

QSOP Quad-Channel Digital Isolators High Speed CEQ834XXX-G Series

Preliminary

Features:

- Compliance Halogens Free
(Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- Data rate: 10M ~ 200Mbps
- High robustness to radiated and conducted noise
- Isolation voltages 3000Vrms
- Wide temperature range: -40°C to 110°C

Description

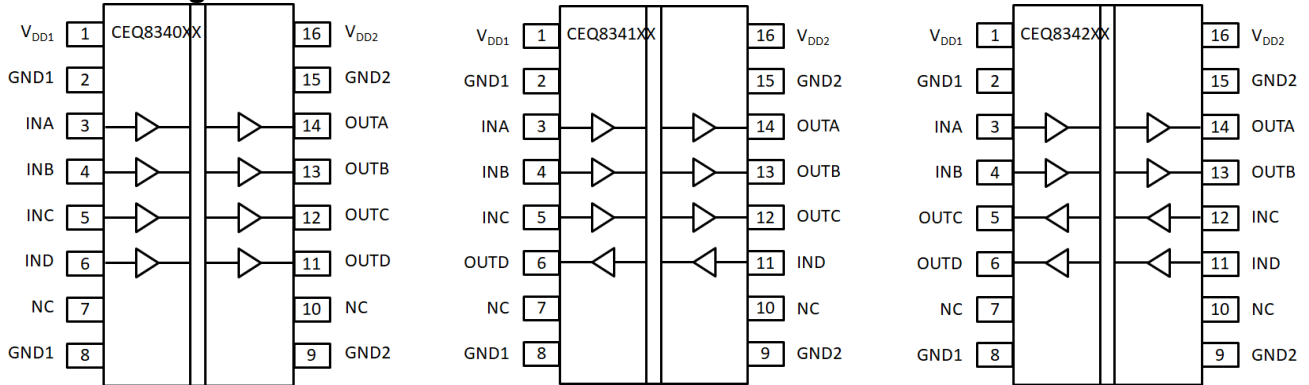
The CEQ834XXX-G are quad-channel digital isolators.

The CEQ834XXX-G provides digital channel direction configuration and the default output level configuration when the input power is lost. Wide supply voltage of the CEQ834XXX-G device supports to connect with most digital interface directly, easy to do the level shift.

Applications

- General-purpose multichannel isolation
- Industrial field bus isolation
- Isolation Industrial automation systems
- Isolated switch mode supplies
- Isolated ADC, DAC
- Motor control

Functional Diagram



Pin Description

NAME	PIN			DESCRIPTION
	CEQ8340	CEQ8341	CEQ8342	
V _{CC1}	1	1	1	Power supply, side 1
V _{CC2}	16	16	16	Power supply, side 2
GND1	2, 8	2, 8	2, 8	Ground , side 1
GND2	9,15	9,15	9,15	Ground , side 2
INA	3	3	3	Input, channel A
INB	4	4	4	Input, channel B
INC	5	5	12	Input, channel C
IND	6	11	11	Input, channel D
OUTA	14	14	14	Output, channel A
OUTB	13	13	13	Output, channel B
OUTC	12	12	5	Output, channel C
OUTD	11	6	6	Output, channel D
NC	7, 10	7, 10	7, 10	Not connected

Truth Table

V _{IX} Input	V _{DDI} State	V _{DDO} State	Default Low V _{OX} Output	Default High V _{OX} Output	Test Conditions /Comments
H	P	P	H	H	Normal operation
L	P	P	L	L	Normal operation
NC	P	P	L	H	Default output
X ²	UP	P	L	H	Default output ^{*3}
X ²	P	UP	Z	Z	

Notes:

- V_{IX}/V_{OX} are the input/output signals of a given channel. V_{DDI}/V_{DDO} are the supply voltages on the input/output signal sides of this given channel.
- Input signal (V_{IX}) must be in a low state to avoid powering the given V_{DDI} through its ESD protection circuitry.
- If the V_{DDI} goes into unpowered status, the channel outputs the default logic signal after around 1us. If the V_{DDI} goes into powered status, the channel outputs the input status logic signal after around 5us.

