

# 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

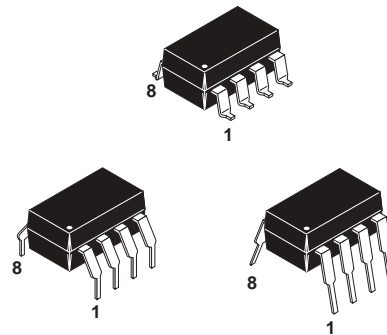
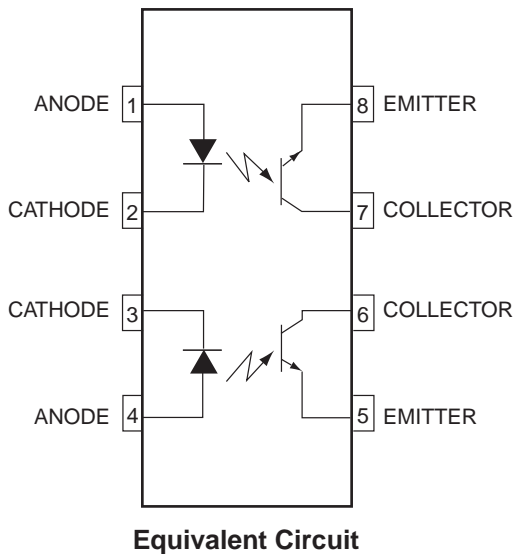
## Applications

- 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
<b>EMITTER (Each channel)</b>			
Forward Current – Continuous	$I_F$	60	mA
Forward Current – Peak (PW = 1 $\mu$ 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/ $^\circ\text{C}$
<b>DETECTOR (Each channel)</b>			
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/ $^\circ\text{C}$
<b>TOTAL DEVICE</b>			
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
<b>INDIVIDUAL COMPONENT CHARACTERISTICS</b>						
<b>Emitter</b>						
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	$\mu\text{A}$
Junction Capacitance	$V_F = 0\text{V}$ , $f = 1\text{MHz}$	$C_J$		50		pF
<b>Detector</b>						
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
<b>TRANSFER CHARACTERISTICS</b>						
<b>Switching Characteristics</b>						
Non-Saturated Turn-on Time	$R_L = 100\Omega$ , $I_C = 2\text{mA}$ , $V_{CC} = 10\text{V}$	$t_{on}$		2.4		$\mu\text{s}$
Non-Saturated Turn-off Time		$t_{off}$		2.4		$\mu\text{s}$

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

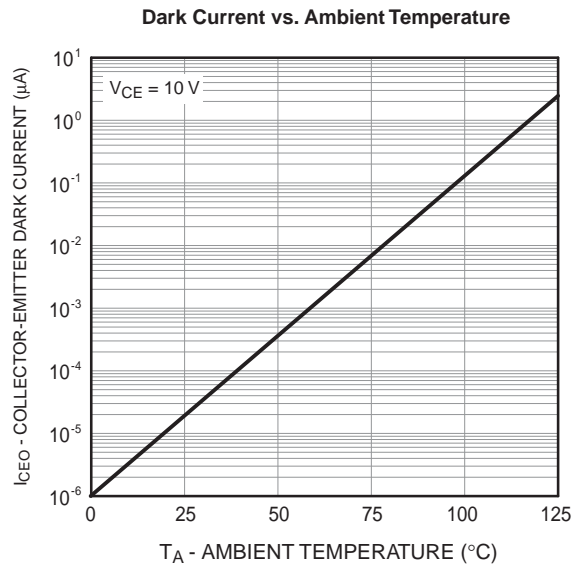
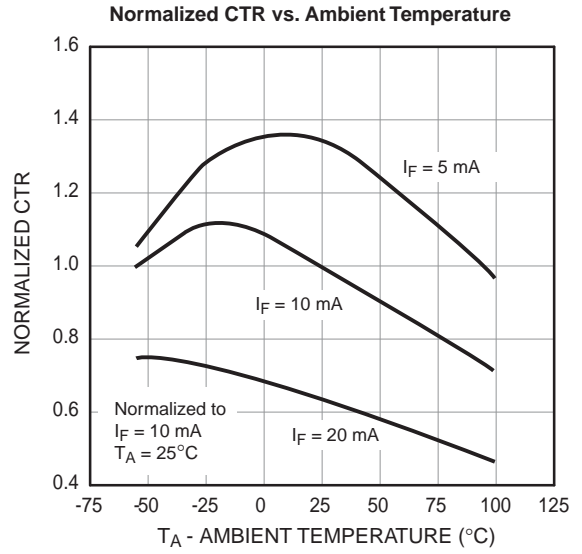
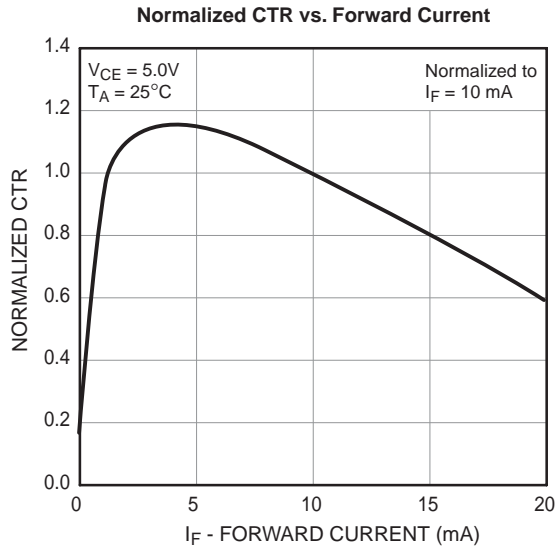
**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$ ) (Continued)

