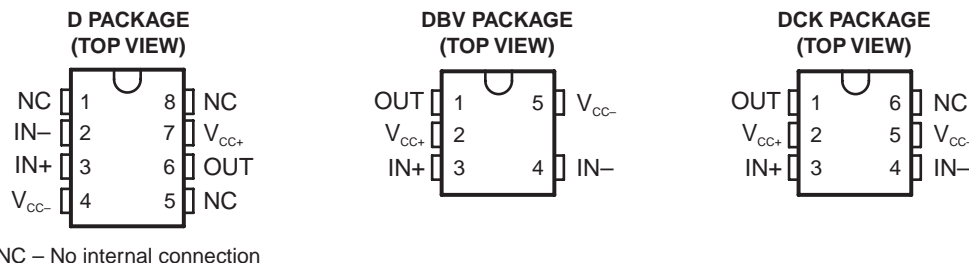


## FEATURES

- Parameters Specified at 2.7-V, 5-V, and 15-V Supplies
- Supply Current 7  $\mu$ A (Typ) at 5 V
- Response Time 4  $\mu$ s (Typ) at 5 V
- Push-Pull Output
- Input Common-Mode Range Beyond  $V_{CC-}$  and  $V_{CC+}$
- Low Input Current

## APPLICATIONS

- Battery-Powered Products
- Notebooks and PDAs
- Mobile Communications
- Alarm and Security Circuits
- Direct Sensor Interface
- Replaces Amplifiers Used as Comparators With Better Performance and Lower Current



## DESCRIPTION/ORDERING INFORMATION

The TLV7211 and TLV7211A are micropower CMOS comparators available in the space-saving SOT-23-5 package. This makes the comparators ideal for space- and weight-critical designs. The TLV7211A features an input offset voltage of 5 mV, and the TLV7211 features an input offset voltage of 15 mV.

The main benefits of the SOT-23-5 package are most apparent in small portable electronic devices, such as mobile phones, pagers, notebook computers, personal digital assistants, and PCMCIA cards. The rail-to-rail input voltage makes the TLV7211 or TLV7211A a good choice for sensor interfacing, such as light detector circuits, optical and magnetic sensors, and alarm and status circuits.

The SOT-23-5 package's small size allows it to fit into tight spaces on PC boards.

## ORDERING INFORMATION

$T_A$	$V_{OS}$ (MAX)	PACKAGE <sup>(1)</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING <sup>(2)</sup>
-40°C to 85°C	5 mV	SOIC – D	Reel of 2500	TLV7211AIDR	7211AI
			Tube of 75	TLV7211AID	
		SOT-23-5 – DBV	Reel of 3000	TLV7211AIDBVR	YBN_
	SOT (SC-70) – DCK	Reel of 3000	TLV7211AIDCKR	Y8_	
		Reel of 250	TLV7211AIDCKT		
	-40°C to 85°C	15 mV	SOIC – D	Reel of 2500	TLV7211IDR
Tube of 75				TLV7211ID	
SOT-23-5 – DBV			Reel of 3000	TLV7211IDBVR	YBK_
SOT (SC-70) – DCK		Reel of 3000	TLV7211IDCKR	Y7_	
		Reel of 250	TLV7211IDCKT		

(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

(2) DBV/DCK: The actual top-side marking has one additional character that designates the assembly/test site.

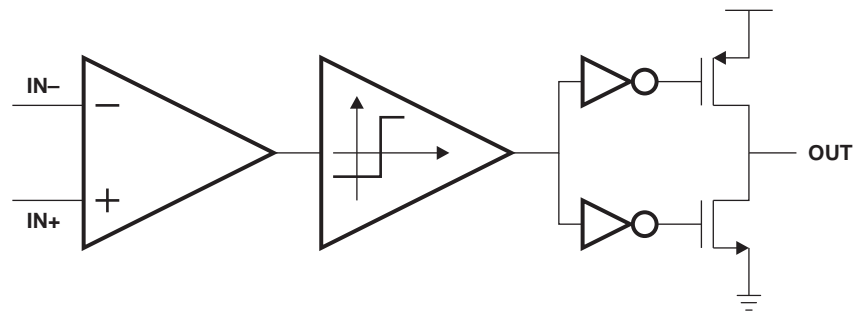


Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

# TLV7211, TLV7211A CMOS COMPARATORS WITH RAIL-TO-RAIL INPUT AND PUSH-PULL OUTPUT

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## FUNCTIONAL BLOCK DIAGRAM



### Absolute Maximum Ratings<sup>(1)</sup>

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

		MIN	MAX	UNIT
$V_{CC+} - V_{CC-}$	Supply voltage <sup>(2)</sup>		16	V
$V_{ID}$	Differential input voltage <sup>(3)</sup>		±Supply voltage	V
$V_I$	Input voltage range (any input)	$V_{CC-} - 0.3$	$V_{CC+} + 0.3$	V
$V_O$	Output voltage range	$V_{CC-} - 0.3$	$V_{CC+} + 0.3$	V
$I_{CC}$	Supply current		40	mA
$I_I$	Input current		±5	mA
$I_O$	Output current		±30	mA
$\theta_{JA}$	Package thermal impedance <sup>(4)(5)</sup>	D package	97	°C/W
		DBV package	206	
		DCK package	259	
$T_J$	Operating virtual junction temperature		150	°C
$T_{stg}$	Storage temperature range	-65	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 voltages and  $V_{CC}$  specified for the measurement of  $I_{OS}$ ) are with respect to the network GND.
- (3) Differential voltages are at IN+ with respect to IN-.
- (4) Maximum power dissipation is a function of  $T_J(\max)$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(\max) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.
- (5) The package thermal impedance is calculated in accordance with JESD 51-7.