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V _{DDX}	6.5	V
Maximum Input Voltage	V _{IN}	V _{DD} +0.5	V
Maximum Output Voltage	V _{OUT}	V _{DD} +0.5	V
Output Current	I _o	10	mA
Isolation Voltage *1	V _{ISO}	3000	V rms
Operating Temperature	T _{OPR}	-40 ~ +110	°C
Storage Temperature	T _{STG}	-55 ~ +125	°C
Soldering Temperature *2	T _{SOL}	260	°C

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 to 8 are shorted together, and pins 9 to 16 are shorted together.

*2 For 10 seconds.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{DDX}	3	5.5	V
High Level Input Voltage	V _{IH}	V _{DDX} *0.7	V _{DDX}	V
Low Level Input Voltage	V _{IL}	0	V _{DDX} *0.3	V

Electro-Optical Characteristics $V_{DD1} - V_{GND1} = V_{DD2} - V_{GND2} = 3.3V$ or $5V$, $T_A=25^{\circ}C$, unless otherwise noted.

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High Level Input Voltage	V_{IH}		$0.6 \cdot V_{DDX}$	$0.7 \cdot V_{DDX}$	V	
Low Level Input Voltage	V_{IL}	$0.3 \cdot V_{DDX}$	$0.4 \cdot V_{DDX}$		V	
High Level Output Voltage	V_{OH}	$V_{DDX}-0.1$	V_{DDX}		V	$I_o = -20\mu A$
		$V_{DDX}-0.2$	$V_{DDX}-0.1$			$I_o = -2mA$
Low Level Output Voltage	V_{OL}		0	0.1	V	$I_o = 20\mu A$
			0.1	0.2		$I_o = 2mA$
Input Current per Signal Channel	I_{IN}	-10	0.5	10	μA	$0V \leq \text{Signal voltage} \leq V_{DD}$
V_{DDX} Undervoltage Rising Threshold	V_{DDXUV+}	2.45	2.75	2.95	V	
V_{DDX} Undervoltage Falling Threshold	V_{DDXUV-}	2.30	2.60	2.75	V	
V_{DDX} Hysteresis	V_{DDXUVH}		0.15		V	
Common Mode Transient Immunity	CMTI		75	-	$kV/\mu S$	$V_{CM} = 1000V$

Switching Characteristics - 5V Supply

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Minimum Pulse Width	PW			5	ns	for CEQ834xEx
				100	nS	for CEQ834xMx
Propagation Delay	t_{PLH} 、 t_{PLH}			19	nS	
Pulse Width Distortion	PWD			5	nS	
Part to Part Propagation Delay Skew	t_{PSK}			3	nS	
Channel-to-Channel Delay Skew	t_{CSK}			3	nS	
Rising Time	T_r		1.5		nS	
Falling Time	T_f		1.5		nS	

Switching Characteristics – 3.3V Supply

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Minimum Pulse Width	PW	—		5	ns	for CEQ834xEx
				100	nS	for CEQ834xMx
Propagation Delay	t_{PLH} 、 t_{PLH}			19	nS	
Pulse Width Distortion	PWD			5	nS	
Part to Part Propagation Delay Skew	t_{PSK}			3	nS	
Channel-to-Channel Delay Skew	t_{CSK}			3	nS	
Rising Time	T_r		1.5		nS	
Falling Time	T_f		1.5		nS	

