

# FODM3011, FODM3012, FODM3022, FODM3023, 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  
250V (FODM301X)  
400V (FODM302X)  
600V (FODM305X)
- Available in tape and reel quantities of 500 and 2500.
- Add "NF098" for new construction version with 260°C max. reflow temperature rating
- UL, C-UL and VDE certifications pending

### Applications

- Industrial controls
- Traffic lights
- Vending machines

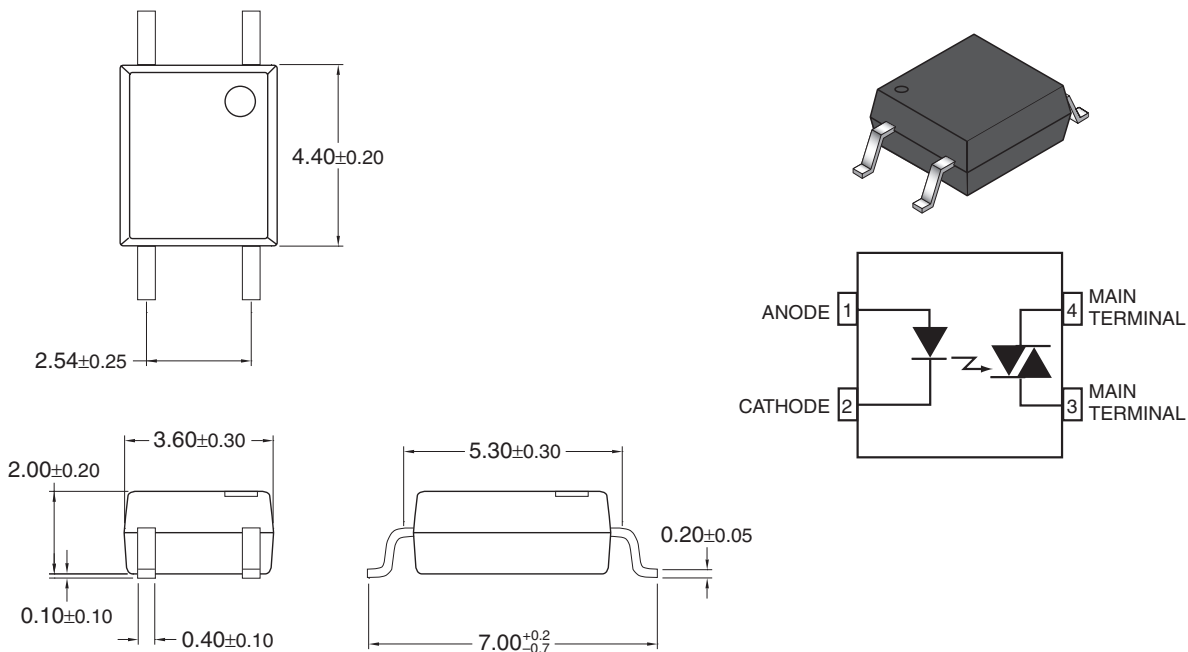
### Applications (Continued)

- Solid state relay
- Lamp ballasts
- Solenoid/valve controls
- Static AC power switch
- Incandescent lamp dimmers
- Motor control

### Description

The FODM301X, FODM302X, and FODM305X series consists of a GaAs infrared emitting diode driving a silicon bilateral switch housed in a compact 4-pin mini-flat package. The lead pitch is 2.54mm. They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115V/240V operations.

