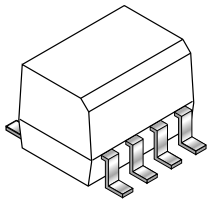
FAIRCHILD
SEMICONDUCTOR®

DUAL CHANNEL PHOTOTRANSISTOR SMALL OUTLINE SURFACE MOUNT OPTOCOUPLERS

MOCD223-M

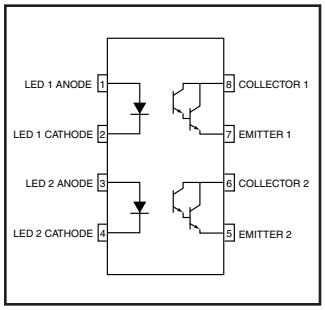
DESCRIPTION

The MOCD223-M consist of two gallium arsenide infrared emitting diodes optically coupled to two monolithic silicon phototransistor darlington detectors, in a surface mountable, small outline plastic package. It is ideally suited for high density applications that require low input current and eliminates the need for through-the-board mounting.



FEATURES

- U.L. Recognized (File #E90700, Volume 2)
- VDE Recognized (File #13616) (add option “V” for VDE approval, i.e, MOCD223V-M)
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- High Current Transfer Ratio of 500% Minimum at I_F = 1 mA
- Minimum BV_{CEO} of 30 Volts Guaranteed
- Standard SOIC-8 Footprint, with 0.050" Lead Spacing
- Compatible with Dual Wave, Vapor Phase and IR Reflow Soldering
- High Input-Output Isolation Voltage of 2500 $V_{AC(rms)}$ Guaranteed



APPLICATIONS

- Interfacing and coupling systems of different potentials and impedances
- General purpose switching circuits
- Monitor and detection circuits

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C Unless otherwise specified)

Rating	Symbol	Value	Unit
EMITTER			
Forward Current - Continuous	I_F	60	mA
Forward Current - Peak (PW = 100 µs, 120 pps)	I_F (pk)	1.0	A
Reverse Voltage	V_R	6.0	V
LED Power Dissipation @ T_A = 25°C	P_D	90	mW
Derate above 25°C		0.8	mW/°C
DETECTOR			
Collector-Emitter Voltage	V_{CEO}	30	V
Collector-Base Voltage	V_{CBO}	70	V
Emitter-Collector Voltage	V_{ECO}	7.0	V
Collector Current-Continuous	I_C	150	mA
Detector Power Dissipation @ T_A = 25°C	P_D	150	mW
Derate above 25°C		1.76	mW/°C
TOTAL DEVICE			
Input-Output Isolation Voltage[1,2,3] (f = 60 Hz, t = 1 min. Duration)	V_{ISO}	2500	Vac(rms)
Total Device Power Dissipation @ T_A = 25°C	P_D	250	mW
Derate above 25°C		2.94	mW/°C
Ambient Operating Temperature Range	T_A	-40 to +100	°C
Storage Temperature Range	T_{stg}	-40 to +150	°C
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	T_L	260	°C

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

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Input Forward Voltage	(I_F = 1.0 mA)	V_F	—	1.25	1.3	V
Reverse Leakage Current	(V_R = 6.0 V)	I_R	—	0.001	100	µA
Capacitance		C_{IN}	—	18	—	pF
DETECTOR						
Collector-Emitter Dark Current	(V_{CE} = 5.0 V, T_A = 25°C)	I_{CEO1}	—	1.0	50	nA
	(V_{CE} = 5.0 V, T_A = 100°C)	I_{CEO2}	—	1.0	—	µA
Collector-Emitter Breakdown Voltage	(I_C = 100 µA)	BV_{CEO}	30	90	—	V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA)	BV_{ECO}	7.0	10	—	V
Collector-Emitter Capacitance	(f =z 1.0 MHz, V_{CE} = 0)	C_{CE}	—	5.5	—	pF
COUPLED						
Collector-Output Current(4)	(I_F = 1.0 mA, V_{CE} = 5 V)	CTR	500	1000	—	%
Collector-Emitter Saturation Voltage	(I_C = 500 µA, I_F = 1.0 mA)	$V_{CE\ (sat)}$	—	—	1.0	V
Turn-On Time	(I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)(fig 6.)	t_{on}	—	3.5	—	µs
Turn-Off Time	(I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)(fig 6.)	t_{off}	—	95	—	µs
Rise Time	(I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)(fig 6.)	t_r	—	1.0	—	µs
Fall Time	(I_F = 5.0 mA, V_{CC} = 10 V, R_L = 100 Ω)(fig 6.)	t_f	—	2.0	—	µs
Isolation Surge Voltage(1,2,3)	f = 60 Hz, t = 1 min.	V_{ISO}	2500	—	—	Vac(rms)
Isolation Resistance(2)	V_{I-O} = 500 V	R_{ISO}	10^{11}	—	—	Ω
Isolation Capacitance(2)	V_{I-O} = 0 V, f = 1 MHz	C_{ISO}	—	0.2	—	pF

