

FAIRCHILD
SEMICONDUCTOR®

DUAL PHOTOTRANSISTOR OPTOCOUPLEDERS

MCT6

MCT61

MCT62

DESCRIPTION

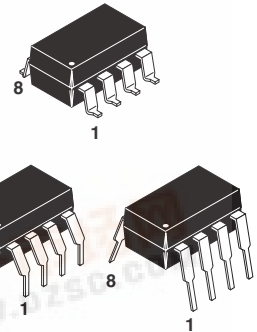
The MCT6X Optocouplers have two channels for density applications. For four channel applications, two-packages fit into a standard 16-pin DIP socket. Each channel is an NPN silicon planar phototransistor optically coupled to a gallium arsenide infrared emitting diode.

FEATURES

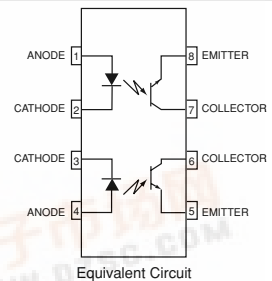
- Two isolated channels per package
- Two packages fit into a 16 lead DIP socket
- Choice of three current transfer ratios
- Underwriters Laboratory (U.L.) recognized File E90700

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



SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

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

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Input Forward Voltage	($I_F = 20\text{ mA}$)	V_F		1.2	1.5	V
Reverse Voltage	($I_R = 10\text{ }\mu\text{A}$)	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	($I_E = 100\text{ }\mu\text{A}$, $I_F = 0$)	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

TRANSFER CHARACTERISTICS

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

TRANSFER CHARACTERISTICS

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

ISOLATION CHARACTERISTICS

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

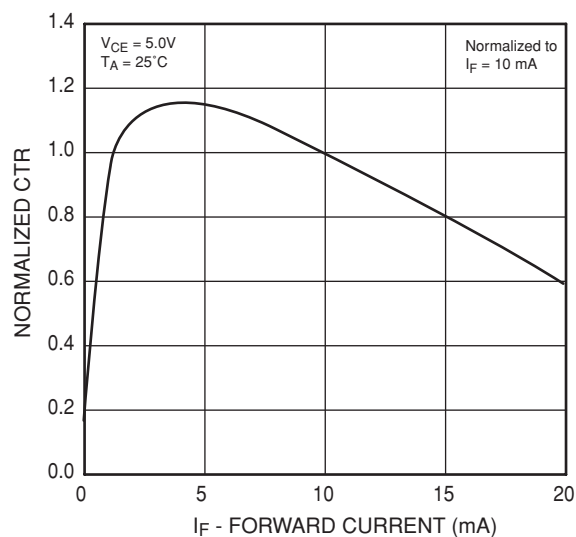
** All typicals at $T_A = 25^\circ\text{C}$

