Low-Power 5 KV(rms) Dual Digital Isolators

Check for Samples: ISO7520C, ISO7521C

FEATURES

- **Highest Signaling Rate: 1 Mbps**
- **Propagation Delay Less Than 20 ns**
- **Low Power Consumption**
- **Wide Ambient Temperature: –40°C to 105°C**
- **Safety and Regulatory Approvals**
  - **UL 1577 Approved with 4243 Vrms Rating**
  - **CSA CA Notice 5A, IEC 60747-5-2, IEC 60601-1, 60950-1, and 61010-1 Approved**
- **50 kV/μs Transient Immunity Typical**
- **Operates From 3.3V or 5V Supply and Logic Levels**

APPLICATIONS

- **Opto-Coupler Replacement in:**
  - **Medical Applications for IEC 60601-1 (5 KVrms Rated)**
  - **Industrial Field-Bus**
    - **ProfiBus**
    - **ModBus**
    - **DeviceNetTM Data Buses**
  - **Servo Control Interface**
  - **Motor Control**
  - **Power Supply**
  - **Battery Packs**

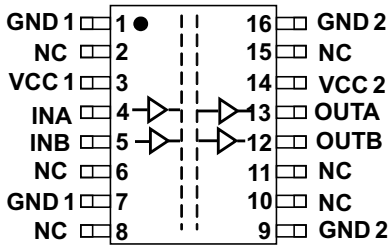
DESCRIPTION

The ISO7520C and ISO7521C provide galvanic isolation of up to 4243 Vrms for 1 minute per UL. These devices are also certified to 5000 Vrms reinforced insulation per end equipment standards IEC 60950-1, 61010-1, and 60601-1. These digital isolators have two isolated channels with uni-directional (ISO7520C) and bi-directional (ISO7521C) channel configurations. Each isolation channel has a logic input and output buffer separated by a silicon oxide (SiO_2) insulation barrier. Used in conjunction with isolated power supplies, these devices prevent noise currents on a data bus or other circuits from entering the local ground and interfering with or damaging sensitive circuitry.

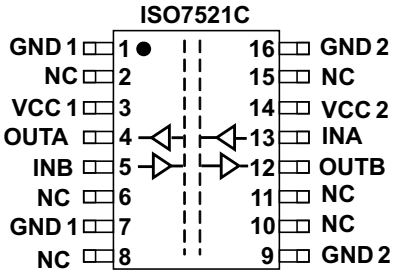
The devices have TTL input thresholds and require two supply voltages, 3.3V or 5V, or any combination. All inputs are 5-V tolerant when supplied from a 3.3-V supply.

Note: The ISO7520C and ISO7521C are specified for signaling rates up to 1 Mbps. Due to their fast response time, under most cases, these devices will also transmit data with much shorter pulse widths. Designers should add external filtering to remove spurious signals with input pulse duration < 20 ns if desired.

ISO7520C



ISO7521C



NC = No Internal Connection

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Table 1. PIN DESCRIPTIONS

PIN			I/O	DESCRIPTION
NAME	ISO7520C	ISO7521C		
INA	4	13	I	Input, channel A
INB	5	5	I	Input, channel B
GND1	1, 7	1, 7	–	Ground connection for V_{CC1}
GND2	9, 16	9, 16	–	Ground connection for V_{CC2}
OUTA	13	4	O	Output, channel A
OUTB	12	12	O	Output, channel B
V_{CC1}	3	14	–	Power supply, V_{CC1}
V_{CC2}	3	14	–	Power supply, V_{CC2}
NC	2, 6, 8, 10, 11, 15	2, 6, 8, 10, 11, 15	-	No Connect Pin

DEVICE FUNCTION TABLE

INPUT SIDE (VCC)(1)	OUTPUT SIDE (VCC)(1)	INPUT (IN)(1)	OUTPUT (OUT)(1)
PU	PU	H	H
		L	L
		Open	H
PD	PU	X	H

(1) PU = Powered Up (Vcc ≥ 3.15V); PD = Powered Down (Vcc ≤ 2.4V); X = Irrelevant; H = High Level; L = Low Level

AVAILABLE OPTIONS

PRODUCT	RATED T_A	MARKED AS	ORDERING NUMBER
ISO7520C	–40°C to 105°C	ISO7520CDW	ISO7520CDW (rail)
			ISO7520CDWR (reel)
ISO7521C	–40°C to 105°C	ISO7521CDW	ISO7521CDW (rail)
			ISO7521CDWR (reel)

ABSOLUTE MAXIMUM RATINGS(1)

					VALUE	UNIT
V_{CC}	Supply voltage(2), V_{CC1}, V_{CC2}				–0.5 V to 6	V
V_I	Voltage at IN, OUT				–0.5 V to 6	V
I_O	Output Current				±15	mA
ESD	Electrostatic discharge	Human Body Model	JEDEC Standard 22, Test Method A114-C.01	All pins	±4	kV
		Field-Induced-Charged Device Model	JEDEC Standard 22, Test Method C101		±1	kV
		Machine Model	ANSI/ESDS5.2-1996		±200	V
T_J	Maximum junction temperature				150	°C

(1) Stresses beyond those listed under *absolute maximum ratings* may 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-rated conditions for extended periods may affect device reliability.
(2) All voltage values except differential I/O bus voltages are with respect to network ground terminal and are peak voltage values.

