MF3009, MF301#, MF302# Series

DESCRIPTION

The MF3009, MF301# and MF302# series of devices consist of a GaAs infrared emitting diode optically coupled to a light activated bilateral triac. They are designed for use with a discrete power triac in the control of resistive and inductive loads operating in 110 to 240 VAC lines.

FEATURES

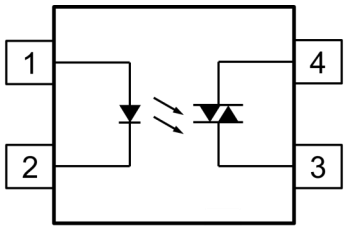
- Non Zero Crossing (Random Phase)
- V_{DRM}
  MF3009 250V
  MF301# Series 250V
  MF302# Series 400V
- Isolation Voltage 3750V_{RMS}
- Wide Operating Temperature Range -40°C to 110°C
- RoHS Compliant
- UL File E91231 designated as MF302# where # is any number 0-9
- Safety Approval Pending for MF3009 and MF301# Series

APPLICATIONS

- Solenoid / Valve Controls
- Lamp Ballasts
- Light Dimming Controls
- AC Motor Drivers
- Temperature Controls
- Solid State Relays

ORDER INFORMATION

- Available in Tape & Reel



1 Anode
2 Cathode
3 Main Terminal 2
4 Main Terminal 1

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device.
Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

Input	
Forward Current	60mA
Reverse Voltage	6V
Power dissipation	100mW
Output	
Off-state Output Terminal Voltage MF3009 MF301# Series MF302# Series	 250V 250V 400V
ON-state RMS Current	70mA
Peak Repetitive Surge Current	1A
Power Dissipation	300mW
Total Package	
Isolation Voltage	3750V_{RMS}
Operating Temperature	-40 to 110 °C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	I_F = 10mA		1.2	1.5	V
Reverse Current	I_R	V_R = 6V			10	µA

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak Off-state Current Either Direction	I_{DRM}	V_{DRM} = Rated V_{DRM} I_F = 0mA (Note 1)			100	nA
Peak Blocking Voltage	V_{DRM}	I_{DRM} = 100nA MF3009 MF3010 / MF3011 / MF3012 MF3020 / MF3021 MF3022 / MF3023 MF3024	 250 250 400			V
Peak On-state Voltage Either Direction	V_{TM}	I_{TM} = 100mA Peak I_F = Rated I_{FT}			2.5	V
Critical Rate of Rise of Off-state Voltage	dv/dt	I_F = 0mA		10		V/µs

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input Trigger Current	I_{FT}	V_{TM} = 3V				mA
		MF3009 / MF3020			30	
		MF3010 / MF3021			15	
		MF3011 / MF3022			10	
		MF3012 / MF3023			5	
		MF3024			3	
		(Note 2)				
Holding Current Either Direction	I_H			3	5	mA
Turn-on Time	t_{ON}	V_O = 6V, R_L = 100Ω, I_F = 20mA			100	µs

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage	V_{ISO}	R.H. = 40% - 60%, t = 1 min	3750			V_{RMS}
		(Note 3)				

Note 1 : Test Voltage must be applied within dv/dt rating.

Note 2 : Guaranteed to trigger at an I_F value less than or equal to max I_{FT}, recommended I_F lies between Rated I_{FT} to Absolute Max I_F.

Note 3 : Measured with input leads shorted together and output leads shorted together.