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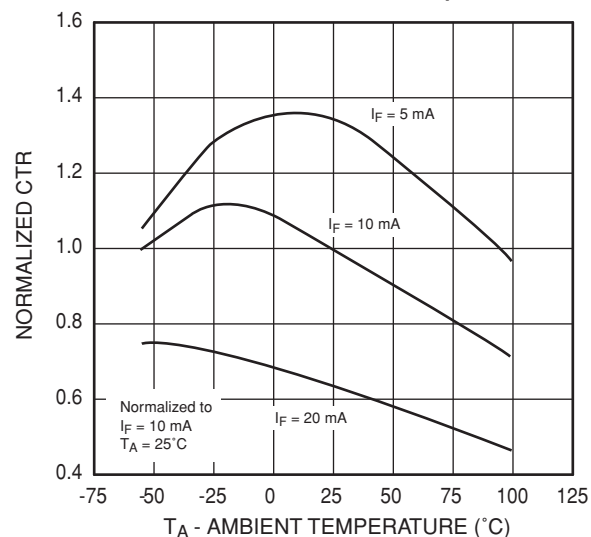
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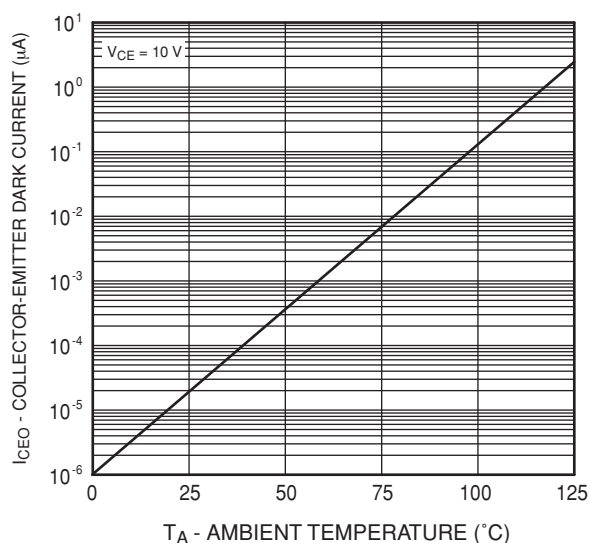
Normalized CTR vs. Forward Current



Normalized CTR vs. Ambient Temperature



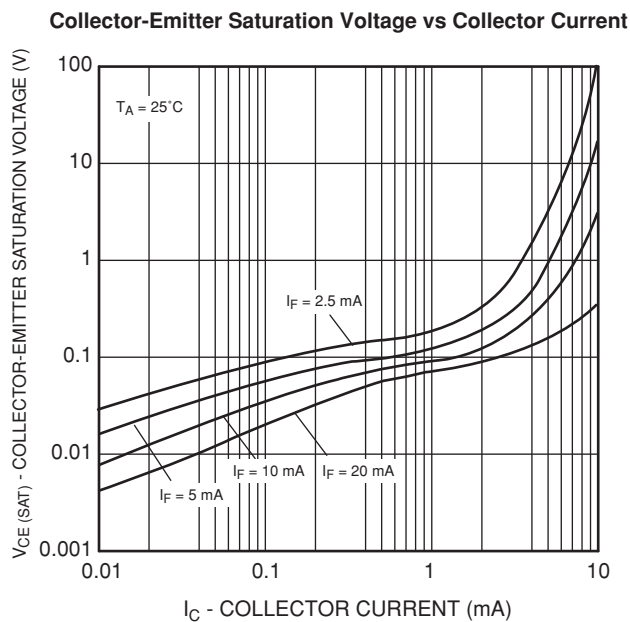
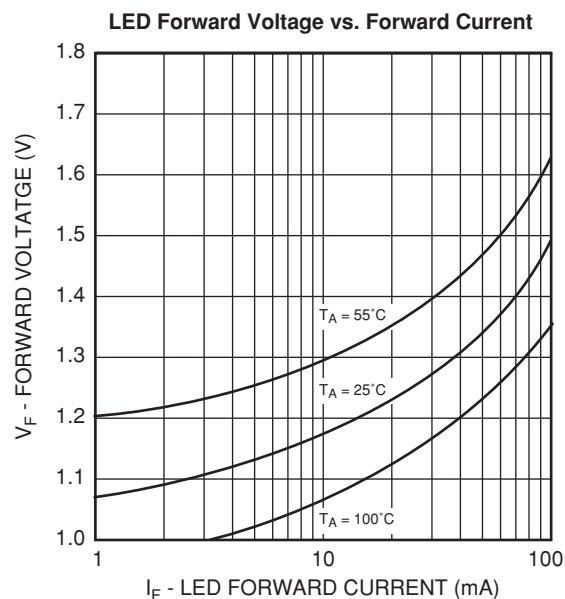
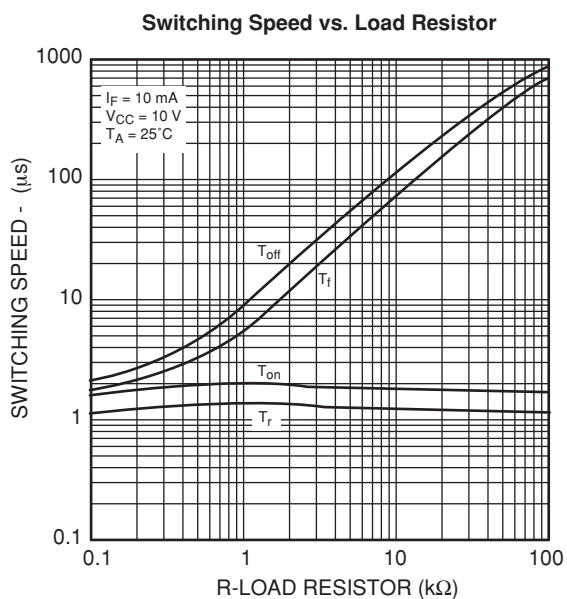
Dark Current vs. Ambient Temperature



