# OLI110: Phototransistor Optocoupler

Features

- High current transfer ratio (CTR)-guaranteed over -55°C to +100°C ambient temperature range
- 1500 VDC electrical isolation
- High breakdown voltage, collector to emitter, base open (BVCEO), >60V
- Small surface mount size

Description

The OLI110 consists of an LED and N-P-N silicon phototransistor that is electrically isolated, but optically coupled on a ceramic Leadless Chip Carrier (LCC) surface mount package. The epoxy coating on the OLI110 allows the device to withstand normal solvent cleaning operations.

Surface mounting can be accomplished with either conductive epoxies or by reflow soldering. Special electrical parametric selections are available upon request.
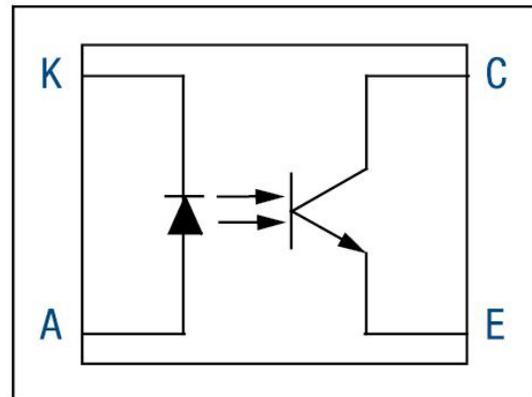
Figure 1. OLI110 Block Diagram

A functional block diagram of the OLI110 is shown in Figure 1. The absolute maximum ratings of the OLI110 are provided in Table 1.

Electrical specifications are provided in Table 2.

Typical performance characteristics of the OLI110 are illustrated in Figures 2 through 4.

A rise and fall time test circuit is shown in Figure 5.

Package dimensions for the OLI110 are provided in Figure 6.

Table 1. OLI110 Absolute Maximum Ratings[1]

Parameter	Symbol	Minimum	Maximum	Units
Coupled				
Input to output isolation voltage[2]	VDC	-1500	+1500	V
Storage temperature range	TSTG	-65	+150	C
Operating temperature range	TA	-55	+125	C
Input Diode				
Average input current	IDD		40	mA
Peak forward current	IF		60	mA
Reverse voltage	VR		3	V
Power dissipation	PD		70	mW
Output Detector				
Collector to emitter voltage	VCE		60	V
Power dissipation[3]	PD		200	mW

1: Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to the device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed in the above table may result in permanent damage to the device.
2: Measured between LED pins shorted together, and output pins shorted together. TA = 25 °C and duration = 1s.
3: Derate linearly at 2 mW/°C above 25°C.

ESD Handling: Industry-standard ESD handling precautions must be adhered to at all times to avoid damage to this device.

Table 2. OLI110 Electrical Specifications[1]

Parameter	Symbol	Test Condition	Min	Typical	Max	Units
Current Transfer Ratio (CTR)[2]	CTR	I_F = 10 mA, V_{CE} = 5V	100	200		%
		I_F = 1 mA, V_{CE} = 5V	100	200		
Saturation voltage	V_{CE_SAT}	I_F = 10.0 mA, I_C = 2.0 mA		0.15	0.3	V
Breakdown voltage:						
Collector to emitter	BV_{CEO}	ICE = 100 µA, T_A = 25°C	60			V
Emitter to collector	BV_{ECO}	IEC = 100 µA, T_A = 25°C	5			V
Leakage current collector to emitter	I_{CEO}	VCE = 20 V, T_A = 25°C			100	nA
		VCE = 20 V, T_A = 100°C			100	µA
Input:						
Forward voltage	V_F	I_F = 10.0 mA	0.90	1.3	1.7	V
Reverse current	I_R	V_R = 3V			100	µA
Output leakage current[3]	I_{I_O}	R_L = ≥50%, TA = 25°C, VI-O = ±1500 V_{DC}			1	µA
Time:						
Rise	t_r	V_{CC} = 10V, RL = 100Ω, IC = 2 mA, TA = 25°C		5	15	µs
Fall	t_f			5	15	µs

1: Performance is guaranteed only under the conditions listed in this table.
2. CTR is defined as the ratio of output collector current (IC) to the forward LED current (IF) multiplied by 100%.
3. Measured between LED pins shorted together, and output pins shorted together. TA = 25°C and duration = 1s.

