66058

SINGLE/DUAL CHANNEL, LOW-INPUT CURRENT, OPTOCOUPLER (Electrically similar to 6N140)

Mii

OPTOELECTRONIC PRODUCTS DIVISION

Features:

- DSCC Approved 8978501PX (Dual) and 8981001PX (Single)
- High current transfer ratio: 1000% typical
- 1500 Vdc isolation test voltage
- Low input current requirement: 0.5mA

Applications:

- Telephone ring detection
- Voltage level shifting
- Isolated receiver input
- Communication systems
- Medical systems

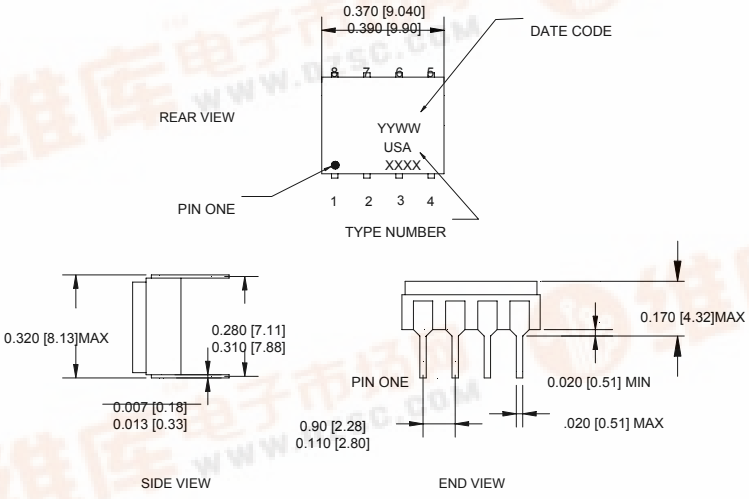
DESCRIPTION

The ***66058*** single/dual optocoupler utilizes infrared LEDs optically coupled to high gain photodarlington detectors. This unique optocoupler provides high CTR and low leakage current over the full military temperature range (-55° to +125°C). The 66058 is a 8 pin dual-in-line, hermetically sealed package and is available in standard and screened versions or tested to customer specifications.

ABSOLUTE MAXIMUM RATINGS

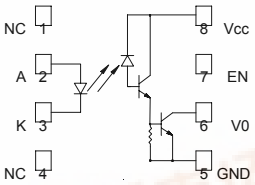
Storage Temperature ..... -65°C to +150°C
Operating Free-Air Temperature Range ..... -55°C to +125°C
Lead Solder Temperature ..... 260°C for 10s (1.6mm below seating plane)
Peak Forward Input Current (each channel) ..... 20mA (1ms duration)
Average Forward Input Current ..... (see Note 1) 10mA
Reverse Input Voltage 5V
Output Current - I_O (each channel) 40mA
Output Power Dissipation (each channel) ..... (see Note 2) 50mW
Supply Voltage - V_{CC} ..... (see Note 3) ..... 0.5 to 20V
Output Voltage - V_O (each channel) ..... (see Note 3) ..... -0.5 to 20V

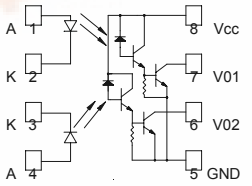
Package Dimensions



ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

Schematic Diagram





Notes:

1. Derate I_F at 0.33 mA/°C above 110°C.
2. Collector output power plus one half of the total supply power is total output power. Derate at 1.66mW/°C above 110°C.
3. The lowest total I_{OH} over temperature is developed by keeping V_{CC} as low as possible, but greater that 2 volts. The negative voltage at the detector side should be applied to Pin 10.