THERMAL INFORMATION

THERMAL METRIC		ISO752xC DW 16 PINS	UNITS
θ_{JA}	Junction-to-ambient thermal resistance(1)	79.9	°C/W
θ_{JCtop}	Junction-to-case (top) thermal resistance(2)	44.6	
θ_{JB}	Junction-to-board thermal resistance(3)	51.2	
ψ_{JT}	Junction-to-top characterization parameter(4)	18.0	
ψ_{JB}	Junction-to-board characterization parameter(5)	42.2	
θ_{JCbot}	Junction-to-case (bottom) thermal resistance(6)	n/a	
P_D	Device power dissipation, Vcc1 = Vcc2 = 5.25 V, T_J = 150°C, C_L = 15 pF, Input a 0.5 MHz 50% duty cycle square wave	42	mW

(1) The junction-to-ambient thermal resistance under natural convection is obtained in a simulation on a JEDEC-standard, high-K board, as specified in JESD51-7, in an environment described in JESD51-2a.
(2) The junction-to-case (top) thermal resistance is obtained by simulating a cold plate test on the package top. No specific JEDEC-standard test exists, but a close description can be found in the ANSI SEMI standard G30-88.
(3) The junction-to-board thermal resistance is obtained by simulating in an environment with a ring cold plate fixture to control the PCB temperature, as described in JESD51-8.
(4) The junction-to-top characterization parameter, ψ_{JT}, estimates the junction temperature of a device in a real system and is extracted from the simulation data for obtaining θ_{JA}, using a procedure described in JESD51-2a (sections 6 and 7).
(5) The junction-to-board characterization parameter, ψ_{JB}, estimates the junction temperature of a device in a real system and is extracted from the simulation data for obtaining θ_{JA} , using a procedure described in JESD51-2a (sections 6 and 7).
(6) The junction-to-case (bottom) thermal resistance is obtained by simulating a cold plate test on the exposed (power) pad. No specific JEDEC standard test exists, but a close description can be found in the ANSI SEMI standard G30-88.

RECOMMENDED OPERATING CONDITIONS

over operating free-air temperature range (unless otherwise noted)

		MIN	TYP	MAX	UNIT
V_{CC1}, V_{CC2}	Supply voltage - 3.3V Operation	3.15	3.3	3.45	V
	Supply voltage - 5V Operation	4.75	5	5.25	
I_{OH}	High-level output current	–4			mA
I_{OL}	Low-level output current			4	mA
V_{IH}	High-level output voltage	2		V_{CC}	V
V_{IL}	Low-level output voltage	0		0.8	V
T_A	Ambient Temperature	-40		105	°C
T_J(1)	Junction temperature	–40		136	°C
$1/t_{ui}$	Signaling rate	0		1	Mbps
t_{ui}	Input pulse duration	1			µs

(1) To maintain the recommended operating conditions for T_J, see the *Thermal Information* table

ELECTRICAL CHARACTERISTICS

V_{CC1} and V_{CC2} at 5 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage	I_{OH} = –4 mA; See Figure 1		V_{CC} –0.8	4.6		V
		I_{OH} = –20 µA; See Figure 1		V_{CC} –0.1	5		
V_{OL}	Low-level output voltage	I_{OL} = 4 mA; See Figure 1			0.2	0.4	V
		I_{OL} = 20 µA; See Figure 1			0	0.1	
$V_{I(HYS)}$	Input threshold voltage hysteresis				400		mV
I_{IH}	High-level input current	INx at 0 V or V_{CC}				10	µA
I_{IL}	Low-level input current			–10			µA
CMTI	Common-mode transient immunity	V_I = V_{CC} or 0 V; See Figure 3		25	50		kV/µs
SUPPLY CURRENT (All inputs switching with square wave clock signal for dynamic ICC measurement)							
	ISO7520C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		0.4	1	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		3	6	mA
	ISO7521C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4	mA

SWITCHING CHARACTERISTICS

V_{CC1} and V_{CC2} at 5 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}, t_{PHL}	Propagation delay time	See Figure 1		9	14	ns
PWD (1)	Pulse width distortion $\|t_{PHL} - t_{PLH}\|$			0.3	3.7	ns
$t_{sk(pp)}$	Part-to-part skew time				4.9	ns
$t_{sk(o)}$	Channel-to-channel output skew time				3.6	ns
t_r	Output signal rise time	See Figure 1		1		ns
t_f	Output signal fall time			1		ns
t_{fs}	Fail-safe output delay time from input power loss	See Figure 2		6		µs

(1) Also known as pulse skew.

ELECTRICAL CHARACTERISTICS

V_{CC1} at 5 V ± 5%, V_{CC2} at 3.3 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage	I_{OH} = –4 mA; See Figure 1	ISO7521C (5-V side)	V_{CC} –0.8	4.6		V
			ISO7520C/7521C(3.3-V side)	V_{CC} –0.4	3		
		I_{OH} = –20 µA; See Figure 1		V_{CC} –0.1	V_{CC}		
V_{OL}	Low-level output voltage	I_{OL} = 4 mA; See Figure 1			0.2	0.4	V
		I_{OL} = 20 µA; See Figure 1			0	0.1	
$V_{I(HYS)}$	Input threshold voltage hysteresis				400		mV
I_{IH}	High-level input current	INx at 0 V or V_{CC}				10	µA
I_{IL}	Low-level input current			–10			µA
CMTI	Common-mode transient immunity	V_I = V_{CC} or 0 V; See Figure 3		25	40		kV/µs
SUPPLY CURRENT (All inputs switching with square wave clock signal for dynamic ICC measurement)							
	ISO7520C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		0.4	1	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4.5	mA
	ISO7521C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		1.5	3.5	mA

SWITCHING CHARACTERISTICS

V_{CC1} at 5 V ± 5%, V_{CC2} at 3.3 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}, t_{PHL}	Propagation delay time	See Figure 1		10	17	ns
PWD(1)	Pulse width distortion $\lvert t_{PHL} - t_{PLH} \rvert$			0.5	5.6	ns
$t_{sk(pp)}$	Part-to-part skew time				6.3	ns
$t_{sk(o)}$	Channel-to-channel output skew time				4	ns
t_r	Output signal rise time	See Figure 1		2		ns
t_f	Output signal fall time			2		ns
t_{fs}	Fail-safe output delay time from input power loss	See Figure 2		6		µs

(1) Also known as pulse skew.

