

MOC3031M

MOC3032M

MOC3033M

MOC3041M

MOC3042M

MOC3043M

DESCRIPTION

The MOC303XM and MOC304XM devices consist of a AlGaAs infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a zero voltage crossing bilateral triac driver.

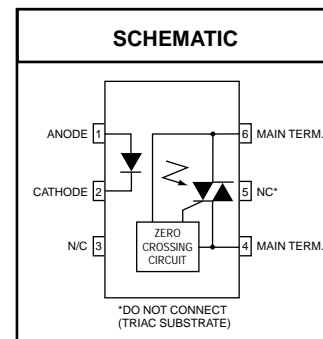
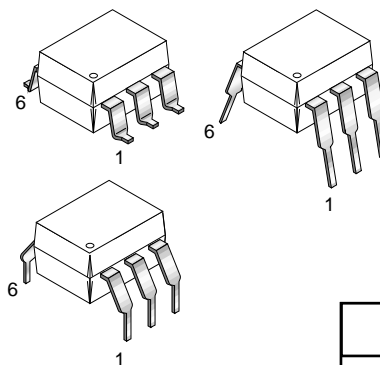
They are designed for use with a triac in the interface of logic systems to equipment powered from 115 VAC lines, such as teletypewriters, CRTs, solid-state relays, industrial controls, printers, motors, solenoids and consumer appliances, etc.

FEATURES

- Simplifies logic control of 115 VAC power
- Zero voltage crossing
- dv/dt of 2000 V/μs typical, 1000 V/μs guaranteed
- VDE recognized (File # 94766)
- ordering option V (e.g., MOC3043VM)

APPLICATIONS

- Solenoid/valve controls
- Static power switches
- Temperature controls
- AC motor starters
- Lighting controls
- AC motor drives
- E.M. contactors
- Solid state relays



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)				
Parameters	Symbol	Device	Value	Units
TOTAL DEVICE				
Storage Temperature	T _{STG}	All	-40 to +150	°C
Operating Temperature	T _{OPR}	All	-40 to +85	°C
Lead Solder Temperature	T _{SOL}	All	260 for 10 sec	°C
Junction Temperature Range	T _J	All	-40 to +100	°C
Isolation Surge Voltage ⁽¹⁾ (peak AC voltage, 60Hz, 1 sec duration)	V _{ISO}	All	7500	Vac(pk)
Total Device Power Dissipation @ 25°C Derate above 25°C	P _D	All	250	mW
			2.94	mW/°C
EMITTER				
Continuous Forward Current	I _F	All	60	mA
Reverse Voltage	V _R	All	6	V
Total Power Dissipation 25°C Ambient Derate above 25°C	P _D	All	120	mW
			1.41	mW/°C
DETECTOR				
Off-State Output Terminal Voltage	V _{DRM}	MOC3031M/2M/3M	250	V
		MOC3041M/2M/3M	400	
Peak Repetitive Surge Current (PW = 100 μs, 120 pps)	I _{TSM}	All	1	A
Total Power Dissipation @ 25°C Ambient Derate above 25°C	P _D	All	150	mW
		All	1.76	mW/°C

Note
1. Isolation surge voltage, V_{ISO}, is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ	Max	Units
EMITTER							
Input Forward Voltage	$I_F = 30\text{ mA}$	V_F	All		1.25	1.5	V
Reverse Leakage Current	$V_R = 6\text{ V}$	I_R	All		0.01	100	μA
DETECTOR							
Peak Blocking Current, Either Direction	Rated V_{DRM} , $I_F = 0$ (note 1)	I_{DRM1}	All			100	nA
Peak On-State Voltage, Either Direction	$I_{TM} = 100\text{ mA peak}$, $I_F = 0$	V_{TM}	All		1.8	3	V
Critical Rate of Rise of Off-State Voltage	$I_F = 0$ (figure 9, note 3)	dv/dt	All	1000			V/ μs

TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
LED Trigger Current	Main terminal voltage = 3V (note 2)	I_{FT}	MOC3031M/MOC3041M			15	mA
			MOC3032M/MOC3042M			10	
			MOC3033M/MOC3043M			5	
Holding Current, Either Direction		I_H	All		400		μA

ZERO CROSSING CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

Characteristics	Test Conditions	Symbol	Device	Min	Typ	Max	Units
Inhibit Voltage	$I_F = \text{rated } I_{FT}$, MT1-MT2 voltage above which device will not trigger off-state	V_{IH}	All			20	V
Leakage in Inhibited State	$I_F = \text{rated } I_F$, rated V_{DRM} , off-state	I_{DRM2}	All			500	μA

Note

- Test voltage must be applied within dv/dt rating.
- 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 MOC3031M & MOC3041M, 10 mA for MOC3032M & MOC3042M, 5 mA for MOC3033M & MOC3043M) and absolute max I_F (60 mA).
- This is static dv/dt. See Figure 9 for test circuit. Commutating dv/dt is a function of the load-driving thyristor(s) only.

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Figure 1. LED Forward Voltage vs. Forward Current

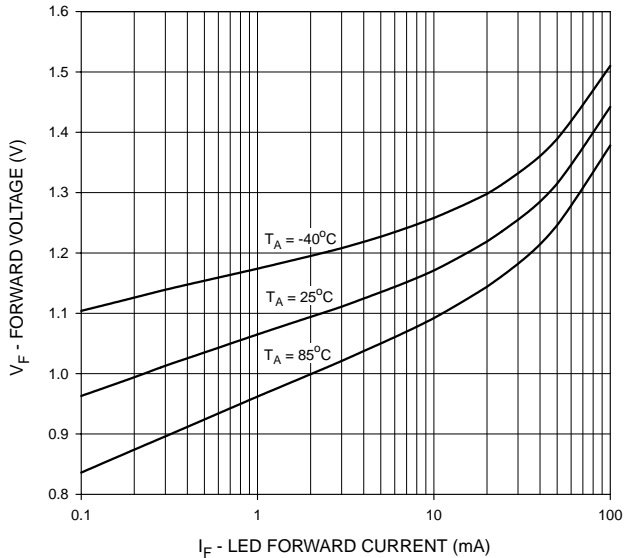


Figure 2. On-State Characteristics

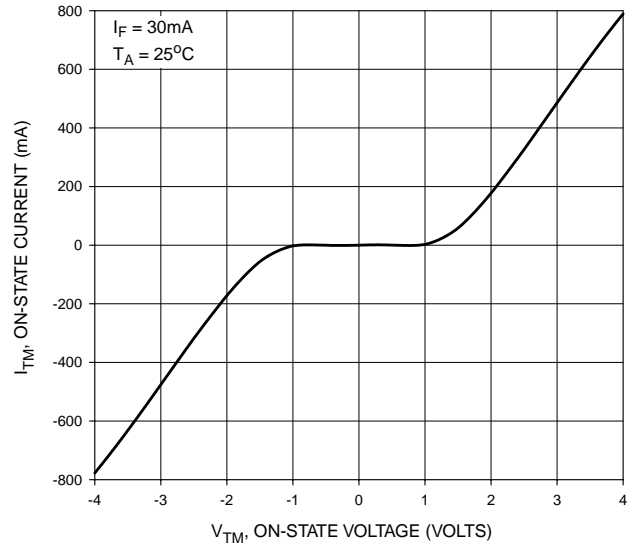


Figure 3. Trigger Current vs. Temperature

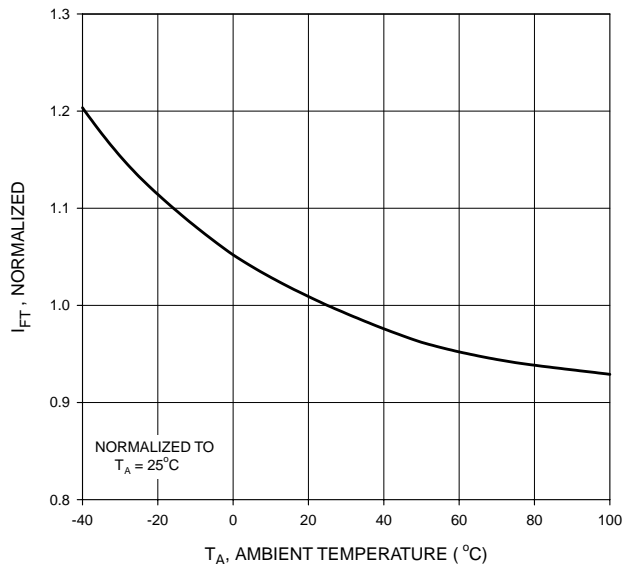
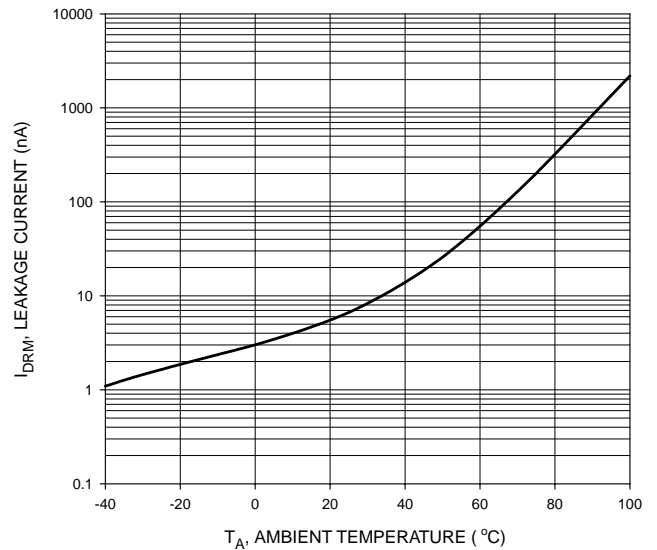


Figure 4. Leakage Current, I_{DRM} vs. Temperature



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Figure 5. I_{DRM2} - Leakage in Inhibit State vs. Temperature

