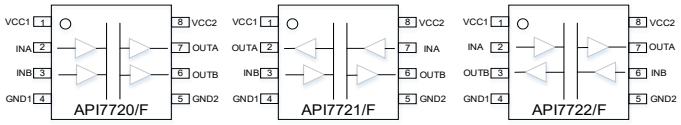
Description

The API772X are high-performance dual-channel digital isolators with 5000V_{RMS} (SO-8W (Type CJ) package) per UL 1577. This family insulation level can fulfill reinforce and basic isolation requirements, according to VDE, UL, CQC, etc. The data rate of API772X is up to 100Mbps. It provides digital channel direction configuration and the default output level. It can also operate under wide supply voltage of 2.5V to 5.5V.

The API772X provide strong electromagnetic immunity and low emissions at low-power consumption. This family has a minimum of 150kV/μs common-mode transient immunity (CMTI). The API7720 device has both channels in the same direction while the API7721/22 device have both channels in the opposite direction. The default output is high for devices without suffix F and low for devices with suffix F. See *Device Functional Modes* section for further details.

Pin Assignments

SO-8W (Type CJ)



Top View

Features

- 100Mbps Data Rate
- Supply Voltage: 2.5V to 5.5V
- ±150kV/μs Minimum CMTI
- CMOS Threshold Inputs
- Default Output High (API772X) and Low (API772XF) Options
- Low-Power Consumption, Typical 2.1mA per Channel at 1Mbps
- Low Propagation Delay: 11ns Typical
- Safety-Related Certifications:
  - 8000V_{PK} (SO-8W (Type CJ)) Isolation per DIN VDE 0884-17:2021-10
  - 5000V_{RMS} (SO-8W (Type CJ)) Isolation for 1 Minute per UL 1577
  - CQC Certification per GB 4943.1-2022
- Packaged in SO-8W (Type CJ)
- Operation Temperature Range -40 to +125°C
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control, (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Applications

- Solar inverters
- Motor control
- Industrial automation
- Power in DATA center/telecom equipment
- Grid, electricity meters

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

Typical Applications Circuit

The API772X device can be used with MCU, CAN transceiver, bias power supply, and voltage regulator to create an isolated CAN interface. The following is an example circuit of API7721.

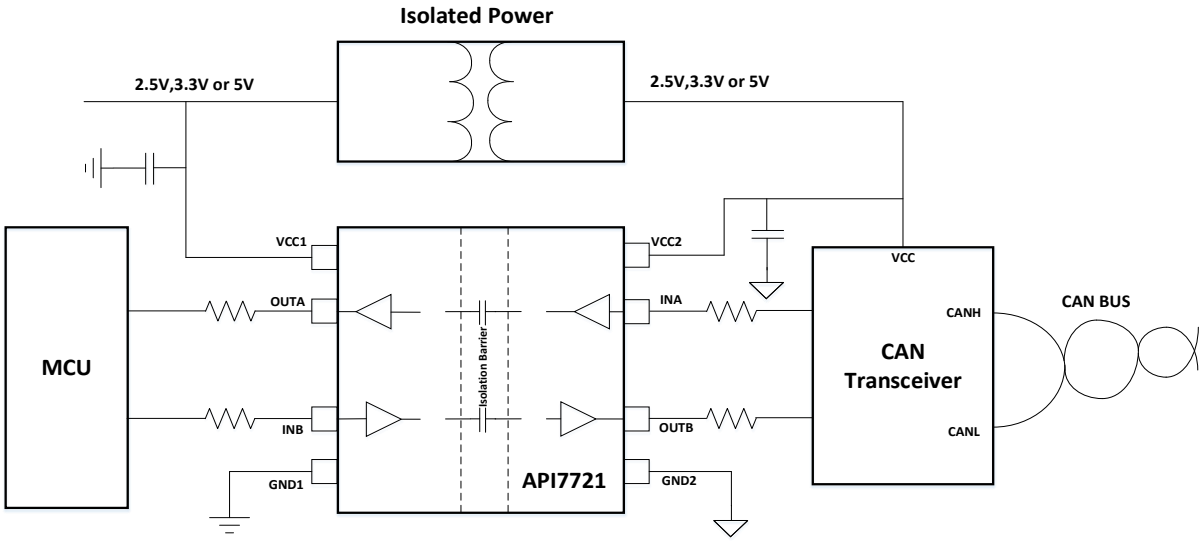


Figure 1. Typical Application Circuit of API772X

Pin Configuration and Descriptions

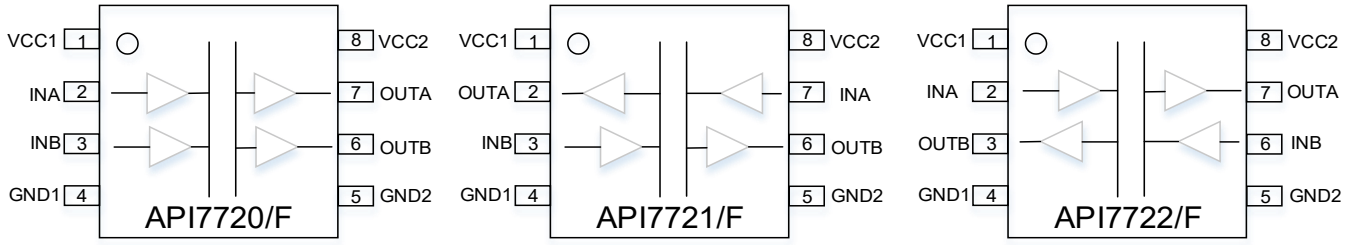


Figure 2. API772X Pin Configuration

Pin Name	Pin Number			Function
	API7720/F	API7721/F	API7722/F	
VCC1	1	1	1	Power supply, VCC1
INA	2	7	2	Input of Channel A
INB	3	3	6	Input of Channel B
GND1	4	4	4	Ground reference for VCC1 side
GND2	5	5	5	Ground reference for VCC2 side
OUTB	6	6	3	Output of Channel B
OUTA	7	2	7	Output of Channel A
VCC2	8	8	8	Power supply, VCC2

Table 1. Pin Description

Absolute Maximum Ratings (Note 4)

Symbol	Parameter	Rating	Unit
V_{CC1}, V_{CC2}	Supply Voltage	-0.5 to 6	V
V_{INA}, V_{INB}	Input Signal Voltage	-0.5 to V_{CC} +0.5 (Note 5)	V
V_{OUTA}, V_{OUTB}	Output Signal Voltage	-0.5 to V_{CC} +0.5 (Note 5)	V
I_O	Output Current	-15 to 15	mA
T_J	Operating Junction Temperature Range	-40 to +150	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
ESD	Human Body Model	8000	V
	Charged Device Model	1600	V
	Contact Discharge per IEC 61000-4-2; Isolation Barrier Withstand Test (Note 6)	8000	V

Notes: 4. Stresses greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.
5. Maximum voltage must not exceed 6V.
6. IEC ESD strike is applied across the barrier with all pins on each side tied together creating a two-terminal device.

Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
V_{CC1}, V_{CC2}	Power Supply Voltage	2.5	—	5.5	V
V_{IH}	High-Level Input Voltage	0.7 × V_{CCI}	—	V_{CCI}	V
V_{IL}	Low-Level Input Voltage	0	—	0.3 × V_{CCI}	V
DR	Data Rate	—	—	100	Mbps
T_A	Ambient Temperature	-40	—	+125	°C

Package Thermal Information

Symbol	Parameter	SO-8W (Type CJ)	Unit
$R_{\theta JA}$	Junction to Ambient Thermal Resistance	92.3	°C/W
$R_{\theta JC(top)}$	Junction to Case Thermal Resistance	34.0	°C/W
$R_{\theta JB}$	Junction-to-Board Thermal Resistance	39.5	°C/W
ψ_{JT}	Junction-to-Top Characterization Parameter	7.7	°C/W
ψ_{JB}	Junction-to-Board Characterization Parameter	37.7	°C/W
$R_{\theta JC(bot)}$	Junction-to-Case (Bottom) Thermal Resistance	48.2	°C/W

Power Ratings

Parameter		Test Conditions	Min	Typ	Max	Unit
API7720						
P_D	Maximum Power Dissipation (Both Sides)	V_{CC1} = V_{CC2} = 5.5V, T_J = +150°C, CL = 15pF, Input 50MHz 50% duty cycle square wave	—	—	154	mW
P_{D1}	Maximum Power Dissipation (Side-1)		—	—	27.5	mW
P_{D2}	Maximum Power Dissipation (Side-2)		—	—	126.5	mW
API7721/API7722						
P_D	Maximum Power Dissipation (Both Sides)	V_{CC1} = V_{CC2} = 5.5V, T_J = +150°C, CL = 15pF, Input 50MHz 50% duty cycle square wave	—	—	165	mW
P_{D1}	Maximum Power Dissipation (Side-1)		—	—	82.5	mW
P_{D2}	Maximum Power Dissipation (Side-2)		—	—	82.5	mW

Insulation Specifications

Symbol	Parameter	Condition	Value	Unit
			SO-8W (Type CJ)	
CLR	External Clearance	Shortest terminal-to-terminal distance through air	> 8	mm
CPG	External Creepage	Shortest terminal-to-terminal distance across the package surface	> 8	mm
DTI	Distance Through the Insulation	Minimum internal gap (internal clearance)	28	µm
CTI	Comparative Tracking Index	DIN EN 60112 (VDE 0303-11); IEC 60112	> 600	V
—	Material Group	According to IEC 60664-1	I	—
Installation Classification per DIN VDE 0110				
—	For Rated Mains Voltage ≤ 150V_{RMS}	—	I to IV	—
—	For Rated Mains Voltage ≤ 300V_{RMS}	—	I to IV	—
—	For Rated Mains Voltage ≤ 600V_{RMS}	—	I to IV	—
—	For Rated Mains Voltage ≤ 1000V_{RMS}	—	I to III	—
DIN V VDE 0884-11 (VDE V 0884-11): 2017-01				
V_{IORM}	Maximum Repetitive Peak Isolation Voltage	AC voltage	2121	V_{PK}
V_{IOWM}	Maximum Working Isolation Voltage	AC voltage	1500	V_{RMS}
		DC voltage	2121	VDC
V_{IOTM}	Maximum Transient Isolation Voltage	VTEST = VIOTM, t = 60s (qualification) VTEST = 1.2 × VIOTM, t = 1s (100% production)	8000	V_{PK}
V_{IMP}	Maximum Impulse Voltage	Tested in air, 1.2/50µs waveform per IEC 62368-1	8000	V_{PK}
V_{IOSM}	Maximum Surge Isolation Voltage	V_{IOSM} ≥ 1.3 × V_{IMP}; Tested in oil (qualification test), 1.2/50µs waveform, per IEC 62368-1	12800	V_{PK}
Q_{pd}	Apparent Charge	Method a, After I/O safety test subgroup 2/3. Vini = VIOTM, tini = 60s; Vpd(m) = 1.2 × VIORM, tm = 10s	< 5	pC
		Method a, After environmental tests subgroup 1. Vini = VIOTM, tini = 60s; Vpd(m) = 1.6 × VIORM, tm = 10s	< 5	pC
		Method b1; At routine test (100% production) and preconditioning (type test) Vini = 1.2 × VIOTM; tini = 1s; Vpd(m) = 1.875 × VIORM, tm = 1s	< 5	pC
C_{IO}	Barrier Capacitance, Input to Output	VIO = 0.4 sin (2πft), f = 1MHz	~0.5	pF
R_{IO}	Isolation Resistance, Input to Output	VIO = 500V at T_A = +25°C	> 10^{12}	Ω
R_{IO}	Isolation Resistance, Input to Output	VIO = 500V at +100°C ≤ T_A ≤ +125°C	> 10^{11}	Ω
R_{IO}	Isolation Resistance, Input to Output	VIO = 500V at T_S = +150°C	> 10^{9}	Ω
Pollution Degree	—	—	2	—
Climatic Category	—	—	55/125/21	—
UL 1577				
V_{ISO}	Withstand Isolation Voltage	VTEST = VISO, t = 60s (qualification), VTEST = 1.2 × VISO, t = 1s (100% production)	5000	V_{RMS}