ELECTRICAL CHARACTERISTICS

V_{CC1} at 3.3 V ± 5%, V_{CC2} at 5 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage	I_{OH} = –4 mA; See Figure 1	ISO7520C/7521C (5-V side)	V_{CC} –0.8	4.6		V
			ISO7521C (3.3-V side)	V_{CC} –0.4	3		
		I_{OH} = –20 µA; See Figure 1		V_{CC} –0.1	V_{CC}		
V_{OL}	Low-level output voltage	I_{OL} = 4 mA; See Figure 1			0.2	0.4	V
		I_{OL} = 20 µA; See Figure 1			0	0.1	
$V_{I(HYS)}$	Input threshold voltage hysteresis				400		mV
I_{IH}	High-level input current	INx at 0 V or V_{CC}				10	µA
I_{IL}	Low-level input current			–10			µA
CMTI	Common-mode transient immunity	V_I = V_{CC} or 0 V; See Figure 3		25	40		kV/µs
SUPPLY CURRENT (All inputs switching with square wave clock signal for dynamic ICC measurement)							
	ISO7520C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		0.2	0.7	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		3	6	mA
	ISO7521C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		1.5	3.5	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4	mA

SWITCHING CHARACTERISTICS

V_{CC1} at 3.3 V ± 5%, V_{CC2} at 5 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}, t_{PHL}	Propagation delay time	See Figure 1		10	17	ns
PWD(1)	Pulse width distortion $\lvert t_{PHL} - t_{PLH} \rvert$			0.5	4	ns
$t_{sk(pp)}$	Part-to-part skew time				8.5	ns
$t_{sk(o)}$	Channel-to-channel output skew time				4	ns
t_r	Output signal rise time	See Figure 1		2		ns
t_f	Output signal fall time			2		ns
t_{fs}	Fail-safe output delay time from input power loss	See Figure 2		6		µs

(1) Also known as pulse skew.

ELECTRICAL CHARACTERISTICS

V_{CC1} and V_{CC2} at 3.3 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage	I_{OH} = –4 mA; See Figure 1		V_{CC} –0.4	3		V
		I_{OH} = –20 µA; See Figure 1		V_{CC} –0.1	3.3		
V_{OL}	Low-level output voltage	I_{OL} = 4 mA; See Figure 1			0.2	0.4	V
		I_{OL} = 20 µA; See Figure 1			0	0.1	
$V_{I(HYS)}$	Input threshold voltage hysteresis				400		mV
I_{IH}	High-level input current	INx at 0 V or V_{CC}					µA
I_{IL}	Low-level input current			–10			µA
CMTI	Common-mode transient immunity	V_I = V_{CC} or 0 V; See Figure 3		25	40		kV/µs
SUPPLY CURRENT (All inputs switching with square wave clock signal for dynamic ICC measurement)							
	ISO7520C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		0.2	0.7	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		2	4.5	mA
	ISO7521C						
I_{CC1}	Supply current for V_{CC1}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		1.5	3.5	mA
I_{CC2}	Supply current for V_{CC2}	DC to 1 Mbps	V_I = V_{CC} or 0 V, 15 pF load		1.5	3.5	mA

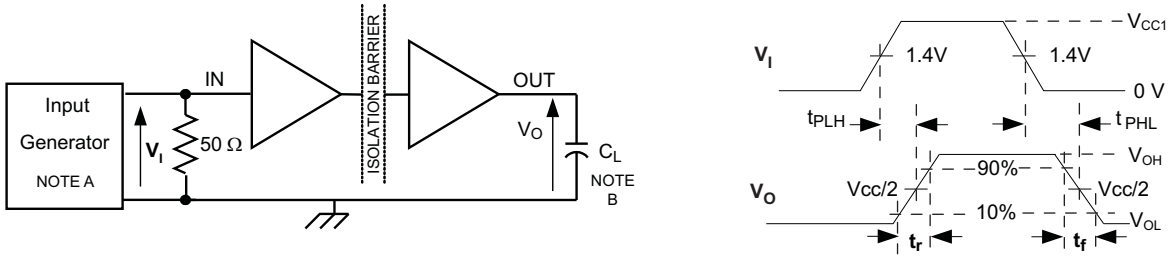
SWITCHING CHARACTERISTICS

V_{CC1} and V_{CC2} at 3.3 V ± 5%, T_A = –40°C to 105°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}, t_{PHL}	Propagation delay time	See Figure 1		12	20	ns
PWD (1)	Pulse width distortion $\lvert t_{PHL} - t_{PLH} \rvert$			1	5	ns
$t_{sk(pp)}$	Part-to-part skew time				6.8	ns
$t_{sk(o)}$	Channel-to-channel output skew time				5.5	ns
t_r	Output signal rise time	See Figure 1		2		ns
t_f	Output signal fall time			2		ns
t_{fs}	Fail-safe output delay time from input power loss	See Figure 2		6		µs

(1) Also known as pulse skew.

