

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

MOC3061-M

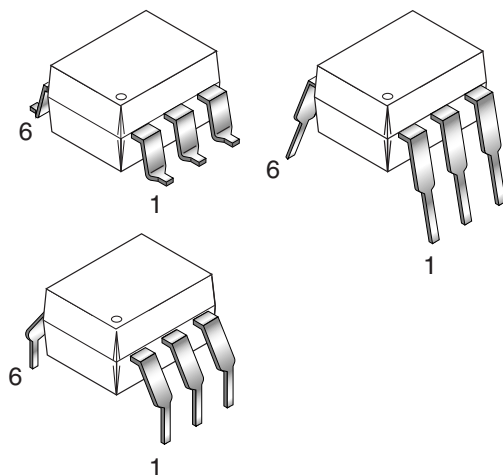
MOC3062-M

MOC3063-M

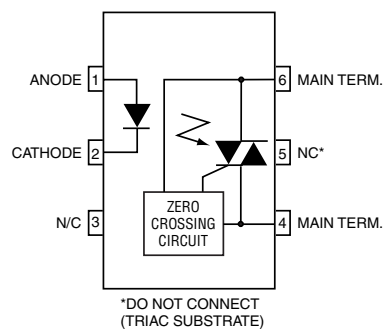
MOC3162-M

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/ μ s guaranteed (MOC316X-M),
– 600 V/ms 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

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

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

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 ⁽⁴⁾ (peak AC voltage, 60Hz, 1 sec duration)	V _{ISO}	All	7500	Vac(pk)
Total Device Power Dissipation @ 25°C	P _D	All	250	mW
Derate above 25°C			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	P _D	All	120	mW
Derate above 25°C			1.41	mW/°C
DETECTOR				
Off-State Output Terminal Voltage	V _{DRM}	All	600	V
Peak Repetitive Surge Current (PW = 100 μs, 120 pps)	I _{TSM}	All	1	A
Total Power Dissipation @ 25°C Ambient	P _D	All	150	mW
Derate above 25°C			1.76	mW/°C

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

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

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

INDIVIDUAL COMPONENT CHARACTERISTICS

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

TRANSFER CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

DC Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
LED Trigger Current (rated I _{FT})	main terminal Voltage = 3V (note 2)	I _{FT}	MOC3061-M MOC3062-M/ MOC3162-M MOC3063-M/ MOC3163-M			15 10 5	mA
Peak On-State Voltage, Either Direction	I _{TM} = 100 mA peak, I _F = rated I _{FT}	V _{TM}	All		1.8	3	V
Holding Current, Either Direction		I _H	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 _F = Rated I _{FT}	V _{INH}	MOC3061-M/2M/3M MOC3062-M/3M		12 12	20 15	V
Leakage in Inhibited State	I _F = Rated I _{FT} , V _{DRM} = 600V, off state	I _{DRM2}	All		150	500	μA

ISOLATION CHARACTERISTICS

Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
Isolation Voltage	f = 60 Hz, t = 1 sec	V _{ISO}	All	7500			V

*Typical values at T_A = 25°C

Notes

- 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 MOC3061-M, 10 mA for MOC3062-M & MOC3162-M, 5 mA for MOC3063-M & MOC3163-M) 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.
- 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.

