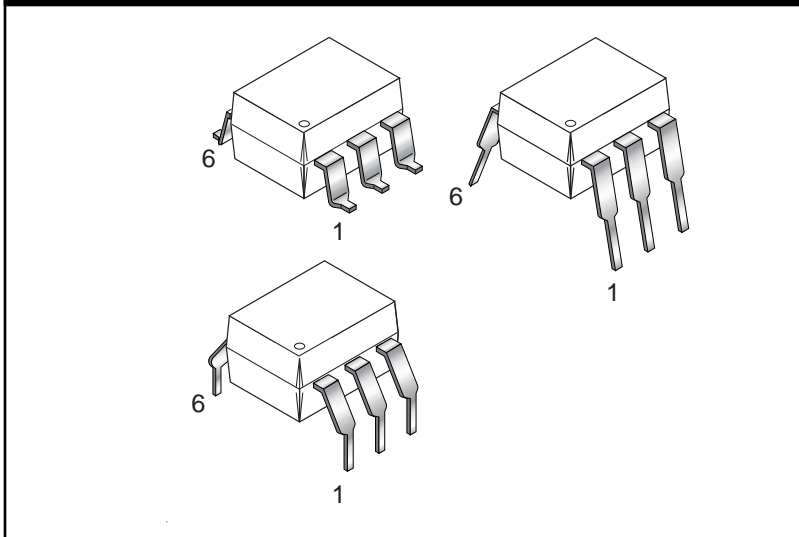


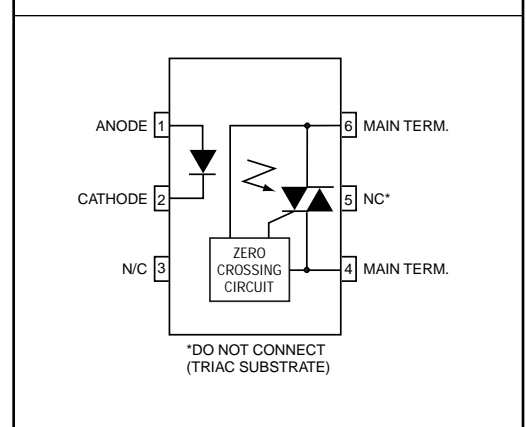
# 6-PIN DIP ZERO-CROSS PHOTOTRIAC DRIVER OPTOCOUPLER (600V PEAK)

**MOC3061-M    MOC3062-M    MOC3063-M    MOC3162-M    MOC3163-M**

## PACKAGE



## SCHEMATIC



## DESCRIPTION

The MOC306X-M and MOC316X-M devices consist of a GaAs 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 115/240 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances, etc.

## FEATURES

- Simplifies logic control of 115/240 VAC power
- Zero voltage crossing
- $dv/dt$  of 1000 V/ $\mu$ s guaranteed (MOC316X-M),  
– 600 V/ $\mu$ s guaranteed (MOC306X-M)
- VDE recognized (File # 94766)  
– ordering option V (e.g., MOC3063V-M)
- Underwriters Laboratories (UL) recognized (File #E90700, volume 2)

## APPLICATIONS

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

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ABSOLUTE MAXIMUM RATINGS (T <sub>A</sub> = 25°C unless otherwise noted)				
Parameters	Symbol	Device	Value	Units
TOTAL DEVICE				
Storage Temperature	T <sub>STG</sub>	All	-40 to +150	°C
Operating Temperature	T <sub>OPR</sub>	All	-40 to +85	°C
Lead Solder Temperature	T <sub>SOL</sub>	All	260 for 10 sec	°C
Junction Temperature Range	T <sub>J</sub>	All	-40 to +100	°C
Isolation Surge Voltage <sup>(4)</sup> (peak AC voltage, 60Hz, 1 sec duration)	V <sub>ISO</sub>	All	7500	Vac(pk)
Total Device Power Dissipation @ 25°C	P <sub>D</sub>	All	250	mW
Derate above 25°C			2.94	mW/°C
EMITTER				
Continuous Forward Current	I <sub>F</sub>	All	60	mA
Reverse Voltage	V <sub>R</sub>	All	6	V
Total Power Dissipation 25°C Ambient	P <sub>D</sub>	All	120	mW
Derate above 25°C			1.41	mW/°C
DETECTOR				
Off-State Output Terminal Voltage	V <sub>DRM</sub>	All	600	V
Peak Repetitive Surge Current (PW = 100 μs, 120 pps)	I <sub>TSM</sub>	All	1	A
Total Power Dissipation @ 25°C Ambient	P <sub>D</sub>	All	150	mW
Derate above 25°C			1.76	mW/°C