### Package Dimensions



**Note:**  
All dimensions are in millimeters.

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

Symbol	Parameter	Value	Units
<b>TOTAL PACKAGE</b>			
$T_{STG}$	Storage Temperature	-55 to +150	$^\circ\text{C}$
$T_{OPR}$	Operating Temperature	-40 to +100	$^\circ\text{C}$
<b>EMITTER</b>			
$I_F$ (avg)	Continuous Forward Current	60	mA
$I_F$ (pk)	Peak Forward Current (1 $\mu\text{s}$ pulse, 300pps.)	1	A
$V_R$	Reverse Input Voltage	3	V
$P_D$	Power Dissipation (No derating required over operating temp. range)	100	mW
<b>DETECTOR</b>			
$I_{T(RMS)}$	On-State RMS Current	70	mA (RMS)
$V_{DRM}$	Off-State Output Terminal Voltage	FODM3011/FODM3012	250
		FODM3022/FODM3023	400
		FODM3052/FODM3053	600
$P_D$	Power Dissipation (No derating required over operating temp. range)	300	mW

**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$ )**Individual Component Characteristics**

Symbol	Parameter	Test Conditions	Device	Min.	Typ.*	Max.	Unit
<b>EMITTER</b>							
$V_F$	Input Forward Voltage	$I_F = 10\text{mA}$	All		1.20	1.5	V
$I_R$	Reverse Leakage Current	$V_R = 3\text{V}, T_A = 25^\circ\text{C}$	All		0.01	100	$\mu\text{A}$
<b>DETECTOR</b>							
$I_{\text{DRM}}$	Peak Blocking Current Either Direction	Rated $V_{\text{DRM}}, I_F = 0^{(1)}$	All		2	100	nA
dV/dt	Critical Rate of Rise of Off-State Voltage	$I_F = 0$ (Figure 8) <sup>(2)</sup>	FODM3011, FODM3012, FODM3022, FODM3023		10		V/ $\mu\text{s}$
			FODM3052, FODM3053	1,000			

**Transfer Characteristics** ( $T_A = 25^\circ\text{C}$ )

Symbol	DC Characteristics	Test Conditions	Device	Min.	Typ.*	Max.	Unit
$I_{\text{FT}}$	LED Trigger Current	Main Terminal Voltage = $3\text{V}^{(3)}$	FODM3011, FODM3022, FODM3052			10	mA
			FODM3012, FODM3023, FODM3053			5	
$I_H$	Holding Current, Either Direction		All		300		$\mu\text{A}$
$V_{\text{TM}}$	Peak On-State Voltage Either Direction	$I_{\text{TM}} = 100\text{mA}$ peak	All		1.7	3	V

**Isolation Characteristics**

Symbol	Characteristic	Test Conditions	Device	Min.	Typ.*	Max.	Unit
$V_{\text{ISO}}$	Steady State Isolation Voltage	1 Minute, R.H. = 40% to 60%	All	3750			VRMS

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

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  $I_{\text{FT}}$ . Therefore, recommended operating  $I_F$  lies between max  $I_{\text{FT}}$  (10mA for FODM3011, FODM3022, and FODM3052, 5mA for FODM3012, FODM3023, and FODM3053) and absolute max  $I_F$  (60mA).

## Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

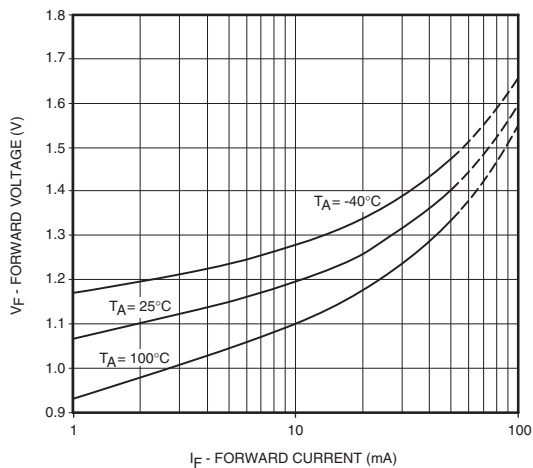


Fig. 2 Leakage Current vs. Ambient Temperature

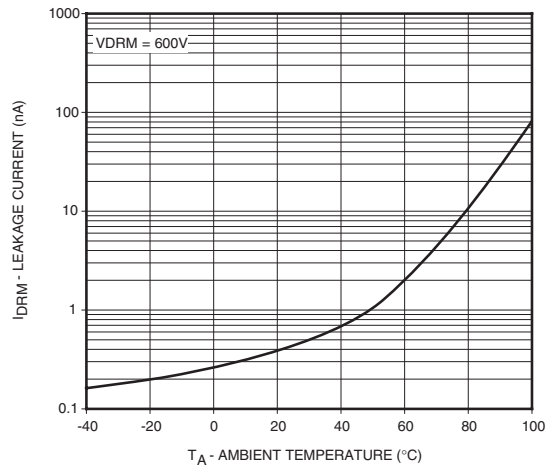


Fig. 3 Holding Current vs. Ambient Temperature

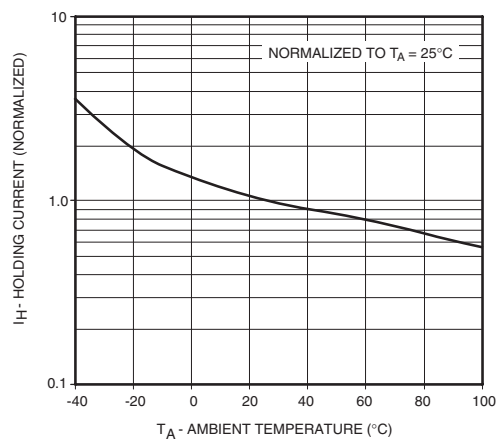
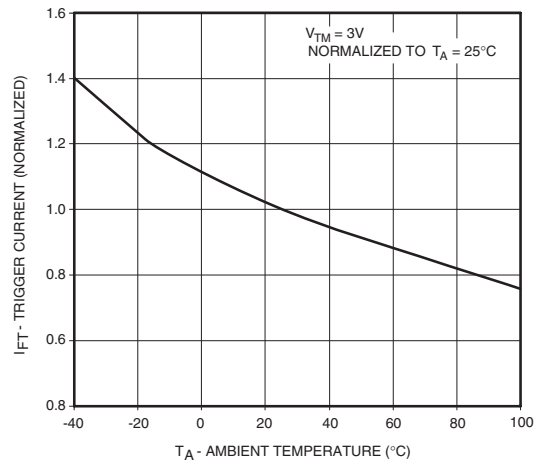