### ESD Protection

	TYP	UNIT
Human-Body Model	2000	V

### Recommended Operating Conditions

	MIN	MAX	UNIT
$V_{CC+} - V_{CC-}$	2.7	15	V
$T_J$	-40	85	°C

**2.7-V Electrical Characteristics**
 $V_{CC+} = 2.7\text{ V}$ ,  $V_{CC-} = \text{GND}$ ,  $V_{CM} = V_O = V_{CC+}/2$ , and  $R_L > 1\text{ M}\Omega$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T <sub>J</sub>	TLV7211A			TLV7211			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
V <sub>OS</sub>	Input offset voltage	25°C		3	5		3	15	mV	
		–40°C to 85°C			8			18		
TCV <sub>OS</sub>	Input offset voltage temperature drift	25°C		1			1		μV/°C	
	Input offset voltage average drift <sup>(1)</sup>	25°C		3.3			3.3		μV/month	
I <sub>B</sub>	Input current	25°C		0.04			0.04		pA	
I <sub>OS</sub>	Input offset current	25°C		0.02			0.02		pA	
CMRR	Common-mode rejection ratio	0 ≤ V <sub>CM</sub> ≤ 2.7 V		75			75		dB	
PSRR	Power-supply rejection ratio	2.7 V ≤ V <sub>CC+</sub> ≤ 15 V		80			80		dB	
A <sub>V</sub>	Voltage gain	25°C		100			100		dB	
CMVR	Input common-mode voltage range	CMRR > 55 dB	25°C	2.9	3		2.9	3	V	
			–40°C to 85°C	2.7			2.7			
		CMRR > 55 dB	25°C		–0.3	–0.2		–0.3		–0.2
			–40°C to 85°C			0				0
V <sub>OH</sub>	High-level output voltage	I <sub>load</sub> = 2.5 mA	25°C	2.4	2.5		2.4	2.5	V	
			–40°C to 85°C	2.3			2.3			
V <sub>OL</sub>	Low-level output voltage	I <sub>load</sub> = 2.5 mA	25°C		0.2	0.3		0.2	0.3	V
			–40°C to 85°C			0.4			0.4	
I <sub>CC</sub>	Supply current	V <sub>OUT</sub> = Low	25°C		7	12		7	12	μA
			–40°C to 85°C			14			14	
		V <sub>OUT</sub> = High-Idle	25°C		5	10		5	10	
			–40°C to 85°C			12			12	

(1) Input offset voltage average drift is calculated by dividing the accelerated operating life V<sub>OS</sub> drift by the equivalent operational time. This represents worst-case input conditions and includes the first 30 days of drift.

# TLV7211, TLV7211A CMOS COMPARATORS WITH RAIL-TO-RAIL INPUT AND PUSH-PULL OUTPUT

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## 5-V Electrical Characteristics

$V_{CC+} = 5\text{ V}$ ,  $V_{CC-} = \text{GND}$ ,  $V_{CM} = V_O = V_{CC+}/2$ , and  $R_L > 1\text{ M}\Omega$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS	T <sub>J</sub>	TLV7211A			TLV7211			UNIT	
			MIN	TYP	MAX	MIN	TYP	MAX		
V <sub>OS</sub>	Input offset voltage	25°C		3	5		3	15	mV	
		-40°C to 85°C			8			18		
TCV <sub>OS</sub>	Input offset voltage temperature drift	25°C		1			1		μV/°C	
	Input offset voltage average drift <sup>(1)</sup>	25°C		3.3			3.3		μV/month	
I <sub>B</sub>	Input current	25°C		0.04			0.04		pA	
I <sub>OS</sub>	Input offset current	25°C		0.02			0.02		pA	
CMRR	Common-mode rejection ratio	25°C		75			75		dB	
PSRR	Power-supply rejection ratio	5 V ≤ V <sub>CC+</sub> ≤ 10 V	25°C		80		80		dB	
A <sub>V</sub>	Voltage gain	25°C		100			100		dB	
CMVR	Input common-mode voltage range	CMRR > 55 dB	25°C	5.2	5.3		5.2	5.3	V	
			-40°C to 85°C	5			5			
		CMRR > 55 dB	25°C		-0.3	-0.2		-0.3		-0.2
			-40°C to 85°C			0				0
V <sub>OH</sub>	High-level output voltage	I <sub>load</sub> = 5 mA	25°C	4.6	4.8		4.6	4.8	V	
			-40°C to 85°C	4.45			4.45			
V <sub>OL</sub>	Low-level output voltage	I <sub>load</sub> = 5 mA	25°C		0.2	0.4		0.2	0.4	V
			-40°C to 85°C			0.55			0.55	
I <sub>CC</sub>	Supply current	V <sub>OUT</sub> = Low	25°C		7	14		7	14	μA
			-40°C to 85°C			18			18	
		V <sub>OUT</sub> = High-Idle	25°C		5	10		5	10	
			-40°C to 85°C			13			13	
I <sub>OH</sub>	Short-circuit output current	I <sub>source</sub>	25°C		30		30		mA	
I <sub>OL</sub>	Short-circuit output current	I <sub>sink</sub> , V <sub>O</sub> < 12 V <sup>(2)</sup>	25°C		45		45		mA	

- (1) Input offset voltage average drift is calculated by dividing the accelerated operating life V<sub>OS</sub> drift by the equivalent operational time. This represents worst-case input conditions and includes the first 30 days of drift.
- (2) Do not short circuit the output to V+ if V+ is >12 V.

