

**MCT9001**

**DESCRIPTION**

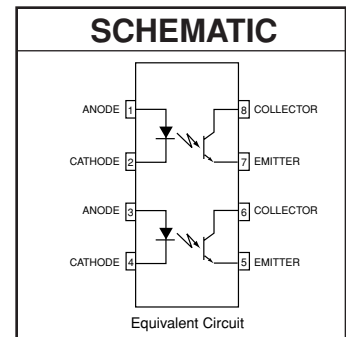
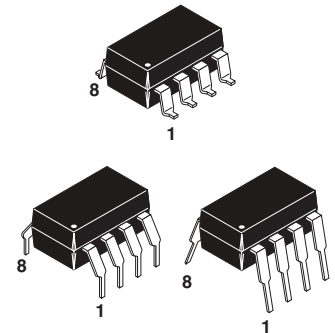
The MCT9001 Optocoupler has two channels for density applications. For four channel applications, two-packages fit into a standard 16-pin DIP socket. Each channel is an NPN silicon planar phototransistor optically coupled to a gallium arsenide infrared emitting diode.

**FEATURES**

- Two isolated channels per package
- Two packages fit into a 16 lead DIP socket
- 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



<b>ABSOLUTE MAXIMUM RATINGS</b>			
Rating	Symbol	Value	Unit
<b>EMITTER (Each channel)</b>			
Forward Current - Continuous	$I_F$	60	mA
Forward Current - Peak (PW = 1µs, 300pps)	$I_F(pk)$	3	A
Reverse Voltage	$V_R$	5.0	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C (Total Input)	$P_D$	100 1.1	mW mW/°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°C	$P_D$	150 1.67	mW mW/°C
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{STG}$	-55 to +150	°C
Operating Temperature	$T_{OPR}$	-55 to +100	°C
Lead Solder Temperature	$T_{SOL}$	250 for 10 sec	°C
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	$P_D$	400 4.83	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
<b>EMITTER</b>						
Input Forward Voltage	( $I_F = 10\text{ mA}$ )	$V_F$		1.0	1.3	V
Reverse Current	( $V_R = 5\text{ V}$ )	$I_R$			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	( $I_C = 0.5\text{ mA}$ , $I_F = 0$ )	$BV_{CEO}$	55			V
Emitter-Collector Breakdown Voltage	( $I_E = 100\text{ }\mu\text{A}$ , $I_F = 0$ )	$BV_{ECO}$	7			V
Collector-Emitter Dark Current	( $V_{CE} = 24\text{ V}$ , $I_F = 0$ )	$I_{CEO}$		5	100	nA
	( $V_{CE} = 24\text{ V}$ , $T_A = 85^\circ\text{C}$ )				50	$\mu\text{A}$
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
<b>SWITCHING TIMES</b>						
Non-Saturated	$(R_L = 100\text{ }\Omega$ , $I_C = 2\text{ mA}$ , $V_{CC} = 10\text{ V}$ )					$\mu\text{s}$
Turn-on Time		$t_{on}$		3		
Turn-off Time		$t_{off}$			3	
Rise Time		$t_r$			2.4	
Fall Time		$t_f$			2.4	
Saturated	$(I_F = 16\text{ mA}$ , $R_L = 1.9\text{ k}\Omega$ , $V_{CE} = 5\text{ V}$ )					
Turn-on Time		$t_{on}$			2.4	
Turn-off Time		$t_{off}$			25.0	

