THE DATASHEET OF

FODM3051R3V

October 2005

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

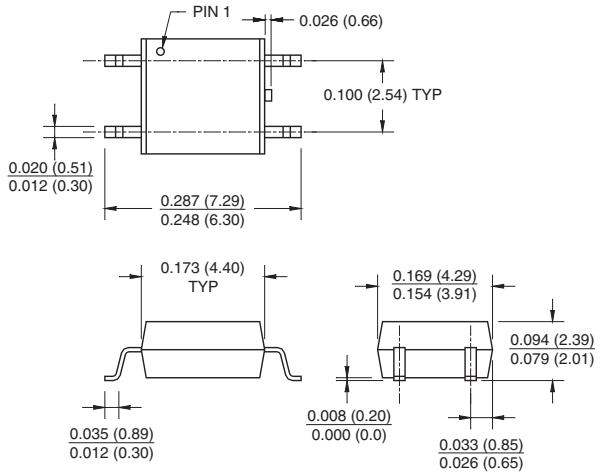
Applications

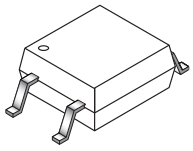
- Solenoid/valve controls
- Interfacing microprocessors to 115 and 240 Vac peripherals
- Temperature controls
- Solid state relays
- Lamp ballast
- Static AC power switch
- Motor control
- Incandescent lamp dimmers

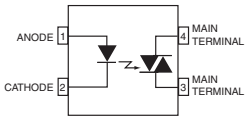
Description

The FODM305X series consists of a galium 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°C unless otherwise specified)

Parameter	Symbol	Value	Units
TOTAL PACKAGE			
Storage Temperature	T_{STG}	-40 to +125	°C
Junction Temperature	T_J	125	°C
Operating Temperature	T_{OPR}	-40 to +100	°C
EMITTER			
Continuous Forward Current	$I_{F\ (avg)}$	60	mA
Peak Forward Current (1 µs 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
DETECTOR			
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°C Unless otherwise specified)

Individual Component Characteristics

Parameter	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
EMITTER							
Input Forward Voltage	I_F = 10 mA	V_F	All		1.20	1.5	V
Reverse Leakage Current	V_R = 3 V	I_R	All		0.01	100	µA
DETECTOR							
Peak Blocking Current Either Direction	V_{DRM} = 600V, I_F = 0 (note 1)	I_{DRM}	All		3	100	nA
Peak On-State Voltage Either Direction	I_{TM} = 100mA 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			V/µs

Transfer Characteristics (T_A = 25°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		µA

Isolation Characteristics (T_A = 25°C Unless otherwise specified)

