

MOCD223-M Dual Channel Phototransistor Small Outline Surface Mount Optocouplers

Features

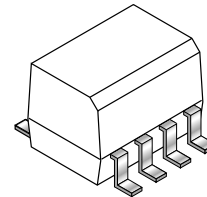
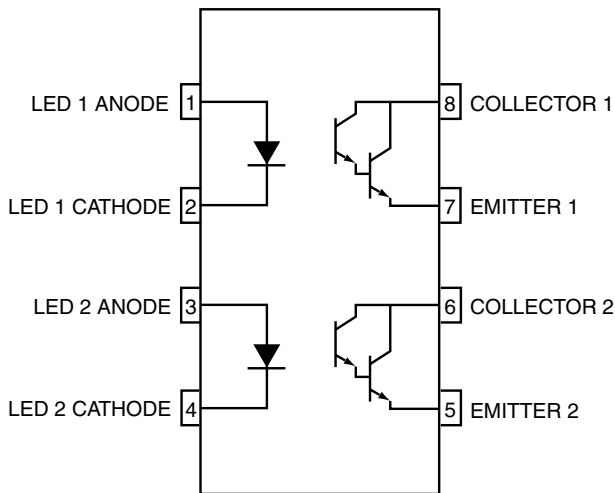
- U.L. Recognized (File #E90700, Volume 2)
- VDE Recognized (File #13616) (add option "V" for VDE approval, i.e, MOCD223V-M)
- Convenient Plastic SOIC-8 Surface Mountable Package Style
- High Current Transfer Ratio of 500% Minimum at $I_F = 1\text{mA}$
- Minimum BV_{CEO} of 30 Volts Guaranteed
- Standard 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

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.



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless otherwise specified)

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

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.*	Max.	Unit
EMITTER						
V_F	Input Forward Voltage	$I_F = 1.0\text{mA}$		1.25	1.3	V
I_R	Reverse Leakage Current	$V_R = 6.0\text{V}$		0.001	100	μA
C_{IN}	Capacitance			18		pF
DETECTOR						
I_{CEO1}	Collector-Emitter Dark Current	$V_{CE} = 5.0\text{V}, T_A = 25^\circ\text{C}$		1.0	50	nA
I_{CEO2}		$V_{CE} = 5.0\text{V}, T_A = 100^\circ\text{C}$		1.0		μA
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 100\mu\text{A}$	30	90		V
BV_{ECO}	Emitter-Collector Breakdown Voltage	$I_E = 100\mu\text{A}$	7.0	10		V
C_{CE}	Collector-Emitter Capacitance	$f = 1.0\text{MHz}, V_{CE} = 0$		5.5		pF
COUPLED						
CTR	Collector-Output Current ⁽⁴⁾	$I_F = 1.0\text{mA}, V_{CE} = 5\text{V}$	500	1000		%
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 500\mu\text{A}, I_F = 1.0\text{mA}$			1.0	V
t_{on}	Turn-On Time	$I_F = 5.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig 6.)		8		μs
t_{off}	Turn-Off Time	$I_F = 5.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig 6.)		55		μs
t_r	Rise Time	$I_F = 5.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig 6.)		6		μs
t_f	Fall Time	$I_F = 5.0\text{mA}, V_{CC} = 10\text{V}, R_L = 100\Omega$ (Fig 6.)		45		μs
V_{ISO}	Isolation Surge Voltage ^(1,2,3)	$f = 60\text{Hz}, t = 1 \text{ min.}$	2500			Vac(rms)
R_{ISO}	Isolation Resistance ⁽²⁾	$V_{I-O} = 500\text{V}$	10^{11}			Ω
C_{ISO}	Isolation Capacitance ⁽²⁾	$V_{I-O} = 0\text{V}, f = 1 \text{ MHz}$		0.2		pF

*Typical values at $T_A = 25^\circ\text{C}$ **Notes:**

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 $t = 1 \text{ min.}$ is equivalent to a rating of 3,000 $V_{AC(rms)}$ for $t = 1 \text{ sec.}$
4. Current Transfer Ratio (CTR) = $I_C / I_F \times 100\%$.