**TRANSFER CHARACTERISTICS**

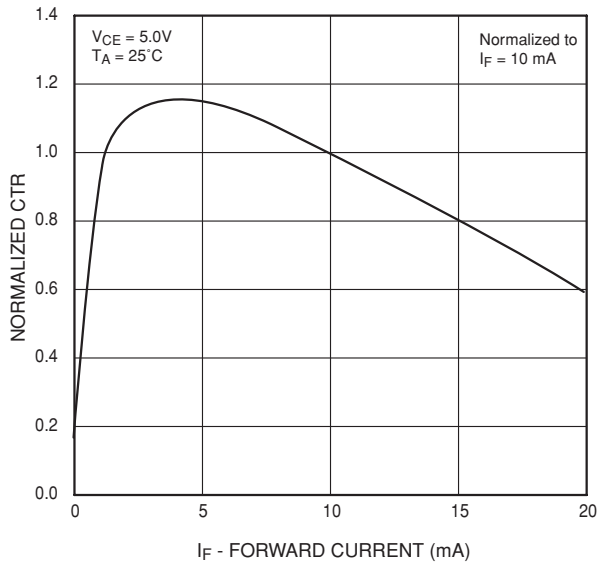
DC Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Current Transfer Ratio, Collector-Emitter	( $I_F = 5\text{ mA}$ , $V_{CE} = 5\text{ V}$ )	CTR	50		600	%
	( $I_F = 8\text{ mA}$ , $V_{CE} = 0.4\text{ V}$ )	$CTR_{(sat)}$	30			
Saturation Voltage	( $I_F = 8\text{ mA}$ , $I_C = 2.4\text{ mA}$ )	$V_{CE(sat)}$			0.40	V

**ISOLATION CHARACTERISTICS**

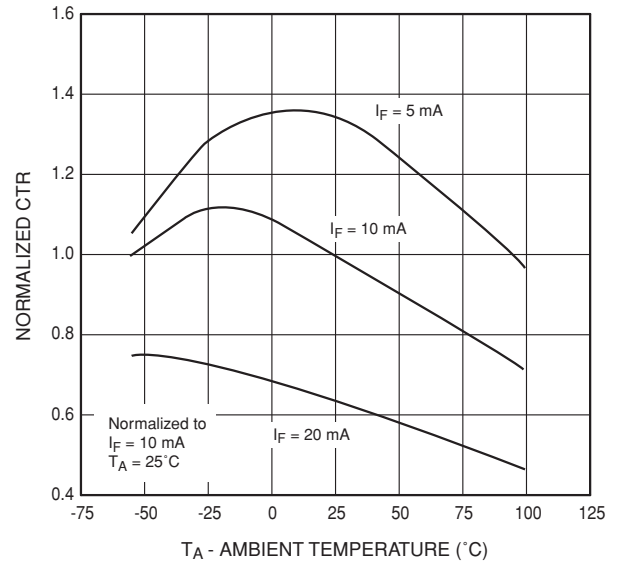
Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Units
Input-Output Isolation Voltage	( $I_{I-O} \leq 1\text{ }\mu\text{A}$ , $t = 1\text{ min.}$ )	$V_{ISO}$	5300			$V_{ac(rms)}$
Isolation Resistance	( $V_{I-O} = 500\text{ VDC}$ )	$R_{ISO}$	$10^{11}$			$\Omega$
Isolation Capacitance	( $f = 1\text{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