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

* All typicals at T_A = 25°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

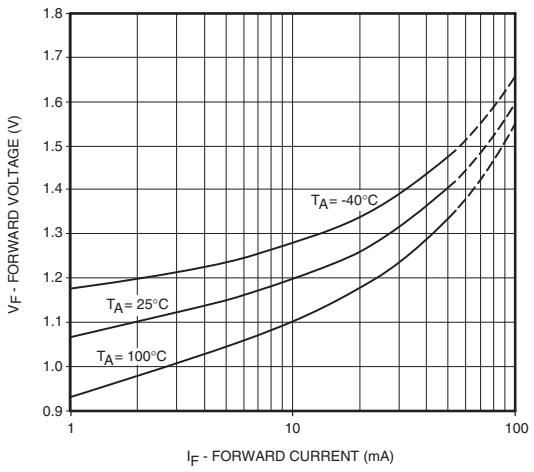


Fig. 2 Leakage Current vs. Ambient Temperature

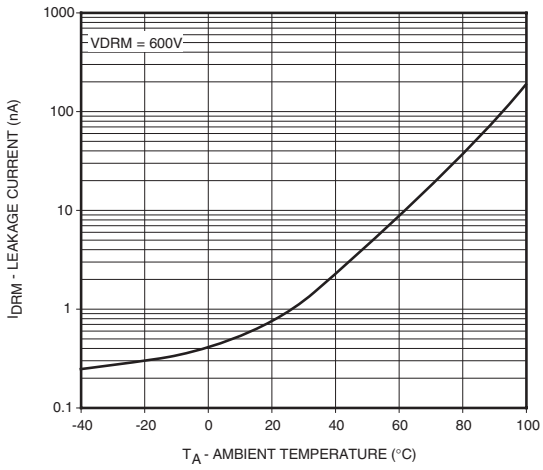


Fig. 3 Holding Current vs. Ambient Temperature

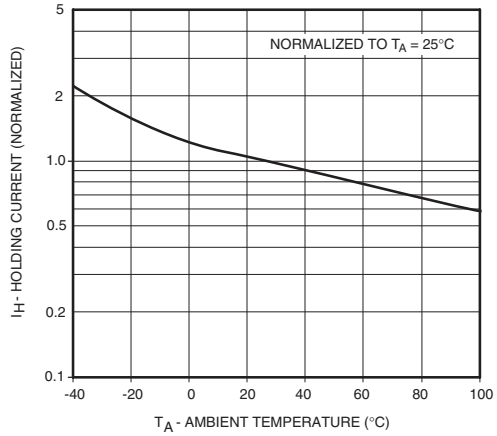


Fig. 4 Trigger Current vs. Ambient Temperature

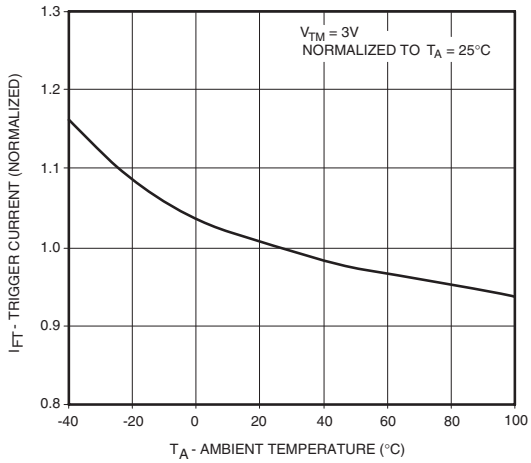


Fig. 5 LED Current Required to Trigger vs. LED Pulse Width