DC Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
<b>TRANSFER CHARACTERISTICS</b>						
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

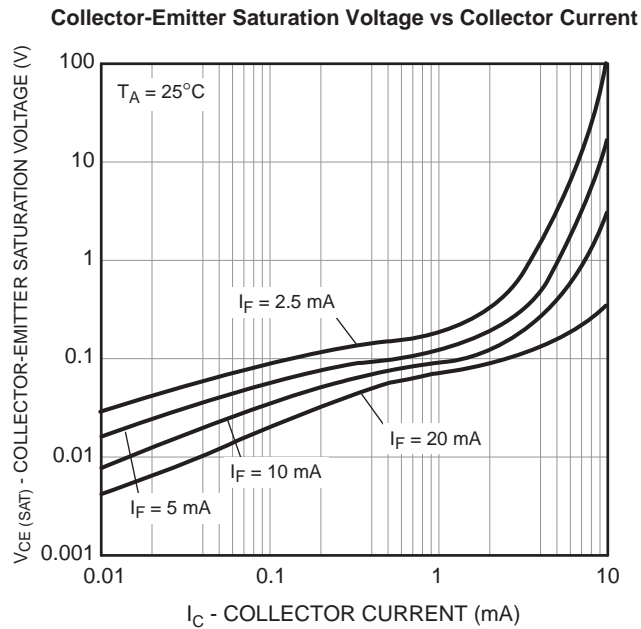
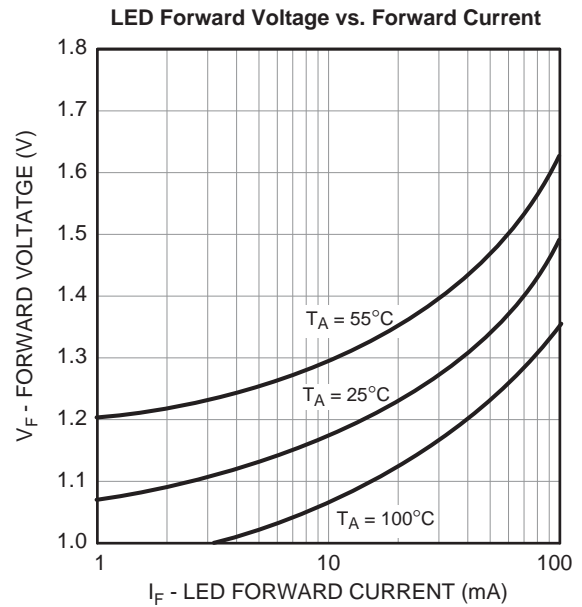
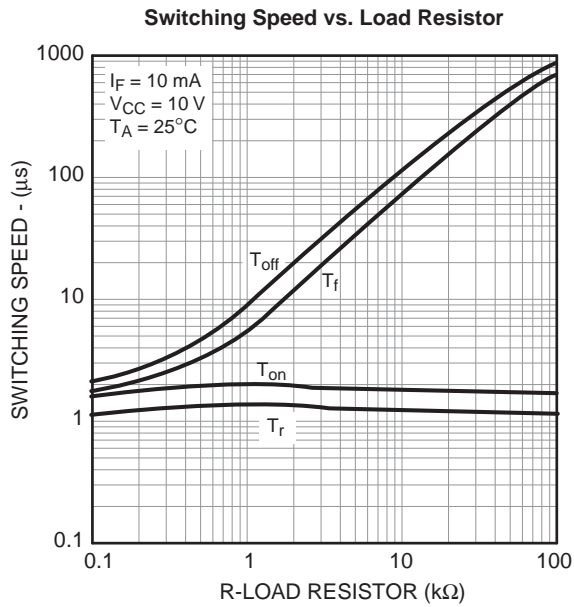
Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
<b>ISOLATION CHARACTERISTICS</b>						
Input-Output Isolation Voltage	$I_{I-O} \leq 1\mu\text{A}$ , $t = 1\text{min.}$	$V_{ISO}$	5300			Vac(rms)
Isolation Resistance	$V_{I-O} = 500\text{VDC}$	$R_{ISO}$	$10^{11}$			$\Omega$
Input-Output Isolation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