** Typical values at T_A = 25°C

NOTE:

1. Isolation Surge Voltage, V_{ISO}, is an internal device dielectric breakdown rating.
2. For this test, Pins 1, 2, 3 and 4 are common and Pins 5, 6, 7 and 8 are common.
3. V_{ISO} rating of 2500 $V_{AC(rms)}$ for t = 1 min. is equivalent to a rating of 3,000 $V_{AC(rms)}$ for t = 1 sec.
4. Current Transfer Ratio (CTR) = I_C/I_F x 100%.

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Fig. 1 LED Forward Voltage vs. Forward Current

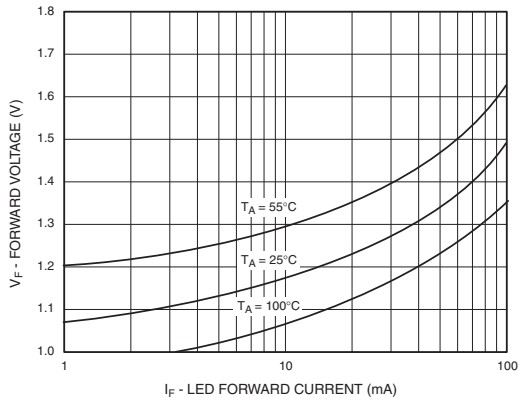


Fig. 2 Output Curent vs. Input Current