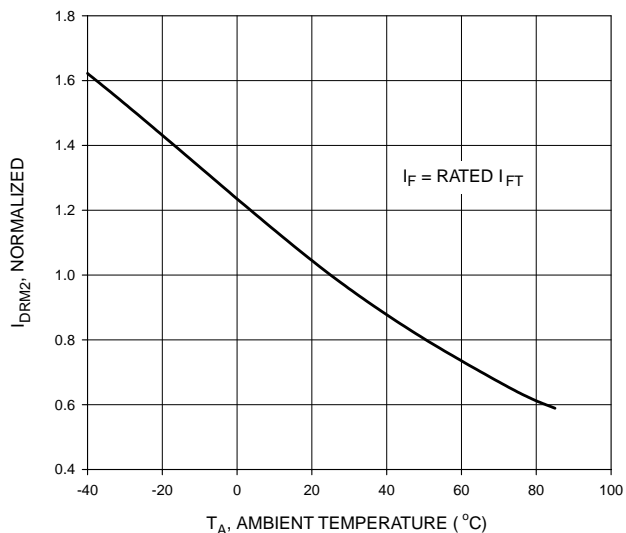


Figure 6. LED Current Required to Trigger vs. LED Pulse Width

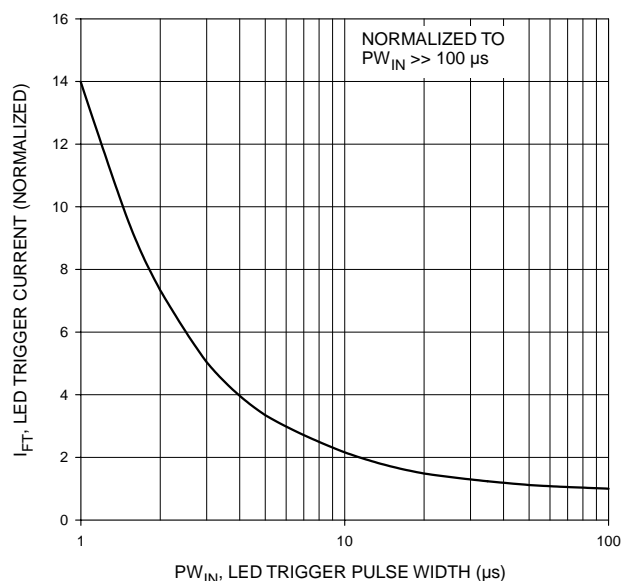


Figure 7. Holding Current, I_H vs. Temperature

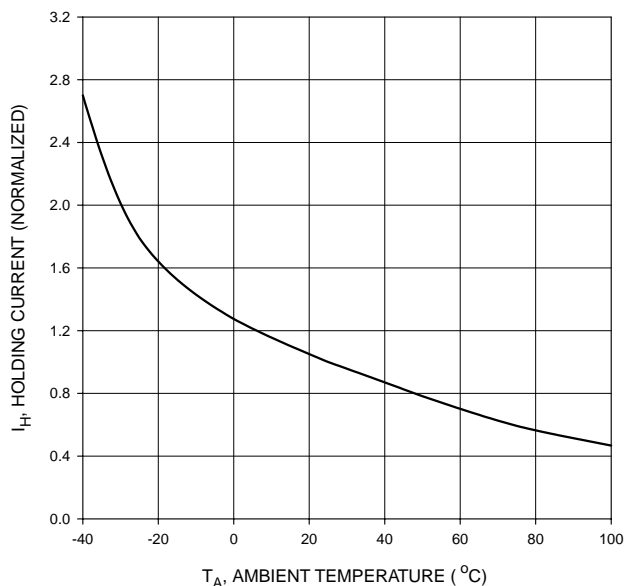


Figure 8. Inhibit Voltage vs. Temperature

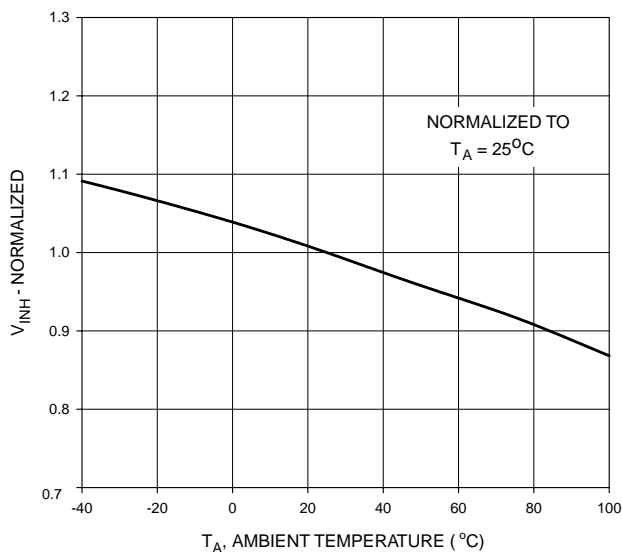


Figure 9. Static dv/dt Test Circuit

**Figure 10. Static dv/dt Test Waveform
(MOC3031M, MOC3032M, MOC3033M)**

MOC3031M

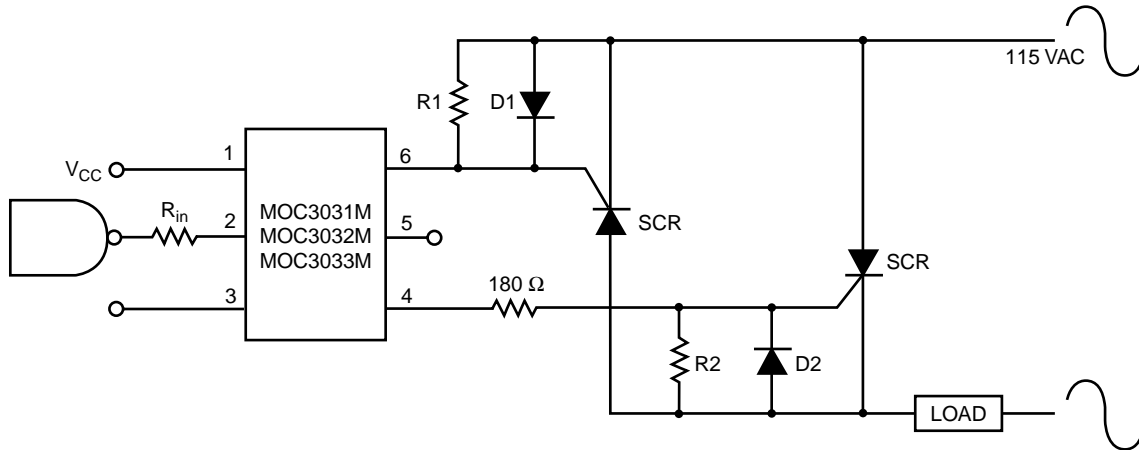
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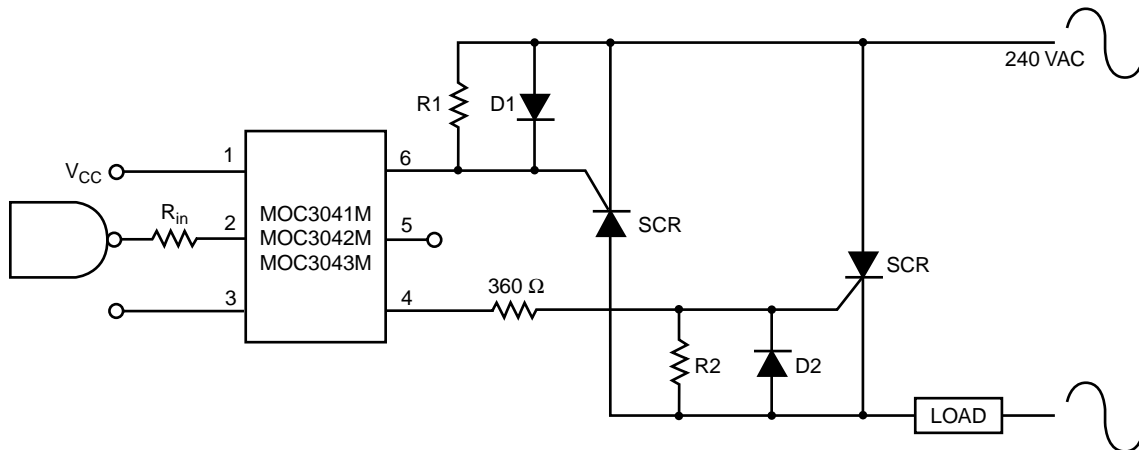
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**Figure 14. Inverse-Parallel SCR Driver Circuit
(MOC3031M, MOC3032M, MOC3033M)**

Suggested method of firing two, back-to-back SCR's with a Fairchild triac driver. Diodes can be 1N4001; resistors, R1 and R2, are optional 1 k ohm.



**Figure 15. Inverse-Parallel SCR Driver Circuit
(MOC3041M, MOC3042M, MOC3043M)**

Suggested method of firing two, back-to-back SCR's with a Fairchild triac driver. Diodes can be 1N4001; resistors, R1 and R2, are optional 330 ohm.

Note: This optoisolator should not be used to drive a load directly. It is intended to be a trigger device only.