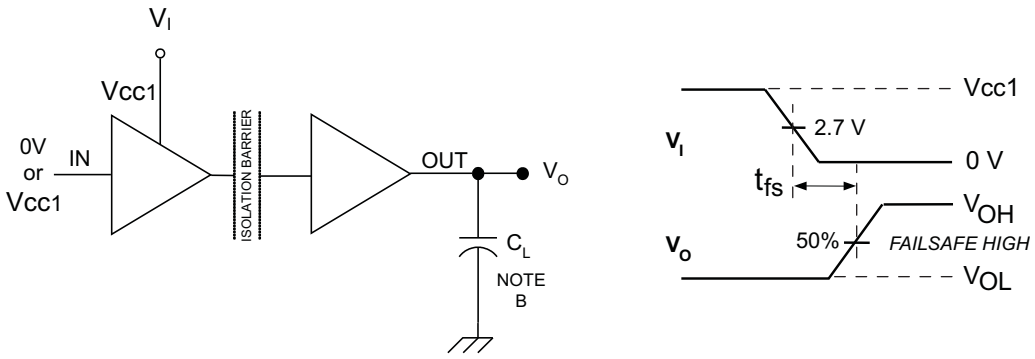
PARAMETER MEASUREMENT INFORMATION



A. The input pulse is supplied by a generator having the following characteristics: PRR ≤ 50 kHz, 50% duty cycle, t_r ≤ 3ns, t_f ≤ 3ns, Z_O = 50Ω.

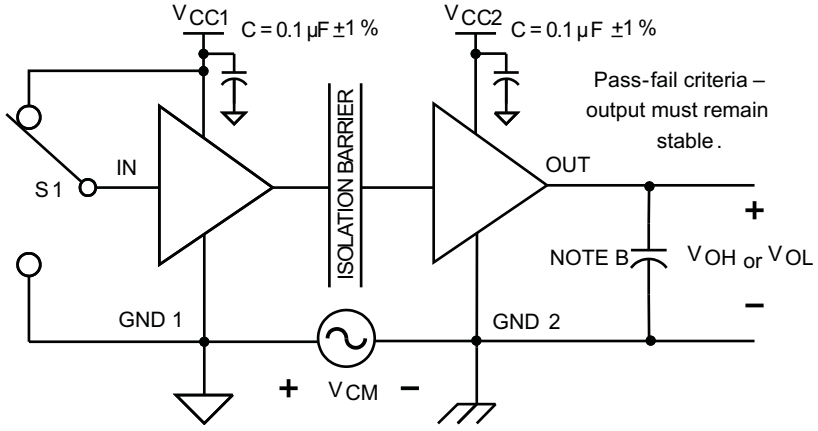
B. C_L = 15 pF and includes instrumentation and fixture capacitance within ±20%.

Figure 1. Switching Characteristic Test Circuit and Voltage Waveforms



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

Figure 2. Failsafe Delay Time Test Circuit and Voltage Waveforms



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

Figure 3. Common-Mode Transient Immunity Test Circuit

DEVICE INFORMATION

PACKAGE CHARACTERISTICS

over recommended operating conditions (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
L(I01)	Minimum air gap (Clearance)	Shortest terminal to terminal distance through air	8.34			mm
L(I02)	Minimum external tracking (Creepage)	Shortest terminal to terminal distance across the package surface	8.1			mm
CTI	Tracking resistance (Comparative Tracking Index)	DIN IEC 60112 / VDE 0303 Part 1	≥400			V
	Minimum internal gap (Internal Clearance)	Distance through the insulation	0.014			mm
R_{IO}	Isolation resistance, input to output(1)	Input to output, V_{IO} = 500 V, all pins on each side of the barrier tied together creating a two-terminal device		$>10^{12}$		Ω
C_{IO}	Barrier capacitance input to output(1)	V_{IO} = 0.4 sin(2πft), f = 1 MHz		2		pF
C_I	Input capacitance to ground(2)	V_I = Vcc/2 + 0.4 sin(2πft), f = 1 MHz, Vcc = 5 V		2		pF

(1) All pins on each side of the barrier tied together creating a two-terminal device.
(2) Measured from input pin to ground.

NOTE

Creepage and clearance requirements should be applied according to the specific equipment isolation standards of an application. Care should be taken to maintain the creepage and clearance distance of a board design to ensure that the mounting pads of the isolator on the printed circuit board do not reduce this distance

Creepage and clearance on a printed circuit board become equal according to the measurement techniques shown in the Isolation Glossary. Techniques such as inserting grooves and/or ribs on a printed circuit board are used to help increase these specifications.