# 6-PIN DIP ZERO-CROSS PHOTOTRIAC DRIVER OPTOCOUPLER (600V PEAK)

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## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C Unless otherwise specified)

### INDIVIDUAL COMPONENT CHARACTERISTICS

Parameters	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
<b>EMITTER</b>							
Input Forward Voltage	I <sub>F</sub> = 30 mA	V <sub>F</sub>	All		1.3	1.5	V
Reverse Leakage Current	V <sub>R</sub> = 6 V	I <sub>R</sub>	All		0.005	100	μA
<b>DETECTOR</b>							
Peak Blocking Current, Either Direction	V <sub>DRM</sub> = 600V, I <sub>F</sub> = 0 (note 1)	I <sub>DRM1</sub>	MOC316X-M MOC306X-M		10 10	100 500	nA
Critical Rate of Rise of Off-State Voltage	I <sub>F</sub> = 0 (figure 9, note 3)	dv/dt	MOC306X-M MOC316X-M	600 1000	1500		V/μs

### TRANSFER CHARACTERISTICS (T<sub>A</sub> = 25°C Unless otherwise specified.)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
LED Trigger Current (rated I <sub>FT</sub> )	main terminal Voltage = 3V (note 2)	I <sub>FT</sub>	MOC3061-M MOC3062-M/ MOC3162-M MOC3063-M/ MOC3163-M			15 10 5	mA
Peak On-State Voltage, Either Direction	I <sub>TM</sub> = 100 mA peak, I <sub>F</sub> = rated I <sub>FT</sub>	V <sub>TM</sub>	All		1.8	3	V
Holding Current, Either Direction		I <sub>H</sub>	All		500		μA

### ZERO CROSSING CHARACTERISTICS

Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)	I <sub>F</sub> = Rated I <sub>FT</sub>	V <sub>INH</sub>	MOC3061-M/2M/3M MOC3162-M/3M		12 12	20 15	V
Leakage in Inhibited State	I <sub>F</sub> = Rated I <sub>FT</sub> , V <sub>DRM</sub> = 600V, off state	I <sub>DRM2</sub>	All		150	500	μA

### ISOLATION CHARACTERISTICS

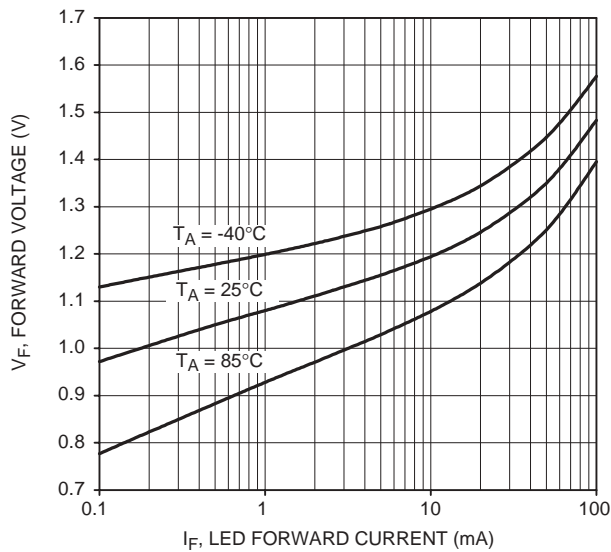
Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
Isolation Voltage	f = 60 Hz, t = 1 sec	V <sub>ISO</sub>	All	7500			V