Safety-Related Certifications

VDE	UL	CQC
DIN VDE 0884-17:2021-10	UL 1577	GB 4943.1-2022
Maximum transient isolation voltage, 8000V_{PK} (SO-8W (Type CJ)) Maximum repetitive peak isolation voltage, 2121V_{PK} (SO-8W (Type CJ)) Maximum surge isolation voltage, 12800V_{PK} (SO-8W (Type CJ))	SO-8W (Type CJ): Single protection, 5000V_{RMS};	SO-8W (Type CJ): Reinforced Insulation, Altitude ≤ 5000m, Tropical Climate, 700V_{RMS} maximum working voltage
Certification planned	File Number: E550819	Certification planned

Safety-Limiting Values

Symbol	Parameter	Condition	Value	Unit
			SO-8W (Type CJ)	
I_S	Safety Supply Current	V_{CC} = 5.5 V, T_J = +150°C, T_A = +25°C	246	mA
P_S	Safety Supply Power	V_{CC} = 5.5 V, T_J = +150°C, T_A = +25°C	1353	mW
T_S	Safety Temperature	—	+150	°C

Electrical Characteristics (V_{CC1} = V_{CC2}, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V_{CC} (UVLOP)	UVLO Threshold When Supply Voltage is Rising	—	—	2.2	—	V
V_{CC} (UVLON)	UVLO Threshold When Supply Voltage is Falling	—	—	2.1	—	V
V_{HYS} (UVLO)	Supply Voltage UVLO Hysteresis	—	—	100	—	mV
V_{OH}	High-Level Output Voltage	I_O <= 4mA	V_{CCO} - 0.4	—	—	V
V_{OL}	Low-Level Output Voltage	I_O <= 4mA	—	—	0.4	V
$V_{IT+(IN)}$	Rising Input Threshold Voltage	—	—	0.6 x V_{CCI}	0.7 x V_{CCI}	V
$V_{IT-(IN)}$	Falling Input Threshold Voltage	—	0.3 x V_{CCI}	0.4 x V_{CCI}	—	V
$V_{I(HYS)}$	Input Threshold Voltage Hysteresis	—	0.1 x V_{CCI}	0.2 x V_{CCI}	—	V
I_{IH}	High-Level Input Current	V_{IH} = V_{CCI} at INx	—	—	15	µA
I_{IL}	Low-Level Input Current	V_{IL} = 0 at INx	-15	—	—	µA
CMTI	Common-Mode Transient Immunity (Note 7)	V_I = V_{CCI} or 0, V_{CM} = 1200V	150	—	—	kV/µs

Note: 7. Parameter is not subject to production test - verified by design/characterization.

Supply Current Characteristics – 5V Supply (V_{CC1} = V_{CC2} = 5V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, Typical values are at T_A = +25°C.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
API7720, API7720F						
$I_{CC1(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7720), V_I = 0 (API7720F)	—	0.80	1.19	mA
$I_{CC2(DC)}$			—	1.80	2.88	
$I_{CC1(DC)}$		V_I = 0 (API7720), V_I = V_{CCI} (API7720F)	—	3.15	4.55	
$I_{CC2(DC)}$			—	1.84	2.85	
$I_{CC1(1M)}$	Supply Current - AC Signal	All channels switch with 1Mbps square wave clock input; CL = 15pF	—	1.96	2.76	
$I_{CC2(1M)}$			—	2.00	3.04	
$I_{CC1(10M)}$		All channels switch with 10Mbps square wave clock input; CL = 15pF	—	1.97	2.86	
$I_{CC2(10M)}$			—	3.49	4.50	
$I_{CC1(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	2.26	4.00	
$I_{CC2(100M)}$			—	16.88	24.08	
API7721, API7721F, API7722, API7722F						
$I_{CC1(DC)}$, $I_{CC2(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7721, API7722), V_I = 0 (API7721F, API7722F)	—	1.48	1.91	mA
$I_{CC1(DC)}$, $I_{CC2(DC)}$		V_I = 0 (API7721, API7722), V_I = V_{CCI} (API7721F, API7722F)	—	2.74	3.71	
$I_{CC1(1M)}$, $I_{CC2(1M)}$	Supply Current - AC Signal	All channels switching with 1Mbps square wave clock input; CL = 15pF	—	2.10	2.87	
$I_{CC1(10M)}$, $I_{CC2(10M)}$		All channels switching with 10Mbps square wave clock input; CL = 15pF	—	2.89	3.83	
$I_{CC1(100M)}$, $I_{CC2(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	10.16	12.25	

Supply Current Characteristics – 3.3V Supply (V_{CC1} = V_{CC2} = 3.3V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
API7720, API7720F						
$I_{CC1(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7720), V_I = 0 (API7720F)	—	0.64	0.91	mA
$I_{CC2(DC)}$			—	1.62	2.81	
$I_{CC1(DC)}$		V_I = 0 (API7720), V_I = V_{CCI} (API7720F)	—	2.98	4.25	
$I_{CC2(DC)}$			—	1.67	2.77	
$I_{CC1(1M)}$	Supply Current - AC Signal	All channels switching with 1Mbps square wave clock input; CL = 15pF	—	1.79	2.62	
$I_{CC2(1M)}$			—	1.75	2.92	
$I_{CC1(10M)}$		All channels switching with 10Mbps square wave clock input; CL = 15pF	—	1.80	2.66	
$I_{CC2(10M)}$			—	2.75	4.26	
$I_{CC1(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	2.17	3.63	
$I_{CC2(100M)}$			—	12.88	16.53	
API7721, API7721F, API7722, API7722F						
$I_{CC1(DC)}$, $I_{CC2(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7721, API7722), V_I = 0 (API7721F, API7722F)	—	1.32	1.77	mA
$I_{CC1(DC)}$, $I_{CC2(DC)}$		V_I = 0 (API7721, API7722), V_I = V_{CCI} (API7721F, API7722F)	—	2.56	3.57	
$I_{CC1(1M)}$, $I_{CC2(1M)}$	Supply Current - AC Signal	All channels switching with 1Mbps square wave clock input; CL = 15pF	—	1.95	2.68	
$I_{CC1(10M)}$, $I_{CC2(10M)}$		All channels switching with 10Mbps square wave clock input; CL = 15pF	—	2.47	3.33	
$I_{CC1(100M)}$, $I_{CC2(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	6.77	9.67	