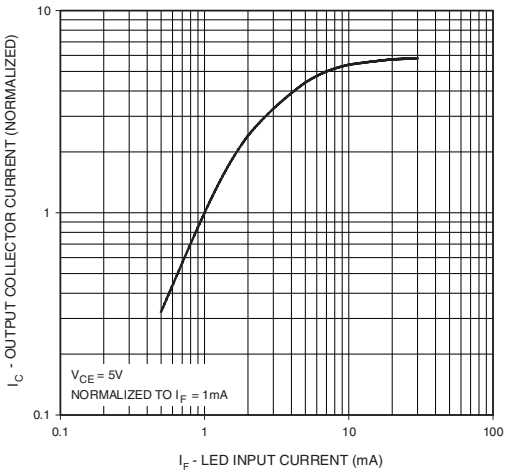


Fig. 3 Output Current vs. Ambient Temperature

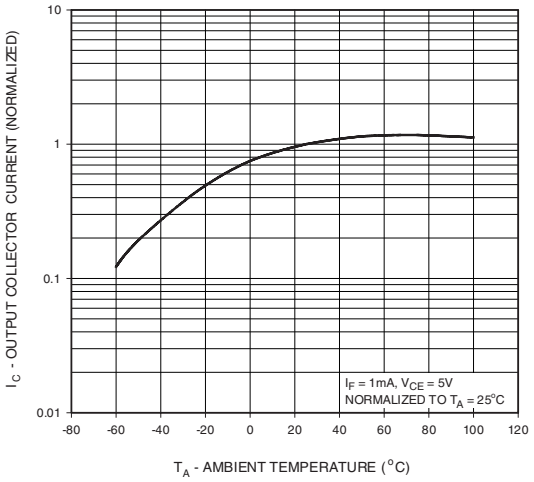


Fig. 4 Output Current vs. Collector - Emitter Voltage

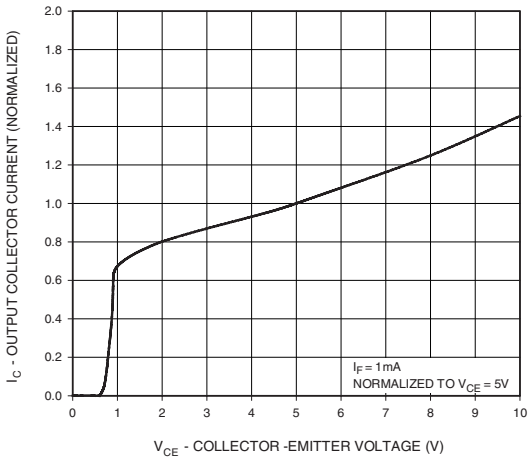
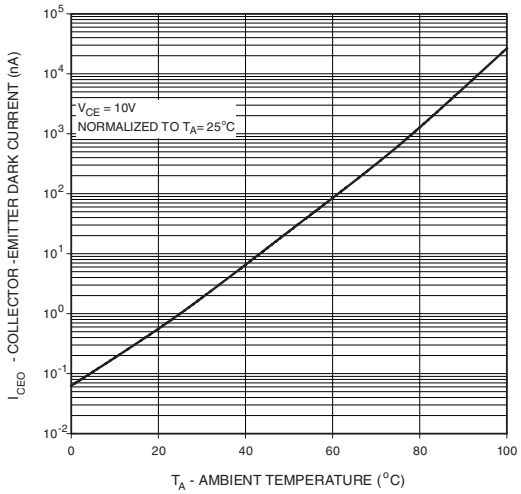


Fig. 5 Dark Current vs. Ambient Temperature



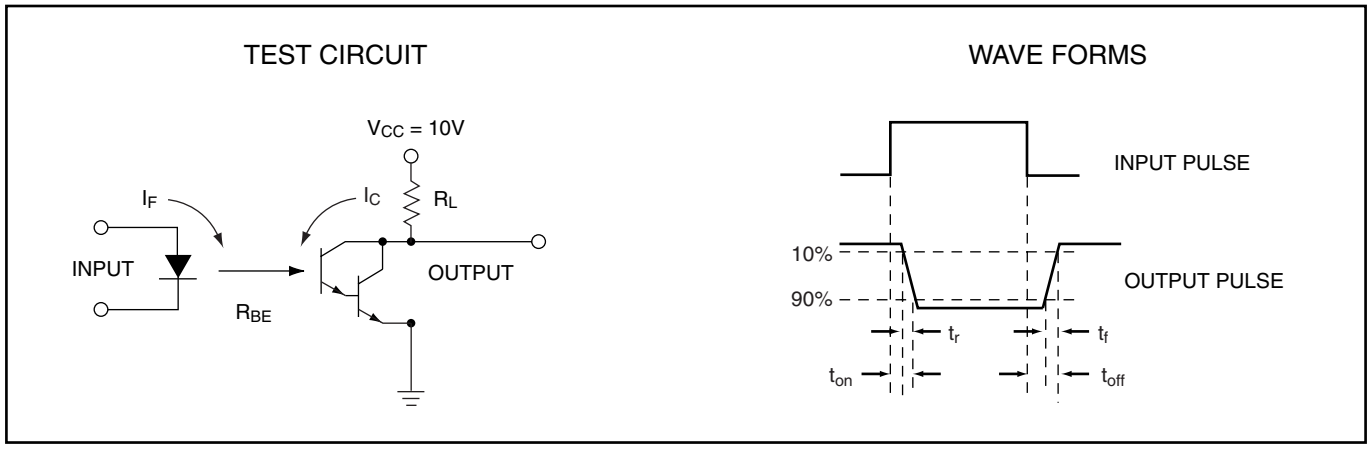


Figure 6. Switching Time Test Circuit and Waveforms

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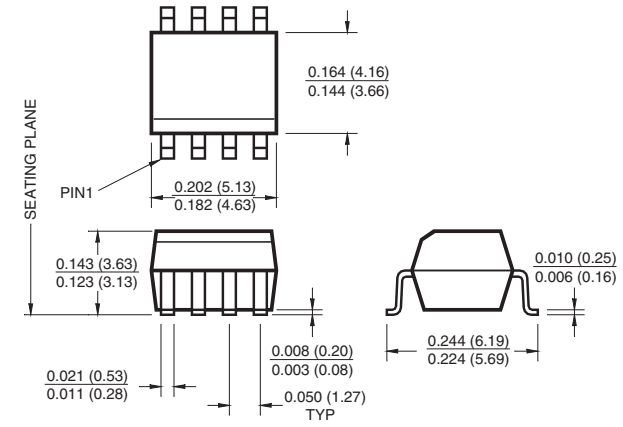
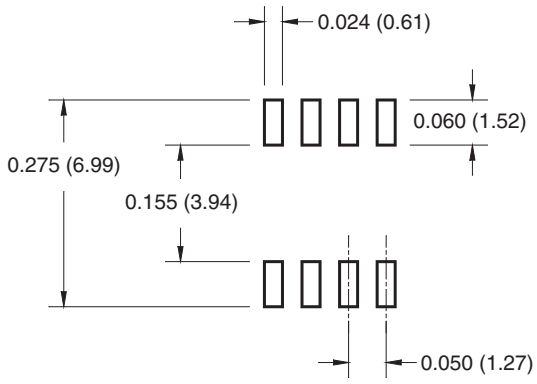
Package Dimensions (Surface Mount)