IEC 60664-1 RATINGS TABLE

PARAMETER	TEST CONDITIONS	SPECIFICATION
Basic Isolation Group	Material Group	II
Installation Classification	Rated mains voltages <= 150 Vrms	I - IV
	Rated mains voltages <= 300 Vrms	I - IV
	Rated mains voltages <= 600 Vrms	I - III
	Rated mains voltages <= 1000 Vrms	I - II

INSULATION CHARACTERISTICS

over recommended operating conditions (unless otherwise noted)

PARAMETER		TEST CONDITIONS	SPECIFICATION	UNIT
V_{IORM}	Maximum working insulation voltage		1414 (1)	Vpeak
V_{PR}	Input to output test voltage	Method a, After environmental tests subgroup 1, $V_{PR} = V_{IORM}$ x 1.6, t = 10 s, Partial discharge < 5 pC	2262	Vpeak
		Method b1, $V_{PR} = V_{IORM}$ x 1.875, t = 1 s (100% Production test) Partial discharge < 5 pC	2651	
		After Input/Output Safety Test Subgroup 2/3, $V_{PR} = V_{IORM}$ x 1.2, t = 10 s, Partial discharge < 5 pC	1697	
V_{IOTM}	Transient overvoltage	t = 60 sec (qualification)	6000	Vpeak
V_{ISO}	Isolation voltage per UL 1577	$V_{TEST} = V_{ISO}$, t = 60 sec (qualification)	4243	Vrms
		$V_{TEST} = 1.2 \times V_{ISO}$, t = 1 sec (100% production)	5092	
R_S	Insulation resistance	V_{TEST} = 500 V at T_S = 150°C	$>10^9$	Ω
	Pollution degree		2	

(1) For applications that require DC working voltages between GND1 and GND2, please contact Texas Instruments for further details.

REGULATORY INFORMATION

VDE	TUV	CSA	UL
Certified according to IEC 60747-5-2	Certified according to EN/UL/CSA 60950-1 & 61010-1	Approved under CSA Component Acceptance Notice	Recognized under 1577 Component Recognition Program
Basic Insulation Maximum Transient Overvoltage, 6000 V_{PK} Maximum Working Voltage, 1414 V_{PK}	5000 V_{RMS} Reinforced Insulation, 400 V_{RMS} maximum working voltage 5000 V_{RMS} Basic Insulation, 600 V_{RMS} maximum working voltage	5000 V_{RMS} Reinforced insulation, 2 Means of Patient Protection at 125 V_{RMS} per IEC 60601-1 (3rd Ed.)	Single Protection, 4243 V_{RMS} Isolation Voltage
File Number: 40016131	Certificate Number: U8V 11 08 77311 006	File Number: 220991	File Number: E181974

IEC SAFETY LIMITING VALUES

Safety limiting intends to prevent potential damage to the isolation barrier upon failure of input or output circuitry. A failure of the IO can allow low resistance to ground or the supply and, without current limiting, dissipate sufficient power to overheat the die and damage the isolation barrier potentially leading to secondary system failures.

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
Is	Safety input, output, or supply current	θ_{JA} =79.9°C/W, V_I = 5.25 V, T_J = 150°C, T_A = 25°C			298	mA
		θ_{JA} =79.9°C/W, V_I = 3.45 V, T_J = 150°C, T_A = 25°C			453	
Ts	Maximum Case Temperature				150	°C

The safety-limiting constraint is the absolute maximum junction temperature specified in the absolute maximum ratings table. The power dissipation and junction-to-air thermal impedance of the device installed in the application hardware determines the junction temperature. The assumed junction-to-air thermal resistance in the Thermal Characteristics table is that of a device installed on a High-K Test Board for Leaded Surface Mount Packages. The power is the recommended maximum input voltage times the current. The junction temperature is then the ambient temperature plus the power times the junction-to-air thermal resistance.