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

### Typical Performance Curves

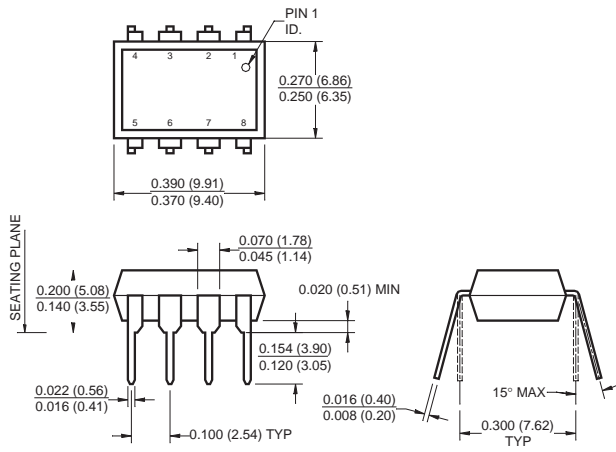


Typical Performance Curves (Continued)

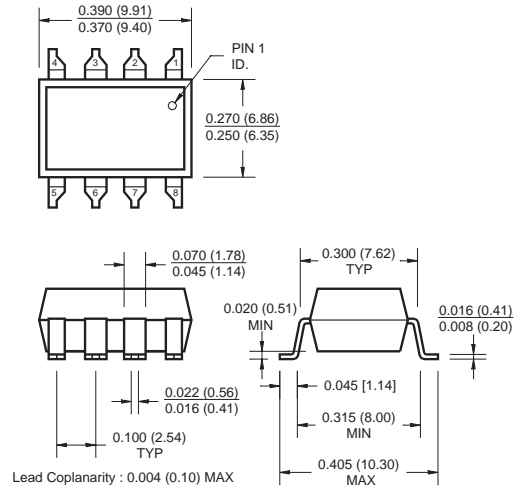


## Package Dimensions

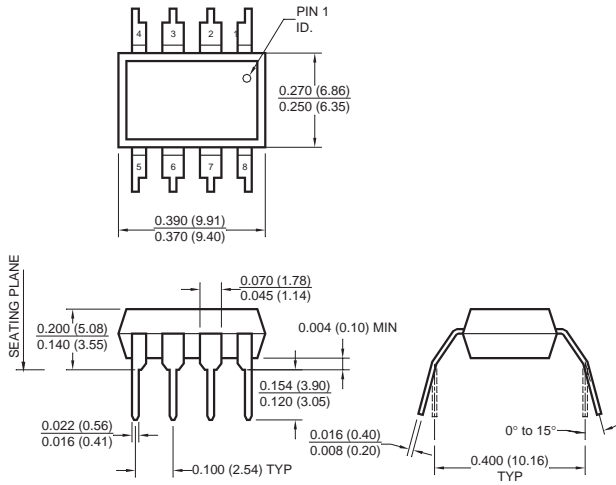
### Through Hole



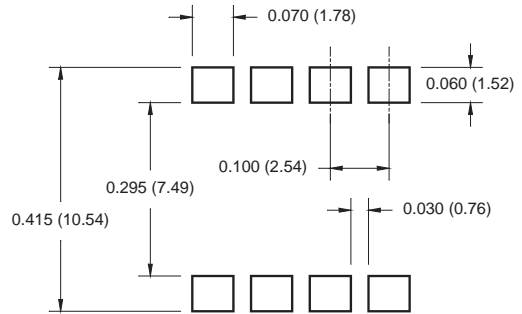
### Surface Mount



### 0.4" Lead Spacing



### Recommend Pad Layout for Surface Mount Leadform



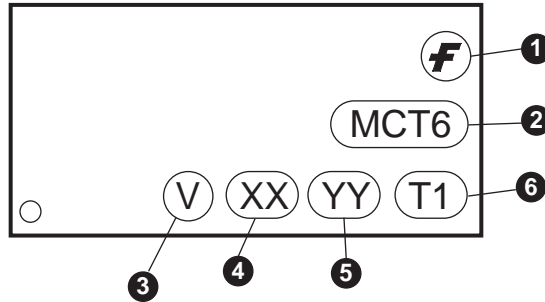