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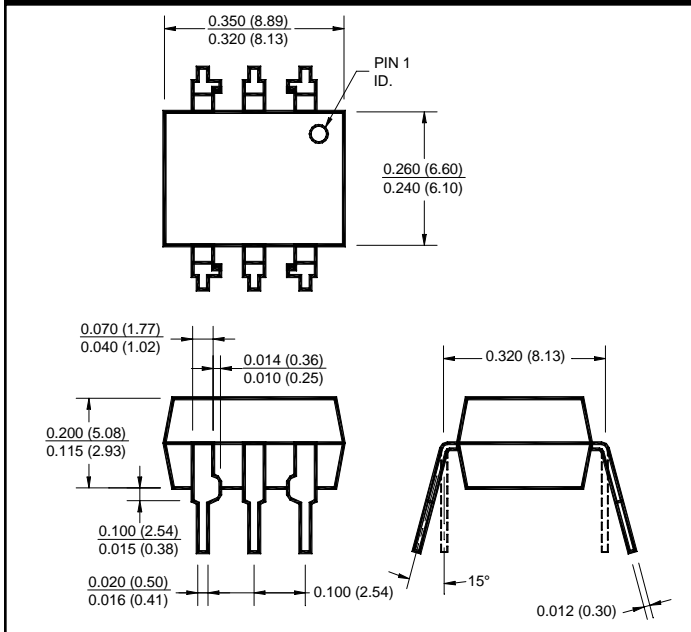
MOC3033M

MOC3041M

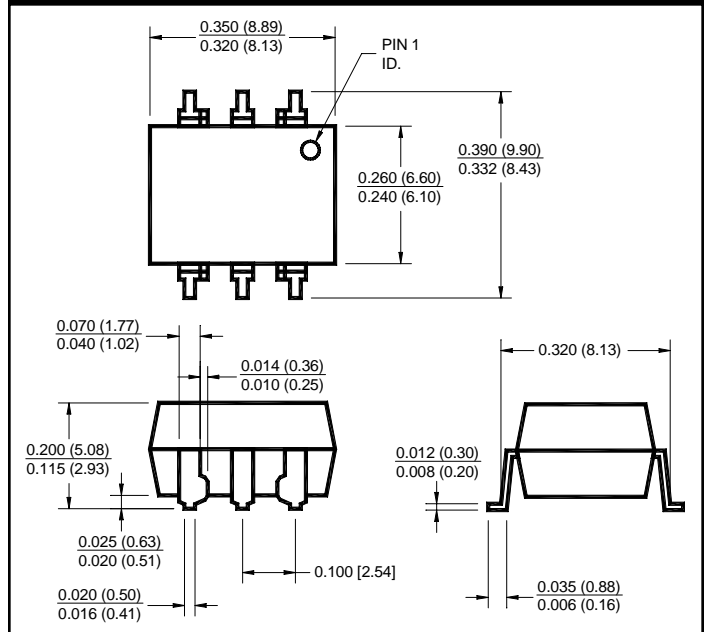
MOC3042M

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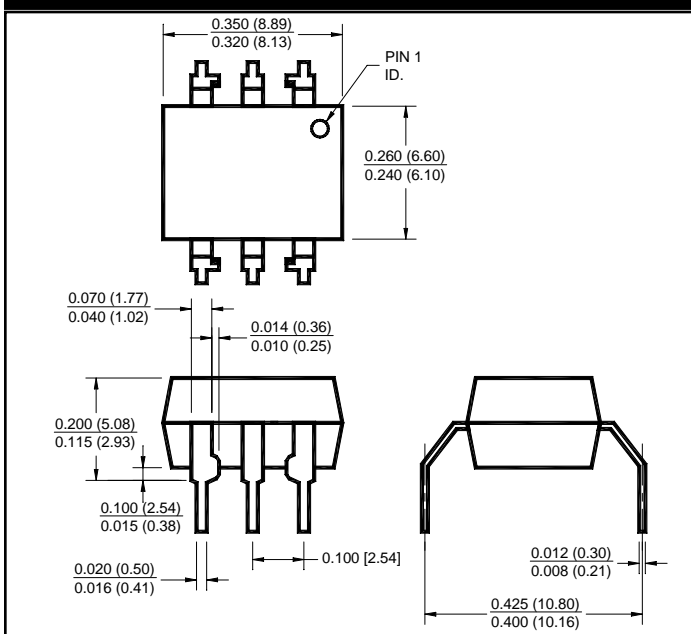
Package Dimensions (Through Hole)