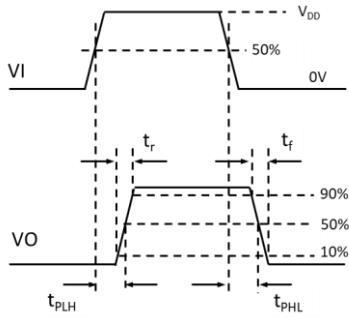
Supply Current

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
CEQ8340xx	I _{DD1}	0.11	0.16	0.25	mA	V _{DD} = 5V V _I =0V for CEQ8340xL
	I _{DD2}	1.55	1.95	2.55	mA	V _I =5V for CEQ8340xH
	I _{DD1}	0.30	0.39	0.55	mA	V _{DD} = 5V V _I =5V for CEQ8340xL
	I _{DD2}	1.48	1.85	2.40	mA	V _I =0V for CEQ8340xH
	I _{DD1}	0.10	0.16	0.25	mA	V _{DD} = 3.3V V _I =0V for CEQ8340xL
	I _{DD2}	1.54	1.93	2.55	mA	V _I =3.3V for CEQ8340xH
	I _{DD1}	0.22	0.29	0.40	mA	V _{DD} = 3.3V V _I =3.3V for CEQ8340xL
	I _{DD2}	1.42	1.77	2.30	mA	V _I =0V for CEQ8340xH
CEQ8341xx	I _{DD1}	0.45	0.60	0.80	mA	V _{DD} = 5V V _I =0V for CEQ8341xL
	I _{DD2}	1.20	1.50	1.95	mA	V _I =5V for CEQ8341xH
	I _{DD1}	0.58	0.74	0.98	mA	V _{DD} = 5V V _I =5V for CEQ8341xL
	I _{DD2}	1.15	1.47	1.95	mA	V _I =0V for CEQ8341xH
	I _{DD1}	0.48	0.60	0.80	mA	V _{DD} = 3.3V V _I =0V for CEQ8341xL
	I _{DD2}	1.15	1.48	1.93	mA	V _I =3.3V for CEQ8341xH
	I _{DD1}	0.52	0.66	0.85	mA	V _{DD} = 3.3V V _I =3.3V for CEQ8341xL
	I _{DD2}	1.12	1.40	1.82	mA	V _I =0V for CEQ8341xH
CEQ8342xx	I _{DD1}	0.84	1.05	1.42	mA	V _{DD} = 5V V _I =0V for CEQ8342xL
	I _{DD2}	0.84	1.05	1.42	mA	V _I =5V for CEQ8342xH
	I _{DD1}	0.84	1.09	1.42	mA	V _{DD} = 5V V _I =5V for CEQ8342xL
	I _{DD2}	0.84	1.09	1.42	mA	V _I =0V for CEQ8342xH
	I _{DD1}	0.82	1.04	1.35	mA	V _{DD} = 3.3V V _I =0V for CEQ8342xL
	I _{DD2}	0.82	1.04	1.35	mA	V _I =3.3V for CEQ8342xH
	I _{DD1}	0.82	1.02	1.35	mA	V _{DD} = 3.3V V _I =3.3V for CEQ8342xL
	I _{DD2}	0.82	1.02	1.35	mA	V _I =0V for CEQ8342xH