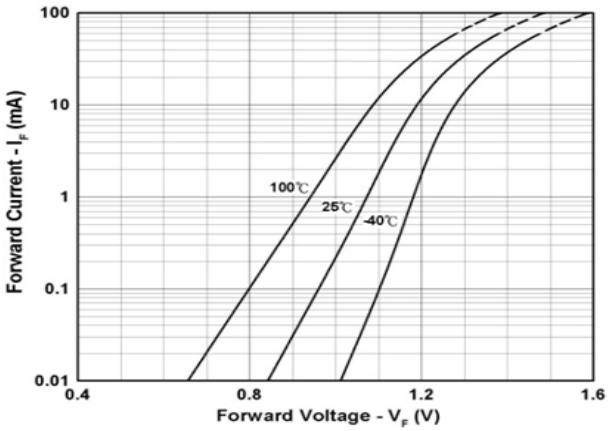


Fig 1 Forward Current vs Forward Voltage

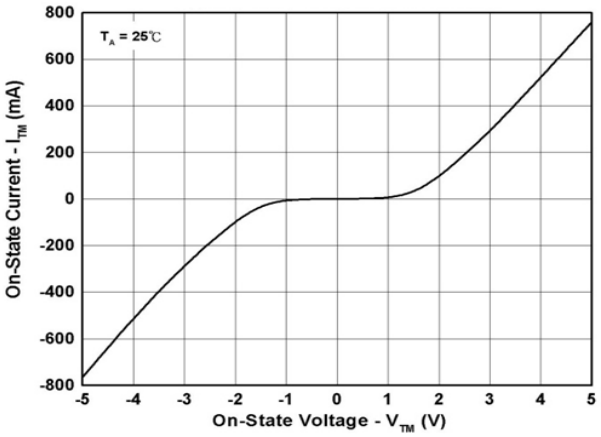


Fig 2 On-State Characteristics

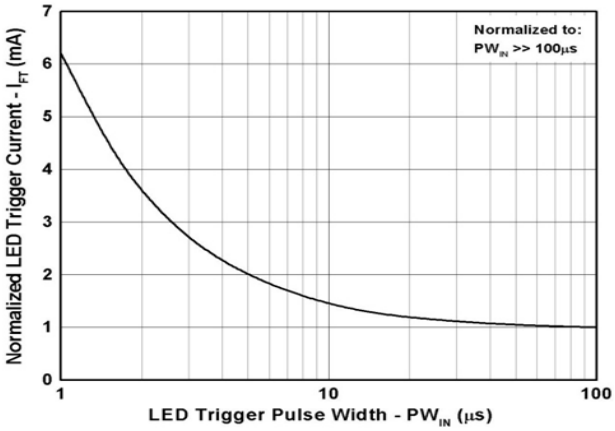


Fig 3 Normalized LED Trigger Current vs Trigger Pulse Width

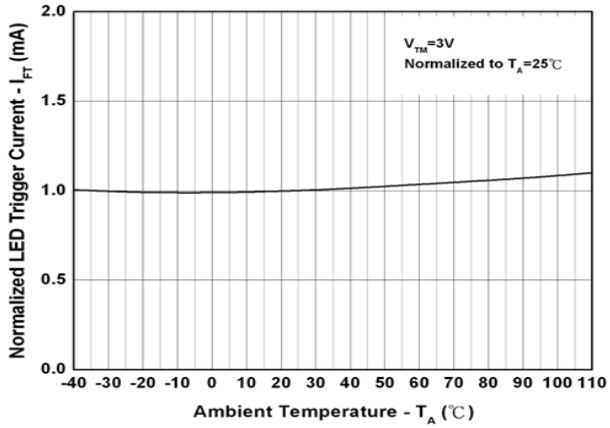


Fig 4 Normalized LED Trigger Current vs Ambient Temperature

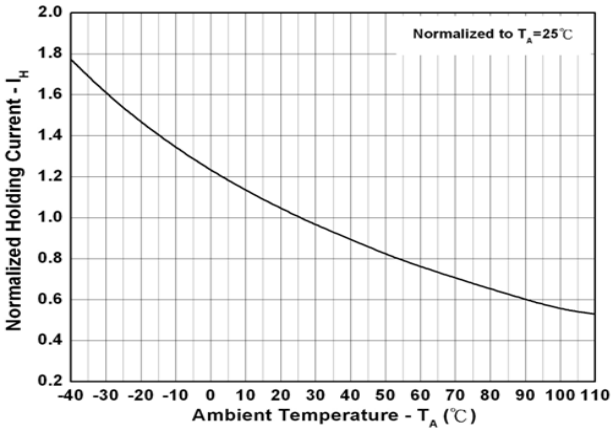


Fig 5 Normalized Holding Current vs Ambient Temperature

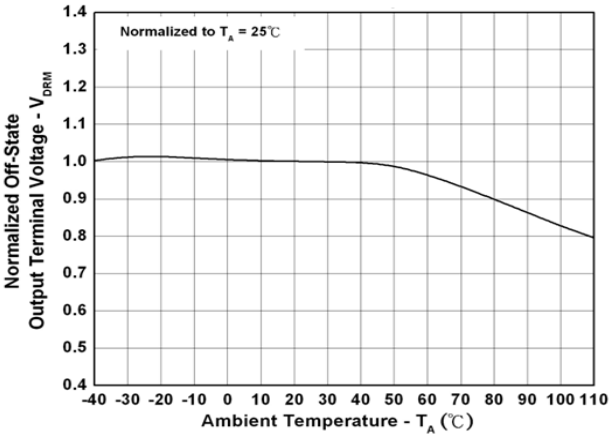


Fig 6 Normalized Off-State Output Terminal Voltage vs Ambient Temperature

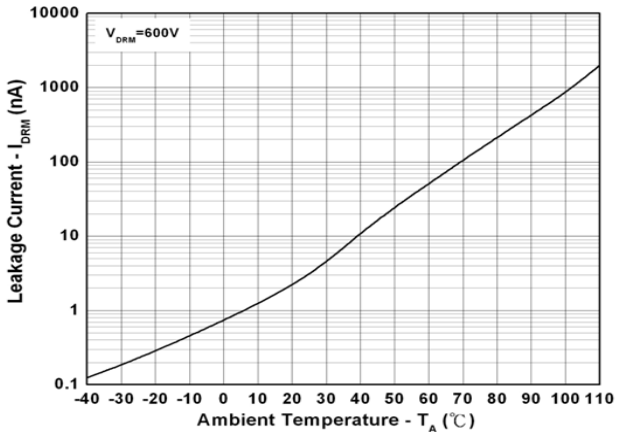
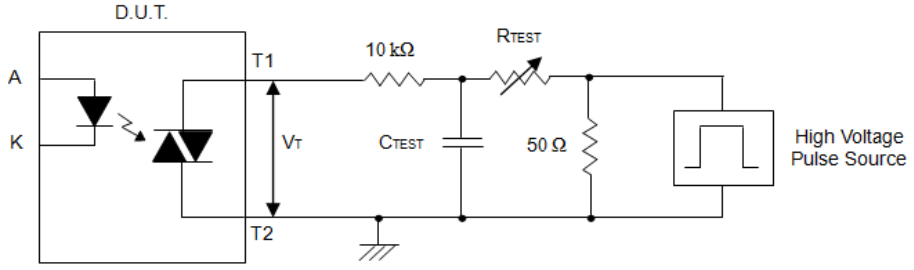
