

MCT6, MCT61, MCT62 Dual Phototransistor Optocouplers

Features

- Two isolated channels per package
- Two packages fit into a 16 lead DIP socket
- Choice of three current transfer ratios
- Underwriters Laboratory (U.L.) recognized File E90700

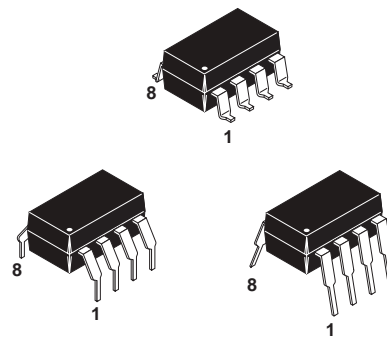
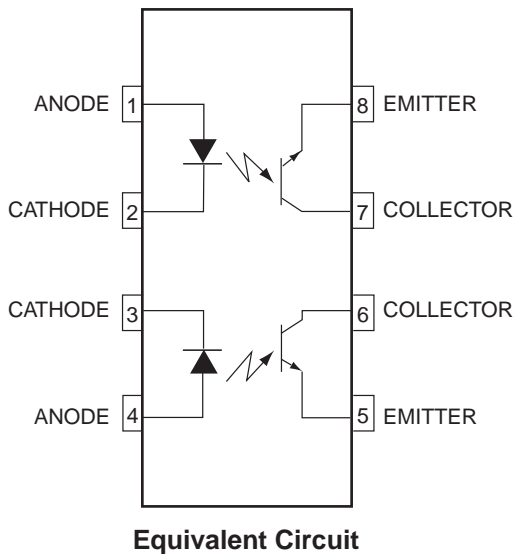
Applications

- AC Line/Digital Logic – Isolate high voltage transients
- Digital Logic/Digital Logic – Eliminate spurious grounds
- Digital Logic/AC Triac Control – Isolate high voltage transients
- Twisted pair line receiver – Eliminate ground loop feedthrough
- Telephone/Telegraph line receiver – Isolate high voltage transients
- High Frequency Power Supply Feedback Control – Maintain floating grounds and transients
- Relay contact monitor – Isolate floating grounds and transients
- Power supply monitor – Isolate transients

Description

The MCT6X Optocouplers have two channels for density applications. For four channel applications, two-packages fit into a standard 16-pin DIP socket. Each channel is an NPN silicon planar phototransistor optically coupled to a gallium arsenide infrared emitting diode.

Schematic



Absolute Maximum Ratings

Rating	Symbol	Value	Unit
EMITTER (Each channel)			
Forward Current – Continuous	I_F	60	mA
Forward Current – Peak (PW = 1 μ s, 300pps)	$I_F(pk)$	3	A
Reverse Voltage	V_R	3.0	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25 $^\circ\text{C}$ (Total Input)	P_D	100 1.3	mW mW/ $^\circ\text{C}$
DETECTOR (Each channel)			
Collector Current – Continuous	I_C	30	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25 $^\circ\text{C}$	P_D	150 2.0	mW mW/ $^\circ\text{C}$
TOTAL DEVICE			
Storage Temperature	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Temperature	T_{OPR}	-55 to +100	$^\circ\text{C}$
Lead Solder Temperature (wave solder)	T_{SOL}	250 for 10 sec	$^\circ\text{C}$
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25 $^\circ\text{C}$	P_D	400 5.33	mW mW/ $^\circ\text{C}$