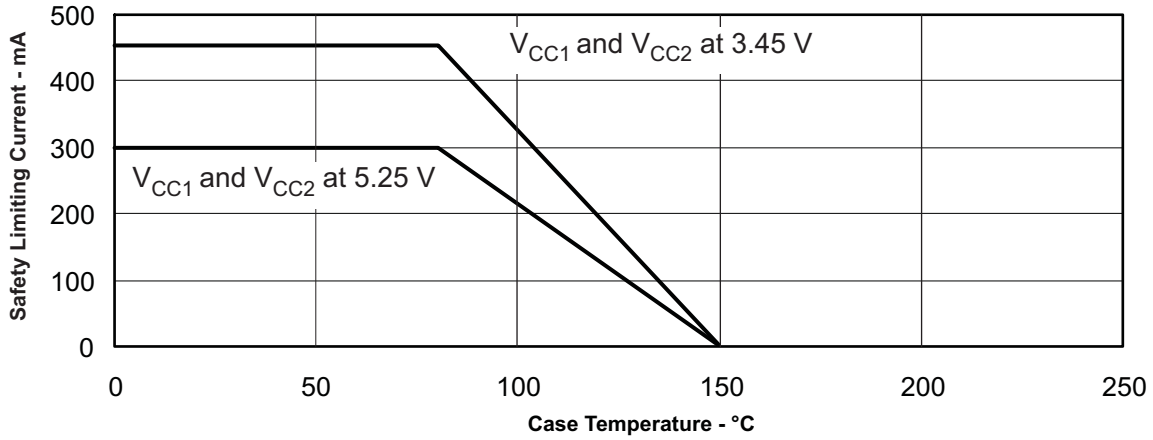


Figure 4. DW-16 Theta-JC Thermal Derating Curve per IEC 60747-5-2

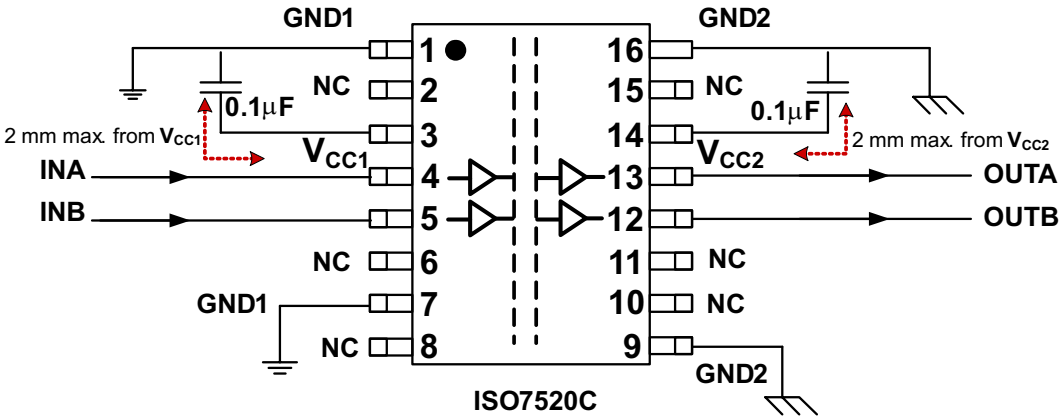


Figure 5. Typical ISO7520C Application Circuit

EQUIVALENT INPUT AND OUTPUT SCHEMATIC DIAGRAMS

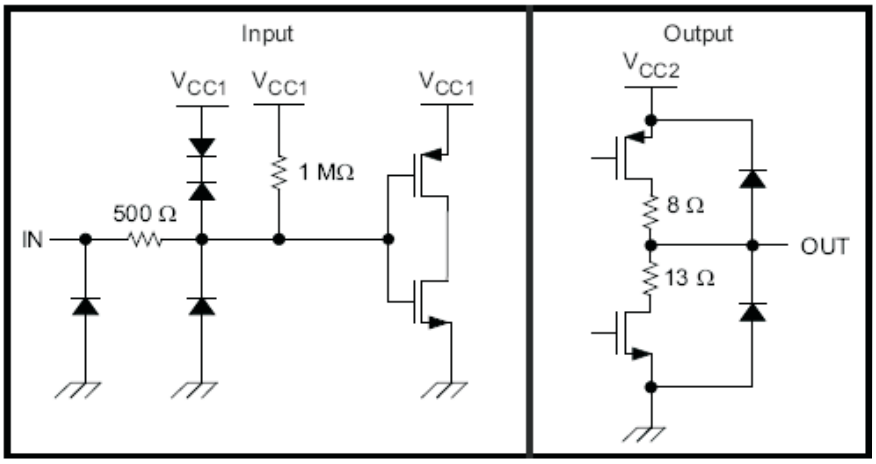


Figure 6. I/O Schematic

TYPICAL CHARACTERISTICS

INPUT VOLTAGE SWITCHING THRESHOLD vs FREE-AIR TEMPERATURE

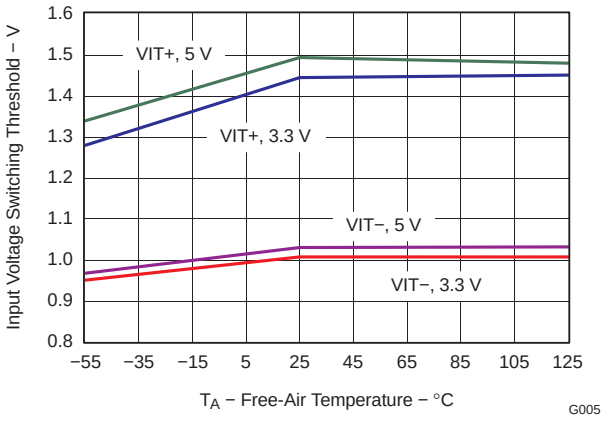


Figure 7.

FAIL-SAFE VOLTAGE THRESHOLD vs FREE-AIR TEMPERATURE

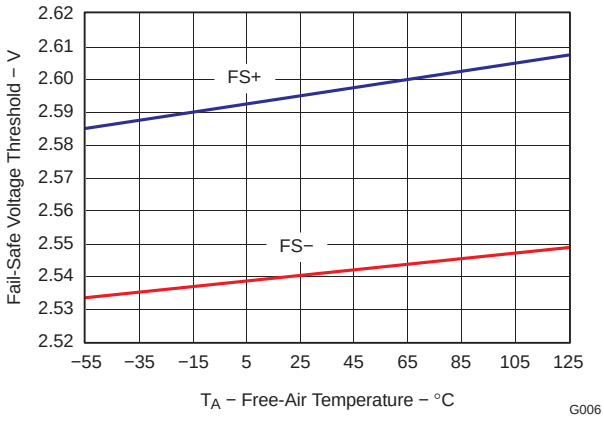


Figure 8.

HIGH-LEVEL OUTPUT CURRENT vs HIGH-LEVEL OUTPUT VOLTAGE

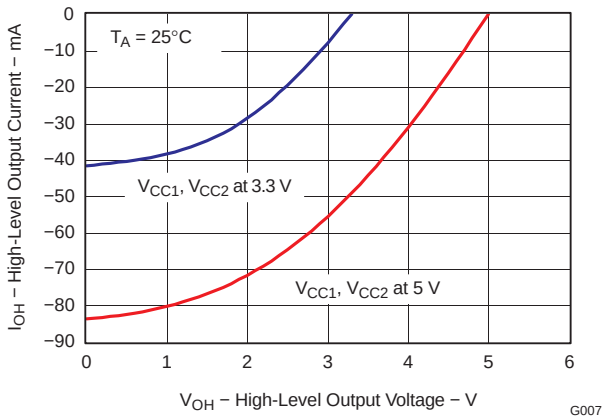


Figure 9.