Typical Performance Characteristics
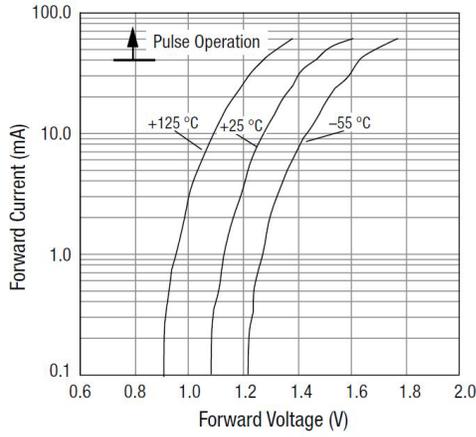
(TA = -55°C to +125°C, Unless Otherwise Noted)

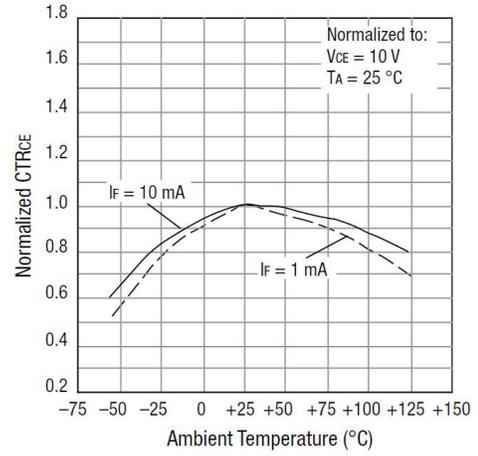

Figure 2. Forward Current vs Forward Voltage

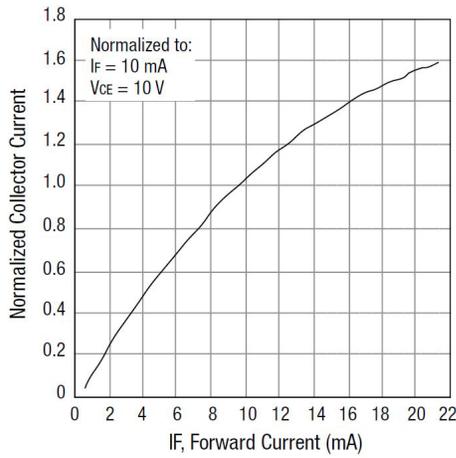Figure 4. Normalized CTR$_{CE}$ vs Temperature

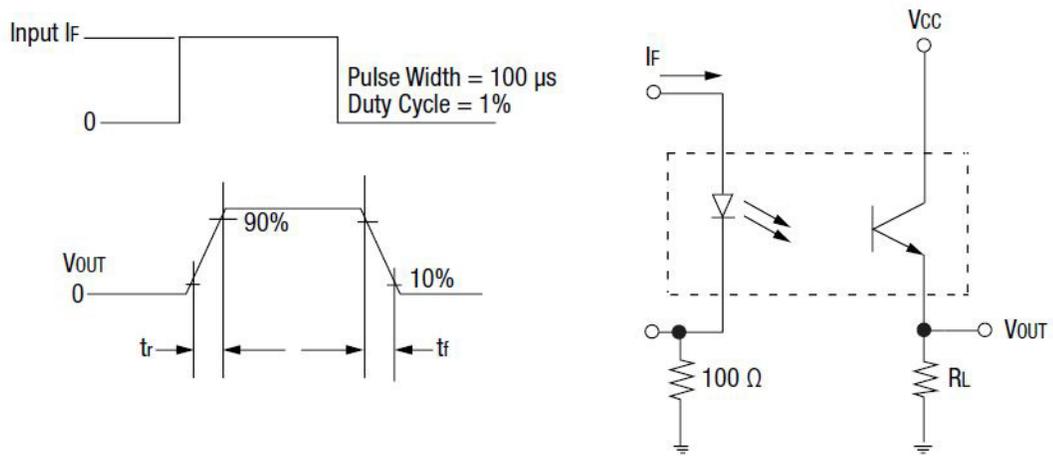Figure 3. Normalized Collector Current vs Forward Current