### 15-V Electrical Characteristics

$V_{CC+} = 15\text{ V}$ ,  $V_{CC-} = \text{GND}$ ,  $V_{CM} = V_O = V_{CC+}/2$ , and  $R_L > 1\text{ M}\Omega$  (unless otherwise noted)

PARAMETER	TEST CONDITIONS	$T_J$	TLV7211A			TLV7211			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
$V_{OS}$ Input offset voltage		25°C		3	5		3	15	mV
		–40°C to 85°C			8			18	
$TCV_{OS}$ Input offset voltage temperature drift		25°C		4			4		$\mu\text{V}/^\circ\text{C}$
Input offset voltage average drift <sup>(1)</sup>		25°C		4			4		$\mu\text{V}/\text{month}$
$I_B$ Input current		25°C		0.04			0.04		pA
$I_{OS}$ Input offset current		25°C		0.02			0.02		pA
CMRR Common-mode rejection ratio		25°C		82			82		dB
PSRR Power-supply rejection ratio	$5\text{ V} \leq V_{CC+} \leq 10\text{ V}$	25°C		80			80		dB
$A_V$ Voltage gain		25°C		100			100		dB
$CMVR$ Input common-mode voltage range	CMRR > 55 dB	25°C	15.2	15.3		15.2	15.3		V
		–40°C to 85°C	15			15			
	CMRR > 55 dB	25°C		–0.3	–0.2		–0.3	–0.2	
		–40°C to 85°C			0			0	
$V_{OH}$ High-level output voltage	$I_{load} = 5\text{ mA}$	25°C	14.6	14.8		14.6	14.8		V
		–40°C to 85°C	14.45			14.45			
$V_{OL}$ Low-level output voltage	$I_{load} = 5\text{ mA}$	25°C		0.2	0.4		0.2	0.4	V
		–40°C to 85°C			0.55			0.55	
$I_{CC}$ Supply current	$V_{OUT} = \text{Low}$	25°C		7	14		7	14	$\mu\text{A}$
		–40°C to 85°C			18			18	
	$V_{OUT} = \text{High-Idle}$	25°C		5	12		5	12	
		–40°C to 85°C			14			14	
$I_{OH}$ Short-circuit output current	$I_{source}$	25°C		30			30		mA
$I_{OL}$ Short-circuit output current	$I_{sink}$ , $V_O < 12\text{ V}^{(2)}$	25°C		45			45		mA

- (1) Input offset voltage average drift is calculated by dividing the accelerated operating life  $V_{OS}$  drift by the equivalent operational time. This represents worst-case input conditions and includes the first 30 days of drift.
- (2) Do not short circuit the output to  $V+$  if  $V+$  is  $>12\text{ V}$ .

# TLV7211, TLV7211A CMOS COMPARATORS WITH RAIL-TO-RAIL INPUT AND PUSH-PULL OUTPUT

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## Switching Characteristics

$T_J = 25^\circ\text{C}$ ,  $V_{CC+} = 5\text{ V}$ ,  $V_{CC-} = \text{GND}$ ,  $V_{CM} = V_O = V_{CC+}/2$ , and  $R_L > 1\text{ M}\Omega$  (unless otherwise noted)

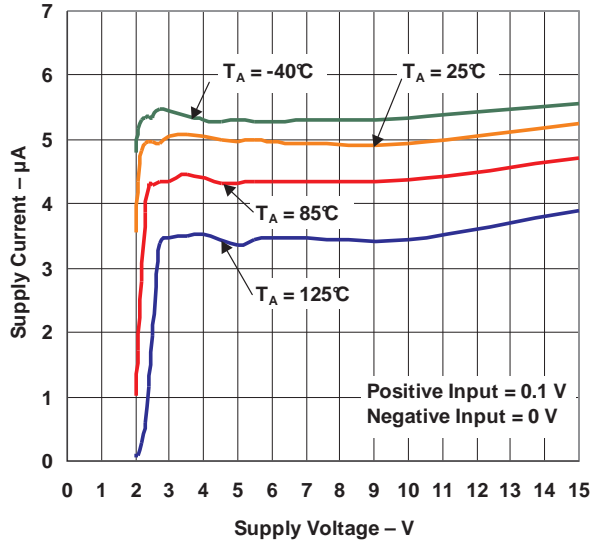
PARAMETER		TEST CONDITIONS		TYP	UNIT
$t_{\text{rise}}$	Rise time	$f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$ , Overdrive = 10 mV		0.3	$\mu\text{s}$
$t_{\text{fall}}$	Fall time	$f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$ , Overdrive = 10 mV		0.3	$\mu\text{s}$
$t_{\text{PHL}}$	Propagation delay time, high to low <sup>(2)</sup>	$f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$	10 mV	10	$\mu\text{s}$
			100 mV	4	
		$V_{CC+} = 2.7\text{ V}$ , $f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$	10 mV	10	
			100 mV	4	
$t_{\text{PLH}}$	Propagation delay time, low to high <sup>(2)</sup>	$f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$	10 mV	6	$\mu\text{s}$
			100 mV	4	
		$V_{CC+} = 2.7\text{ V}$ , $f = 10\text{ kHz}$ , $C_L = 50\text{ pF}^{(1)}$	10 mV	7	
			100 mV	4	

(1)  $C_L$  includes probe and jig capacitance.

