ISOCOM COMPONENTS

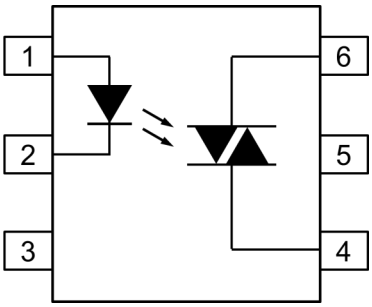
MOC3020 / MOC3021 / MOC3022 / MOC3023

DESCRIPTION

The MOC3020, MOC3021, MOC3022 and MOC3023 are optically coupled isolators consisting of a Gallium Arsenide infrared emitting diode coupled with a light activated silicon bilateral switch performing the functions of a triac.

These photocouplers provide random phase control of high current triacs or thyristors. They feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

These devices are mounted in a standard 6 pin dual-in-line package.



1 Anode
2 Cathode
3 NC
4 Main Terminal
5 Substrate (Do not Connect)
6 Main Terminal

FEATURES

- High Repetitive Peak Off-state Voltage V_{DRM} : minimum 400V
- High Critical Rate of Rise of Off-state Voltage dv/dt : minimum 1000V/µs)
- High Isolation Voltage between Input and Output Viso : 5000Vrms
- Lead Free and RoHS Compliant
- UL Approval Certificate E91231 Package Code “KK”
- VDE Approval Certificate 40028086

APPLICATIONS

- AC Motor Drives / Starters
- Static AC Power Switch
- Lighting Controls
- Solid State Relays
- Solenoid / Valve Controls
- Temperature Controls

ORDER INFORMATION

- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel

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	50mA
Reverse Voltage	6V
Power dissipation	100mW
Junction Temperature	125°C
Output	
Off State Output Terminal Voltage	400V
Peak Repetitive Surge Current (Pulse width = 1ms, 120pps)	1A
Power Dissipation	300mW
Junction Temperature	125°C
Total Package	
Isolation Voltage	5000V_{RMS}
Total Power Dissipation	330mW
Operating Temperature	-40 to 110°C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{AC}			120	V_{AC}
Forward Current					mA
MOC3020		30	40	50	
MOC3021	I_F	22.5	25	30	
MOC3022		15	20	30	
MOC3023		7.5	10	30	
Operating Temperature	T_A	−25		85	°C

NOTE :

Recommended operating conditions are given as a design guideline to obtain expected performance of the device.

Each item is an independent guideline.

Please also refer to specified characteristics in this document.

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

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	I_F = 20mA		1.15	1.4	V
Reverse Current	I_R	V_R = 6V		0.05	10	µA

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak Off-state Current Either Direction	I_{DRM}	V_{DRM} = 400V I_F = 0mA Note 1		10	100	nA
On-State Voltage Either Direction	V_{TM}	I_{TM} = 100mA (Peak)			3.0	V
Critical Rate of Rise of Off-State Voltage	dv/dt	I_F = 0mA V_{IN} = 240V_{RMS}	1000			V/µs

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input Trigger Current Either Direction	I_{FT}	Main Terminal Voltage = 3V Note 2				mA
		MOC3020			30	
		MOC3021			15	
		MOC3022			10	
		MOC3023			5	
Holding Current Either Direction	I_H			200		µA

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	V_{ISO}	AC 1 minute, RH 40 to 60%	5000			V_{RMS}

Measured with input leads shorted together and output leads shorted together.

Note 1 : Test Voltage must be applied within static 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.