Supply Current Characteristics – 2.5V Supply (V_{CC1} = V_{CC2} = 2.5V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
API7720, API7720F						
$I_{CC1(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7720), V_I = 0 (API7720F)	—	0.62	0.89	mA
$I_{CC2(DC)}$			—	1.60	2.78	
$I_{CC1(DC)}$		V_I = 0 (API7720), V_I = V_{CCI} (API7720F)	—	2.95	4.32	
$I_{CC2(DC)}$			—	1.64	2.76	
$I_{CC1(1M)}$	Supply Current - AC Signal	All channels switching with 1Mbps square wave clock input; CL = 15pF	—	1.76	2.58	
$I_{CC2(1M)}$			—	1.70	2.87	
$I_{CC1(10M)}$		All channels switching with 10Mbps square wave clock input; CL = 15pF	—	1.78	2.62	
$I_{CC2(10M)}$			—	2.46	3.96	
$I_{CC1(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	2.15	3.40	
$I_{CC2(100M)}$			—	10.42	13.53	
API7721, API7721F, API7722, API7722F						
$I_{CC1(DC)}$, $I_{CC2(DC)}$	Supply Current - DC Signal	V_I = V_{CCI} (API7721, API7722), V_I = 0 (API7721F, API7722F)	—	1.30	1.72	mA
$I_{CC1(DC)}$, $I_{CC2(DC)}$		V_I = 0 (API7721, API7722), V_I = V_{CCI} (API7721F, API7722F)	—	2.54	3.53	
$I_{CC1(1M)}$, $I_{CC2(1M)}$	Supply Current - AC Signal	All channels switching with 1Mbps square wave clock input; CL = 15pF	—	1.97	2.68	
$I_{CC1(10M)}$, $I_{CC2(10M)}$		All channels switching with 10Mbps square wave clock input; CL = 15pF	—	2.36	3.79	
$I_{CC1(100M)}$, $I_{CC2(100M)}$		All channels switching with 100Mbps square wave clock input; CL = 15pF	—	5.73	8.03	

Switching Characteristics – 5V Supply (V_{CC1} = V_{CC2} = 5V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t_{PLH}, t_{PHL}	Propagation Delay Time	—	—	10	17	ns
PWD	Pulse Width Distortion $\|t_{PHL} - t_{PLH}\|$	—	—	0.5	5	ns
$t_{sk(o)}$	Channel-to-Channel Output Skew Time (Note 8)	Same direction channels	—	—	4	ns
$t_{sk(pp)}$	Part-to-Part Skew Time (Note 9)	—	—	—	5	ns
t_r	Output Signal Rise Time	—	—	—	5	ns
t_f	Output Signal Fall Time	—	—	—	5	ns
MPW	Minimum Pulse Width	—	—	—	10	ns
$t_{JIT(PK)}$	Peak Eye Diagram Jitter (Note 10)	—	—	350	—	ps

Switching Characteristics – 3.3V Supply (V_{CC1} = V_{CC2} = 3.3V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t_{PLH}, t_{PHL}	Propagation Delay Time	—	—	10.5	18.5	ns
PWD	Pulse Width Distortion $\|t_{PHL} - t_{PLH}\|$	—	—	0.5	5	ns
$t_{sk(o)}$	Channel-to-Channel Output Skew Time (Note 8)	Same direction channels	—	—	4	ns
$t_{sk(pp)}$	Part-to-Part Skew Time (Note 9)	—	—	—	5	ns
t_r	Output Signal Rise Time	—	—	—	5	ns
t_f	Output Signal Fall Time	—	—	—	5	ns
MPW	Minimum Pulse Width	—	—	—	10	ns
$t_{JIT(PK)}$	Peak Eye Diagram Jitter (Note 10)	—	—	350	—	ps

Switching Characteristics – 2.5V Supply (V_{CC1} = V_{CC2} = 2.5V ± 10%, T_A = -40°C to +125°C. Unless otherwise noted, typical values are at T_A = +25°C.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
t_{PLH}, t_{PHL}	Propagation Delay Time	—	—	11	21	ns
PWD	Pulse Width Distortion $\|t_{PHL} - t_{PLH}\|$	—	—	0.5	5	ns
$t_{sk(o)}$	Channel-to-Channel Output Skew Time (Note 8)	Same direction channels	—	—	4	ns
$t_{sk(pp)}$	Part-to-Part Skew Time (Note 9)	—	—	—	5	ns
t_r	Output Signal Rise Time	—	—	—	5	ns
t_f	Output Signal Fall Time	—	—	—	5	ns
MPW	Minimum Pulse Width	—	—	—	10	ns
$t_{JIT(PK)}$	Peak Eye Diagram Jitter (Note 10)	—	—	350	—	ps

Notes:
8. $t_{sk(o)}$ is the skew between outputs of a single device with all inputs connected and outputs switching in the same direction with same loads.
9. $t_{sk(pp)}$ is the magnitude of the difference in propagation delay times between any terminals of different devices switching in the same direction while operating at identical supply voltages, temperature, input signals and loads.
10. Parameter is not subject to production test - verified by design/characterization.

Insulation Characteristics Curves

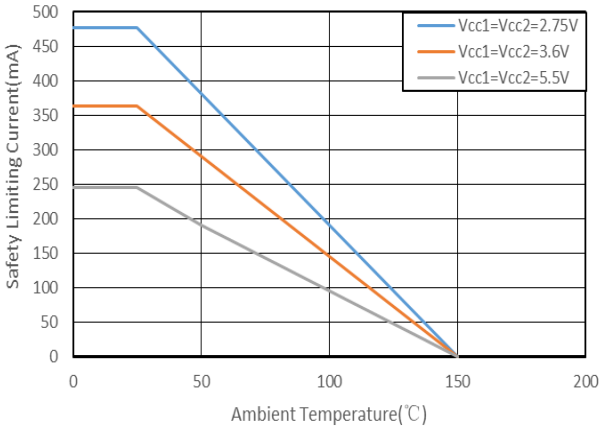


Figure 3. Thermal Derating Curve for Limiting Current per VDE for SO-8W (Type CJ) Package