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

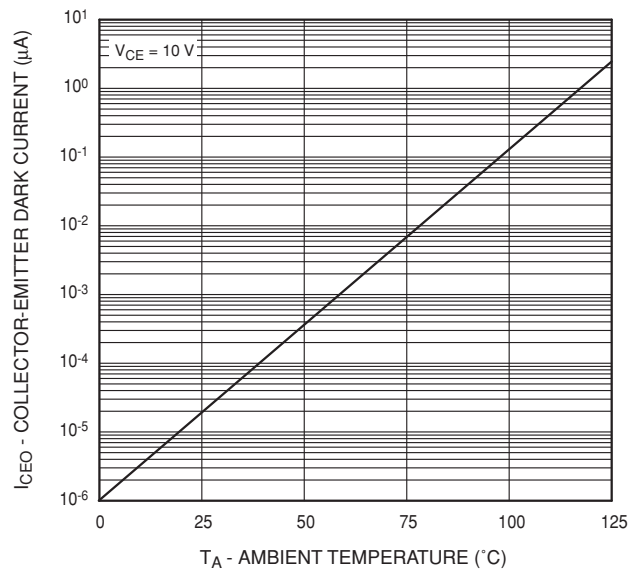
**Normalized CTR vs. Forward Current**



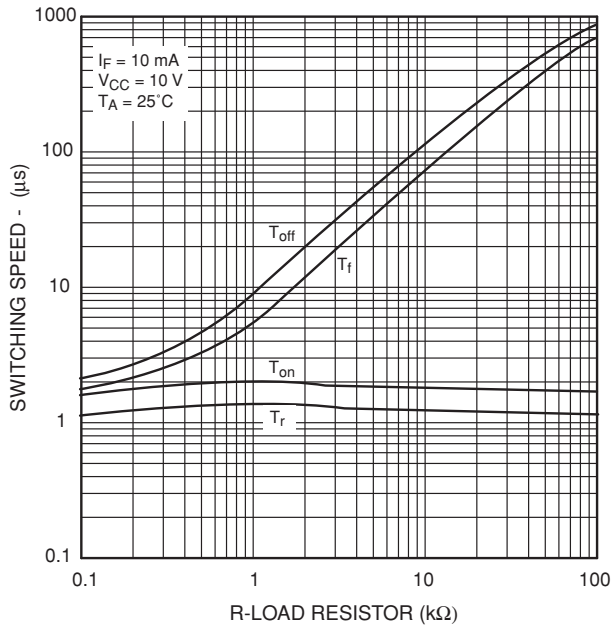
**Normalized CTR vs. Ambient Temperature**



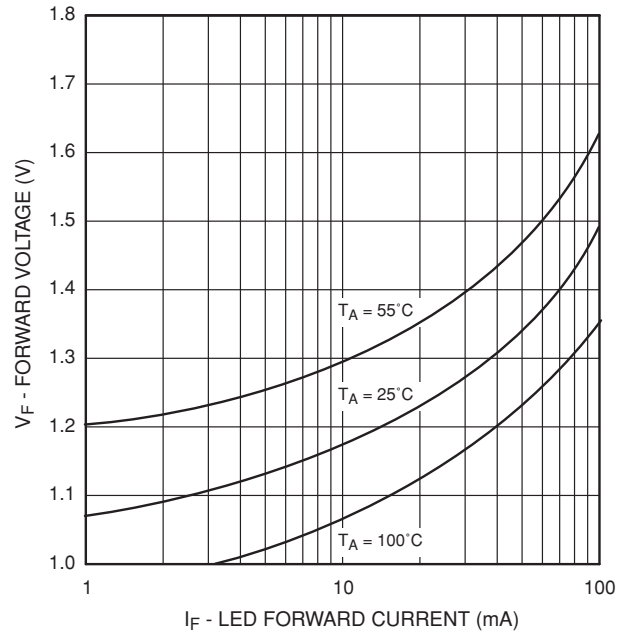
**Dark Current vs. Ambient Temperature**