**Note:**

All dimensions are in inches (millimeters)

### Ordering Information

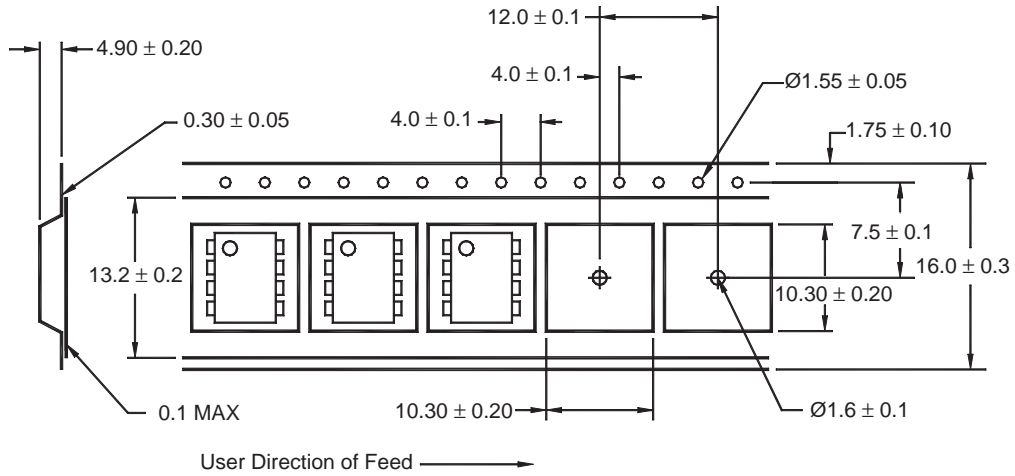
Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and Reel
W	.W	0.4" Lead Spacing

### Marking Information



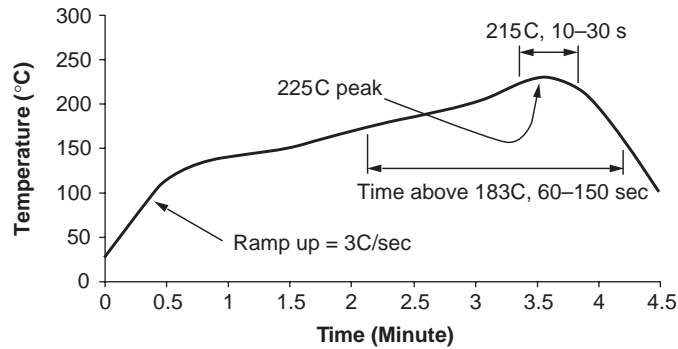
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

### 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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