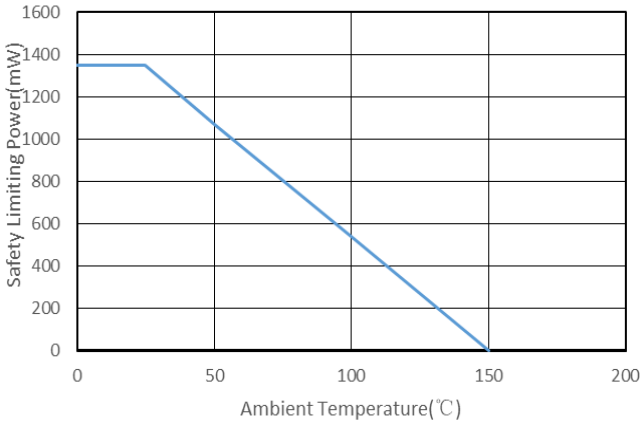
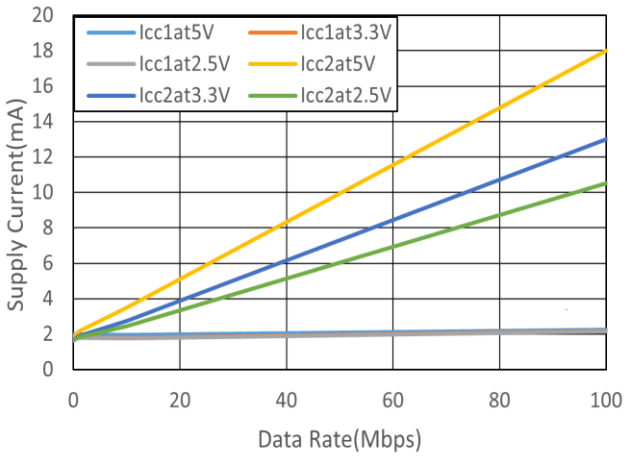
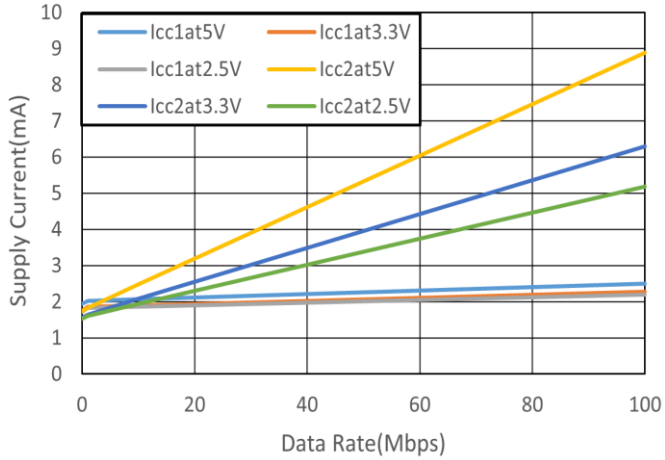


Figure 4. Thermal Derating Curve for Limiting Power per VDE for SO-8W (Type CJ) Package

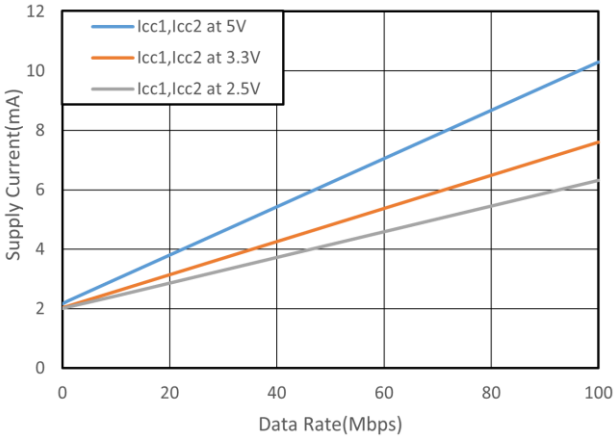
Typical Characteristics



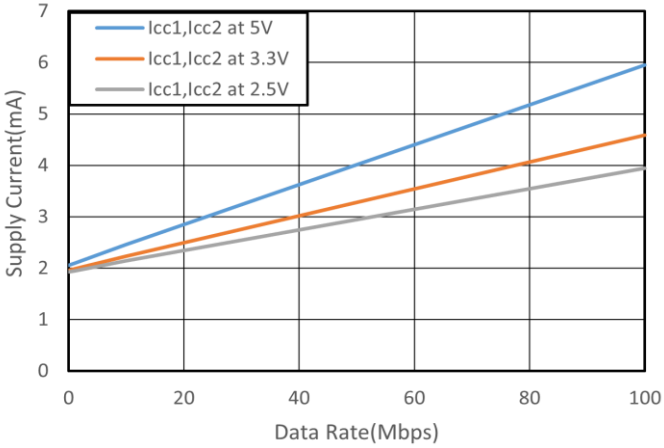
T_A = +25°C CL = 15pF
Figure 5. API7720 Supply Current vs. Data Rate (With 15pF Load)



T_A = +25°C CL = No Load
Figure 6. API7720 Supply Current vs. Data Rate (With No Load)



T_A = +25°C CL = 15pF
Figure 7. API7721/AP7722 Supply Current vs. Data Rate (With 15pF Load)



T_A = +25°C CL = No Load
Figure 8. API7721/AP7722 Supply Current vs. Data Rate (With No Load)