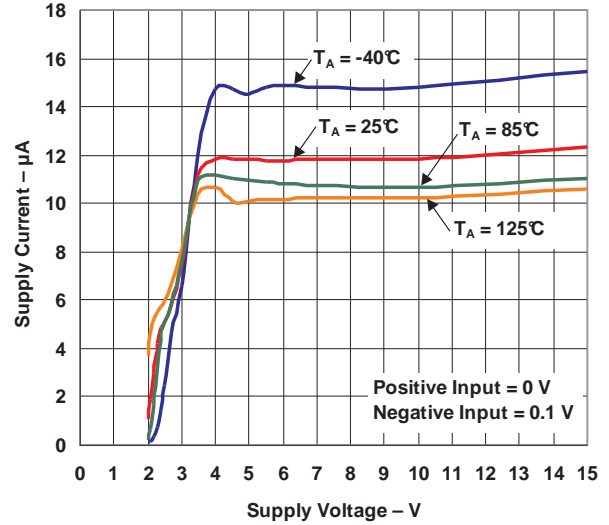
(2) Input step voltage for propagation delay measurement is 2 V.

TYPICAL CHARACTERISTICS

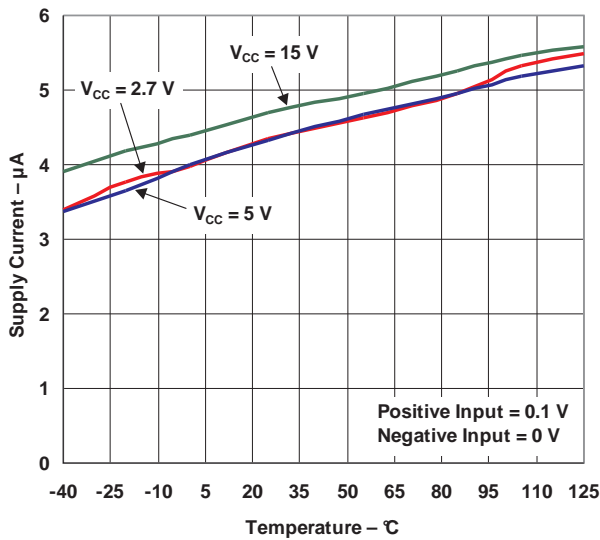
SUPPLY CURRENT  
vs  
SUPPLY VOLTAGE  
(SOURCING)



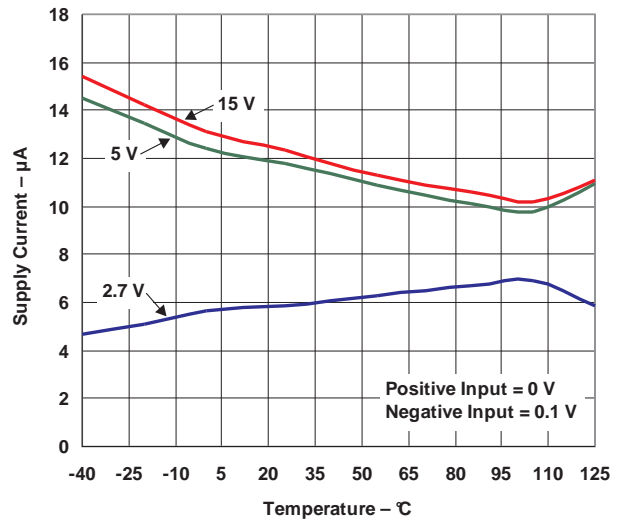
SUPPLY CURRENT  
vs  
SUPPLY VOLTAGE  
(SINKING)



SUPPLY CURRENT  
vs  
TEMPERATURE  
(SOURCING)

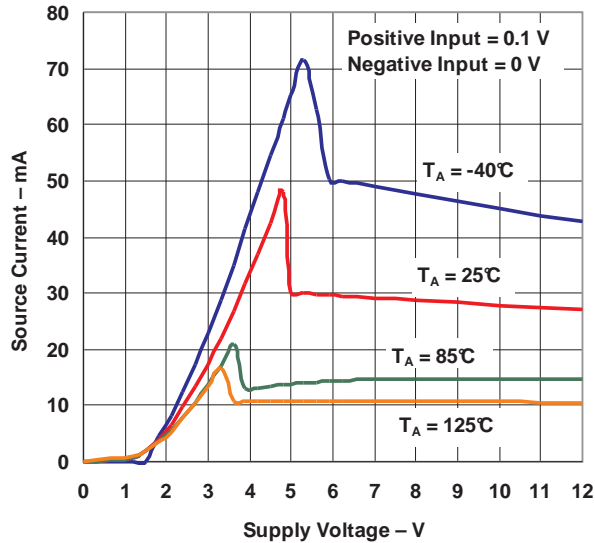


SUPPLY CURRENT  
vs  
TEMPERATURE  
(SINKING)