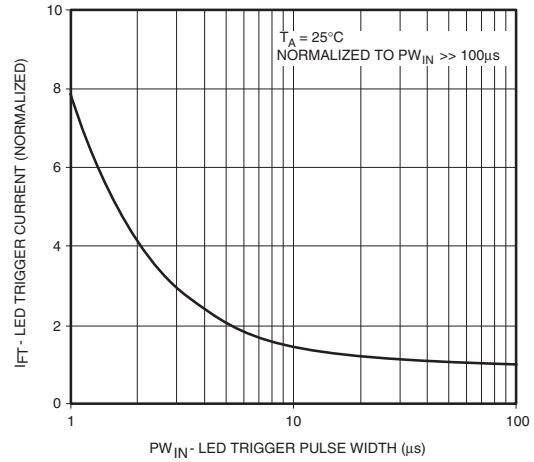


Fig. 6 Off-state Output Terminal Voltage vs. Ambient Temperature

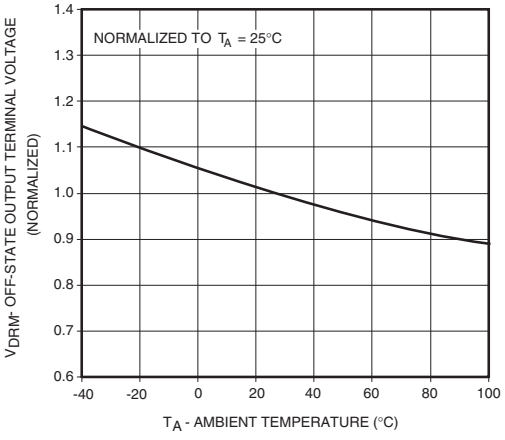
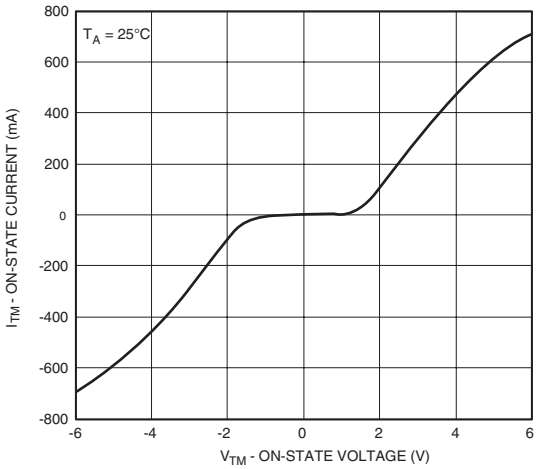
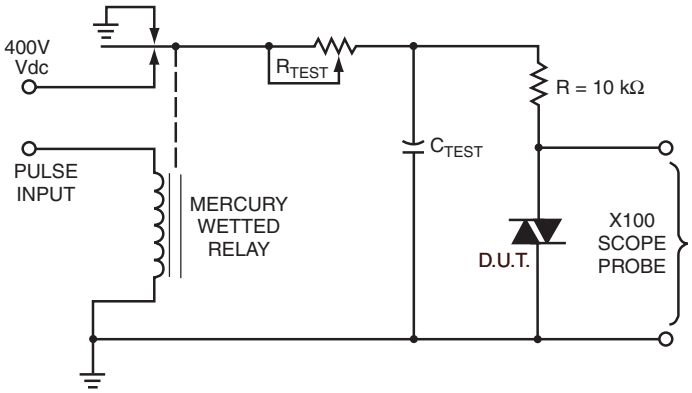


Fig. 7 On-State Characteristics





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_{TEST} 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_{RC} is measured at this point and recorded.

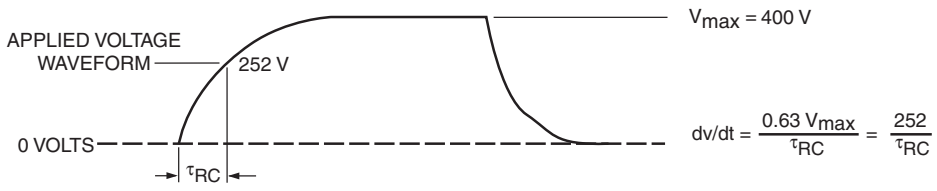
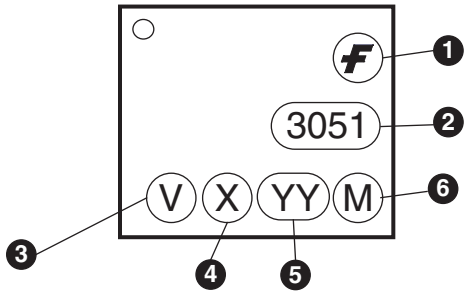