Typical Performance Curves

Fig. 1 LED Forward Voltage vs. Forward Current

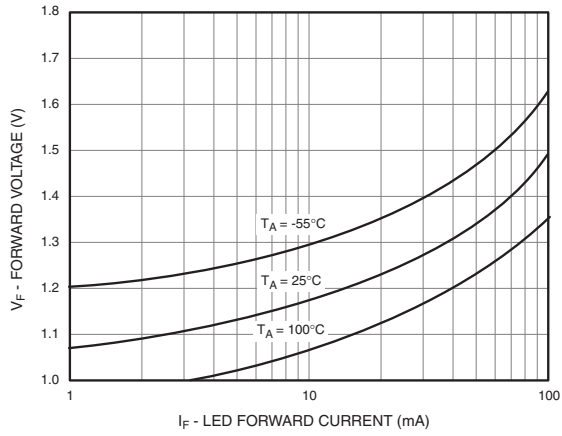


Fig. 2 Output Current vs. Input Current

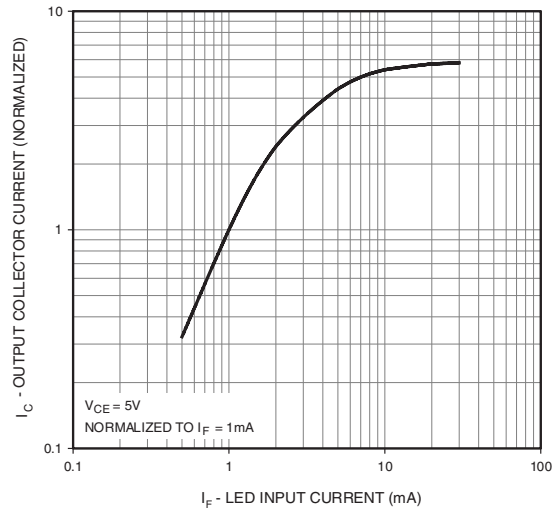


Fig. 3 Output Current vs. Ambient Temperature

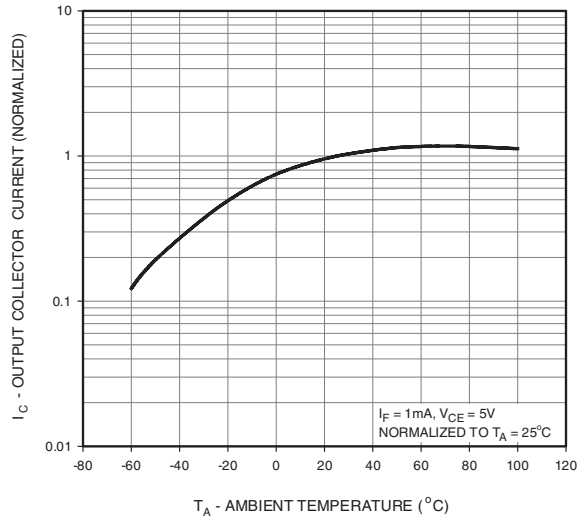


Fig. 4 Output Current vs. Collector - Emitter Voltage

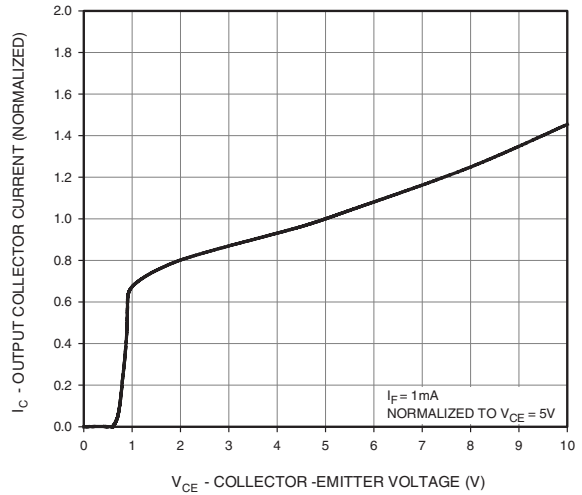
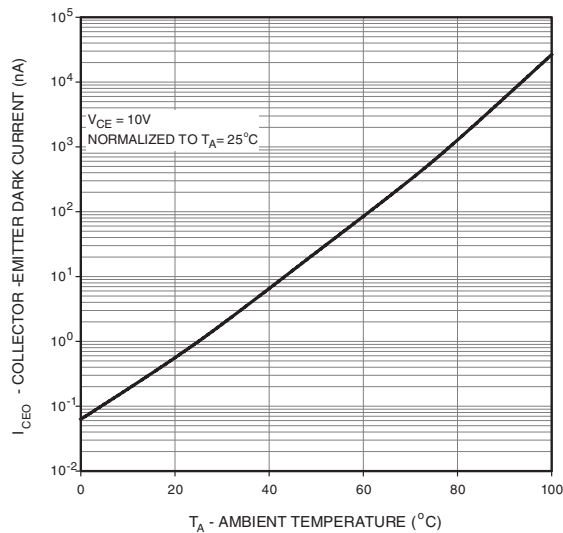