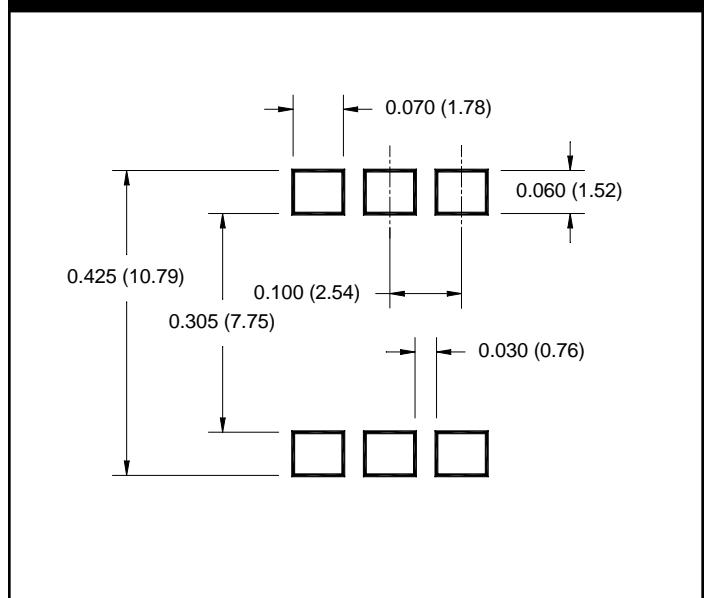
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



**Recommended Pad Layout for
Surface Mount Leadform**



NOTE

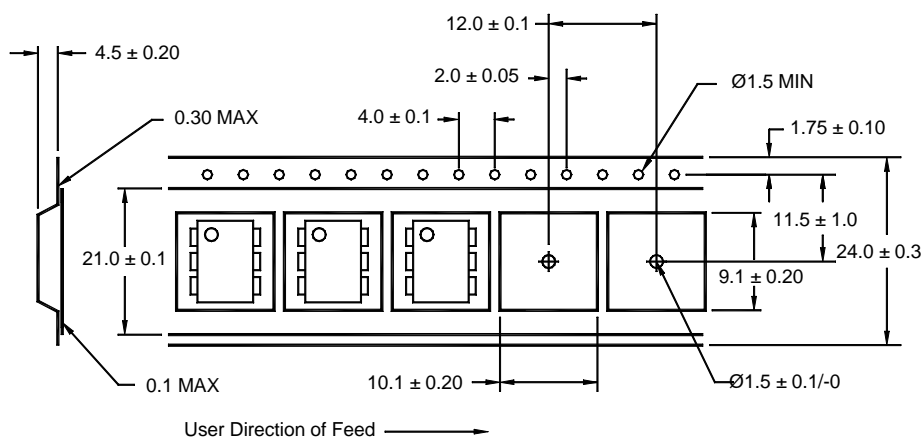
All dimensions are in inches (millimeters)

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ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	S	Surface Mount Lead Bend
SR2	SR2	Surface Mount; Tape and reel
T	T	0.4" Lead Spacing
V	V	VDE 0884
TV	TV	VDE 0884, 0.4" Lead Spacing
SV	SV	VDE 0884, Surface Mount
SR2V	SR2V	VDE 0884, Surface Mount, Tape & Reel

Carrier Tape Specifications ("D" Taping Orientation)



NOTE

All dimensions are in inches (millimeters)

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