LOW-LEVEL OUTPUT CURRENT vs LOW-LEVEL OUTPUT VOLTAGE

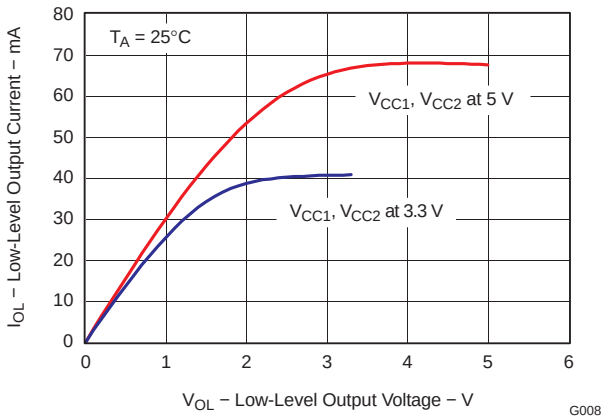


Figure 10.

REVISION HISTORY

Changes from Original (June 2010) to Revision A **Page**

- Added PIN DESCRIPTION table 2
- Changed t_{fs} units in Switching Characteristics Table 4
- Changed t_{fs} units in Switching Characteristics Table 5
- Changed t_{fs} units in Switching Characteristics Table 6
- Changed t_{fs} units in Switching Characteristics Table 7
- Changed Minimum internal gap limit from 0.016 to 0.014 mm. 9
- Deleted V_{IORM} test conditions from INSULATION CHARACTERSISTCS table 10
- Added V_{PR} parameter and Specifications in INSULATION CHARACTERSISTCS table 10
- Changed V_{IOTM} row of the INSULATION CHARACTERISTICS tables 10
- Changed V_{ISO} Specifications in INSULATION CHARACTERISTICS table 10

Changes from Revision A (September 2010) to Revision B **Page**

- Changed 5th Features subbullets 1
- Changed the first SWITCHING CHAR table, MAX value, 2nd row from 3.5 to 3.7 and third row from 4 to 4.9 4
- Changed the second SWITCHING CHAR table, MAX value, 2nd row from 4 to 5.6 and third row from 5 to 6.3 5
- Changed the third SWITCHING CHAR table, MAX value, 3rd row from 5 to 8.5 6
- Changed the fourth SWITCHING CHAR table, MAX value, 3rd row from 6 to 6.8 7
- Changed REGULATORY INFORMATION table , from: File Number: pending, to: File Number: E181974 10

Changes from Revision B (June 2011) to Revision C **Page**

- Changed all the devices numbers by adding a 'C' to the end 1
- Changed the Safety and Regulatory Approvals Feature 1
- Changed the Description section 1
- Changed the IEC 60664-1 Ratings Table 9
- Changed the INSULATION CHARACTERISTICS table 10
- Changed the REGULATORY INFORMATION table 10

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
ISO7520CDW	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 105	ISO7520CDW	Samples
ISO7520CDWR	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 105	ISO7520CDW	Samples
ISO7521CDW	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 105	ISO7521CDW	Samples
ISO7521CDWR	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 105	ISO7521CDW	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

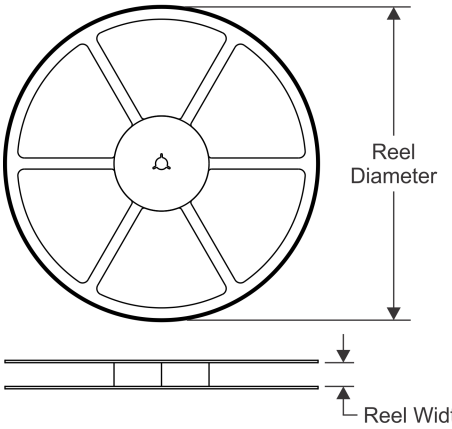
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

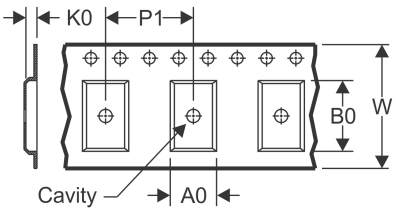
(4) Only one of markings shown within the brackets will appear on the physical device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