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

Parameter	Test Conditions	Symbol	Min.	Typ.*	Max.	Units
INDIVIDUAL COMPONENT CHARACTERISTICS						
Emitter						
Input Forward Voltage	$I_F = 20\text{mA}$	V_F		1.2	1.5	V
Reverse Voltage	$I_R = 10\mu\text{A}$	V_R	3.0	25		V
Reverse Current	$V_R = 5\text{V}$	I_R		0.001	10	μA
Junction Capacitance	$V_F = 0\text{V}$, $f = 1\text{MHz}$	C_J		50		pF
Detector						
Collector-Emitter Breakdown Voltage	$I_C = 1.0\text{mA}$, $I_F = 0$	BV_{CEO}	30	85		V
Emitter-Collector Breakdown Voltage	$I_E = 100\mu\text{A}$, $I_F = 0$	BV_{ECO}	6	13		V
Collector-Emitter Dark Current	$V_{CE} = 10\text{V}$, $I_F = 0$	I_{CEO}		5	100	nA
Capacitance	$V_{CE} = 0\text{V}$, $f = 1\text{MHz}$	C_{CE}		8		pF

AC Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
TRANSFER CHARACTERISTICS						
Switching Characteristics						
Non-Saturated Turn-on Time	$R_L = 100\Omega$, $I_C = 2\text{mA}$, $V_{CC} = 10\text{V}$	t_{on}		2.4		μs
Non-Saturated Turn-off Time		t_{off}		2.4		μs

All typicals at $T_A = 25^\circ\text{C}$

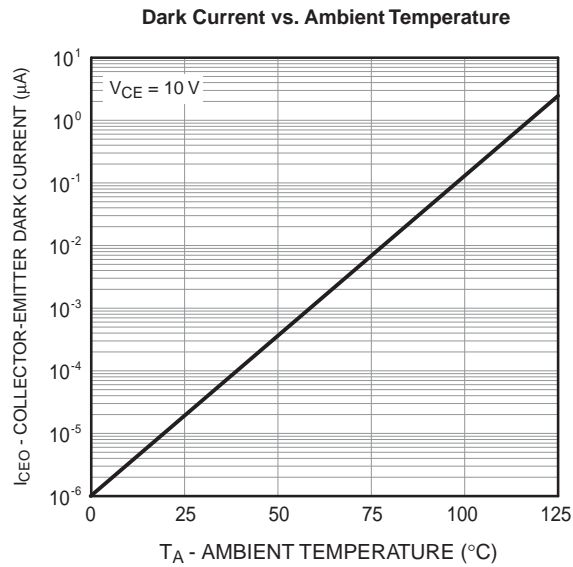
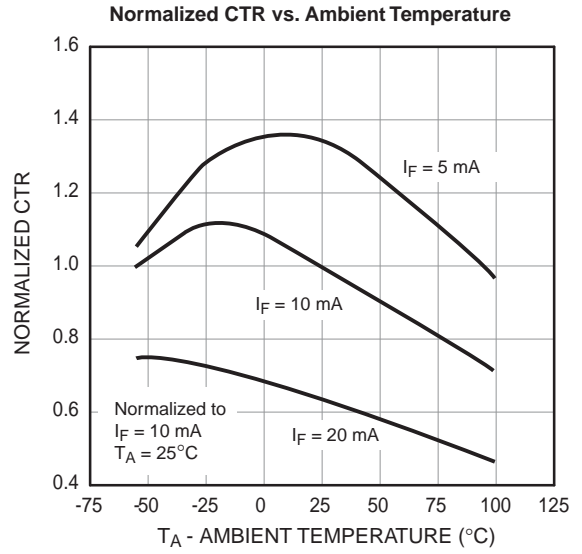
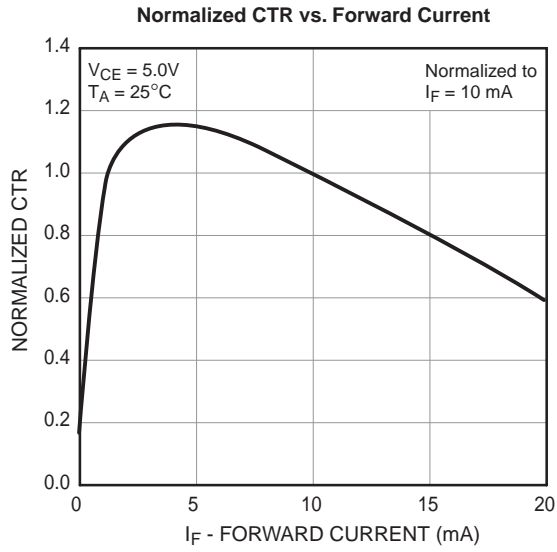
Electrical Characteristics ($T_A = 25^\circ\text{C}$) (Continued)