Figure 1. LED Forward Voltage vs. Forward Current

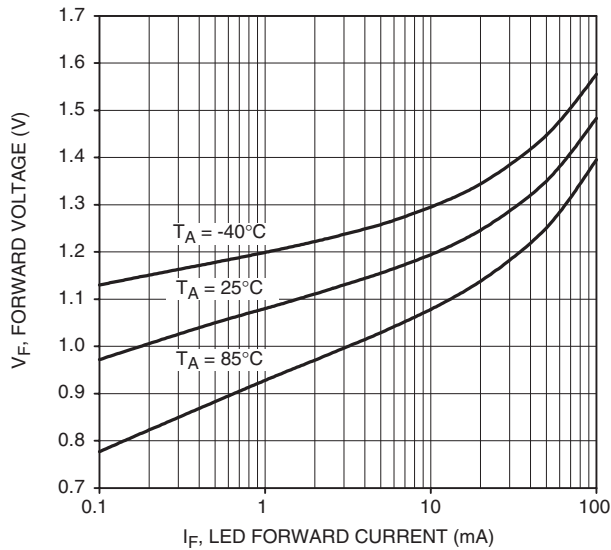


Figure 2. Trigger Current Vs. Temperature

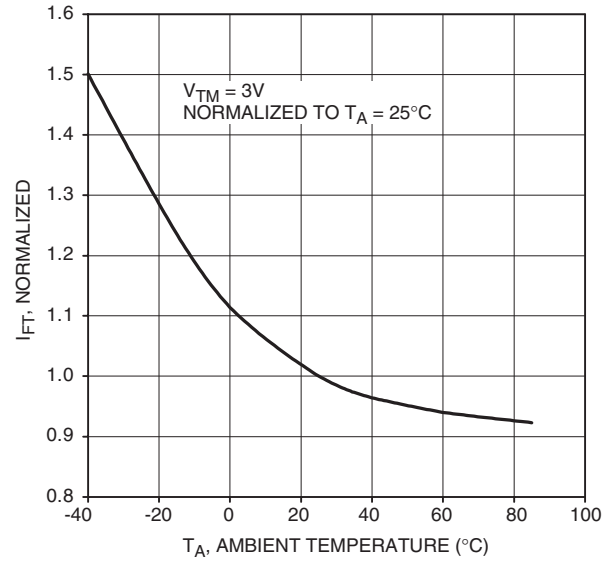


Figure 3. LED Current Required to Trigger vs. LED Pulse Width

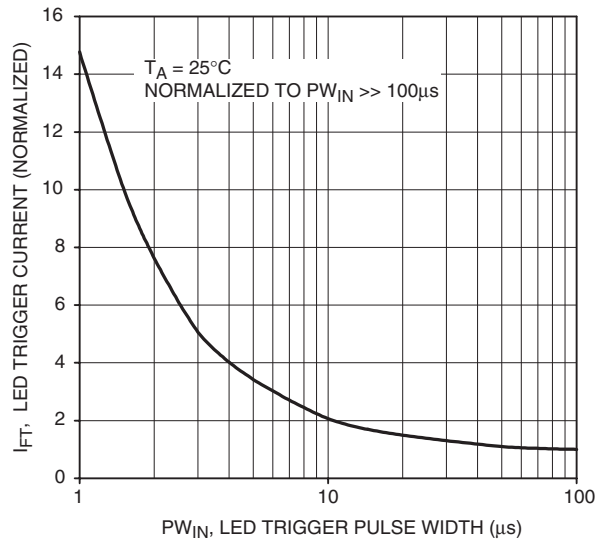
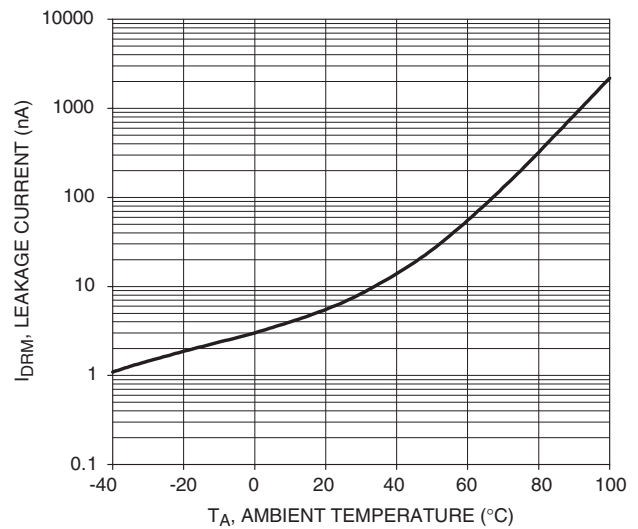