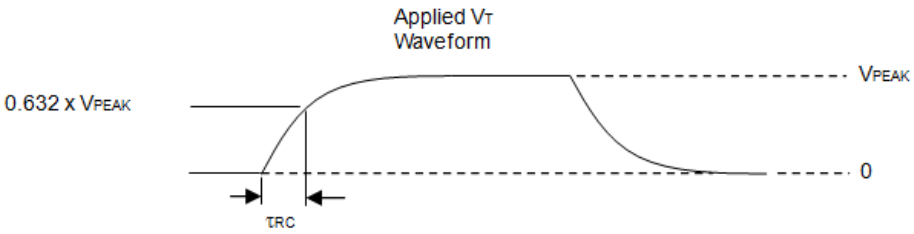


Fig 7 Leakage Current vs Ambient Temperature





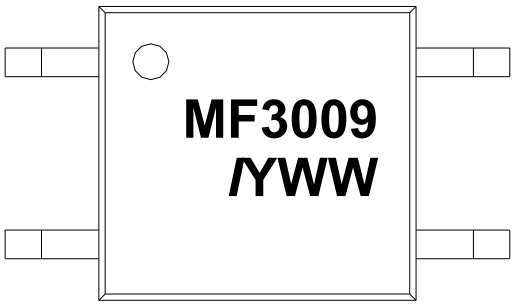
$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

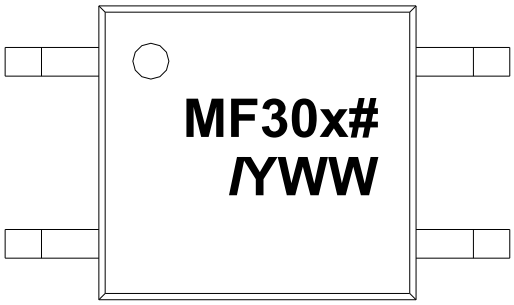
Fig 8 Static dv/dt Test Circuit

ORDER INFORMATION

MF3009, MF301#, MF302# Series			
After PN	**PN**	**Description**	**Packing quantity**
None	MF3009 MF3010, MF3011, MF3012 MF3020, MF3021, MF3022, MF3023, MF3024	Surface Mount Tape & Reel	3000 pcs per reel
NOTE : MF3024 may be supported when ordering any of the following Part Numbers, MF3009, MF3010, MF3011, MF3012, MF3020, MF3021, MF3022, MF3023.			