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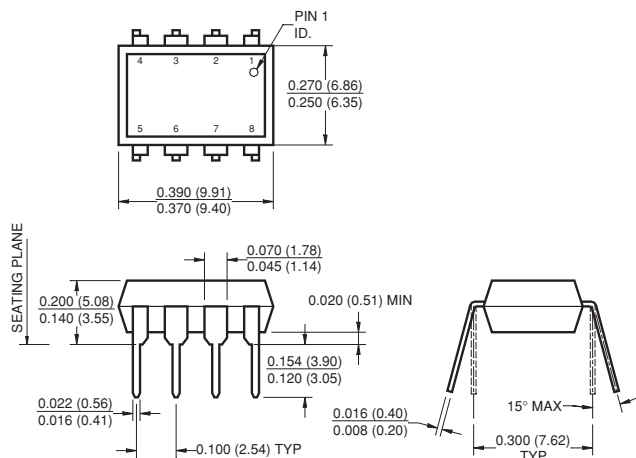


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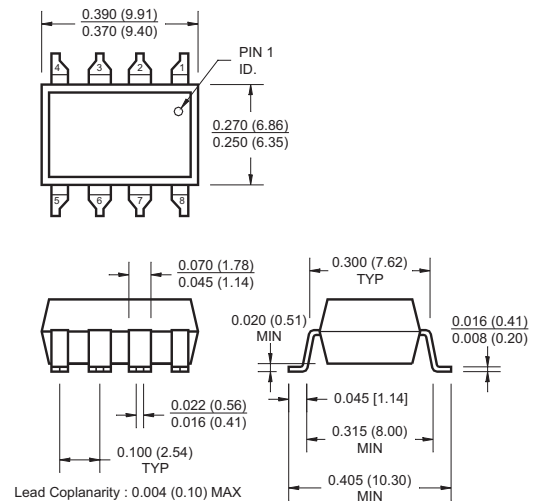
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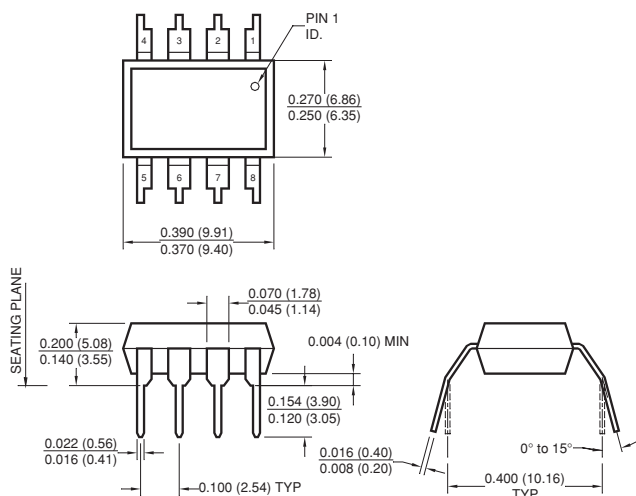
Package Dimensions (Through Hole)