\*Typical values at T<sub>A</sub> = 25°C

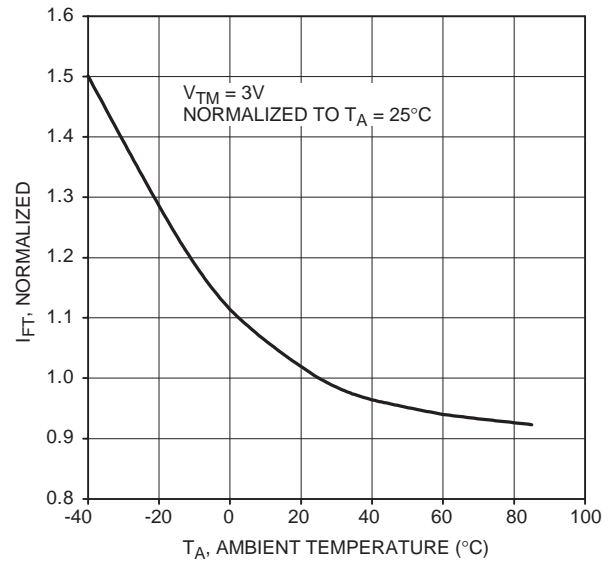
#### Notes

1. Test voltage must be applied within dv/dt rating.
2. All devices are guaranteed to trigger at an I<sub>F</sub> value less than or equal to max I<sub>FT</sub>. Therefore, recommended operating I<sub>F</sub> lies between max I<sub>FT</sub> (15 mA for MOC3061-M, 10 mA for MOC3062-M & MOC3162-M, 5 mA for MOC3063-M & MOC3163-M) and absolute max I<sub>F</sub> (60 mA).
3. This is static dv/dt. See Figure 9 for test circuit. Commutating dv/dt is a function of the load-driving thyristor(s) only.
4. Isolation surge voltage, V<sub>ISO</sub>, is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

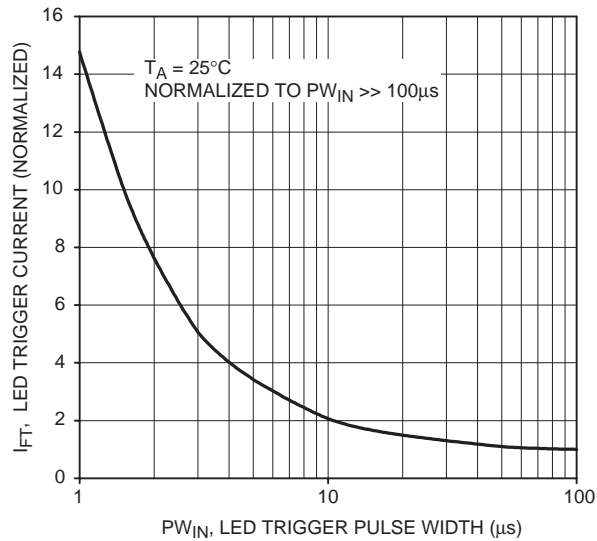
**Figure 1. LED Forward Voltage vs. Forward Current**



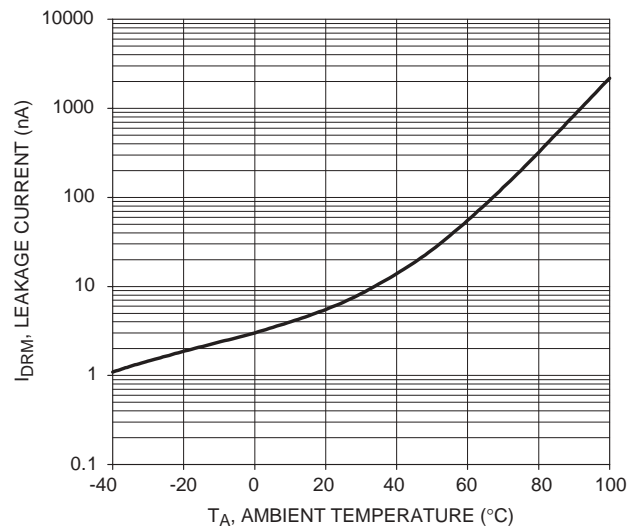
**Figure 2. Trigger Current Vs. Temperature**