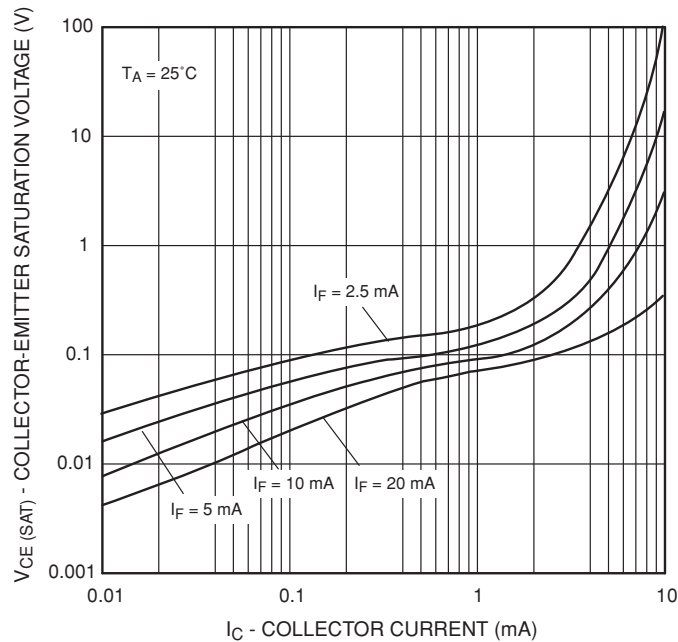
**Switching Speed vs. Load Resistor**



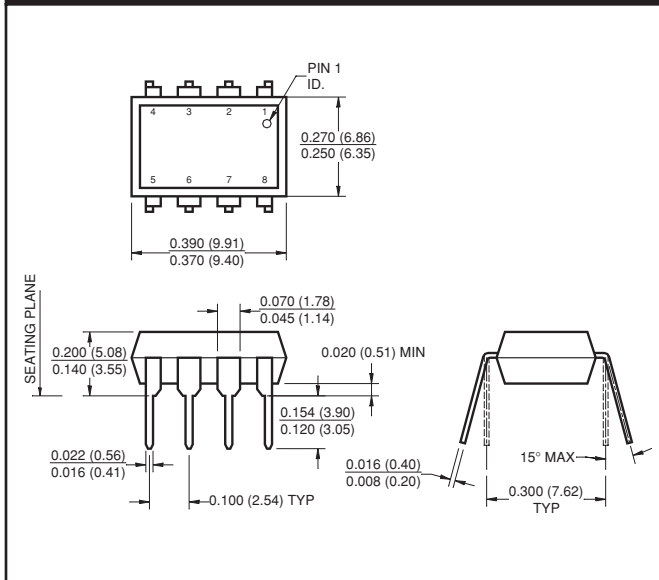
**LED Forward Voltage vs. Forward Current**



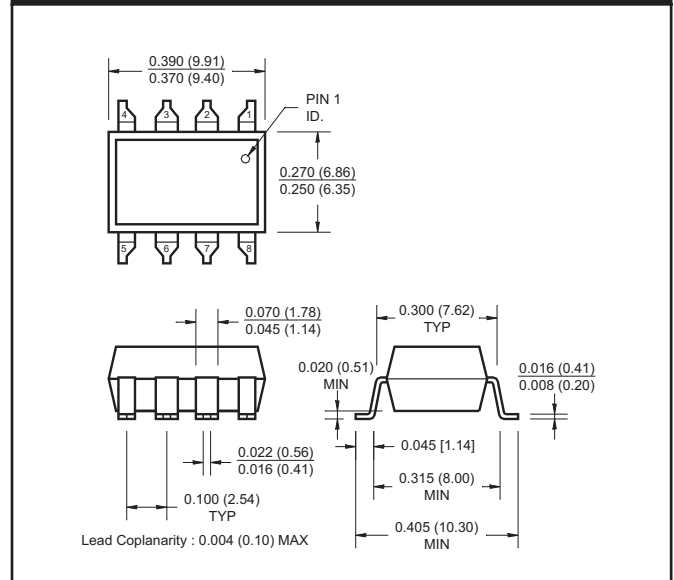
**Collector-Emitter Saturation Voltage vs Collector Current**



