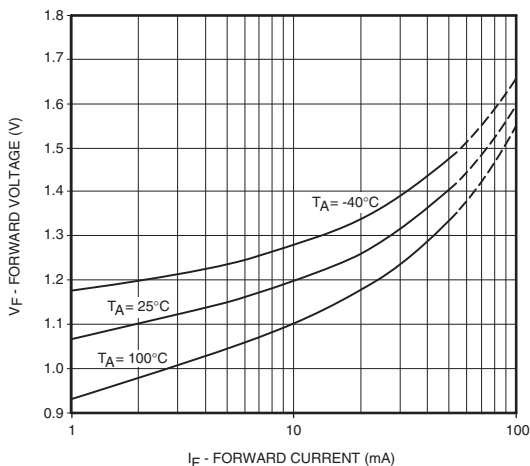


Fig. 2 Leakage Current vs. Ambient Temperature

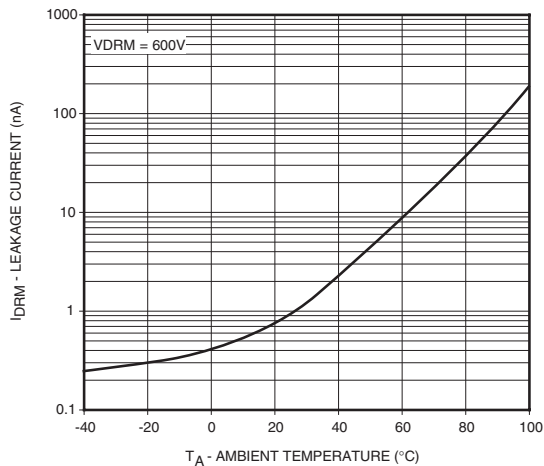


Fig. 3 Holding Current vs. Ambient Temperature

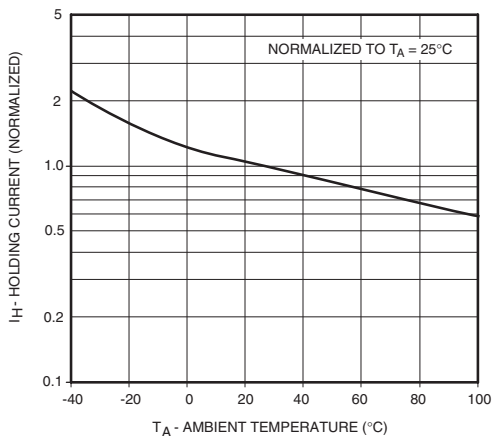


Fig. 4 Trigger Current vs. Ambient Temperature

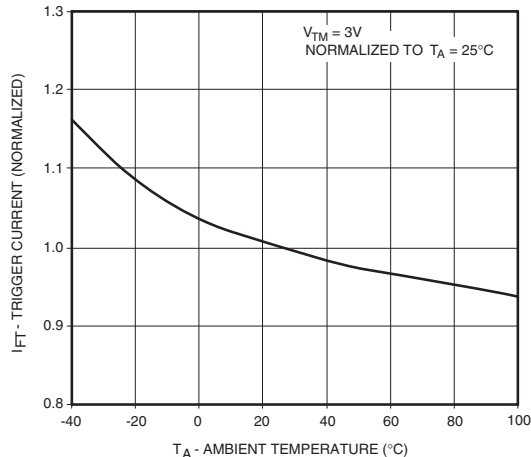


Fig. 5 LED Current Required to Trigger vs. LED Pulse Width

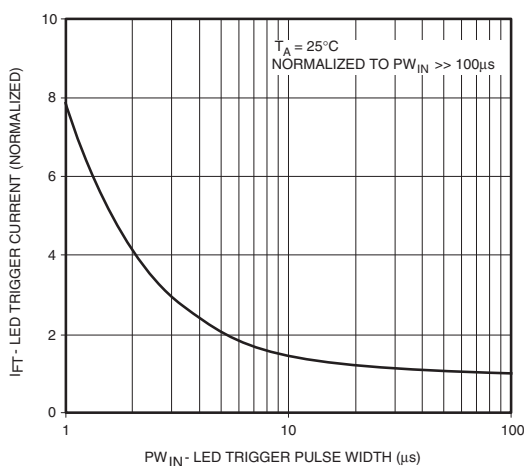


Fig. 6 Off-state Output Terminal Voltage vs. Ambient Temperature

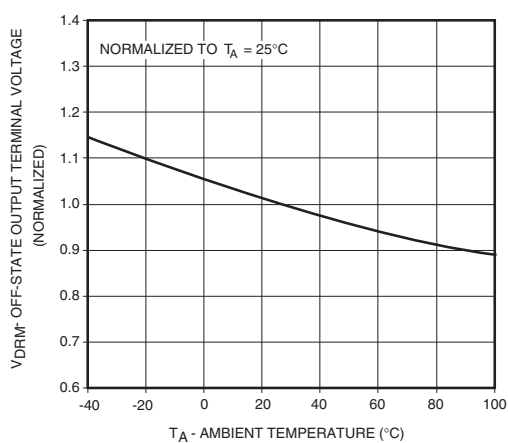
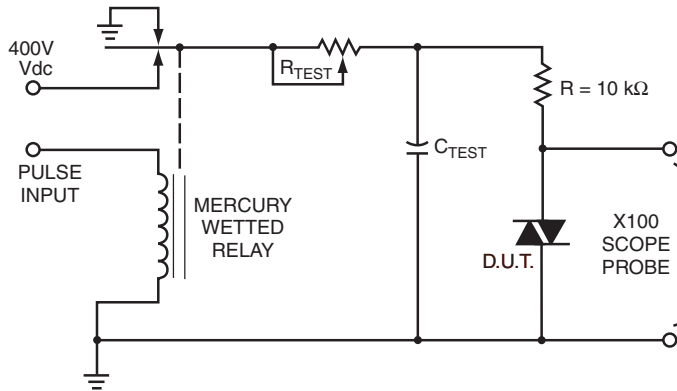
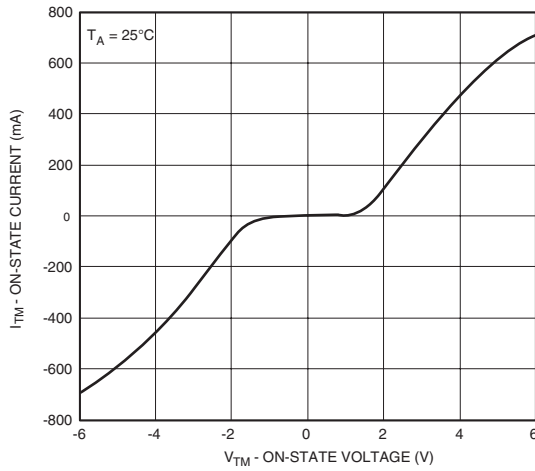


Fig. 7 On-State Characteristics



1. The mercury wetted relay provides a high speed repeated pulse to the D.U.T.
2. 100x scope probes are used, to allow high speeds and voltages.
3. The worst-case condition for static dv/dt is established by triggering the D.U.T. with a normal LED input current, then removing the