Fig. 5 Dark Current vs. Ambient Temperature



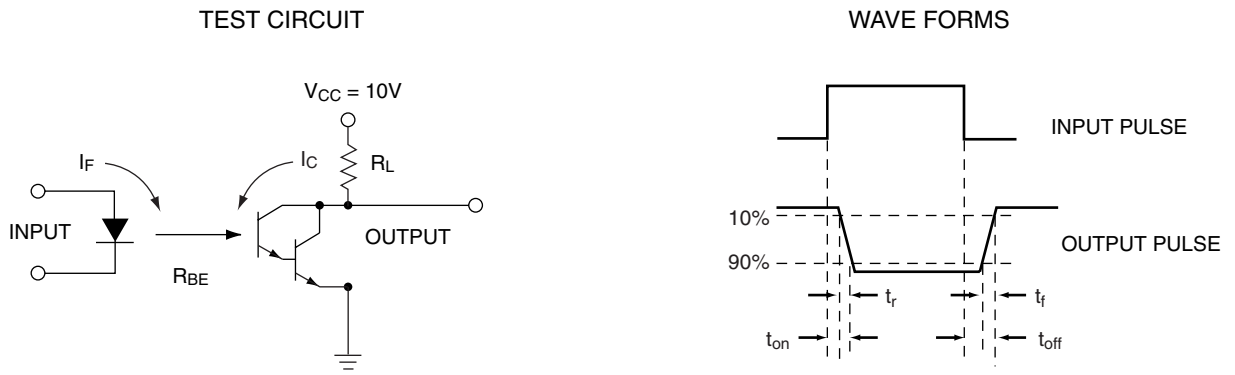
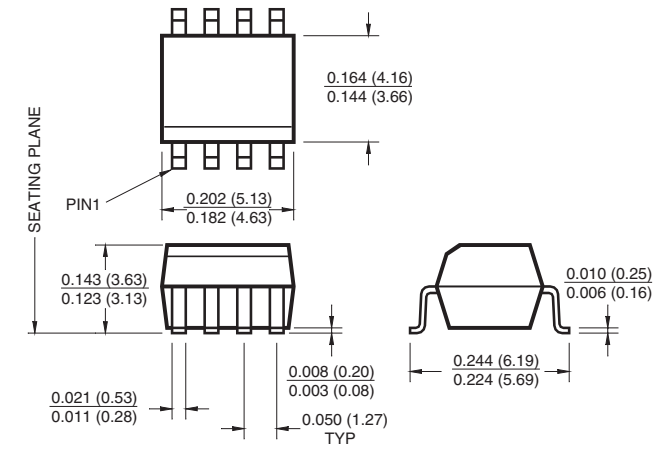


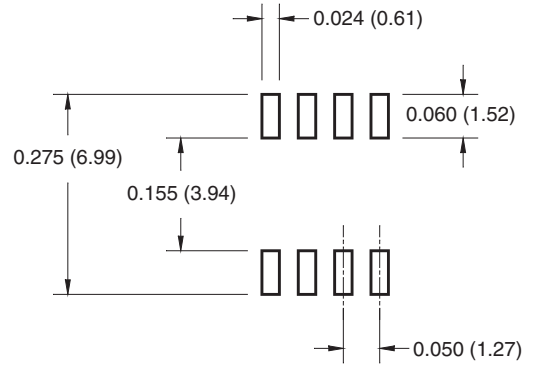
Figure 6. Switching Time Test Circuit and Waveforms