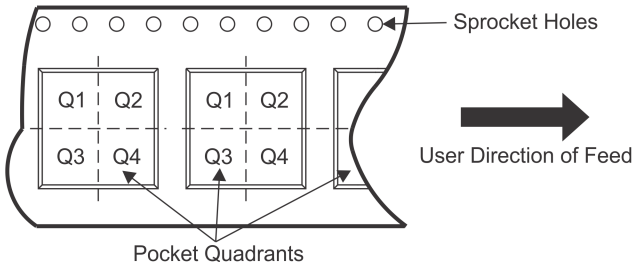


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

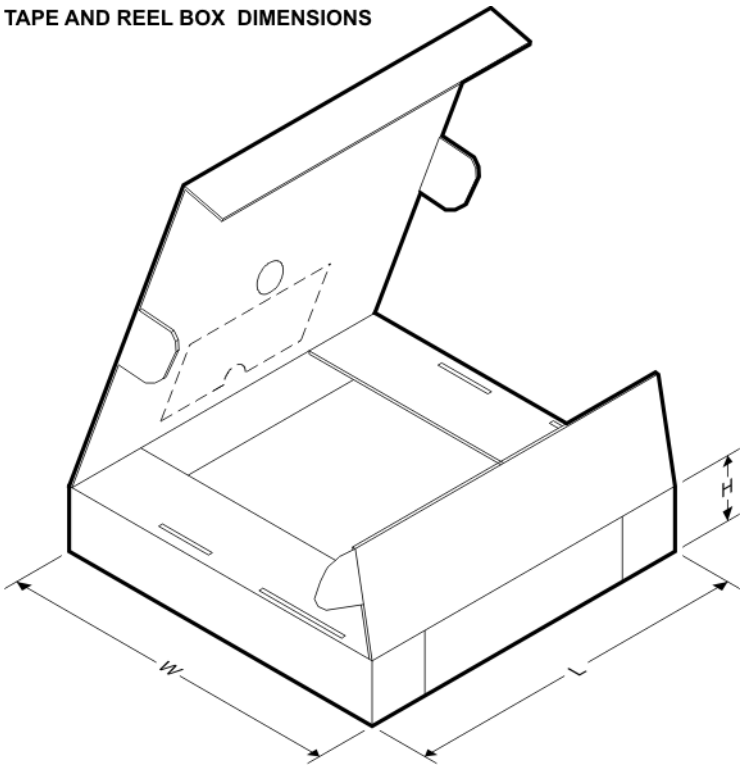
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ISO7521CDWR	SOIC	DW	16	2000	330.0	16.4	10.75	10.7	2.7	12.0	16.0	Q1

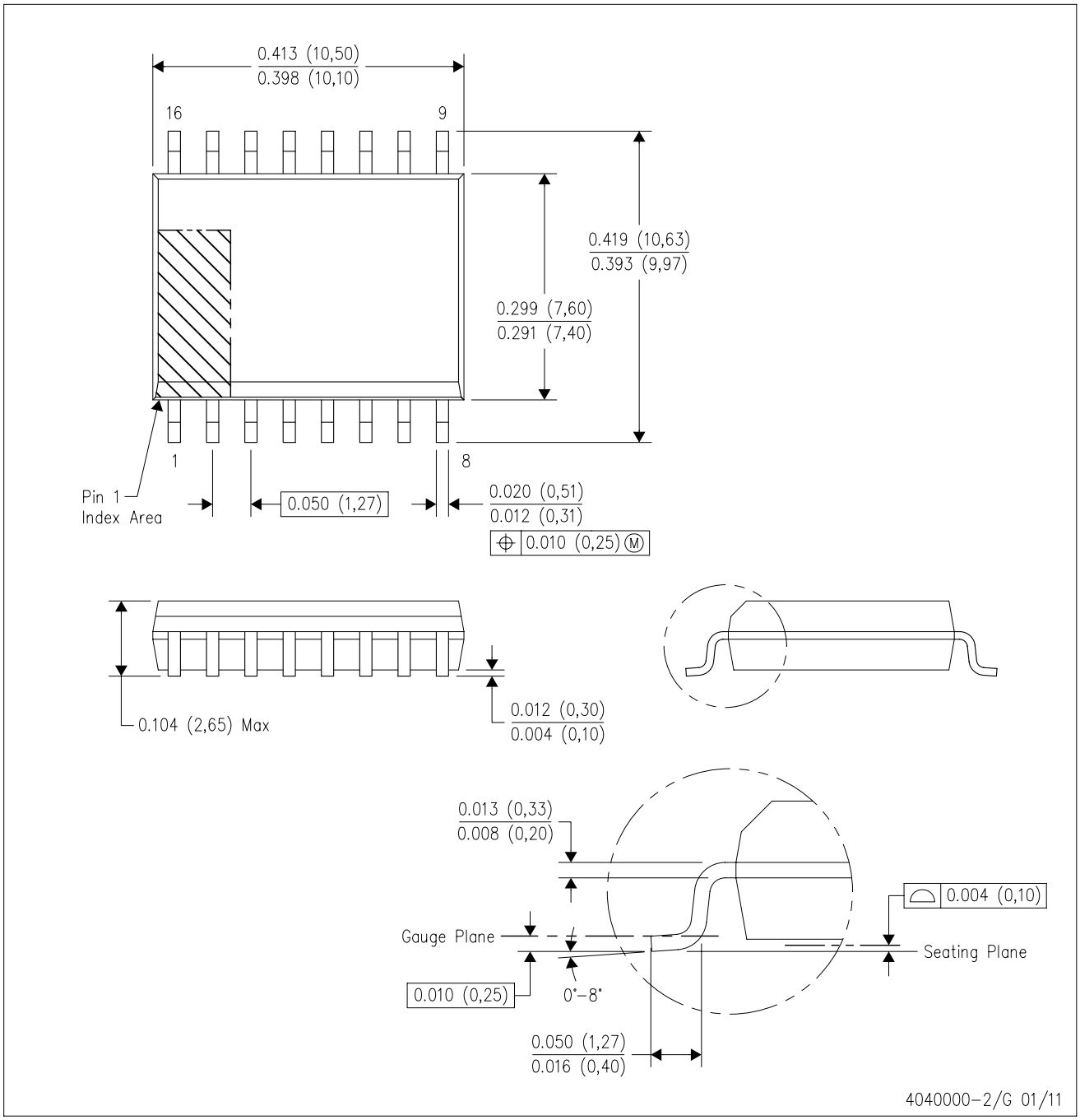
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
ISO7521CDWR	SOIC	DW	16	2000	367.0	367.0	38.0

DW (R–PDSO–G16) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
D. Falls within JEDEC MS–013 variation AA.

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