current. The variable R<sub>TEST</sub> allows the dv/dt to be gradually increased until the D.U.T. continues to trigger in response to the applied voltage pulse, even after the LED current has been removed. The dv/dt is then decreased until the D.U.T. stops triggering. τ<sub>RC</sub> is measured at this point and recorded.

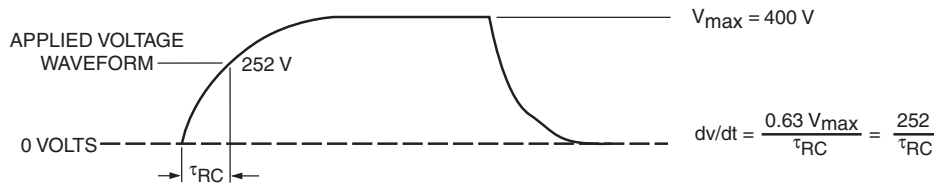
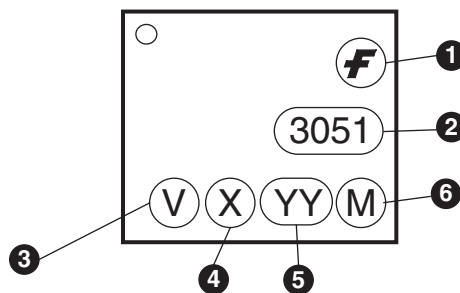


Figure 8. Static dv/dt Test Circuit

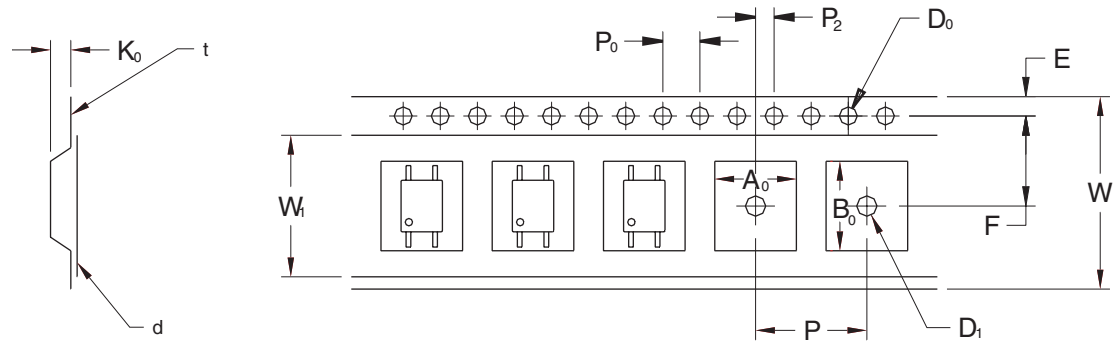
### Ordering Information

Option	Description
V	VDE Approved
R1	Tape and Reel (500 units)
R2	Tape and Reel (2500 units)
R3	Tape and Reel (500 units; unit 180° rotated)
R4	Tape and Reel (2500 units; unit 180° rotated)
R1V	Tape and Reel (500 units) and VDE Approved
R2V	Tape and Reel (2500 units) and VDE Approved
R3V	Tape and Reel (500 units; unit 180° rotated) and VDE Approved
R4V	Tape and Reel (2500 units; unit 180° rotated) and VDE Approved

