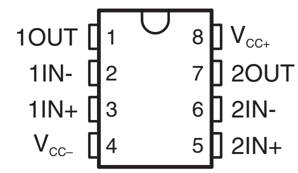
TLV7256
DUAL COMPARATOR

SLCS147A – OCTOBER 2006 – REVISED JANUARY 2007

FEATURES

- **Low Supply Current…20 μA Typ**
- **Single Power Supply**
- **Rail-to-Rail Common-Mode Input Voltage Range**
- **Push-Pull Output Circuit**
- **Low Input-Bias Current**

DCT OR DDU PACKAGE (TOP VIEW)



APPLICATIONS

- **Battery Packs for Sensing Battery Voltage**
- **MP3 Players, Digital Cameras, PMPs**
- **Cellular Phones, PDAs, Notebook Computers**
- **Test Equipment**
- **General-Purpose Low-Voltage Applications**

DESCRIPTION/ORDERING INFORMATION

The TLV7256 is a CMOS-type general-purpose dual comparator capable of single power-supply operation and using lower supply currents than the conventional bipolar comparators. Its push-pull output can connect directly to local ICs such as TTL and CMOS circuits.

ORDERING INFORMATION(1)

T_A	PACKAGE(2)		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	SSOP – DCT	Reel of 3000	TLV7256IDCTR	PREVIEW
		Reel of 250	TLV7256IDCTT	
	VSSOP – DDU	Reel of 3000	TLV7256IDDUR	YAUA

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.
(2) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

Typical Application Circuit

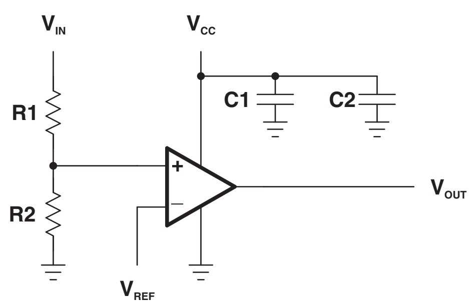


Figure 1. Threshold Detector

Absolute Maximum Ratings[1]

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage		1.5	7	V
V_{ID}	Differential input voltage				V
V_I	Input voltage		V_{CC-}	V_{CC+}	V
I_O	Output current			±35	mA
θ_{JA}	Thermal resistance, juction to ambient[2]	DCT package		220	°C/W
		DDU package		227	
P_D	Power dissipation	DCT package		250	mW
		DDU package		200	
T_A	Operating free-air temperature range		–40	85	°C
T_{stg}	Storage temperature range		–55	125	°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) Package thermal impedance is calculated according to JESD 51-7.

Recommended Operating Conditions

		MIN	MAX	UNIT
V_{CC}	Supply voltage	1.8	5	V
T_A	Operating free-air temperature	–40	85	°C

Electrical Characteristics

V_{CC+} = 5 V, V_{CC-} = GND, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage		25°C		±2	±7	mV
			–40°C to 85°C			±8	
I_{IO}	Input offset current		25°C		2		pA
I_I	Input bias current		25°C		4		pA
V_{CM}	Common-mode input voltage		25°C	0		V_{CC}	V
CMRR	Common-mode rejection ratio	ΔV_{CM} = 5 V	25°C	48	65		dB
		0 ≤ V_{CM} ≤ 5 V	–40°C to 85°C	48			
I_{CC}	Supply current	Output = High, V_{IN} = 5 V	25°C		37	51	μA
		Output = Low, V_{IN} = 5 V			40	60	
		Output = High, V_{IN} = 5 V	–40°C to 85°C			61	
		Output = Low, V_{IN} = 5 V				70	
		Output = High, V_{IN} = 2.5 V	25°C		20	32	
		Output = Low, V_{IN} = 2.5 V			26	42	
		Output = High, V_{IN} = 2.5 V	–40°C to 85°C			40	
		Output = Low, V_{IN} = 2.5 V				53	
A_{VD}	Voltage gain	V_D = 3 V, 1 V ≤ V_{OUT} ≤ 4 V	25°C		88		dB
I_{sink}	Sink current	V_{OL} = 0.5 V	25°C	25	33		mA
			–40°C to 85°C	20			
I_{source}	Source current	V_{OH} = 4.5 V	25°C	30	35		mA
			–40°C to 85°C	25			
V_{OL}	Low-level output voltage	I_{sink} = 5 mA	25°C		0.07	0.12	V
			–40°C to 85°C			0.20	
V_{OH}	High-level output voltage	I_{source} = 5 mA	25°C	4.9	4.93		V
			–40°C to 85°C	4.85			

TEXAS INSTRUMENTS
www.ti.com

Electrical Characteristics

V_{CC+} = 2.7 V, V_{CC-} = GND, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage		25°C		±2	±8	mV
			–40°C to 85°C			±9	
I_{IO}	Input offset current		25°C		2		pA
I_I	Input bias current		25°C		4		pA
V_{CM}	Common-mode input voltage		25°C	0		V_{CC}	V
CMRR	Common-mode rejection ratio	ΔV_{CM} = 2.7 V	25°C	42	57		dB
		$0 \le V_{CM} \le 2.7$ V	–40°C to 85°C	42			
I_{CC}	Supply current	Output = High, V_{IN} = 2.7 V	25°C		30	55	μA
		Output = Low, V_{IN} = 2.7 V			36	55	
		Output = High, V_{IN} = 2.7 V	–40°C to 85°C			65	
		Output = Low, V_{IN} = 2.7 V				65	
		Output = High, V_{IN} = 1.35 V	25°C		30	48	
		Output = Low, V_{IN} = 1.35 V			35	55	
		Output = High, V_{IN} = 1.35 V	–40°C to 85°C			55	
		Output = Low, V_{IN} = 1.35 V				65	
A_{VD}	Voltage gain	V_D = 1.7 V, 0.5 V ≤ V_{OUT} ≤ 2.2 V	25°C		88		dB
I_{sink}	Sink current	V_{OL} = 0.5 V	25°C	13	18		mA
			–40°C to 85°C	11			
I_{source}	Source current	V_{OH} = 2.2 V	25°C	15	20		mA
			–40°C to 85°C	13			
V_{OL}	Low-level output voltage	I_{sink} = 5 mA	25°C		0.11	0.16	V
			–40°C to 85°C			0.19	
V_{OH}	High-level output voltage	I_{source} = 5 mA	25°C	2.54	2.60		V
			–40°C to 85°C	2.45			