Figure 8. Static dv/dt Test Circuit

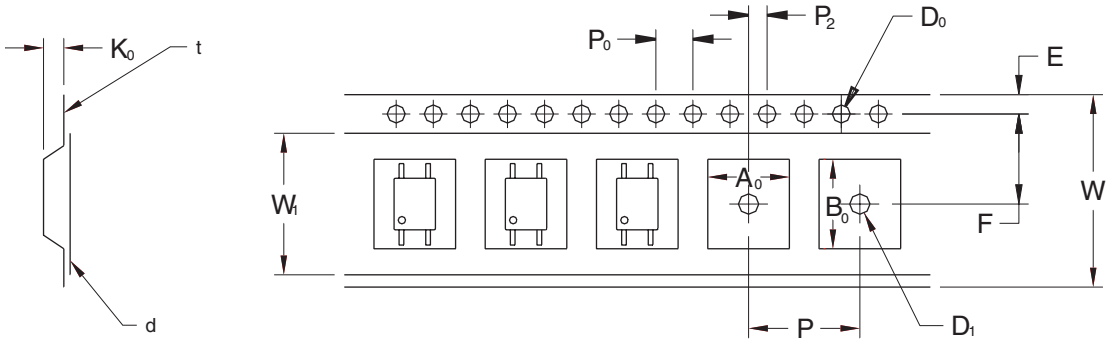
Ordering Information

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

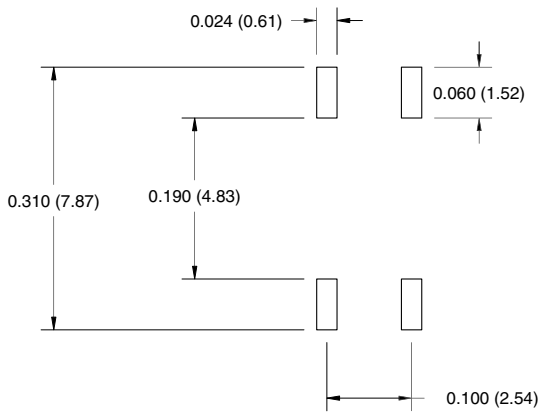


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code
5	Two digit work week ranging from ‘01’ to ‘53’
6	Assembly package code

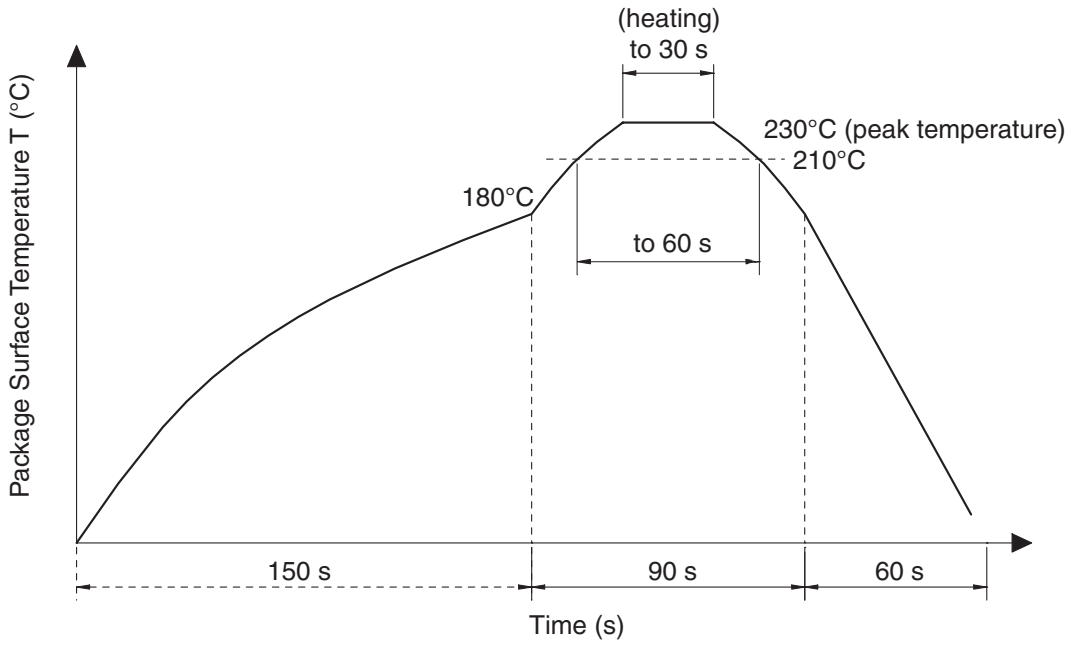


Description		Symbol	2.54 Pitch Dimensions (mm)
Tape Width		W	12.00±0.4
Tape Thickness		t	0.30±0.20
Sprocket Hole Pitch		P_0	4.00±0.20
Sprocket Hole Dia.		D_0	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		P_2	2.00±0.20
Pocket Pitch		P	8.00±0.20
Pocket Dimension		A_0	4.40±0.20
		B_0	7.30±0.20
		K_0	2.30±0.20
Pocket Hole Dia.		D_1	1.55±0.20
Cover Tape Width		W_1	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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