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	1,2 1,2 1,2
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	1
Logic High Output Current	I_{OH}		.005	250	µA	I_F = 2µA, V_O = V_{CC} = 18V	1,3
High Level Output Current -XX1 -XX2	I_{CCH}		.01	10 20	µA µA	I_{F1} = 0mA, V_{CC} = 18V I_{F1} = I_{F2} = 0mA, V_{CC} = 18V	
Low Level Supply Current -XX1 -XX2	I_{CCL}		.01	2 4	mA mA	I_{F1} = 1.6mA, V_{CC} = 18V I_{F1} = I_{F2} =1.6mA, V_{CC} = 18V	
Input Forward Voltage	V_F		1.4	1.7	V	I_F = 1.6mA	1
Input Reverse Breakdown Voltage	BV_R	5			V	I_R = 10µA	1
Input-Output Insulation Leakage Current	$I_{I—O}$			1.0	µA	$V_{I—0}$ = 1500Vdc, Relative Humidity = 45% t_A = 25°C, t = 5s	4
Propagation Delay Time To High Output Level	t_{PLH}		6 6 4	60 50 30	µs µs µs	I_F = 0.5mA, V_{CC} = 5.0V, R_L = 4.7kΩ I_F = 1.6mA, V_{CC} = 5.0V, R_L = 1.5kΩ I_F = 5mA, V_{CC} = 5.0V, R_L = 680Ω	
Propagation Delay Time To Low Output Level	t_{PHL}		8 3 2	100 30 10	µs µs µs	I_F = 0.5mA, V_{CC} = 5.0V, R_L = 4.7kΩ I_F = 1.6mA, V_{CC} = 5.0V, R_L = 1.5kΩ I_F = 5mA, V_{CC} = 5.0V, R_L = 680Ω	

TYPICAL CHARACTERISTICS

T_a = 25°C, V_{CC} = 5V Each Channel

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS	NOTE
Input Capacitance	C_{IN}		60		pF	V_F = 0, f = MHz, t_a = 25°C	1
Capacitance (Input-Output)	C_{I-O}		1.5		pF	f = 1MHz, t_a = 25°C	1, 5
Input Diode Temperature Coefficient	$\frac{\Delta V_F}{\Delta T_A}$		-1.8		mV/°C	I_F = 1.6mA	1
Resistance (Input-Output)	R_{I-0}		10^{12}		Ω	$V_{I—O}$ = 500V, t_a = 25°C	1, 5
Resistance (Input-Input)	R_{I-I}		10^{12}		Ω	$V_{I—I}$ = 500V, t_a = 25°C	6
Input-Input Insulation Leakage Current	I_{I-I}		0.5		nA	Relative Humidity = 45% $V_{I—I}$ = 500V, t = 5s	6
Common Mode Transient immunity at High Output Level	CM_H	500	1000		V/µs	V_{CM} = 50V $_{P-P}$,V_{CC} = 5.0V, R_L = 1.5kΩ, I_F = OmA, t_a = 25°C	7,9
Common Mode Transient Immunity at Low Output Level	CM_L	500	1000		V/µs	V_{CM} = 50V $_{P-P}$,V_{CC} = 5.0V, R_L = 1.5kΩ, I_F = 1.6mA, t_a = 25°C	8,9

NOTES:

1. Each channel.
2. CURRENT TRANSFER RATIO is defined as the ratio of output collector current, I_O, to the forward LED input current., I_F, times 100%.
3. I_F = 2µA for channel under test. For all other channels, I_F = 10mA.
4. Device considered a two-terminal device.
5. Measured between each input pair shorted together and all output pins shorted together.
6. Measured between each input pair shorted together.
7. CM_H is the maximum tolerable common mode transient to assure that the output will remain in a high logic state (ie. V_O > @.0V).
8. CM_L is the maximum tolerable common mode transient to assure that the output will remain in a low logic state (ie. V_O < 0.8V).
9. In applications where dv/dt may exceed 50,000 V/µs (such as static discharge) a series resistor, R_{CC}, should be included to protect the detector IC's from destructively high surge currents. The recommended value is $R_{CC} = \frac{1V}{0.6I_F\ (mA)} = k\Omega$

RECOMMENDED OPERATING CONDITIONS:

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I_{FL}	0	2	µA
Input Current, High Level	I_{FH}	0.5	5	mA
Supply Voltage	V_{CC}	2.0	18	V