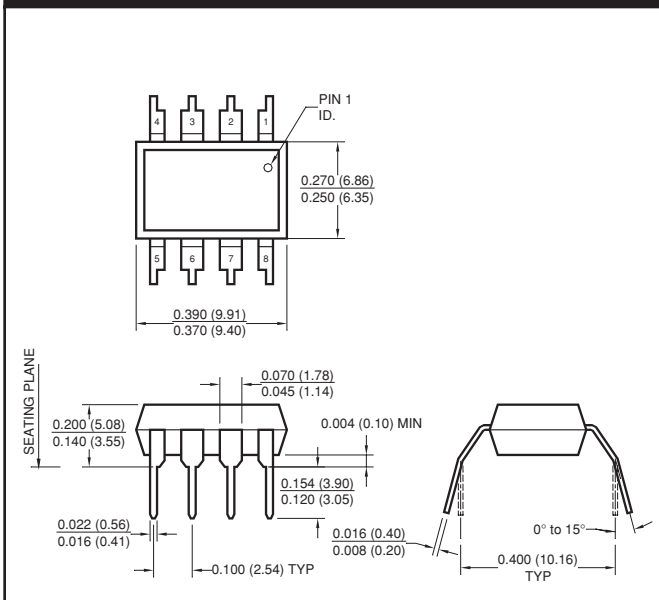
**Package Dimensions (Through Hole)**



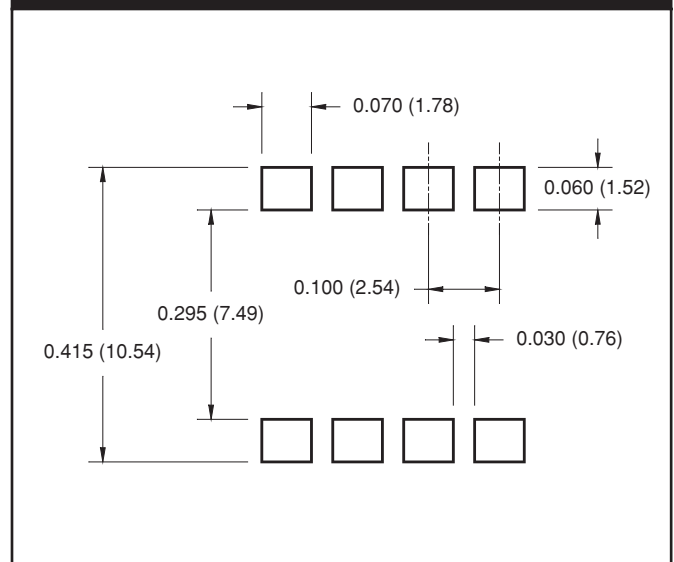
**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**Recommended Pad Layout for  
Surface Mount Leadform**



**NOTE**

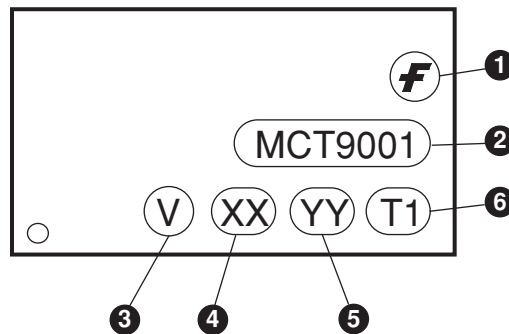
All dimensions are in inches (millimeters)

**MCT9001**

**ORDERING INFORMATION**

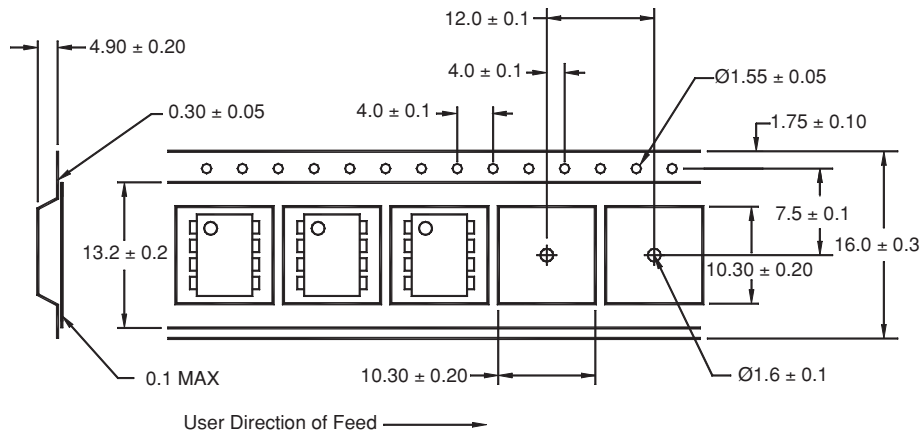
Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing

**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

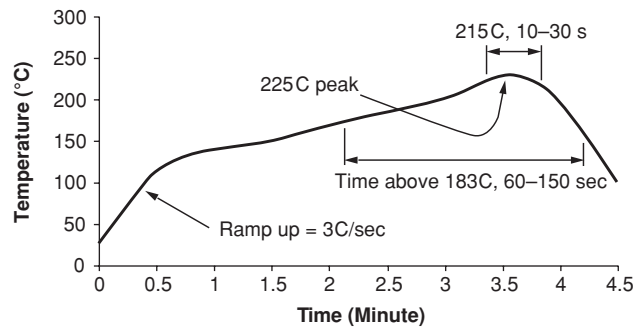
**Carrier Tape Specifications**



**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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