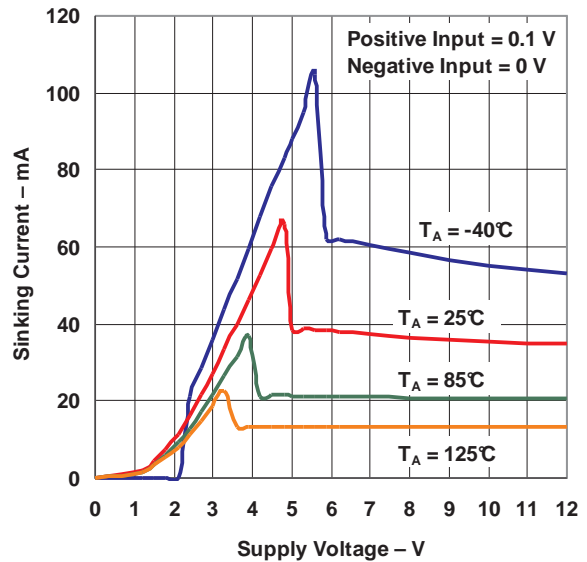


TYPICAL CHARACTERISTICS (continued)

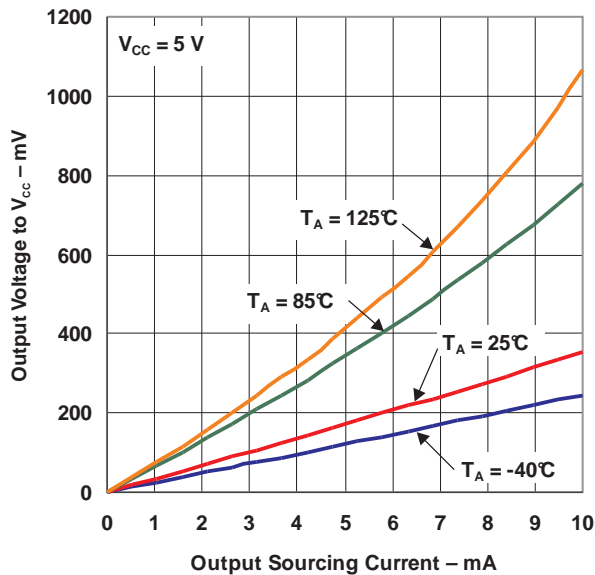
OUTPUT SOURCING CURRENT  
 VS  
 SUPPLY VOLTAGE



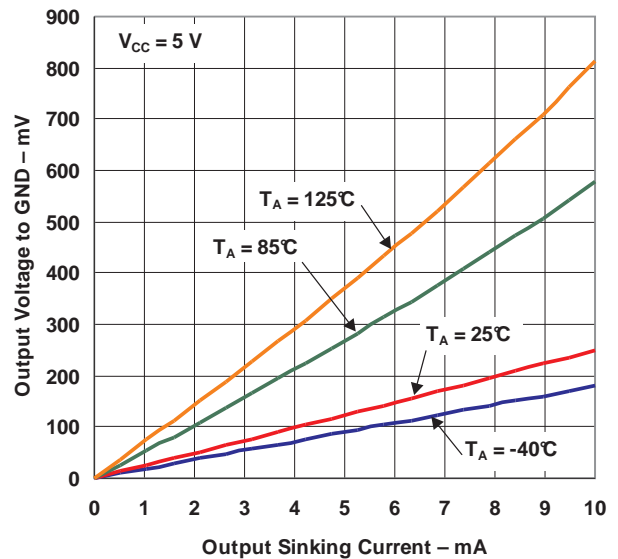
OUTPUT SINKING CURRENT  
 VS  
 SUPPLY VOLTAGE



OUTPUT VOLTAGE  
 VS  
 OUTPUT SOURCING CURRENT



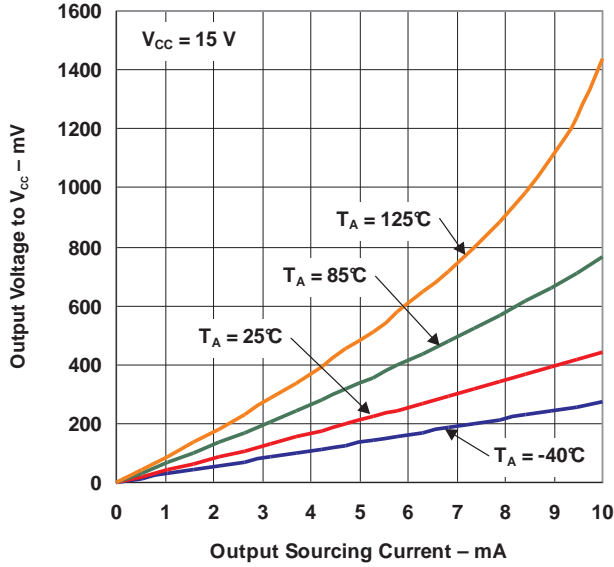
OUTPUT VOLTAGE  
 VS  
 OUTPUT SINKING CURRENT