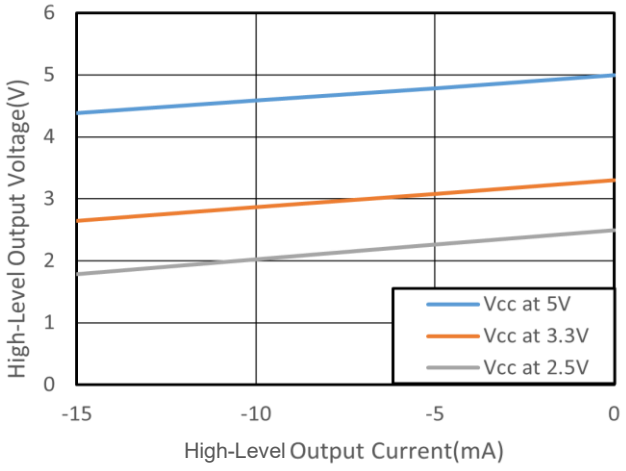


Figure 9. High-Level Output Voltage vs. High-Level Output Current

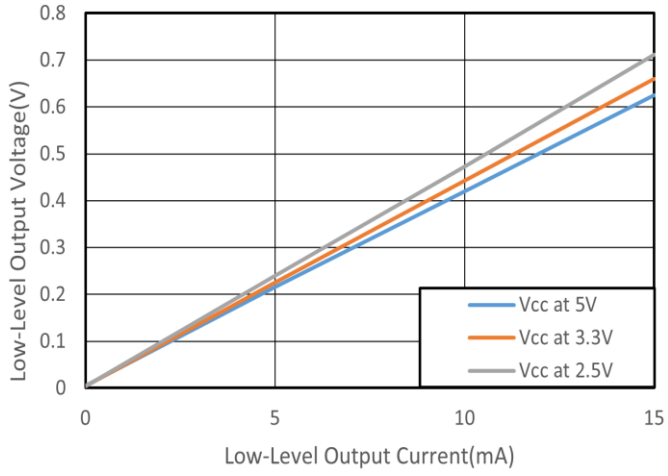


Figure 10. Low-Level Output Voltage vs. Low-Level Output Current

Typical Characteristics (continued)

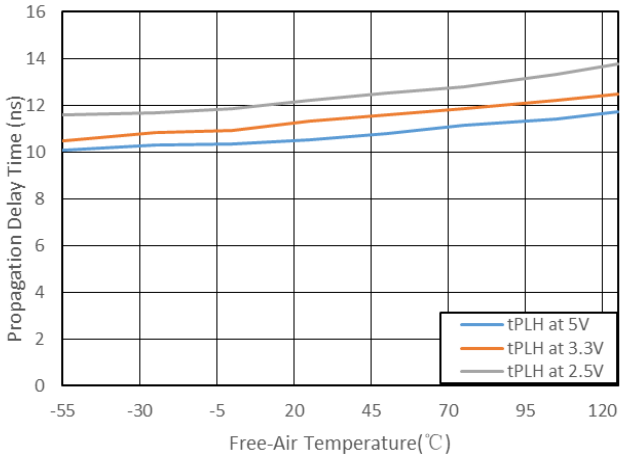


Figure 11. Propagation Delay Time vs. Free-Air Temperature

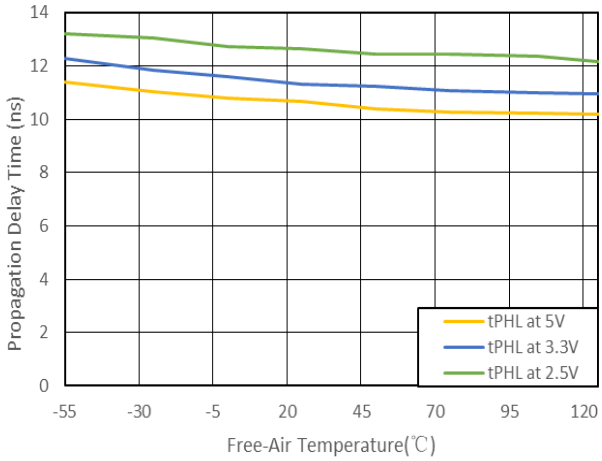


Figure 12. Propagation Delay Time vs. Free-Air Temperature

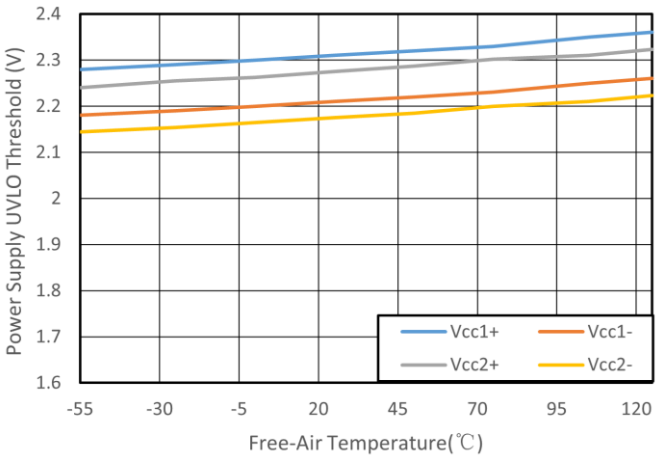
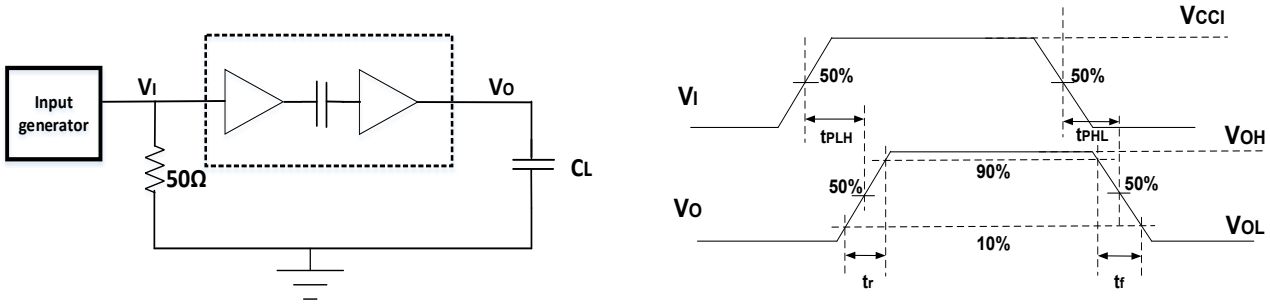


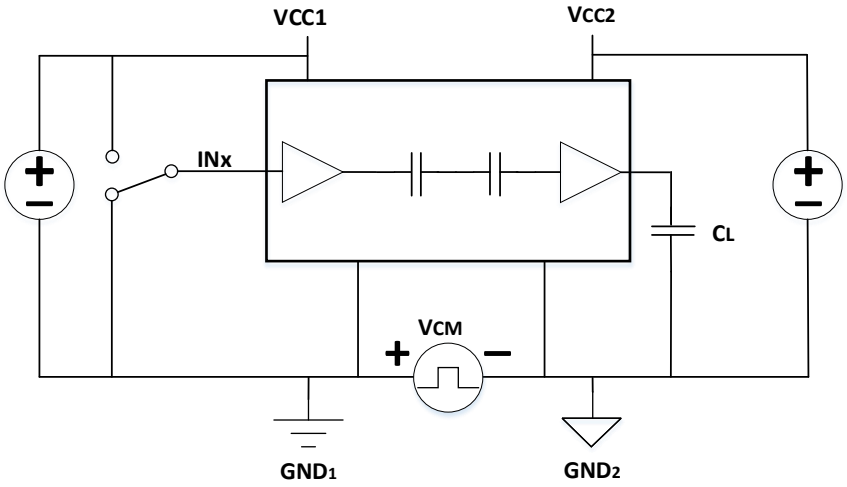
Figure 13. Power-Supply Undervoltage Threshold vs. Free-Air Temperature

Parameter Measurement



A. The input pulse is supplied by a generator having the following characteristics: PRR ≤ 50kHz, 50% duty cycle, tr ≤ 3ns, tf ≤ 3ns, ZO = 50Ω. At the input, 50Ω resistor is required to terminate input generator signal. It is not needed in actual application.
B. CL = 15pF and includes instrumentation and fixture capacitance within ±20%.