Fig. 4 Trigger Current vs. Ambient Temperature



## Typical Performance Curves

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

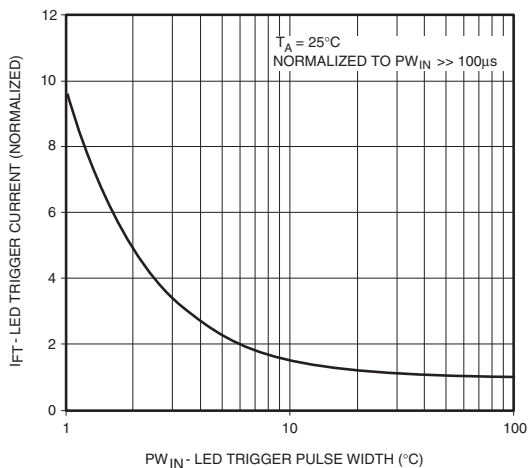


Fig. 6 Off-State Output Terminal Voltage vs. Ambient Temperature

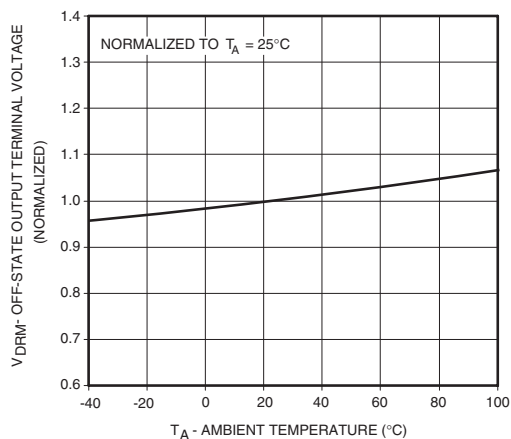
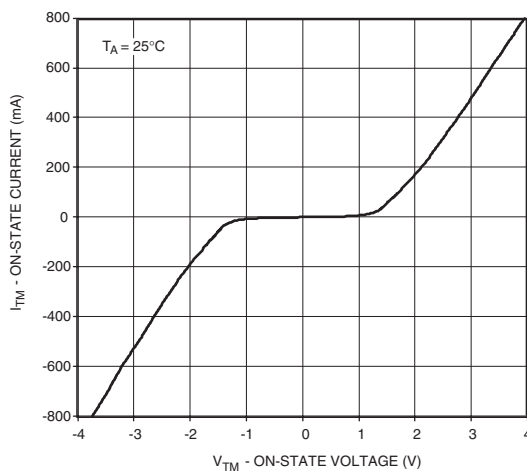