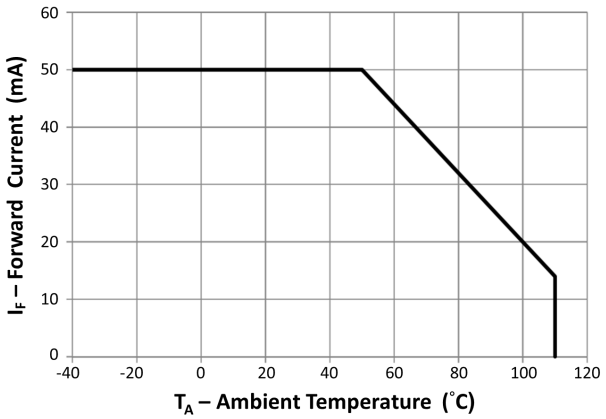


Fig 1 Forward Current vs Ambient Temperature

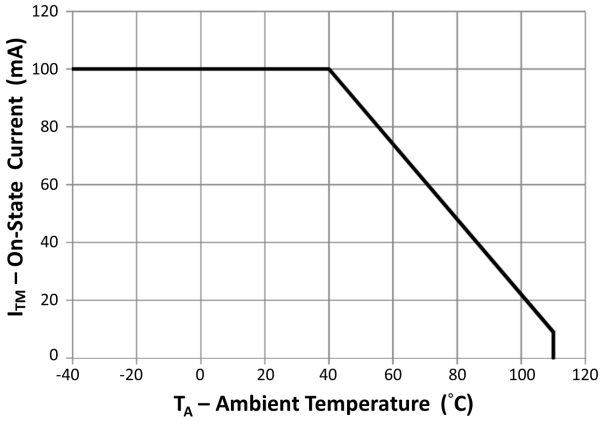


Fig 2 On-State Current vs Ambient Temperature

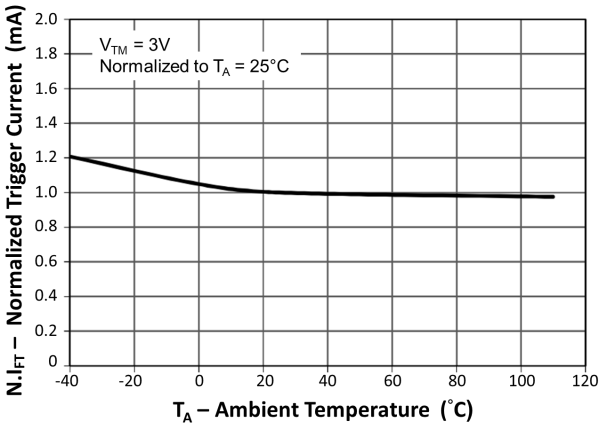


Fig 3 Normalized Trigger Current vs Ambient Temperature

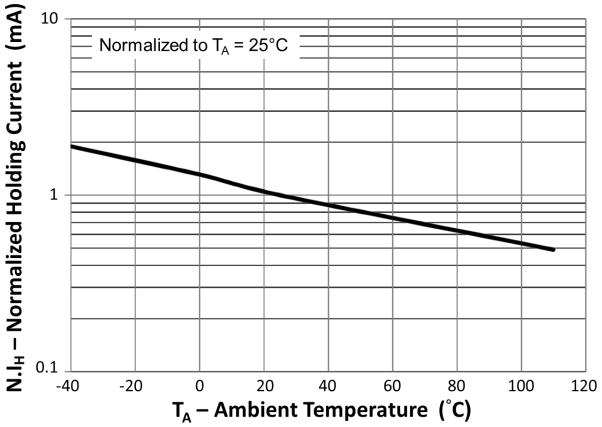


Fig 4 Normalized Holding Current vs Ambient Temperature

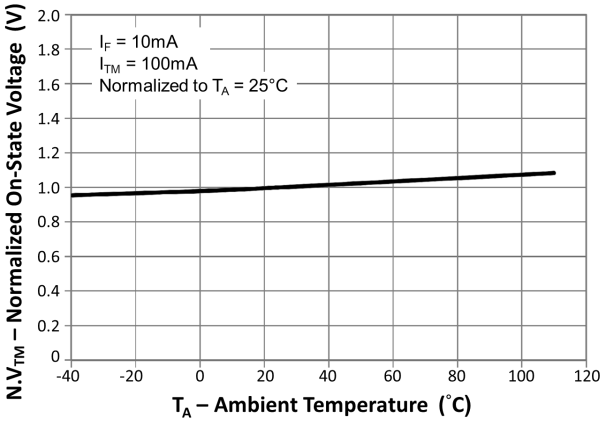


Fig 5 Normalized On-State Voltage vs Ambient Temperature

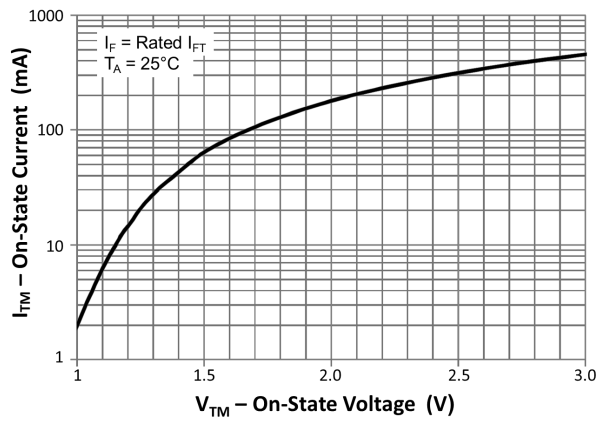


Fig 6 On-State Current vs On-State Voltage

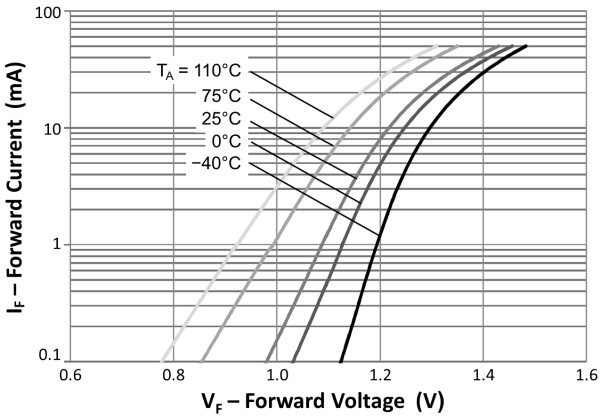


Fig 7 Forward Current vs Forward Voltage

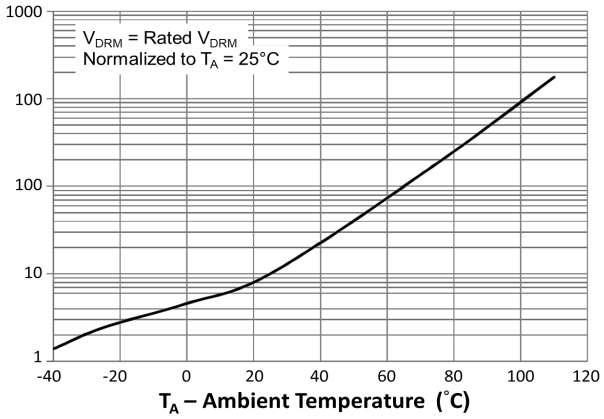


Fig 8 Normalized Peak Off-State Current vs Ambient Temperature

ORDER INFORMATION

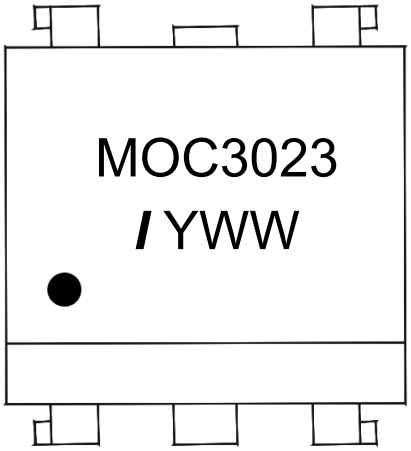
MOC3020 / MOC3021 / MOC3022 / MOC3023 (UL Approval)			
After PN	**PN**	**Description**	**Packing quantity**
None	MOC3020, MOC3021 MOC3022, MOC3023	Standard DIP6	65 pcs per tube
G	MOC3020G, MOC3021G MOC3022G, MOC3023G	10mm Lead Spacing	65 pcs per tube
SM	MOC3020SM, MOC3021SM MOC3022SM, MOC3023SM	Surface Mount	65 pcs per tube
SMT&R	MOC3020SMT&R MOC3021SMT&R MOC3022SMT&R MOC3023SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

MOC3020 / MOC3021 / MOC3022 / MOC3023 (UL and VDE Approvals)			
After PN	**PN**	**Description**	**Packing quantity**
None	MOC3020X, MOC3021X MOC3022X, MOC3023X	Standard DIP6	65 pcs per tube
G	MOC3020XG, MOC3021XG MOC3022XG, MOC3023XG	10mm Lead Spacing	65 pcs per tube
SM	MOC3020XSM, MOC3021XSM MOC3022XSM, MOC3023XSM	Surface Mount	65 pcs per tube
SMT&R	MOC3020XSMT&R MOC3021XSMT&R MOC3022XSMT&R MOC3023XSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