**Figure 3. LED Current Required to Trigger vs. LED Pulse Width**

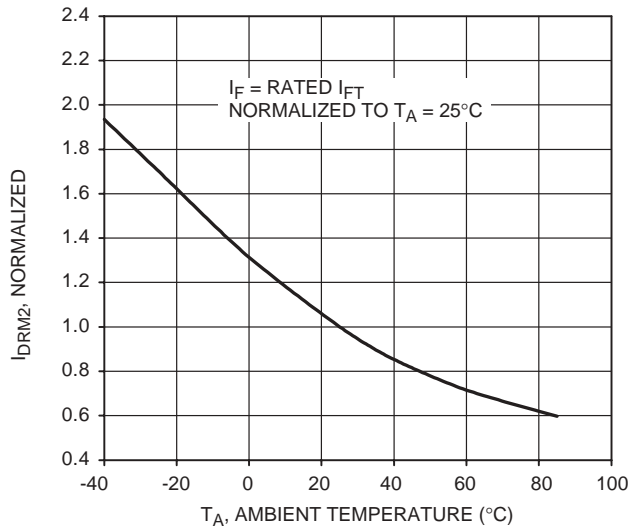


**Figure 4. Leakage Current,  $I_{DRM}$  vs. Temperature**

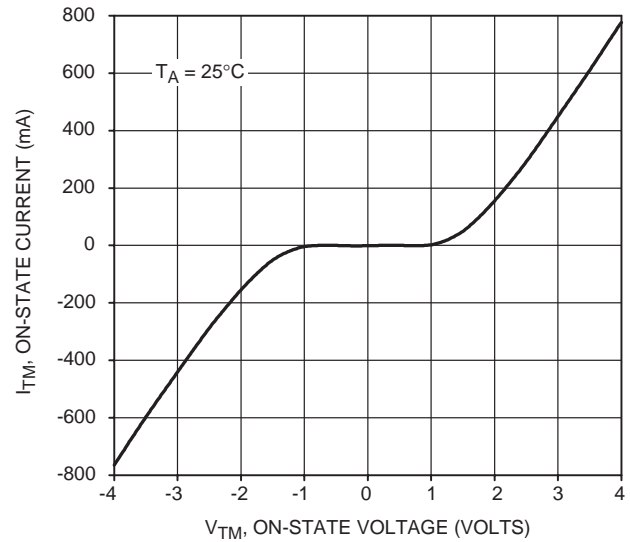


**MOC3061-M    MOC3062-M    MOC3063-M    MOC3162-M    MOC3163-M**

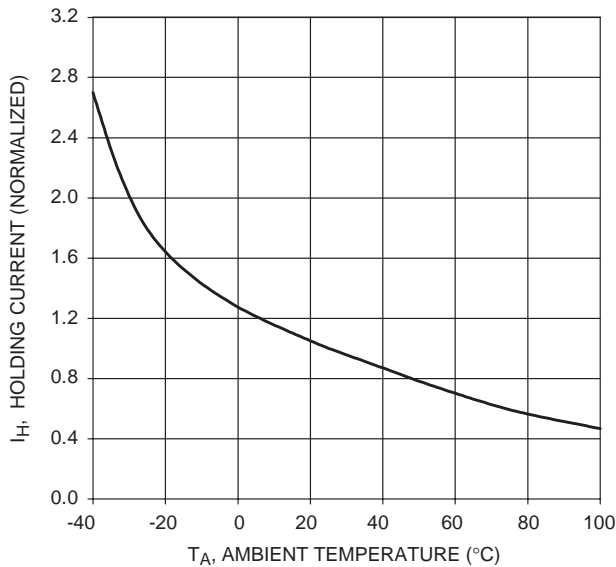
**Figure 5.  $I_{DRM2}$ , Leakage in Inhibit State vs. Temperature**



