Optocoupler, Phototransistor Output, With Base Connection

Features

- Interfaces with common logic families
- Input-output coupling capacitance < 0.5 pF
- Industry Standard Dual-in line 6-pin package
- 5300 V_{RMS} isolation test voltage

Agency Approvals

- UL - File No. E52744 System Code H or J
- DIN EN 60747-5-2(VDE0884)
  DIN EN 60747-5-5 pending
  Available with Option 1
- CSA 93751
- BSI IEC60950 IEC60965

Applications

AC mains detection

Reed relay driving

Switch mode power supply feedback

Telephone ring detection

Logic ground isolation

Logic coupling with high frequency noise rejection

For additional design information see Application Note 45

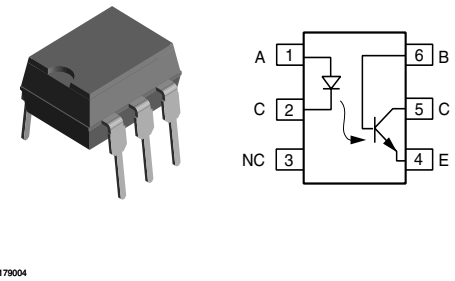
Description

The MCT27x family is an Industry Standard Single Channel Phototransistor Couplers. It includes the MCT270/ 271/ 272/ 273/ 274/ 275/ 276/ 277 couplers.

Each optocoupler consists of gallium arsenide infrared LED and a silicon NPN phototransistor.

These couplers are Underwriters Laboratories (UL) listed to comply with a 5300 V_{RMS} isolation test voltage.

This isolation performance is accomplished through Vishay double molding isolation manufacturing process. Compliance to DIN EN 60747-5-2(VDE0884)/ DIN EN 60747-5-5 pending partial discharge isolation specification is available by ordering option 1.



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These isolation processes and the Vishay ISO9001 quality program results in the highest isolation performance available for a commercial plastic phototransistor optocoupler.

The devices are available also in lead formed configuration suitable for surface mounting and are available either on tape and reel, or in standard tube shipping containers.

Order Information

Part	Remarks
MCT270	CTR > 50 %, DIP-6
MCT271	CTR 45 - 90 %, DIP-6
MCT272	CTR 75 - 150 %, DIP-6
MCT273	CTR 125 - 250 %, DIP-6
MCT274	CTR 225 - 400 %, DIP-6
MCT275	CTR 70 - 210 %, DIP-6
MCT276	CTR 15 - 60 %, DIP-6
MCT277	CTR > 100 %, DIP-6
MCT270-X009	CTR > 50 %, SMD-6 (option 9)
MCT277-X009	CTR > 100 %, SMD-6 (option 9)

For additional information on the available options refer to Option Information.

Absolute Maximum Ratings

T_{amb} = 25 °C, unless otherwise specified

Stresses in excess of the absolute Maximum Ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute Maximum Rating for extended periods of the time can adversely affect reliability.

Input

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	6.0	V
Forward current		I_F	60	mA
Surge current	t < 10 µs	I_{FSM}	2.5	A
Power dissipation		P_{diss}	100	mW

Output

Parameter	Test condition	Symbol	Value	Unit
Collector-emitter breakdown voltage		V_{CEO}	70	V
Emitter-base breakdown voltage			7.0	V
Collector current		I_C	50	mA
	t < 1.0 ms	I_C	100	mA
Power dissipation		P_{diss}	150	mW

Coupler

Parameter	Test condition	Symbol	Value	Unit
Isolation test voltage		V_{ISO}	5300	V_{RMS}
Creepage			≥ 7.0	mm
Clearance			≥ 7.0	mm
Isolation thickness between emitter and detector			≥ 0.4	mm
Comparative tracking index per DIN IEC 112/VDE0303,part 1			175	
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C	R_{IO}	10^{12}	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C	R_{IO}	10^{11}	Ω
Storage temperature		T_{amb}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Junction temperature		T_j	100	°C
Soldering temperature	max. 10 s dip soldering: distance to seating plane ≥ 1.5mm	T_{sld}	260	°C

Electrical Characteristics

T_{amb} = 25 °C, unless otherwise specified
Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

Input

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward voltage	I_F = 20 mA	V_F			1.5	V
Reverse current	V_R = 3.0 V	I_R			10	µA
Capacitance	V_R = 0, f = 1.0 MHz	C_O		25		pF

Output

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Collector-emitter breakdown voltage	I_C = 10 µA, I_F = 0 mA	BV_{CEO}	30			V
Emitter-collector breakdown voltage	I_E = 10 µA, I_F = 0 mA	BV_{ECO}	7.0			V
Collector-base breakdown voltage	I_C = 10 µA, I_F = 0 mA	BV_{CBO}	70			V
Collector-emitter leakage current	V_{CE} = 10 V, I_F = 0 mA	I_{CEO}			50	nA

Coupler

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Resistance, input to output	V_{IO} = 500 VDC	R_{IO}		10^{12}		Ω
Capacitance (input-output)		C_{IO}		0.5		pF
Collector-emitter saturation voltage	I_{CE} = 2.0 mA, I_F = 16 mA	V_{CEsat}			0.4	V

Current Transfer Ratio

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
DC Current Transfer Ratio	V_{CE} = 10 V, I_F = 10 mA	MCT270	CTR_{DC}	50			%
		MCT271	CTR_{DC}	45		90	%
		MCT272	CTR_{DC}	75		150	%
		MCT273	CTR_{DC}	125		250	%
		MCT274	CTR_{DC}	225		400	%
		MCT275	CTR_{DC}	70		210	%
		MCT276	CTR_{DC}	15		60	%
		MCT277	CTR_{DC}	100			%
Current Transfer Ratio (collector-emitter)	V_{CE} = 0.4 V, I_F = 16 mA	MCT271	CTR_{CE}	12.5			%
		MCT272	CTR_{CE}	12.5			%
		MCT273	CTR_{CE}	12.5			%
		MCT274	CTR_{CE}	12.5			%
		MCT275	CTR_{CE}	12.5			%
		MCT276	CTR_{CE}	12.5			%
		MCT277	CTR_{CE}	40			%