ORDER INFORMATION

DEVICE MARKING

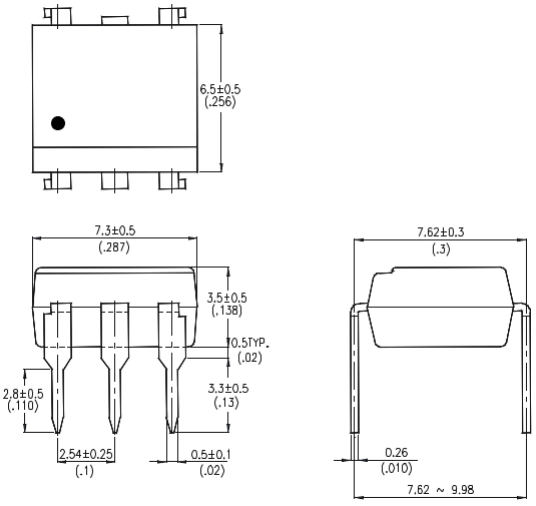
Example : MOC3023



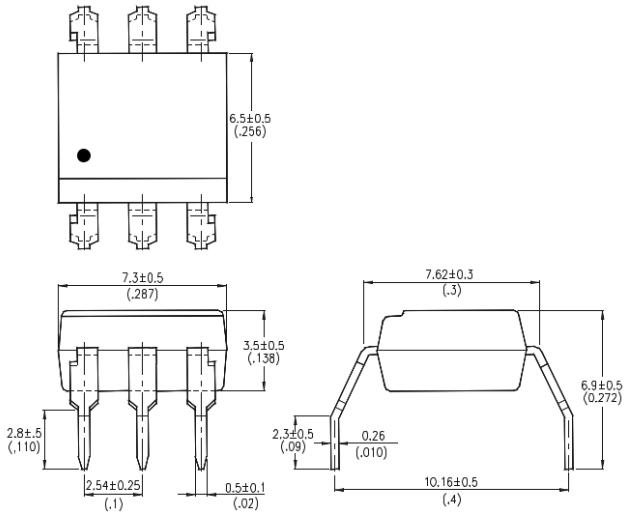
MOC3023	denotes Device Part Number
I	denotes Isocom
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

PACKAGE DIMENSIONS in mm (inch)