DEVICE MARKING

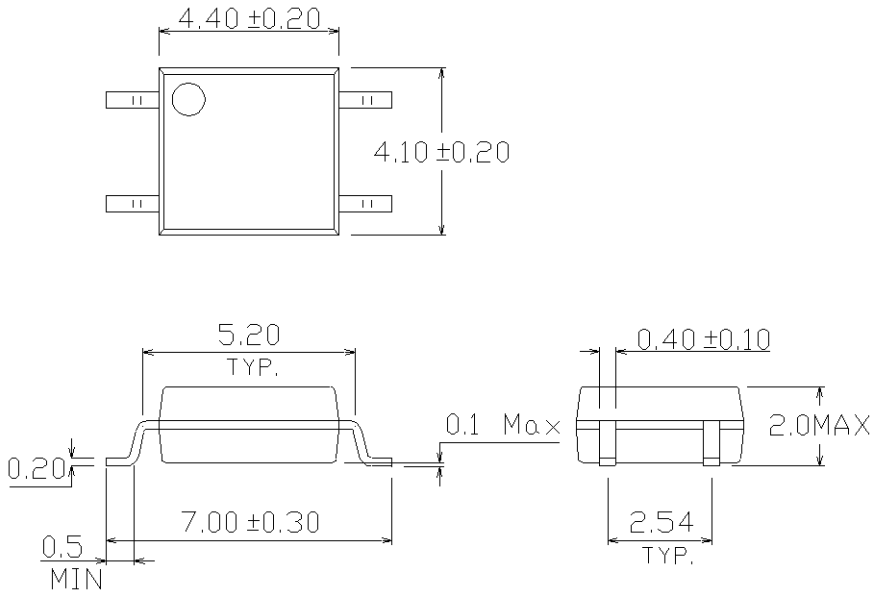




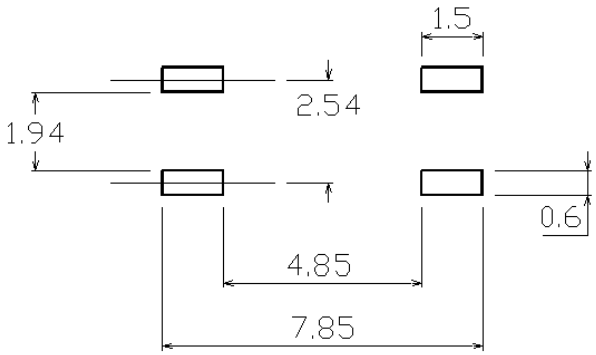
x	x = 1, 2
#	# = 0, 1, 2, 3, 4, #
I	Isocom
Y	Year Code (A = 2010, B = 2011, etc.)
WW	2 digit Week code

Note :	**Device**	**Optional Marking**
	MF3024	MF302#

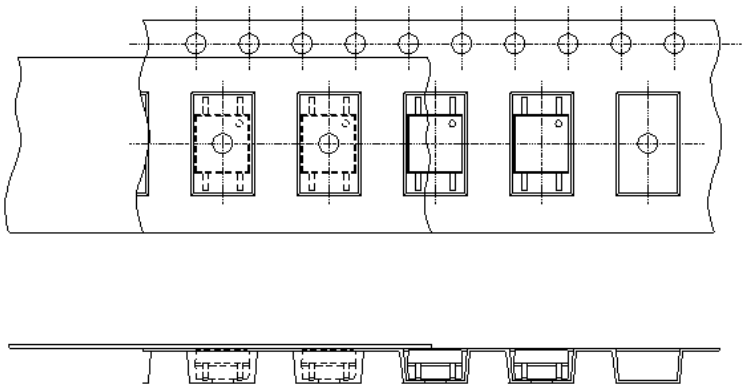
PACKAGE DIMENSIONS (mm)