DC Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
TRANSFER CHARACTERISTICS						
Current Transfer Ratio, Collector-Emitter						
MCT6	$I_F = 10\text{mA}$, $V_{CE} = 10\text{V}$	CTR	20			%
MCT61	$I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$		50			
MCT62			100			
Saturation Voltage	$I_F = 16\text{mA}$, $I_C = 2\text{mA}$	$V_{CE(sat)}$		0.15	0.40	V

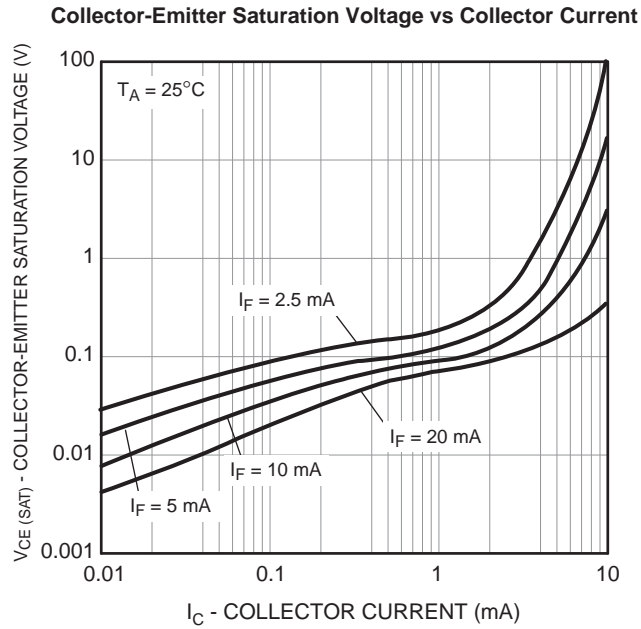
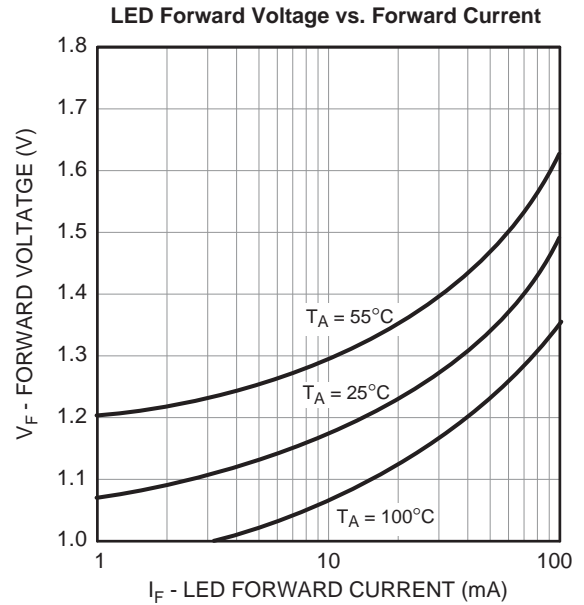
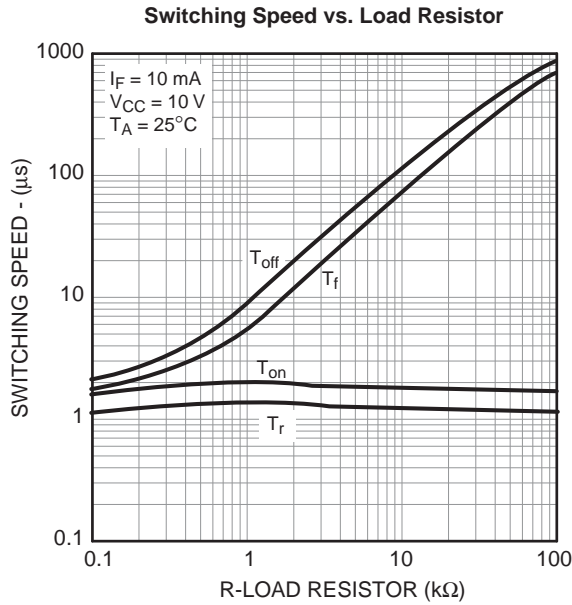
Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
ISOLATION CHARACTERISTICS						
Input-Output Isolation Voltage	$I_{I-O} \leq 1\mu\text{A}$, $t = 1\text{min.}$	V_{ISO}	5300			Vac(rms)
Isolation Resistance	$V_{I-O} = 500\text{VDC}$	R_{ISO}	10^{11}			Ω
Input-Output Isolation Voltage	$f = 1\text{MHz}$	C_{ISO}		0.5		pF