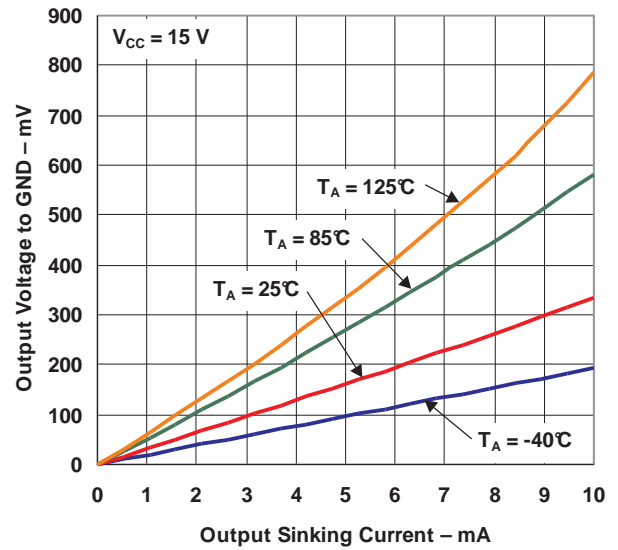


**TYPICAL CHARACTERISTICS (continued)**

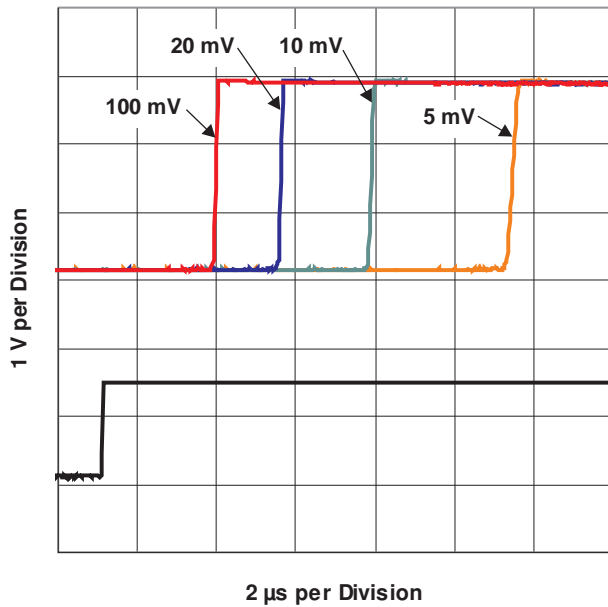
**OUTPUT VOLTAGE**  
**VS**  
**OUTPUT SOURCING CURRENT**



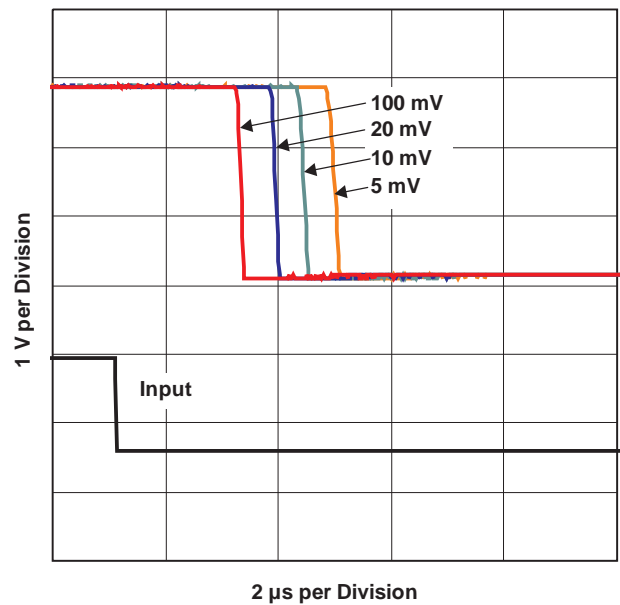
**OUTPUT VOLTAGE**  
**VS**  
**OUTPUT SINKING CURRENT**



**Response Time ( $t_{PLH}$ ) for Various Input Overdrives**  
**( $V_{CC} = 2.7\text{ V}$ )**

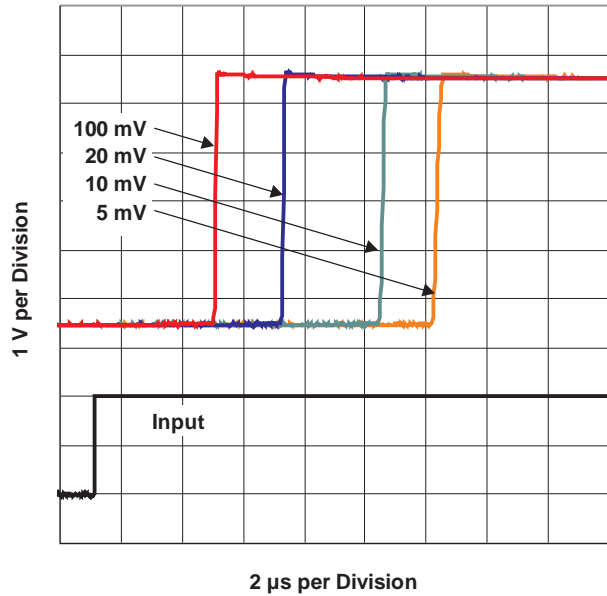


**Response Time ( $t_{PHL}$ ) for Various Input Overdrives**  
**( $V_{CC} = 2.7\text{ V}$ )**

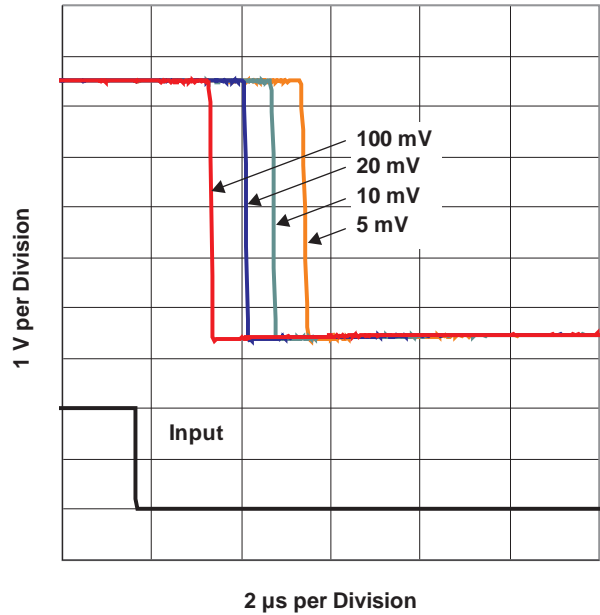


TYPICAL CHARACTERISTICS (continued)

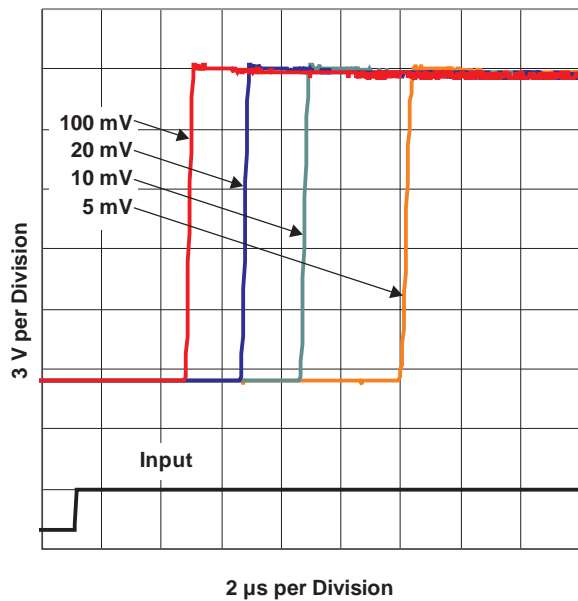
Response Time ( $t_{PLH}$ ) for Various Input Overdrives  
 ( $V_{CC} = 5\text{ V}$ )



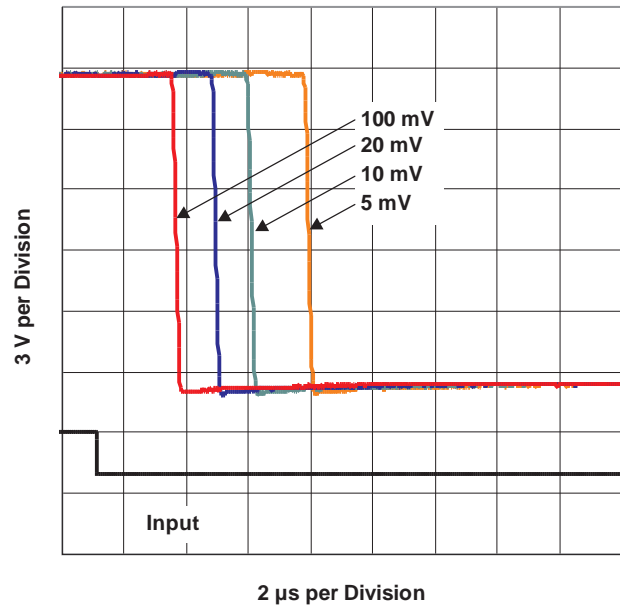
Response Time ( $t_{PHL}$ ) for Various Input Overdrives  
 ( $V_{CC} = 5\text{ V}$ )



Response Time ( $t_{PLH}$ ) for Various Input Overdrives  
 ( $V_{CC} = 15\text{ V}$ )



Response Time ( $t_{PHL}$ ) for Various Input Overdrives  
 ( $V_{CC} = 15\text{ V}$ )



**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLV7211AID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	7211AI	<a href="#">Samples</a>
TLV7211AIDBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	YBNM	<a href="#">Samples</a>
TLV7211AIDCKR	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y8A	<a href="#">Samples</a>
TLV7211AIDCKT	ACTIVE	SC70	DCK	6	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y8A	<a href="#">Samples</a>
TLV7211AIDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	7211AI	<a href="#">Samples</a>
TLV7211ID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TY7211	<a href="#">Samples</a>
TLV7211IDBVR	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	YBKM	<a href="#">Samples</a>
TLV7211IDCKR	ACTIVE	SC70	DCK	6	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7A	<a href="#">Samples</a>
TLV7211IDCKT	ACTIVE	SC70	DCK	6	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7A	<a href="#">Samples</a>
TLV7211IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	TY7211	<a href="#">Samples</a>

(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) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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**TAPE AND REEL INFORMATION**