Lead Coplanarity : 0.004 (0.10) MAX

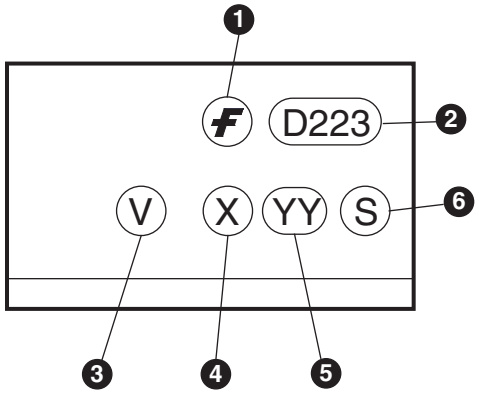
8-Pin Small Outline



ORDERING INFORMATION

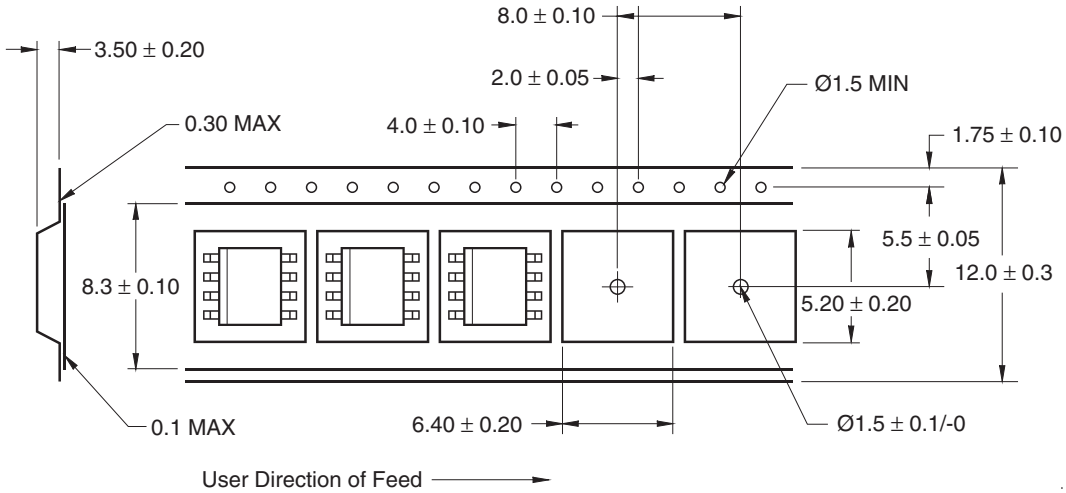
Option	Order Entry Identifier	Description
V	V	VDE 0884
R1	R1	Tape and reel (500 units per reel)
R1V	R1V	VDE 0884, Tape and reel (500 units per reel)
R2	R2	Tape and reel (2500 units per reel)
R2V	R2V	VDE 0884, Tape and reel (2500 units per reel)

MARKING INFORMATION

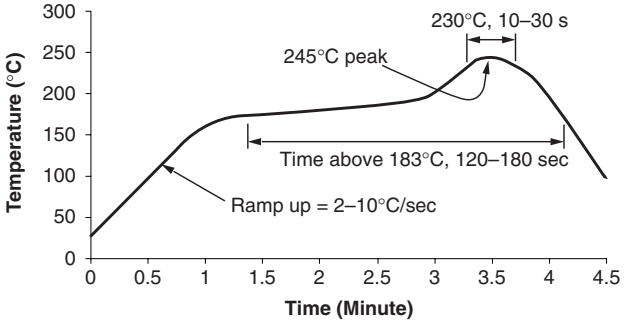


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., ‘3’
5	Two digit work week ranging from ‘01’ to ‘53’
6	Assembly package code

QT Carrier Tape Specifications



Reflow Profile



- 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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