Supply Current- AC signal

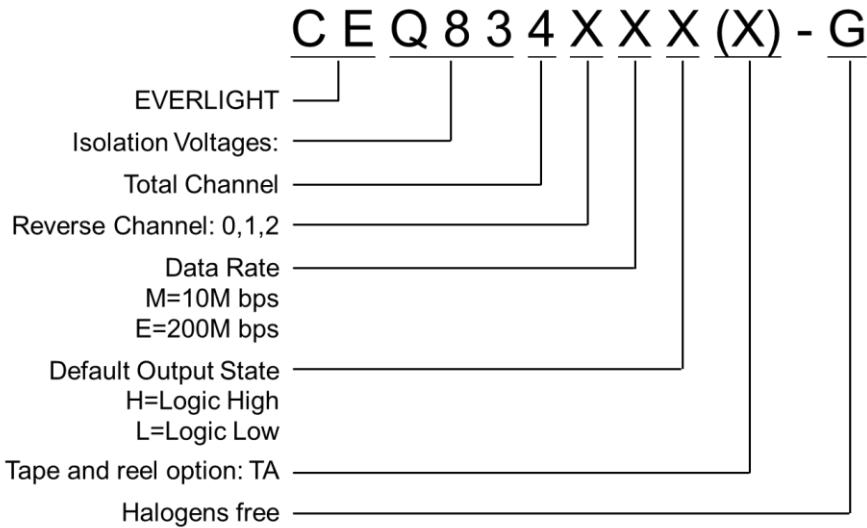
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
CEQ8340Mx	I _{DD1} (10M)		0.48	0.80	mA	V _{DD} = 5V
	I _{DD2} (10M)		3.52	5.30	mA	
	I _{DD1} (10M)		0.36	0.60	mA	V _{DD} = 3.3V
	I _{DD2} (10M)		2.86	4.30	mA	
CEQ8341Mx	I _{DD1} (10M)		1.21	1.85	mA	V _{DD} = 5V
	I _{DD2} (10M)		2.73	4.10	mA	
	I _{DD1} (10M)		0.95	1.45	mA	V _{DD} = 3.3V
	I _{DD2} (10M)		2.20	3.30	mA	
CEQ8342Mx	I _{DD1} (10M)		1.94	2.95	mA	V _{DD} = 5V
	I _{DD2} (10M)		1.94	2.95	mA	
	I _{DD1} (10M)		1.54	2.35	mA	V _{DD} = 3.3V
	I _{DD2} (10M)		1.54	2.35	mA	
CEQ8340Ex	I _{DD1} (200M)		7.44	11.90	mA	V _{DD} = 5V
	I _{DD2} (200M)		34.40	55.10	mA	
	I _{DD1} (200M)		4.32	6.91	mA	V _{DD} = 3.3V
	I _{DD2} (200M)		22.28	35.65	mA	
CEQ8341Ex	I _{DD1} (200M)		14.12	22.60	mA	V _{DD} = 5V
	I _{DD2} (200M)		27.60	44.16	mA	
	I _{DD1} (200M)		8.74	14.00	mA	V _{DD} = 3.3V
	I _{DD2} (200M)		17.72	28.35	mA	
CEQ8342Ex	I _{DD1} (200M)		20.80	33.30	mA	V _{DD} = 5V
	I _{DD2} (200M)		20.80	33.30	mA	
	I _{DD1} (200M)		13.16	21.10	mA	V _{DD} = 3.3V
	I _{DD2} (200M)		13.16	21.10	mA	