Fig. 7 On-State Characteristics



## Typical Performance Curves

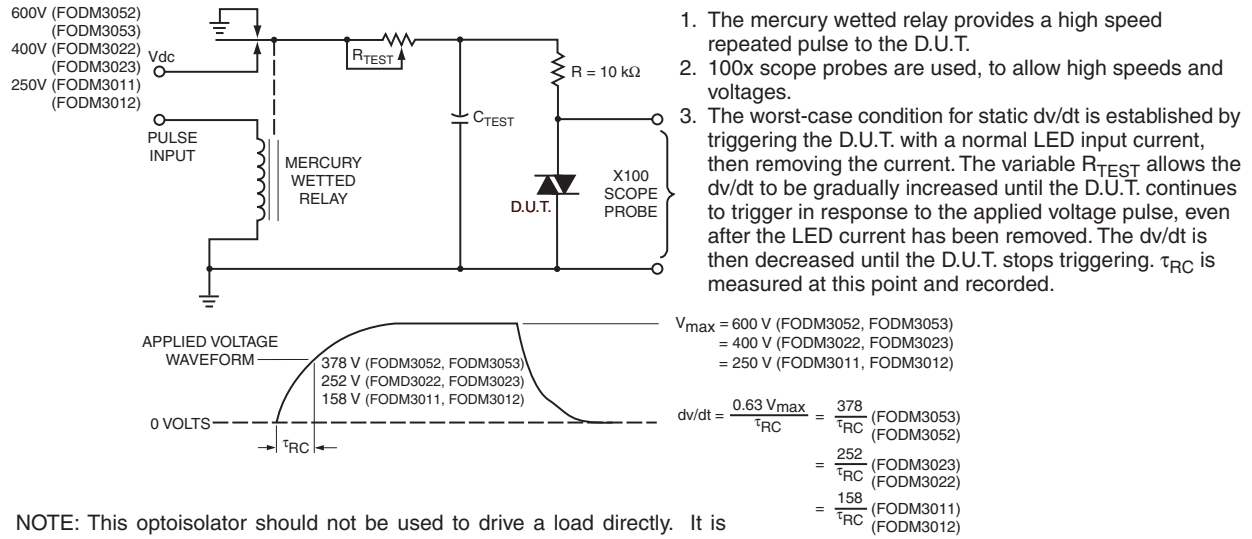


Figure 8. Static dv/dt Test Circuit

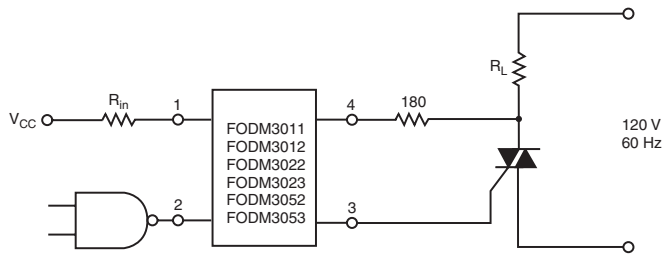


Figure 9. Resistive Load

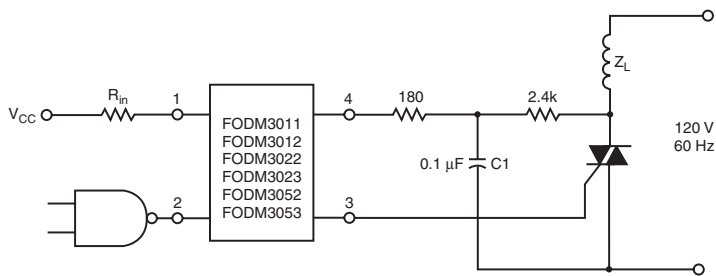
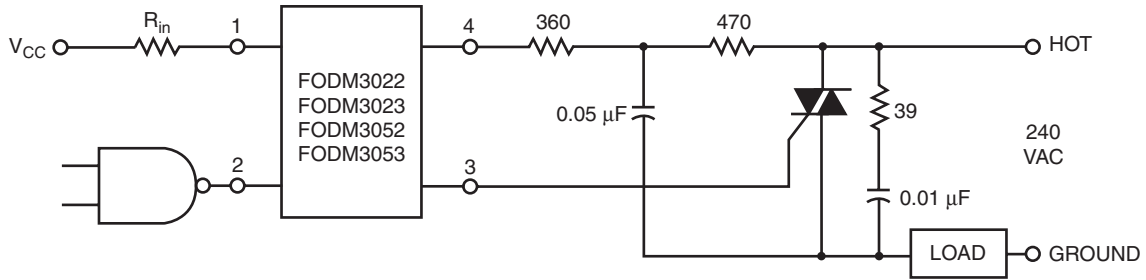


Figure 10. Inductive Load with Sensitive Gate Triac (I<sub>GT</sub> ≤ 15 mA)



In this circuit the "hot" side of the line is switched and the load connected to the cold or ground side. The 39Ω resistor and 0.01μF capacitor are for snubbing of the triac, and the 470Ω resistor and 0.05μF capacitor are for snubbing the coupler. These components may or may not be necessary depending upon the particular and load used.

**Figure 11. Typical Application Circuit**

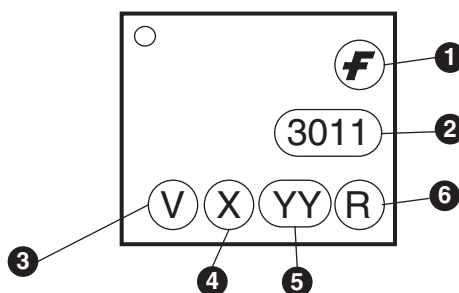
## Ordering Information

Option	Description
V_NF098	VDE Approved
R1_NF098	Tape and Reel (500 units)
R2_NF098	Tape and Reel (2500 units)
R1V_NF098	Tape and Reel (500 units) and VDE Approved
R2V_NF098	Tape and Reel (2500 units) and VDE Approved

### Note:

To specify the new construction version with 260°C max reflow peak temperature rating: Add "NF098" to the end of the part number. The non NF098 version is rated for 230°C peak reflow temperature.