Figure 4. Leakage Current, I_{DRM} vs. Temperature



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

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

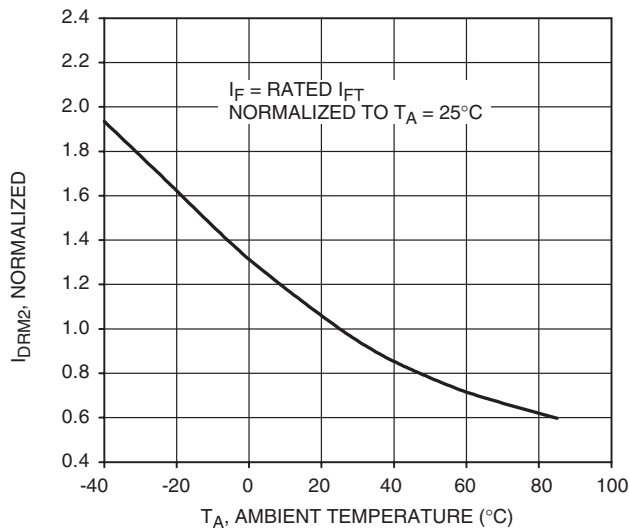


Figure 6. On-State Characteristics

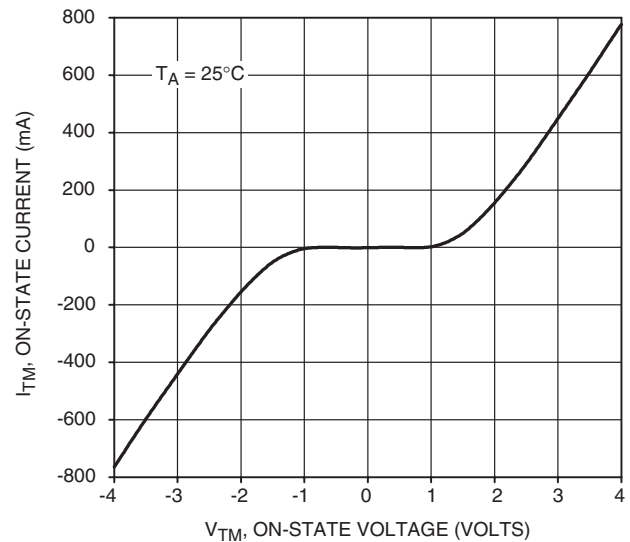


Figure 7. I_H , Holding Current vs. Temperature

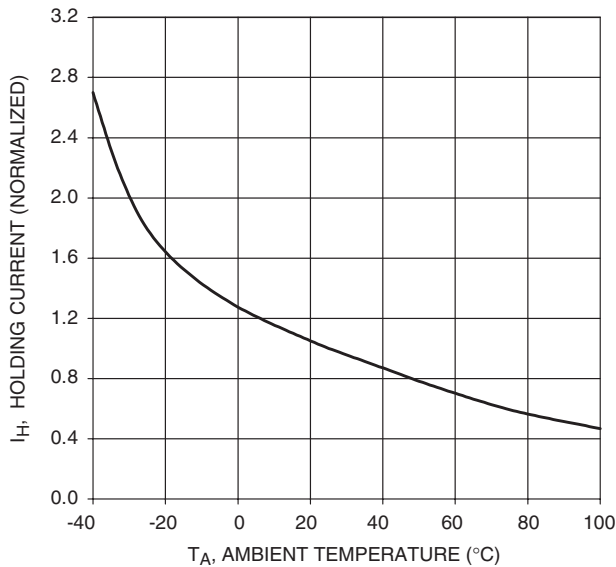
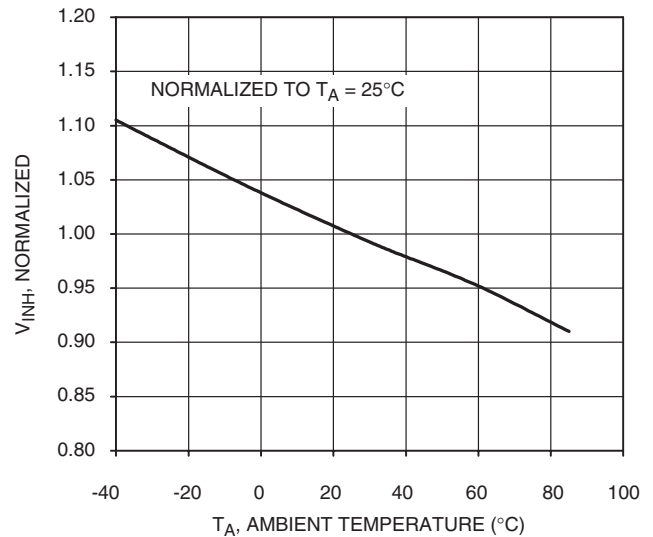