Figure 14. Switching Characteristics Test Circuit and Voltage Waveforms



A. CL = 15pF and includes instrumentation and fixture capacitance within ±20%.

Figure 15. Common-Mode Transient Immunity Test Circuit

Operation Description

Overview

The API772X/API772XF family of devices is a dual-channel isolator based on ON-OFF keying (OOK) modulation scheme to transfer digital data through capacitive isolation barrier. The different states of digital data were modulated with high-frequency carrier at the transmitter side and demodulated at receiver side by advanced signal process technique, and the accomplished circuit technique were incorporated to enhance the CMTI performance and minimize the influence of radiated emissions.

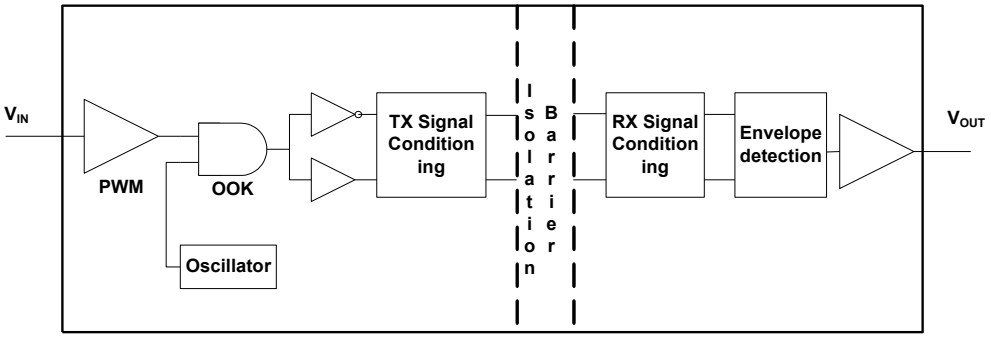


Figure 16. API772X Internal Block Diagram

Operation Description (continued)

A concept of OOK modulation scheme works:

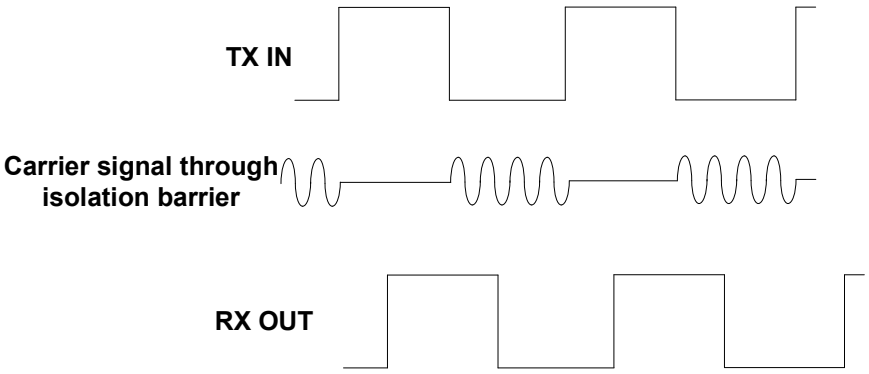


Figure 17. ON-OFF Keying (OOK) Modulation Scheme

Device Functional Modes:

Below table lists the functional modes for the API772X devices.

Input	V_{CCI} Status	V_{CCO} Status	Output	Comment
H	Ready	Ready	H	Normal operation.
L	Ready	Ready	L	
O	Ready	Ready	Default	Default mode: When INx is open, the corresponding channel output goes to the default logic state. The default is High for API7720/21/22 and Low for API7720F/21F/22F.
X	Unready	Ready	Default	Default mode: When V_{CCI} is unpowered, a channel output assumes the logic state based on the selected default option. The default is High for API7720/21/22 and Low for API7720F/21F/22F. When V_{CCI} transitions from unpowered to powered-up, a channel output assumes the logic state of the input. When V_{CCI} transitions from powered-up to unpowered, a channel output assumes the selected default state.
X	X	Unready	Undetermined	When V_{CCO} is unpowered, a channel output is undetermined. When V_{CCO} transitions from unpowered to powered-up, a channel output assumes the logic state of the input.

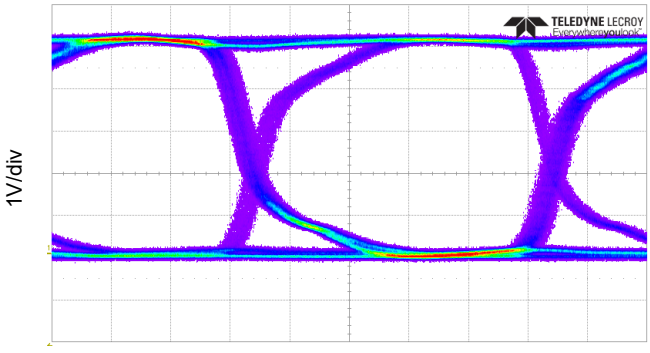
Note: H = Logic High; L = Logic Low; O = Left Open; X = Irrelevant.

