66053

SINGLE-CHANNEL, LOW-INPUT CURRENT LEADLESS CHIP CARRIER OPTOCOPLER

OPTOELECTRONIC PRODUCTS DIVISION

Features:

- Electrically similar to 6N140
- Hermetically sealed 24 Pin LCC
- High Current Transfer ratio: 1000% typical
- CTR and 1_{OH} guaranteed over 55°C to + 125°C
- ambient temperature range
- Standard and high reliability screened parts available
- 1000 Vdc isolation test voltage
- Low input current requirement: 0.5mA
- Low output saturation voltage: 0.1V typical
- Low power consumption
- Leadless chip carrier package
- Faraday shield provides high common mode rejection

DESCRIPTION

The 66053 optocoupler contains an infrared LED optically coupled to a corresponding high gain darlington detector. This unique optocoupler provides high CTR and low leakage current over the full military temperature range (-55°C to + 125°C). The 66053 is a 24 pin hermetically sealed leadless chip carrier and is available in standard and screened versions or tested to customer specifications.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level Each Channel	I_{FL}		2	µA
Input Current, High Level Each Channel	I_{FH}	0.5	5	mA
Supply Voltage	V_{CC}	2.0	18	V

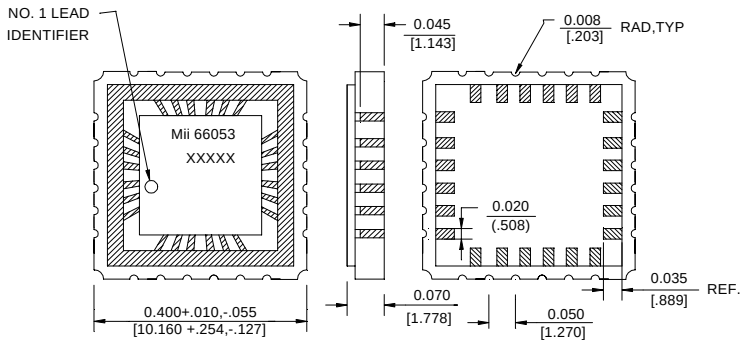
ABSOLUTE MAXIMUM RATINGS

Output current - I_O 40mA
Output voltage - V_O ..... -0.5 to 20V (1)
Supply voltage - V_{CC} ..... -0.5 to 20V (1)
Output power dissipation ..... 50 mW (2)
Storage temperature ..... -65°C to +150°C
Operating temperature ..... -55°C to +125°C
Lead solder temperature ..... 260°C for 10 sec.
Peak input current (<1ms duration) 20mA
Reverse input voltage - V_R 5V
Average input current - I_F 10mA (3)

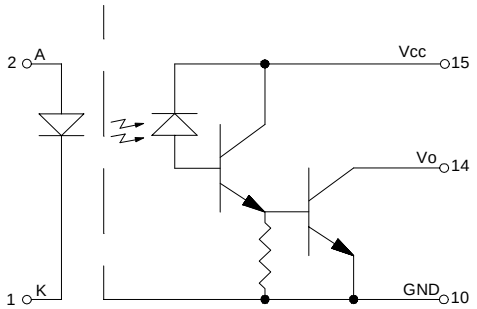
Notes:

1. The lowest total I_{OH} over temperature is developed by keeping V_{CC} as low as possible, but greater than 2.0 volts. The negative voltage at the detector side should be applied to PIN 10.
2. Collector output power plus one fourth of the total supply power is total output power. Derate at 0.46mW/°C above 25°C.
3. Derate I_F at 0.05mA /°C above 25°C.

Package Dimensions



Schematic Diagram



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ELECTRICAL CHARACTERISTICS

(T_A = -55°C to 125°C) unless otherwise specified

PARAMETER	SYMBOL	MIN	TYP**	MAX	UNITS	TEST CONDITIONS	NOTE
Current Transfer Ratio	CTR	300 300 200	1000 750 400		% % %	I_F = 0.5mA, V_O = 0.4V, V_{CC} = 4.5V I_F = 1.6mA, V_O = 0.4V, V_{CC} = 4.5V I_F = 5.0mA, V_O = 0.4V, V_{CC} = 4.5V	1
Logic Low Output Voltage	V_{OL}		0.1 0.2	0.4 0.4	V V	I_F = 0.5mA, I_{OL} = 1.5mA, V_{CC} = 4.5V I_F = 5.0mA, I_{OL} = 10mA, V_{CC} = 4.5V	
Logic High Output Current	I_{OH}		.005	250	µA	I_F = 2µA V_O = V_{CC} = 18V	
Logic Low Supply Current	I_{CCL}		2	4	mA	I_F = 1.6mA V_{CC} = 18V	
Logic High Supply Current	I_{CCH}		.010	40	µA	I_F = 0 V_{CC} = 18V	
Input Forward Voltage	V_F		1.4	1.8	V	I_F = 1.6mA, T_A = 25°C	
Input Reverse Breakdown Voltage	BV_R	5			V	I_R = 10µA, T_A = 25°C	
Input-Output Insulation Leakage Current	$I_{I—O}$			1.0	µA	45% Relative Humidity, T_A = 25°C, t = 5s., V_{I-0} = 1000Vdc	2
Propagation Delay Time To Logic High at Output	t_{PLH}		6 4	60 30	µs µs	I_F = 0.5mA, R_L = 4.7kΩ, V_{CC} = 5.0V, I_F = 5mA, R_L = 680Ω, V_{CC} = 5.0V,	
Propagation Delay Time To Logic Low at Output	t_{PHL}		8 2	100 10	µs µs	I_F = 0.5mA, R_L = 4.7kΩ, V_{CC} = 5.0V, I_F = 5mA, R_L = 680Ω, V_{CC} = 5.0V,	
Common Mode Transient Immunity at High Output	CM_H	500	1000		V/µs	I_F = OmA, R_L = 1.5kΩ, V_{CM} = 50V $_{P-P}$, V_{CC} = 5.0V, T_a = 25°C	3
Common Mode Transient Immunity at Low Output	CM_L	500	1000		V/µs	I_F = 1.6mA, R_L = 1.5kΩ, V_{CM} = 50V $_{P-P}$, V_{CC} = 5.0V, T_a = 25°C	4

**All typical values are at V_{CC} = 5V T_A = 25°C

TYPICAL CHARACTERISTICS

T_A = 25°C, V_{CC} = 5V Each Channel

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Resistance (Input-Output)	R_{I-0}		10^{12}		Ω	$V_{I—O}$ = 500Vdc, T_A = 25°C	2
Capacitance (Input-Output)	C_{I-0}		1.5		pF	f = 1MHz, T_A = 25°C	2
Temperature Coefficient Of Forward Voltage	$\Delta v_F \Delta T_A$		-1.8		mV/°C	I_F = 1.6mA	
Input Capacitance	C_{IN}		60		pF	f = 1MHz, V_F = 0, T_A = 25°C	

NOTES:

1. CURRENT TRANSFER RATIO is defined as the ratio of output collector current, I_O, to the forward LED input current, I_F, times 100%.
2. Device considered a two-terminal device. Pins 1 and 2 are shorted together and pins 10, 14, and 15 are shorted together.
3. CM_H is the maximum tolerable common mode transient to assure that the output will remain in a high logic state (i.e. V_O > 2.0V).
4. CM_L is the maximum tolerable common mode transient to assure that the output will remain in low logic state (i.e. V_O < 0.8V).