1 **Fig. 1 Switching Time waveform measurement**



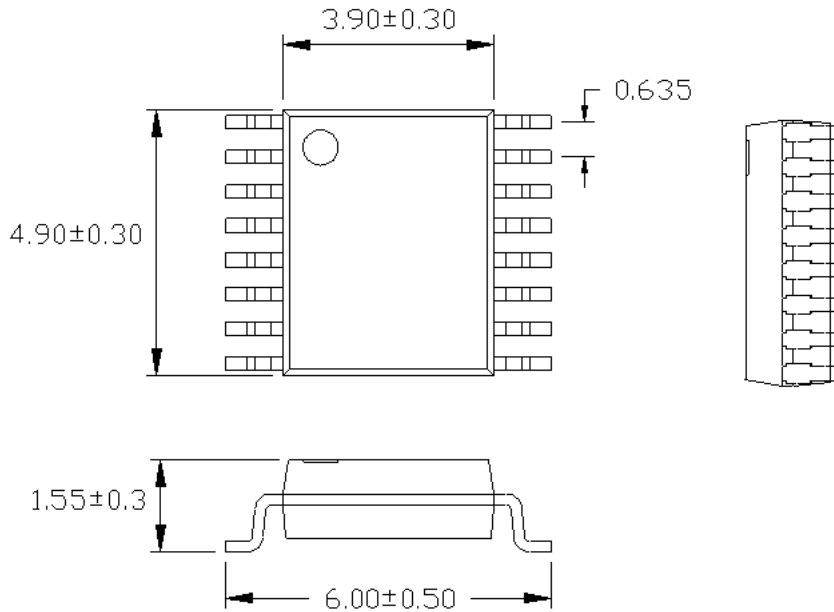
Order Information

Part Number

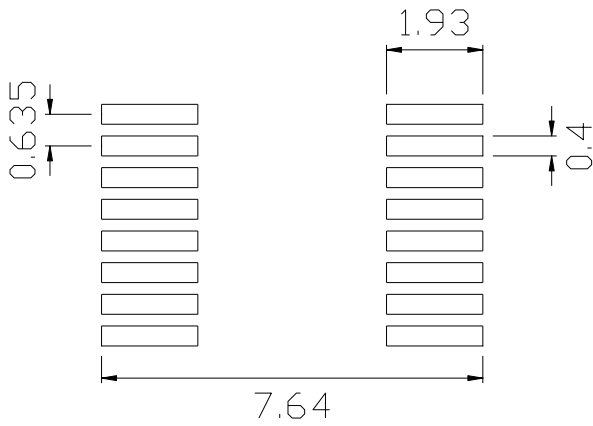


Option	Description	Packing quantity
(TA)	Surface mount lead form + TA tape & reel option	4000 units per reel

Package Dimension
(Dimensions in mm)

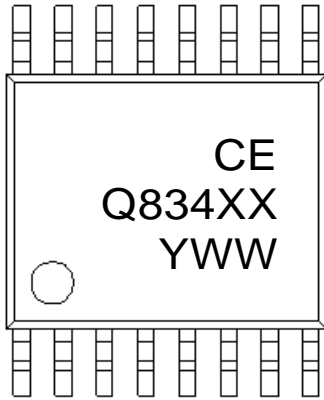


Recommended pad layout for surface mount leadform



Notes.

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

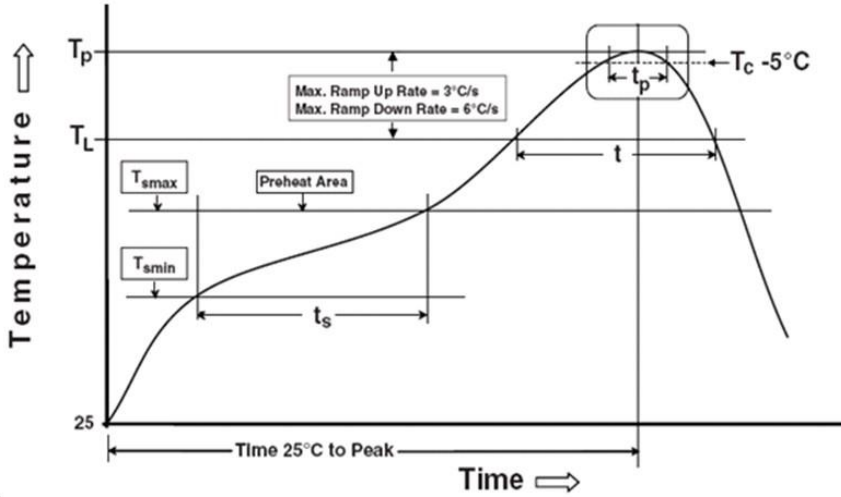
Device Marking**Notes**

CE	denotes EVERLIGHT
Q834XX	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

Preheat

Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max

Other

Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-100 sec
Peak Temperature (T_p)	260°C
Time within 5 °C of Actual Peak Temperature: $T_p -5^\circ C$	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

Precautions for General Storage

1. Avoid storage locations where devices may be exposed to moisture or direct sunlight.
2. Follow the precautions printed on the packing label of the device for transportation and storage.
3. Do not store the products in locations with poisonous gases (especially corrosive gases) or in dusty conditions.
4. Store the products in locations with minimal temperature fluctuations. Rapid temperature changes during storage can cause condensation, resulting in lead oxidation or corrosion, which will deteriorate the solderability of the leads.
5. When restoring devices after removal from their packing, use anti-static containers.
6. Do not allow loads to be applied directly to devices while they are in storage.
7. If devices have been stored for more than two years under normal storage conditions, it is recommended that you check the leads for ease of soldering prior to use.

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2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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