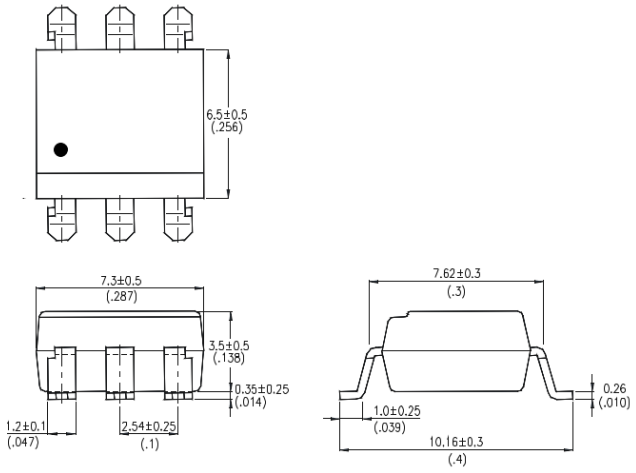
DIP



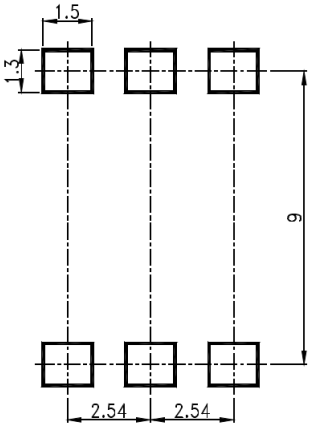
G Form



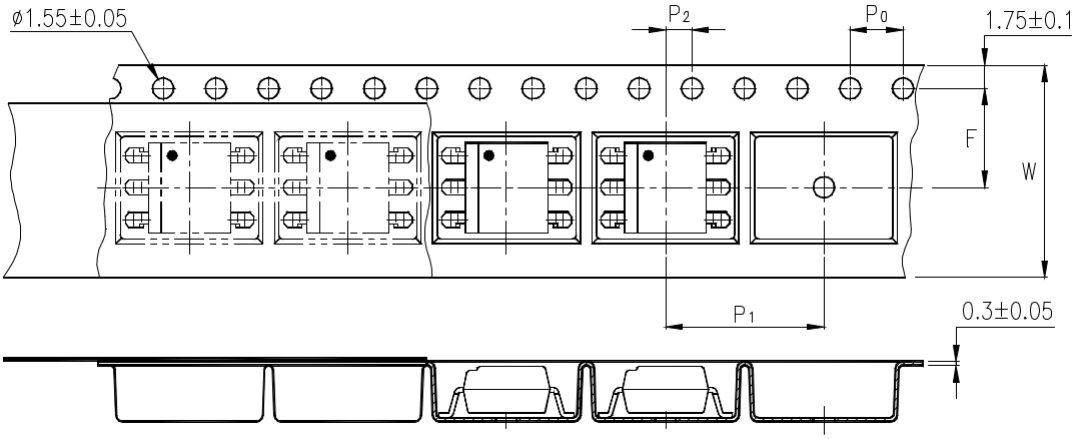
SMD



RECOMMENDED PAD LAYOUT FOR SMD (mm)



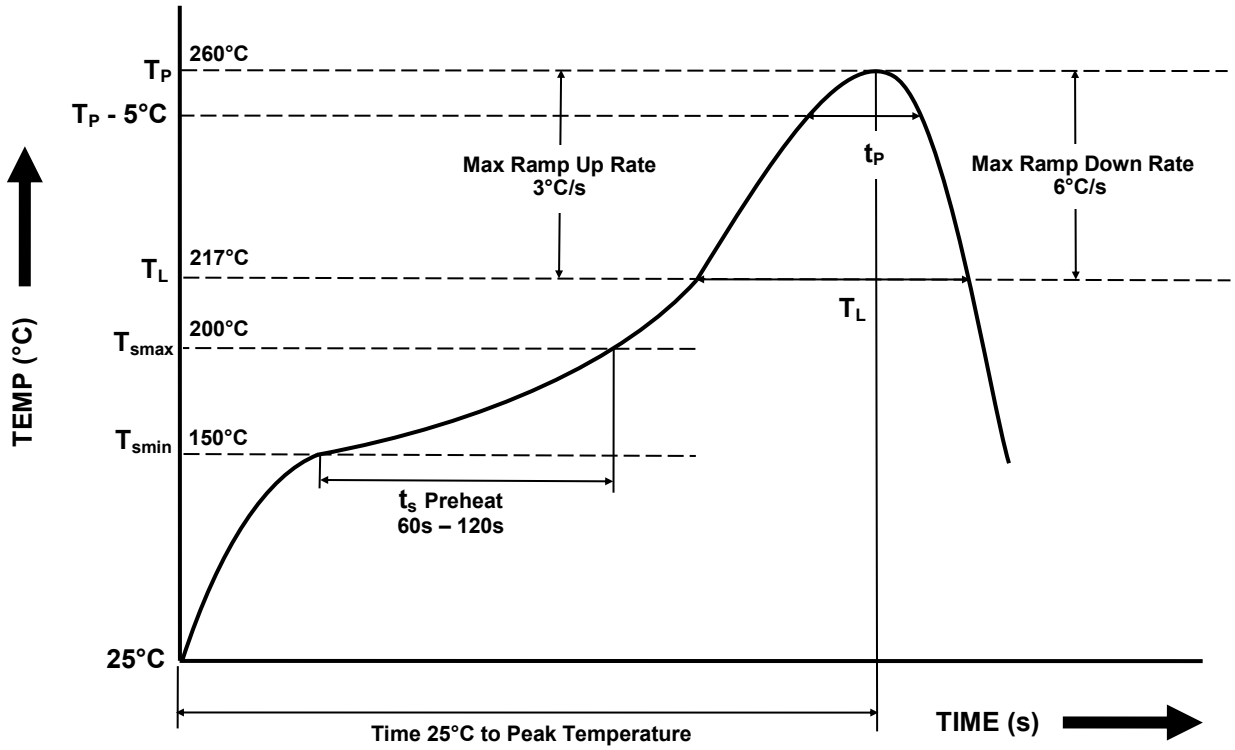
TAPE AND REEL PACKAGING



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P_0	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P_1	12 ± 0.1 (0.472)

IR REFLOW SOLDERING TEMPERATURE PROFILE

Note : 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) - Time at Peak Temperature - 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 10s max 217°C 30s max 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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