Figure 8. Inhibit Voltage vs. Temperature



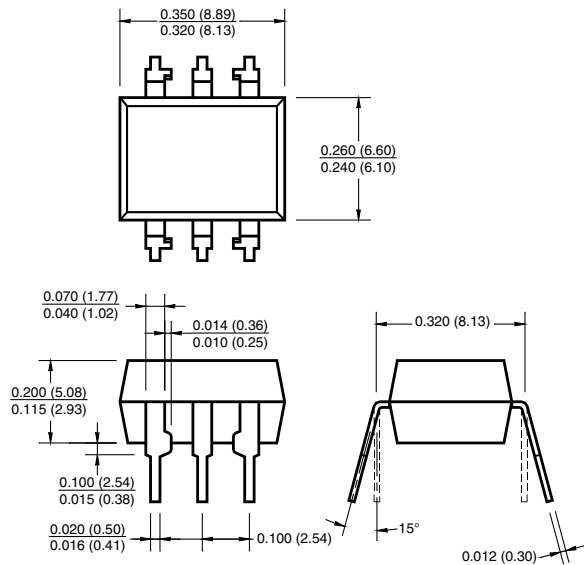
-
- DIFFERENTIAL PREAMP
- X100 PROBE 1
- X100 PROBE 2
- MOUNT DUT ON TEMPERATURE CONTROLLED Cu PLATE
- $f = 10 \text{ Hz}$
- $PW = 100 \mu s$
- 50Ω PULSE GENERATOR
- 20V
- 56 2W
- 1000 1/4W
- 1N914
- 1N967A 18V
- dV/dt VERNIER
- 100 2W
- 82 2W
- RFP4N100
- V_{DRM}/V_{RRM} SELECT
- 27 2W
- 1000 10 WATT WIREWOUND
- 0.33 1000V
- 0.047 1000V
- 470pF
- 0.001
- 0.005
- 0.01
- 0.047
- 0.1
- 0.47
- 1 MEG
- 2W EACH 1.2 MEG
- 2W
- POWER
- TEST
- 0-1000V 10mA
- ALL COMPONENTS ARE NON-INDUCTIVE UNLESS SHOWN

5/29/03

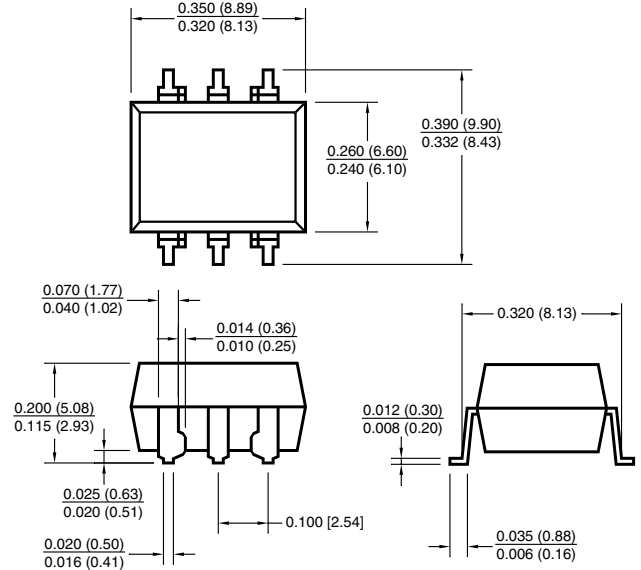
6-PIN DIP ZERO-CROSS PHOTOTRIAC DRIVER OPTOCOUPLER (600V PEAK)

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

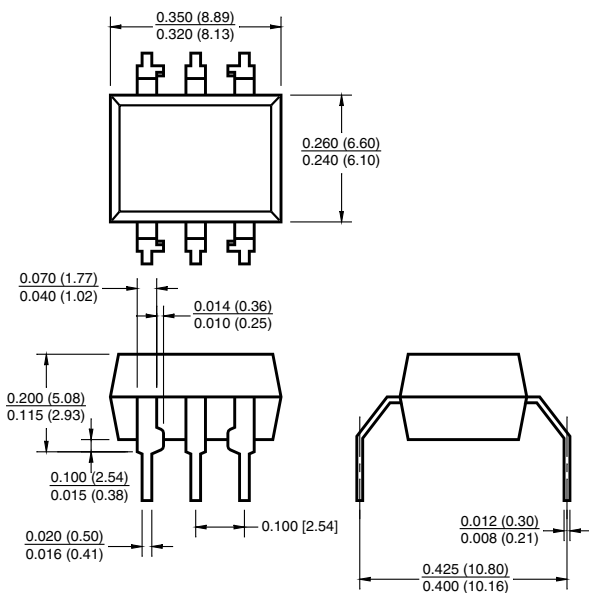
Package Dimensions (Through Hole)