Package Dimensions

Surface Mount



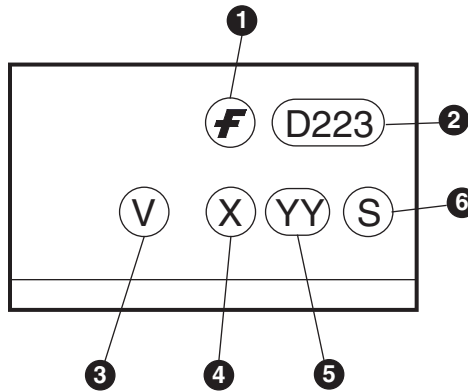
8-Pin Small Outline



Ordering Information

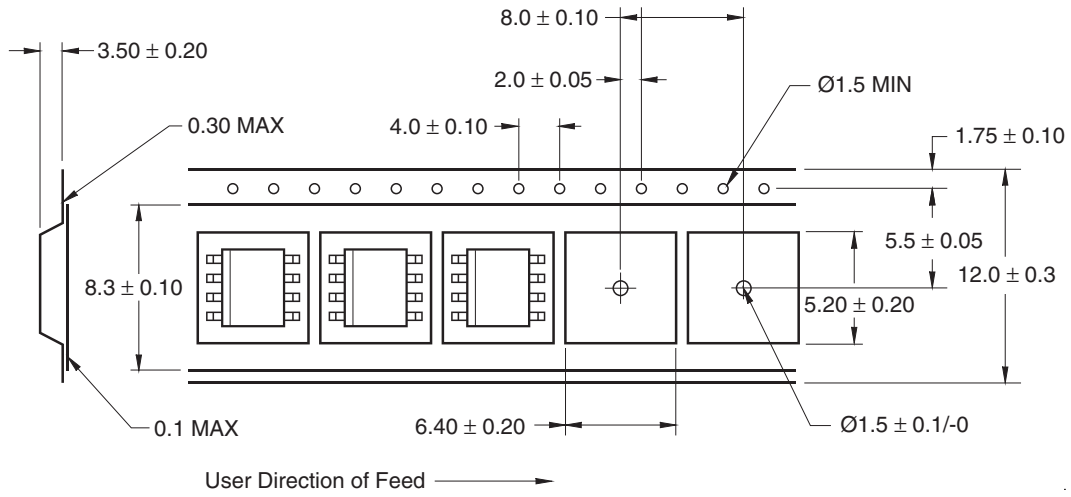
Option	Order Entry Identifier	Description
V	V	VDE 0884
R1	R1	Tape and reel (500 units per reel)
R1V	R1V	VDE 0884, Tape and reel (500 units per reel)
R2	R2	Tape and reel (2500 units per reel)
R2V	R2V	VDE 0884, Tape and reel (2500 units per reel)

Marking Information

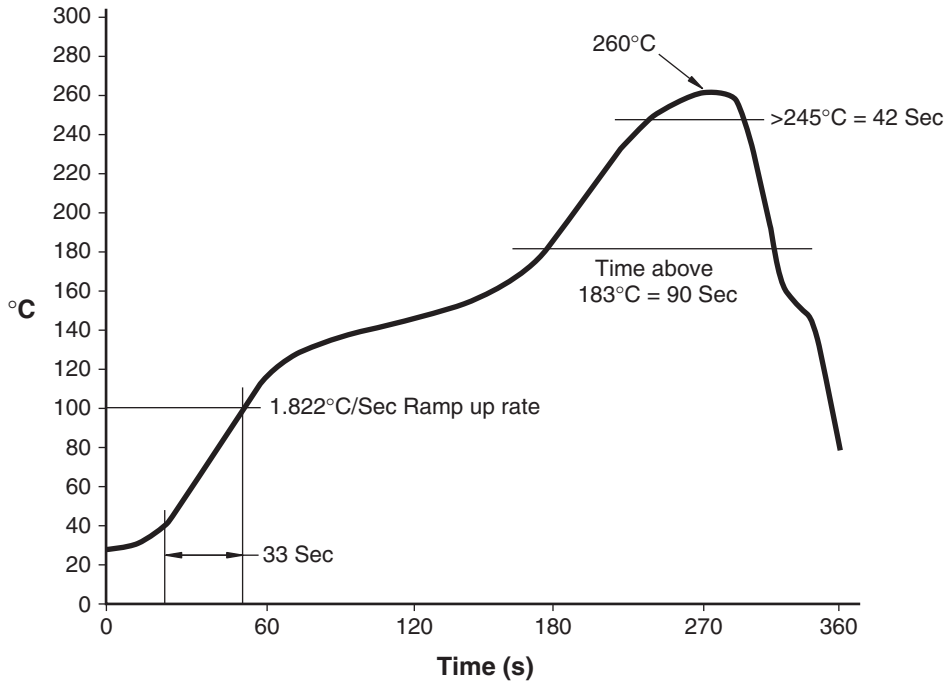


Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Carrier Tape Specifications



Reflow Profile



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FACT™	MICROCOUPLER™	QFET®	TinyBoost™	
FAST®	MicroFET™	QS™	TinyBuck™	
FASTr™	MicroPak™	QT Optoelectronics™	TinyPWM™	
FPS™	MICROWIRE™	Quiet Series™	TinyPower™	
FRFET™	MSX™	RapidConfigure™	TinyLogic®	
	MSXPro™	RapidConnect™	TINYOPTO™	
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Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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Rev. I20