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Figure 5. OLI110 Rise and Fall Time Test Circuit
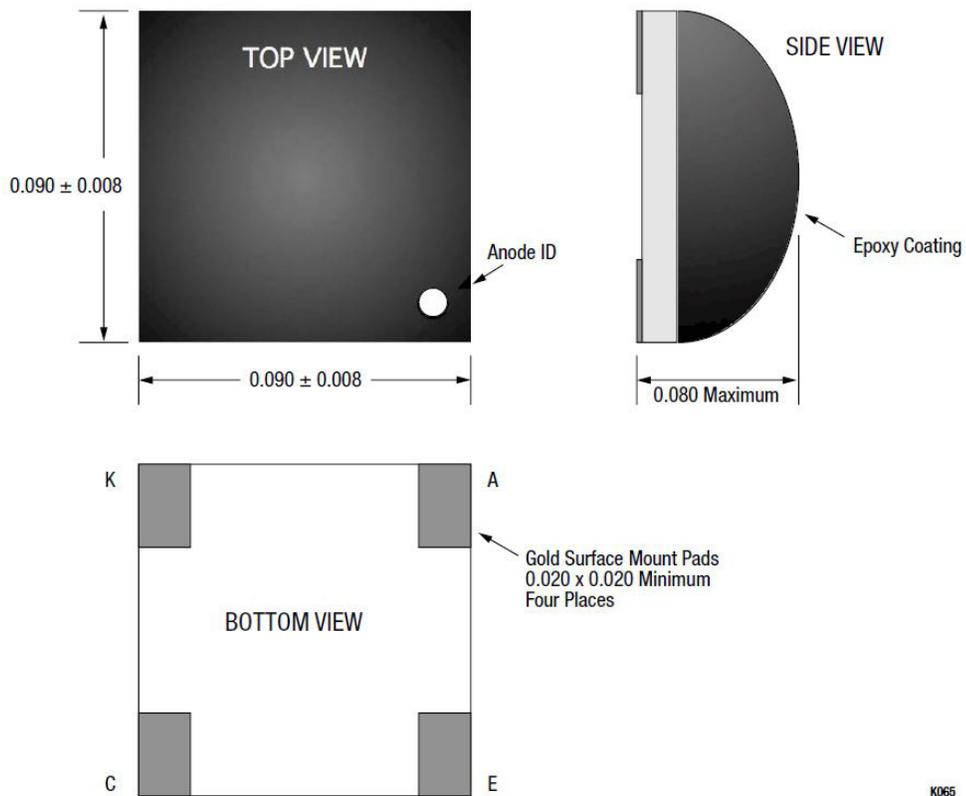
Figure 6. OLI110 Package Dimensions

Ordering Information

Model Name	Manufacturing Part Number
OLI110: Phototransistor Optocoupler	OLI110

References

Skyworks Application Note: *PCB Design and SMT Assembly/Rework Guidelines for MCM-L Packages*; Document Number 101752

Standard SMT Reflow Profiles: *JEDEC Standard J-STD-020*

Electrostatic Discharge Sensitivity (ESD) Testing: *JEDEC Standard, JESD22-A114 Human Body Model (HBM)*

Electrostatic Discharge Sensitivity (ESD) Testing: *JEDEC Standard, JESD22-A115 Machine Model (MM)*

Electrostatic Discharge Sensitivity (ESD) Testing: *JEDEC Standard, JESD22-C101 Charged Device Model (CDM)*

Testing & Measurement Techniques: *Electrostatic Discharge Immunity Test, IEC 61000-4-2*