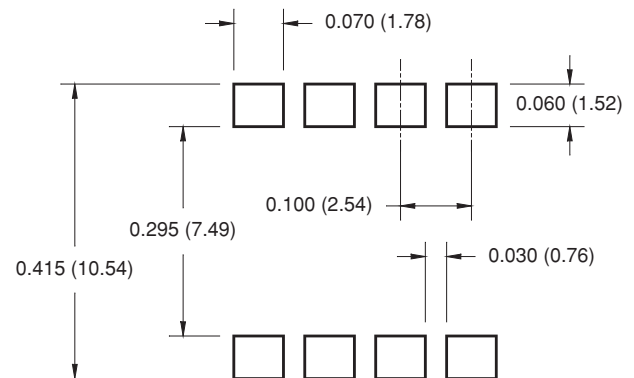
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



**Recommended Pad Layout for
Surface Mount Leadform**



NOTE

All dimensions are in inches (millimeters)

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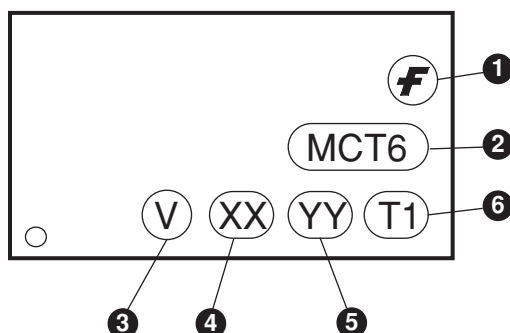
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ORDERING INFORMATION

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



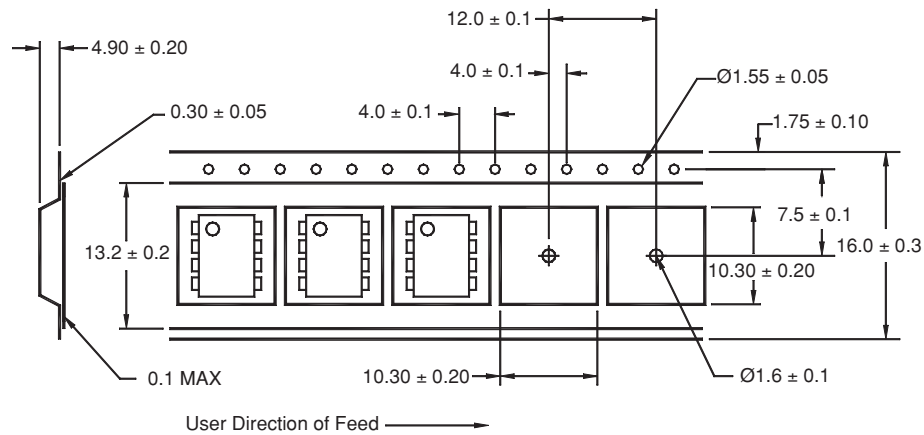
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

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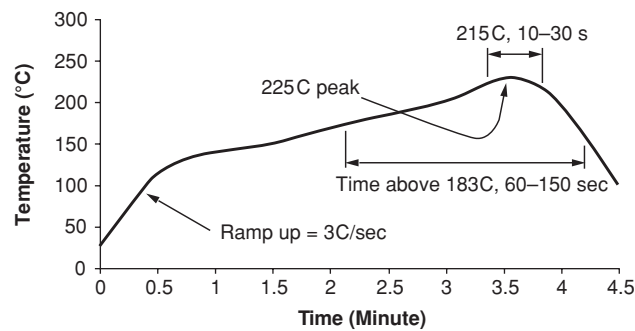
Carrier Tape Specifications



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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