**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
TLV7211AIDBVR	SOT-23	DBV	5	3000	178.0	9.0	3.3	3.2	1.4	4.0	8.0	Q3
TLV7211AIDCKR	SC70	DCK	6	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TLV7211AIDCKT	SC70	DCK	6	250	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TLV7211AIDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLV7211IDBVR	SOT-23	DBV	5	3000	178.0	9.0	3.23	3.17	1.37	4.0	8.0	Q3
TLV7211IDCKR	SC70	DCK	6	3000	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TLV7211IDCKT	SC70	DCK	6	250	180.0	8.4	2.41	2.41	1.2	4.0	8.0	Q3
TLV7211IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLV7211AIDBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
TLV7211AIDCKR	SC70	DCK	6	3000	202.0	201.0	28.0
TLV7211AIDCKT	SC70	DCK	6	250	202.0	201.0	28.0
TLV7211AIDR	SOIC	D	8	2500	340.5	338.1	20.6
TLV7211IDBVR	SOT-23	DBV	5	3000	180.0	180.0	18.0
TLV7211IDCKR	SC70	DCK	6	3000	202.0	201.0	28.0
TLV7211IDCKT	SC70	DCK	6	250	202.0	201.0	28.0
TLV7211IDR	SOIC	D	8	2500	340.5	338.1	20.6

DBV (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-178 Variation AA.

DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - D. Publication IPC-7351 is recommended for alternate designs.
  - E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.





DCK (R-PDSO-G6)

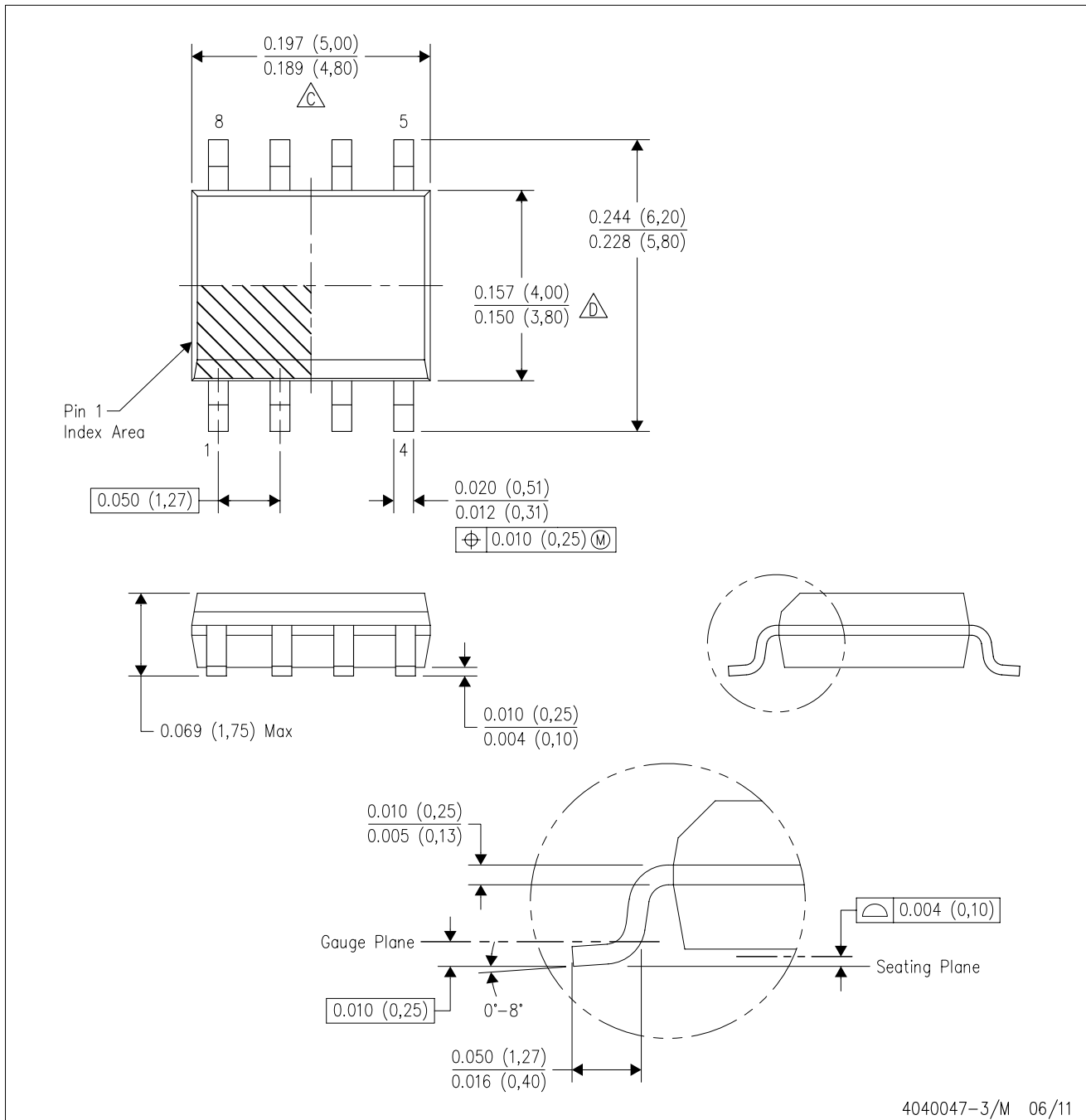
PLASTIC SMALL OUTLINE



- NOTES:
- All linear dimensions are in millimeters.
  - This drawing is subject to change without notice.
  - Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
  - Publication IPC-7351 is recommended for alternate designs.
  - Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.

D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
  - E. Reference JEDEC MS-012 variation AA.

D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate designs.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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