* All typicals at $T_A = 25^\circ\text{C}$

Typical Performance Curves

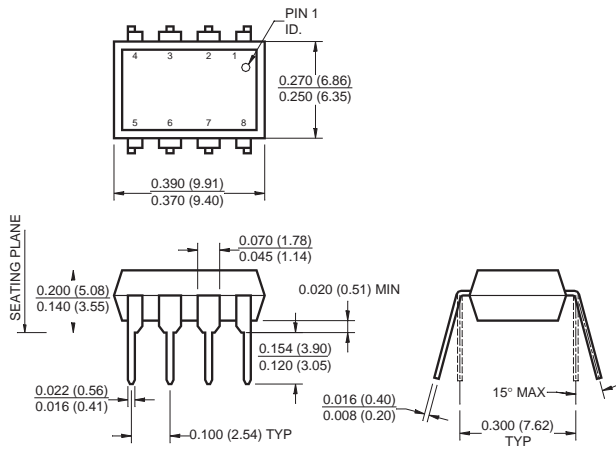


Typical Performance Curves (Continued)

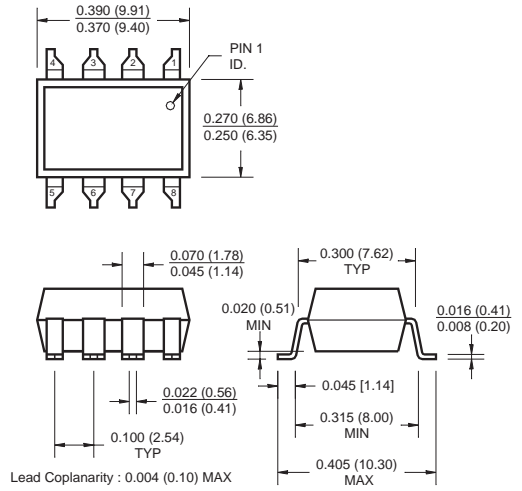


Package Dimensions

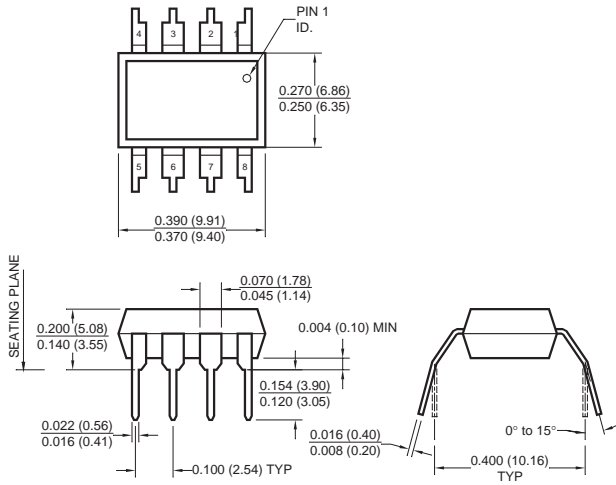
Through Hole



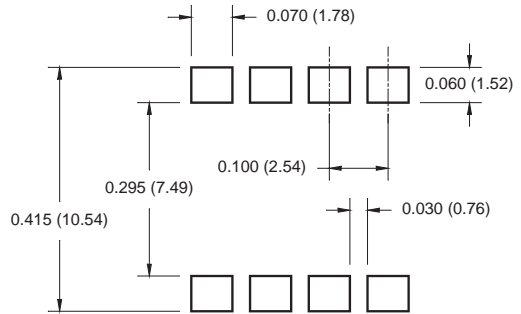
Surface Mount



0.4" Lead Spacing



Recommend Pad Layout for Surface Mount Leadform



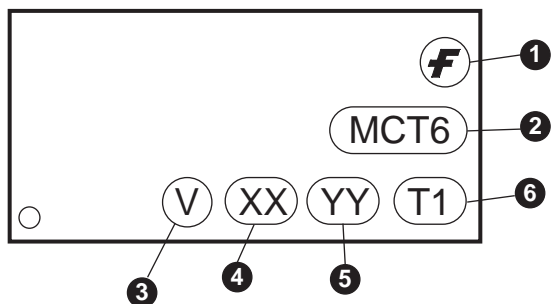
Note:

All dimensions are in inches (millimeters)

Ordering Information

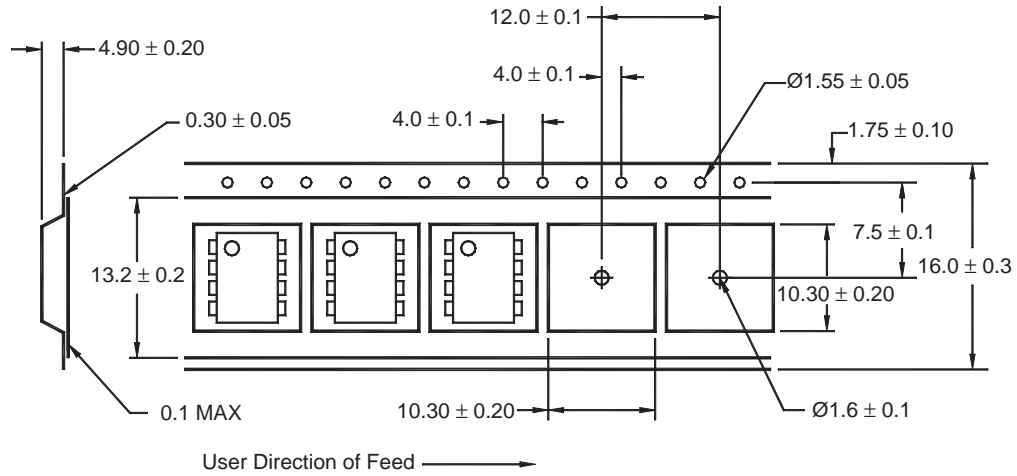
Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and Reel
W	.W	0.4" Lead Spacing

Marking Information



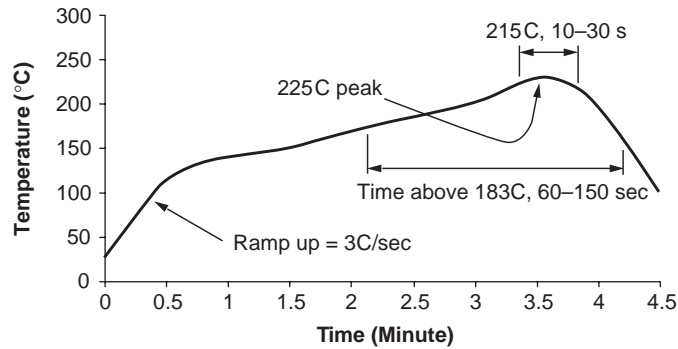
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Carrier Tape Specifications



Note:
All dimensions are in inches (millimeters)

Reflow Profile



- Peak reflow temperature: 225C (package surface temperature)
- Time of temperature higher than 183C for 60-150 seconds
- One time soldering reflow is recommended

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FACT Quiet Series™		OPTOPLANAR™	SMART START™	Wire™
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Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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