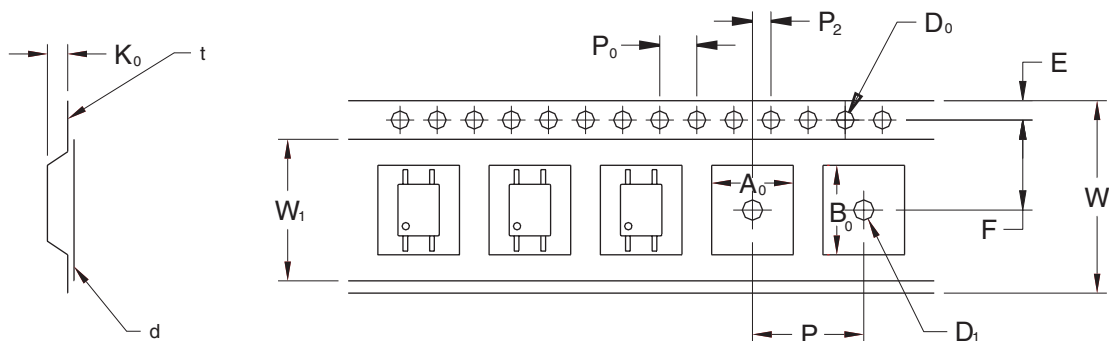
## Marking Information



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

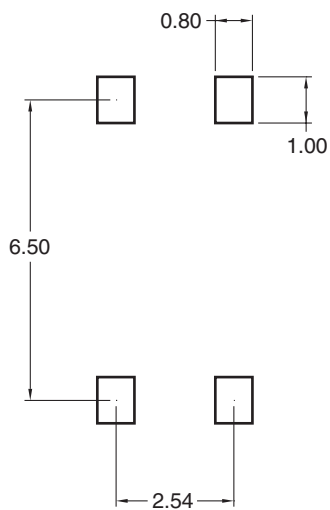


## Tape and Reel Information



		2.54 Pitch
Description	Symbol	Dimensions
Tape Width	W	12.00±0.3
Tape Thickness	t	0.30±0.05
Sprocket Hole Pitch	P <sub>0</sub>	4.00±0.1
Sprocket Hole Dia.	D <sub>0</sub>	1.50±0.1
Sprocket Hole Location	E	1.75±0.1
Pocket Location	F	5.50±0.1
	P <sub>2</sub>	2.00±0.1
Pocket Pitch	P	8.00±0.1
Pocket Dimension	A <sub>0</sub>	3.90±0.1
	B <sub>0</sub>	7.45±0.1
	K <sub>0</sub>	2.45±0.1
Pocket Hole Dia.	D <sub>1</sub>	1.50±0.1
Cover Tape Width	W <sub>1</sub>	9.30±0.1
Cover Tape Thickness	d	0.062±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")

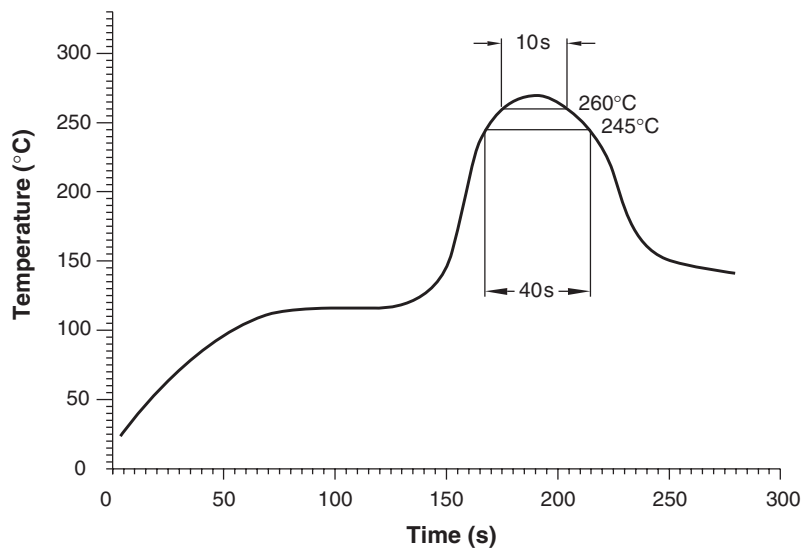
### Footprint Drawing for PCB Layout



**Note:**  
All dimensions are in mm.

### Recommended Infrared Reflow Soldering Profile

- Peak reflow temperature: 260°C (package surface temperature)
- Time of temperature higher than 245°C: 40 seconds or less
- Number of reflows: 3





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