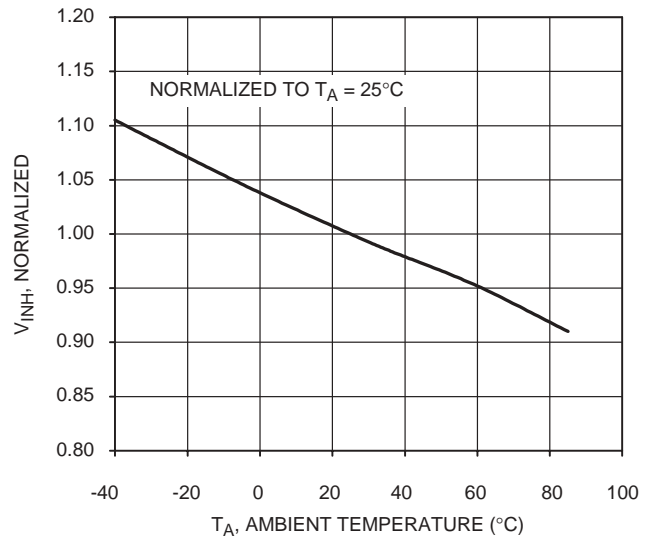
**Figure 6. On-State Characteristics**



**Figure 7.  $I_H$ , Holding Current vs. Temperature**



**Figure 8. Inhibit Voltage vs. Temperature**



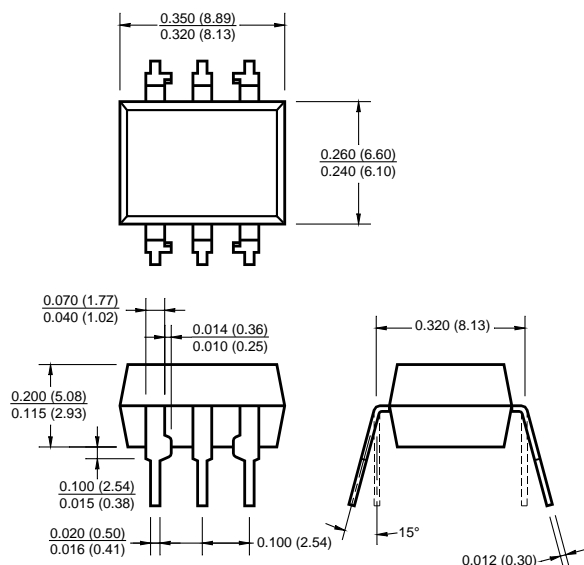


**Figure 11. Inverse-Parallel SCR Driver Circuit**

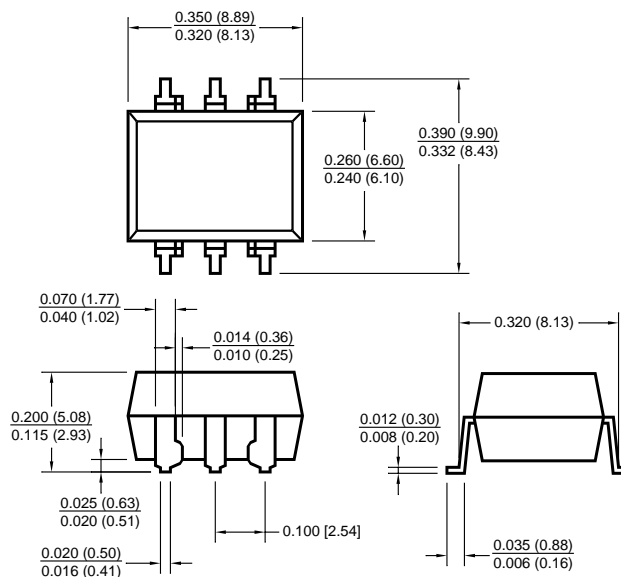
# 6-PIN DIP ZERO-CROSS PHOTOTRIAC DRIVER OPTOCOUPLER (600V PEAK)

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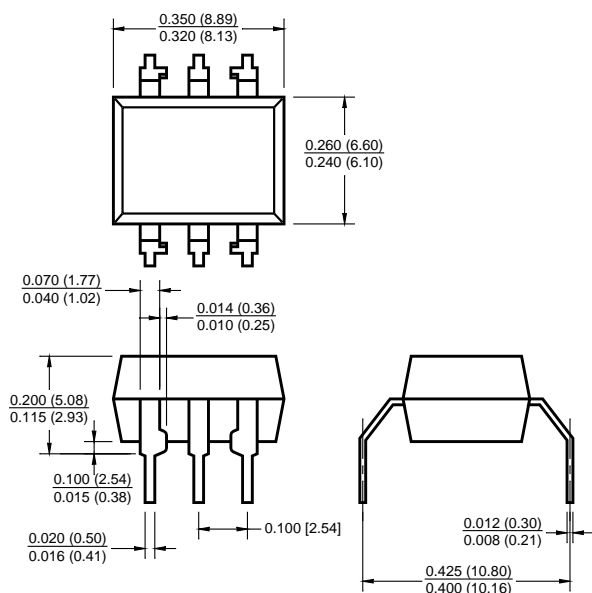
## Package Dimensions (Through Hole)