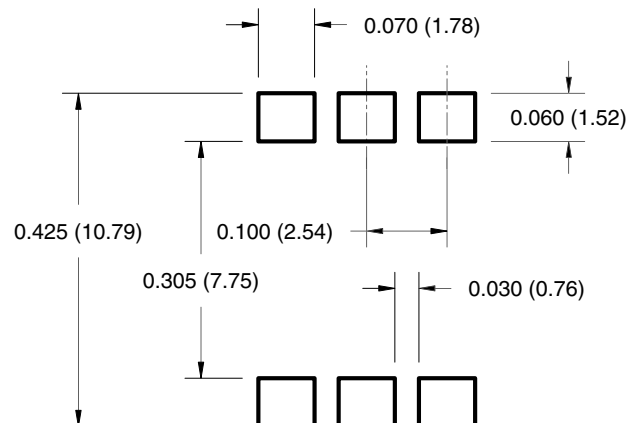
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

All dimensions are in inches (millimeters)

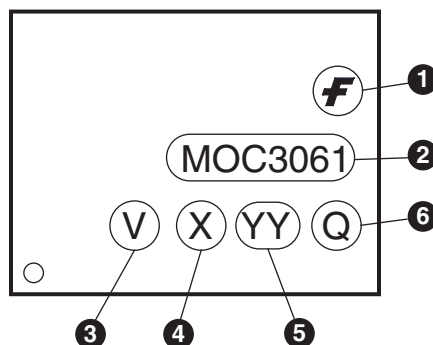
6-PIN DIP ZERO-CROSS PHOTOTRIAC DRIVER OPTOCOUPLER (600V PEAK)

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

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

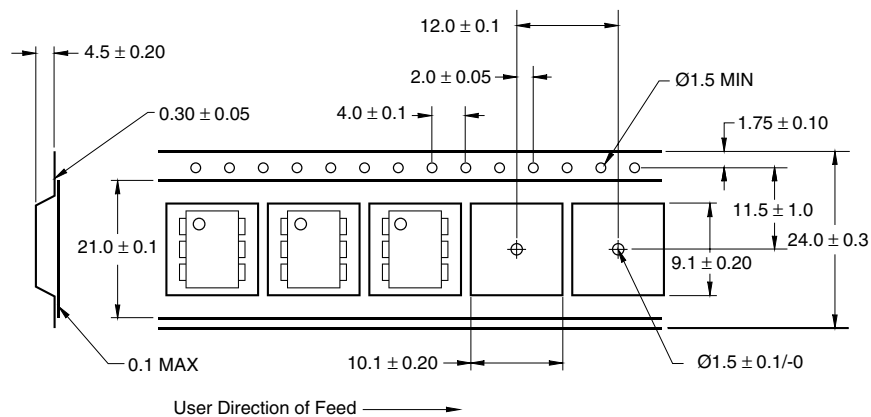
MARKING INFORMATION



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.

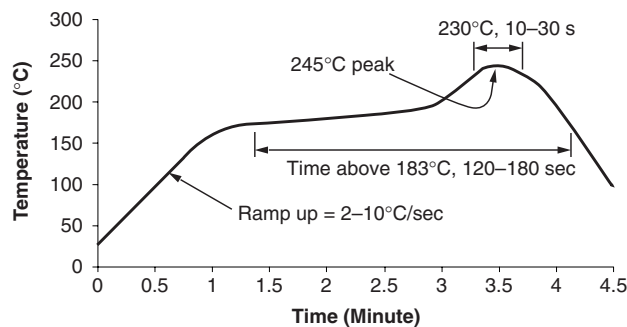
Carrier Tape Specifications



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

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

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.