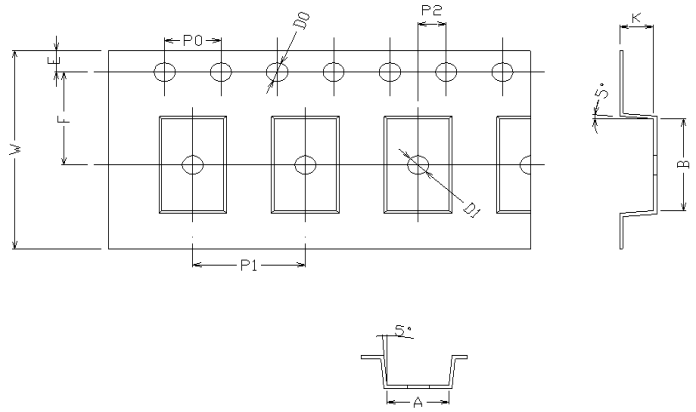
RECOMMENDED PAD LAYOUT (mm)



TAPE AND REEL PACKAGING (mm)



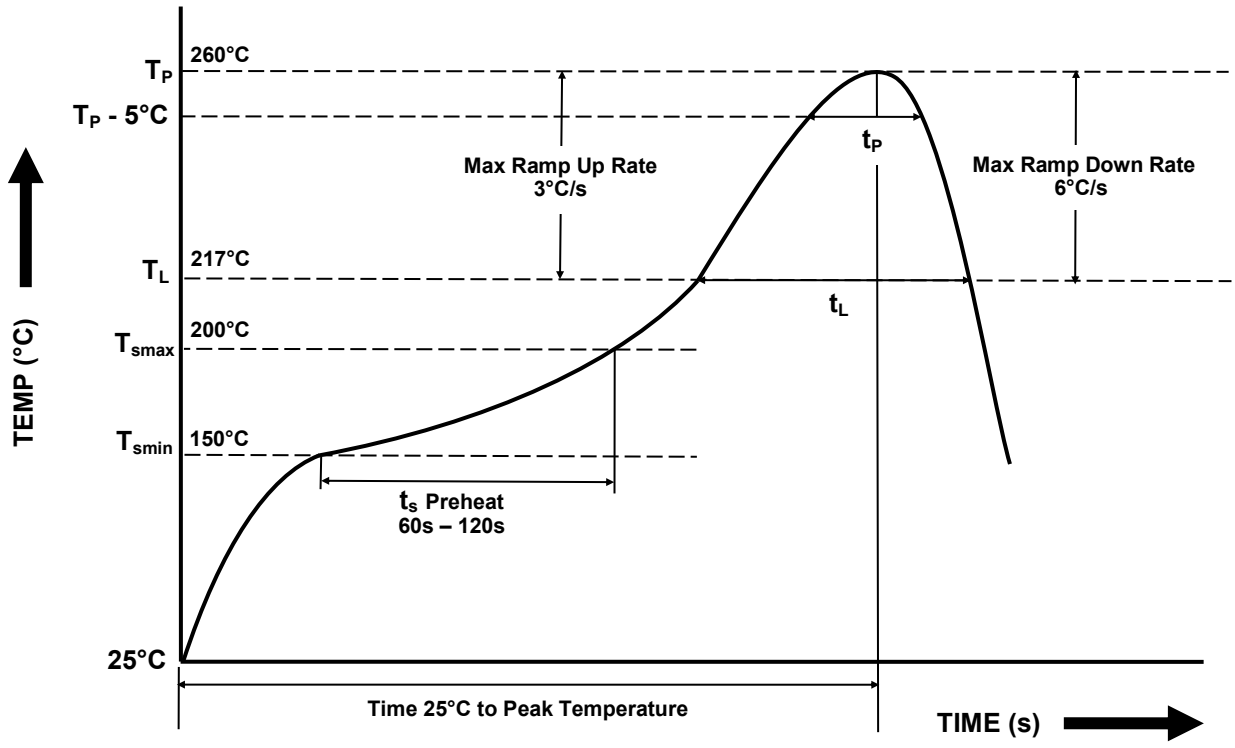
Direction of feed from reel



Dimension No.	A	B	D0	D1	E	F
Dimension(mm)	4.4±0.1	7.4±0.1	1.5+0.1/-0	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	**P0**	**P1**	**P2**	**t**	**W**	**K0**
Dimension (mm)	4.0±0.15	8.0±0.1	2.0±0.1	0.25±0.03	16.0±0.2	2.4±0.1

IR REFLOW SOLDERING TEMPERATURE PROFILE

One Time Reflow Soldering is Recommended.
Do not immerse device body in solder paste.



Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s – 120s
Soldering Zone - Peak Temperature (T_P) - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	 260°C 217°C 30s 60s – 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T_{smax} to T_P)	3°C/s max
Time 25°C to Peak Temperature	8 minutes max

ISOCOM COMPONENTS

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