Table 2. API772X Function Table

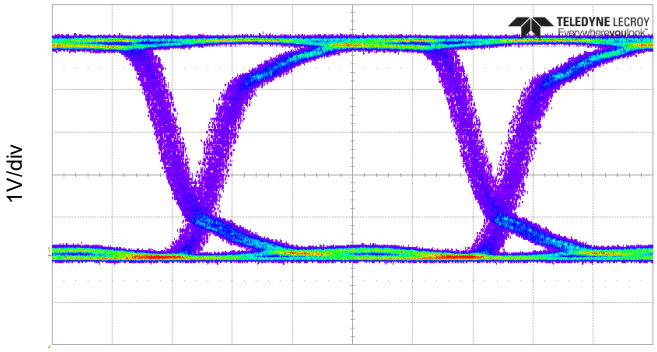
Application and Implementation

Application Curve

The following typical eye diagrams of the API772X family of devices indicate low jitter and wide open eye at the maximum data rate of 100Mbps.



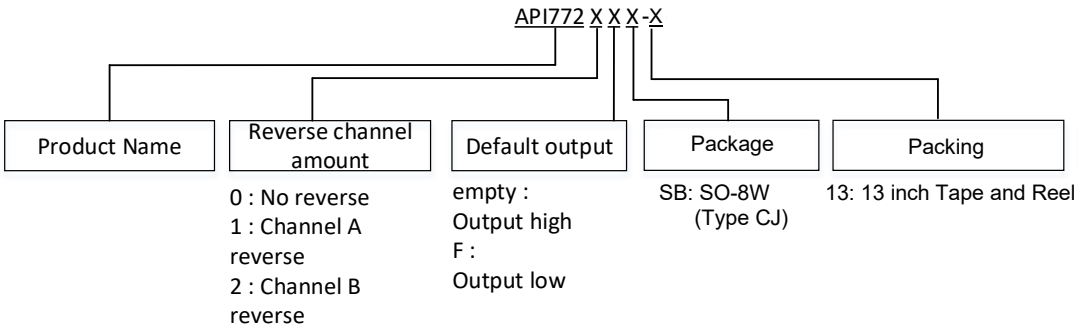
Time = 2ns/div
API7720 Eye Diagram at 100Mbps, 5V Supplies and +25°C



Time = 2ns/div
API7721/API7722 Eye Diagram at 100Mbps, 5V Supplies and +25°C

Figure 18. API7720/21/22 Eye Diagram

Ordering Information (Note 11)



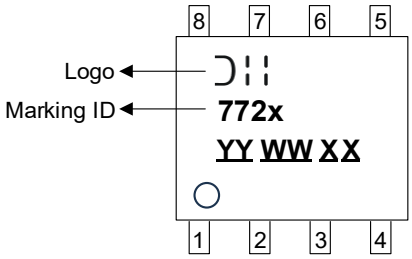
Orderable Part Number	Marking ID	Package	Packing	
			Qty.	Carrier
API7720SB-13	7720	SO-8W (Type CJ)	1000	13'' Tape and Reel
API7721SB-13	7721	SO-8W (Type CJ)	1000	13'' Tape and Reel
API7722SB-13	7722	SO-8W (Type CJ)	1000	13'' Tape and Reel
API7720FSB-13	7720F	SO-8W (Type CJ)	1000	13'' Tape and Reel
API7721FSB-13	7721F	SO-8W (Type CJ)	1000	13'' Tape and Reel
API7722FSB-13	7722F	SO-8W (Type CJ)	1000	13'' Tape and Reel

Note: 11. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SO-8W (Type CJ)

(Top View)

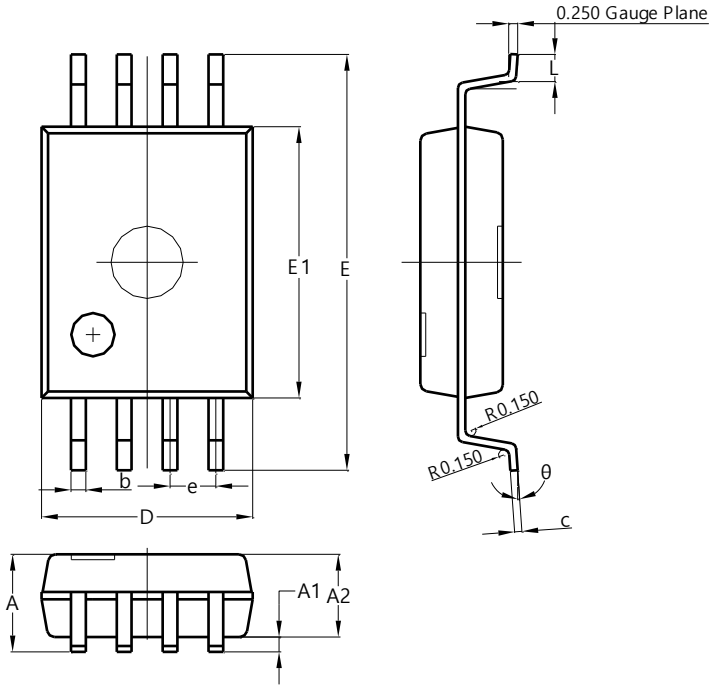


YY : Year : 25, 26, 27~
WW : Week : 01 to 52; 52 Represents 52 and 53 Week
XX : Internal Code

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8W (Type CJ)

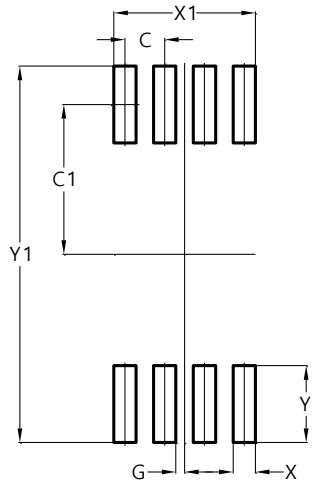


SO-8W (Type CJ)		
Dim	**Min**	**Max**
A	--	2.800
A1	0.360	0.460
A2	2.186	2.386
b	0.310	0.510
c	0.153	0.303
D	5.750	5.950
E	11.250	11.750
E1	7.400	7.600
e	1.140	1.400
L	0.500	1.000
A	0°	8°
All dimensions in mm		

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SO-8W (Type CJ)



Dimensions	Value (in mm)
C	1.270
C1	4.775
G	0.280
X	0.710
X1	4.520
Y	2.450
Y1	12.000
All dimensions in mm	

Mechanical Data

SO-8W (Type CJ)

- Moisture Sensitivity: Level 3 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per JESD22-B102 e3
- Weight: 0.143 grams (Approximate)

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