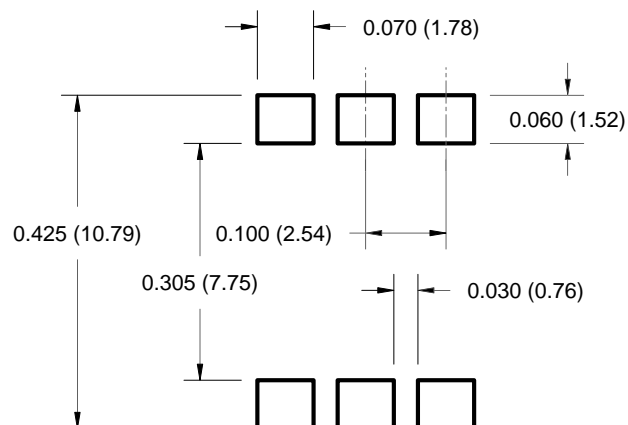
## Package Dimensions (Surface Mount)



## Package Dimensions (0.4" Lead Spacing)



## Recommended Pad Layout for Surface Mount Leadform



### NOTE

All dimensions are in inches (millimeters)

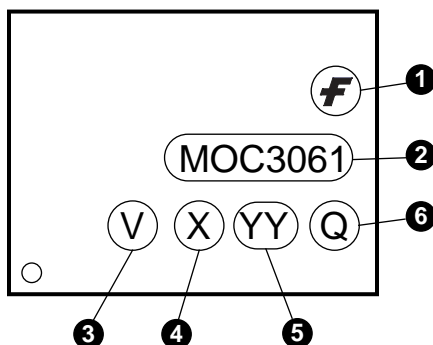
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## ORDERING INFORMATION

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

## MARKING INFORMATION



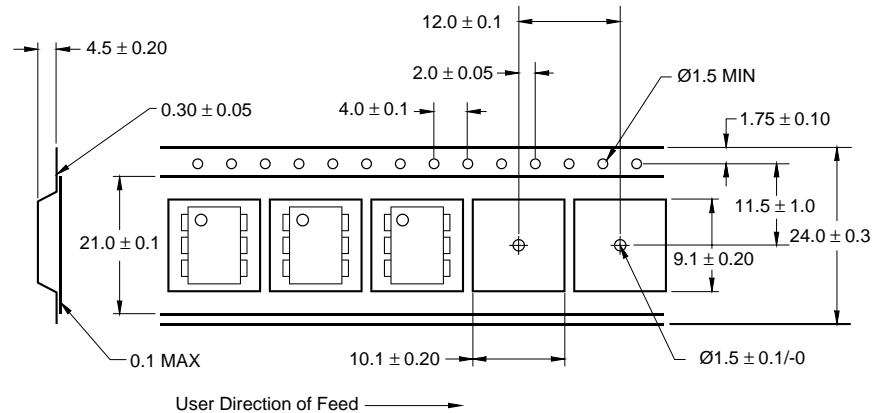
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

\*Note – Parts that do not have the 'V' option (see definition 3 above) that are marked with date code '325' or earlier are marked in portrait format.



**MOC3061-M    MOC3062-M    MOC3063-M    MOC3162-M    MOC3163-M**

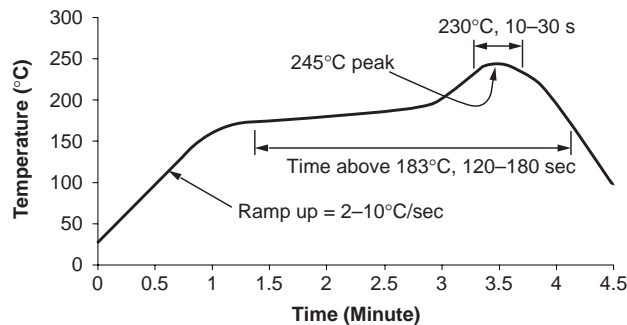
### Carrier Tape Specifications



#### NOTE

All dimensions are in inches (millimeters)

### Reflow Profile (White Package, -M Suffix)



- Peak reflow temperature: 245°C (package surface temperature)
- Time of temperature higher than 183°C for 120-180 seconds
- One time soldering reflow is recommended

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**MOC3061-M    MOC3062-M    MOC3063-M    MOC3162-M    MOC3163-M**

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