### Marking Information

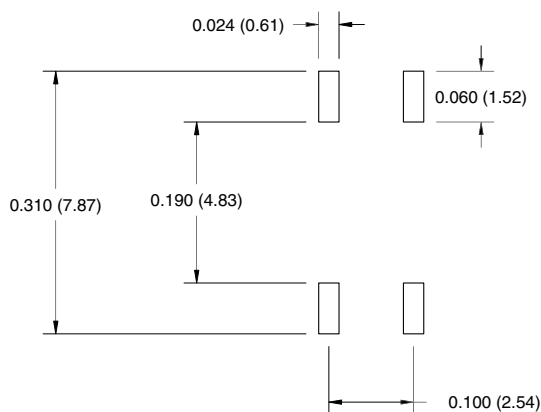


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

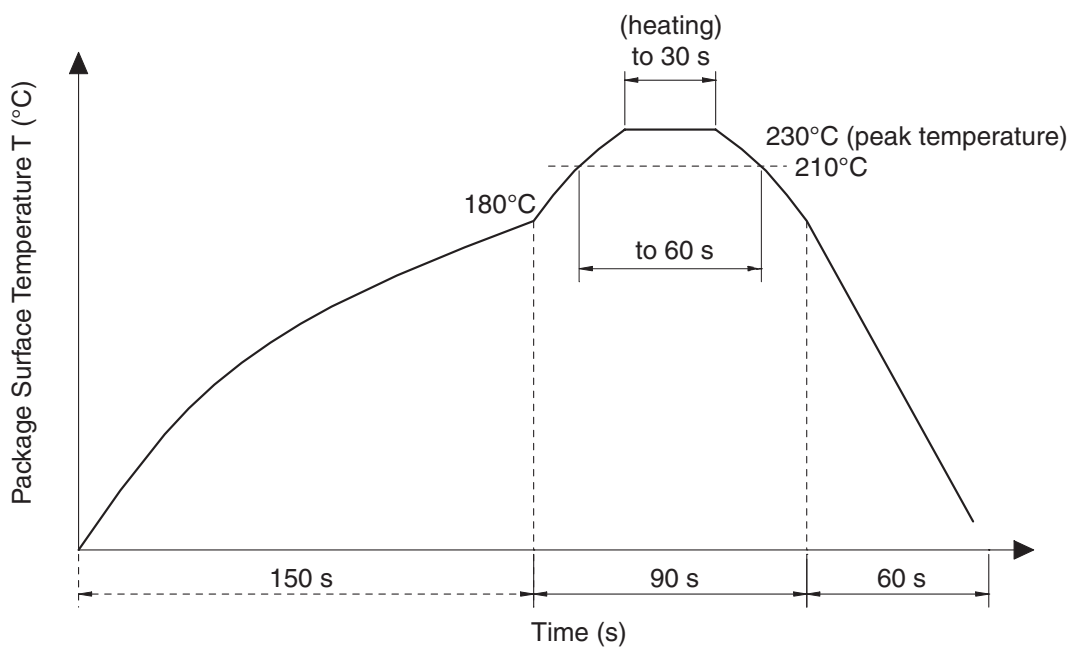


Description		Symbol	2.54 Pitch Dimensions (mm)
Tape Width		W	12.00±0.4
Tape Thickness		t	0.30±0.20
Sprocket Hole Pitch		P <sub>0</sub>	4.00±0.20
Sprocket Hole Dia.		D <sub>0</sub>	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		P <sub>2</sub>	2.00±0.20
Pocket Dimension		P	8.00±0.20
		A <sub>0</sub>	4.40±0.20
		B <sub>0</sub>	7.30±0.20
Pocket Hole Dia.		D <sub>1</sub>	1.55±0.20
Cover Tape Width		W <sub>1</sub>	9.20
Cover Tape Thickness		d	0.065±0.02
Max. Component Rotation or Tilt			20° max
Devices Per Reel		R1	500
		R2	2500
Reel Diameter		R1	178 mm (7")
		R2	330 mm (13")

### Footprint Drawing for PCB Layout



### Recommended Infrared Reflow Soldering Profile



- Peak reflow temperature: 230°C (package surface temperature) for 30 seconds
- Time of temperature higher than 210°C: 60 seconds or less
- One time soldering reflow is recommended

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