Electrical Characteristics

V_{CC+} = 1.8 V, V_{CC-} = GND, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	T_A	MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage		25°C		±2	±8	mV
			–40°C to 85°C			±9	
I_{IO}	Input offset current		25°C		2		pA
I_I	Input bias current		25°C		4		pA
V_{CM}	Common-mode input voltage		25°C	0		V_{CC} – 0.3	V
CMRR	Common-mode rejection ratio	ΔV_{CM} = 5 V	25°C	40	55		dB
		0 ≤ V_{CM} ≤ 5 V	–40°C to 85°C	40			
I_{CC}	Supply current	Output = High, V_{IN} = 1.8 V	25°C		30	55	μA
		Output = Low, V_{IN} = 1.8 V			33	47	
		Output = High, V_{IN} = 1.8 V	–40°C to 85°C			60	
		Output = Low, V_{IN} = 1.8 V				51	
		Output = High, V_{IN} = 0.9 V	25°C		20	32	
		Output = Low, V_{IN} = 0.9 V			25	37	
		Output = High, V_{IN} = 0.9 V	–40°C to 85°C			34	
		Output = Low, V_{IN} = 0.9 V				40	
A_{VD}	Voltage gain	V_D = 1.1 V, 0.4 V ≤ V_{OUT} ≤ 1.5 V	25°C		88		dB
I_{sink}	Sink current	V_{OL} = 0.5 V	25°C	6	9		mA
			–40°C to 85°C	5			
I_{source}	Source current	V_{OH} = 2.2 V	25°C	5	9		mA
			–40°C to 85°C	4			
V_{OL}	Low-level output voltage	I_{sink} = 5 mA	25°C		0.2	0.34	V
			–40°C to 85°C			0.39	
V_{OH}	High-level output voltage	I_{source} = 5 mA	25°C	1.3	1.6		V
			–40°C to 85°C	1.2			

Switching Characteristics

V_{CC+} = 5 V, V_{CC-} = GND, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS	TYP	UNIT
t_{PLH}	Propagation delay time (turn on)	Overdrive = 100 mV	680	ns
		TTL step input	500	
t_{PHL}	Propagation delay time (turn off)	Overdrive = 100 mV	250	ns
		TTL step input	380	
t_{TLH}	Response time	Overdrive = 100 mV	60	ns
t_{THL}			8	

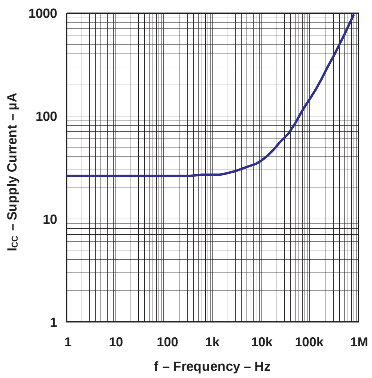
Switching Characteristics

V_{CC+} = 3 V, V_{CC-} = GND, T_A = 25°C (unless otherwise noted)

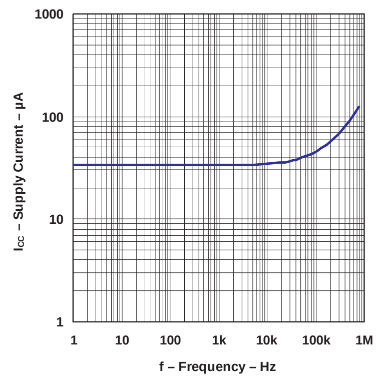
PARAMETER		TEST CONDITIONS	TYP	UNIT
t_{PLH}	Propagation delay time (turn on)	Overdrive = 100 mV	550	ns
t_{PHL}	Propagation delay time (turn off)	Overdrive = 100 mV	250	ns
t_{TLH}	Response time	Overdrive = 100 mV	30	ns
t_{THL}			8	

TYPICAL CHARACTERISTICS

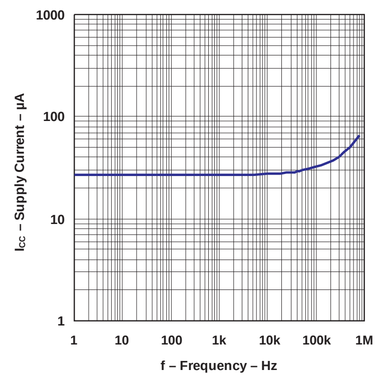
SUPPLY CURRENT vs FREQUENCY V_{CC} = 5 V



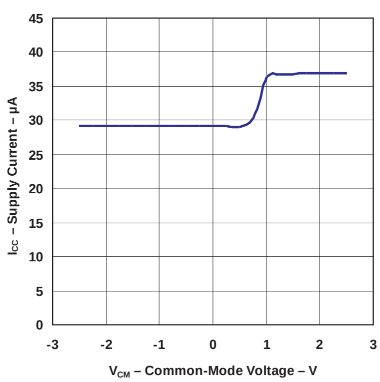
SUPPLY CURRENT vs FREQUENCY V_{CC} = 2.7 V



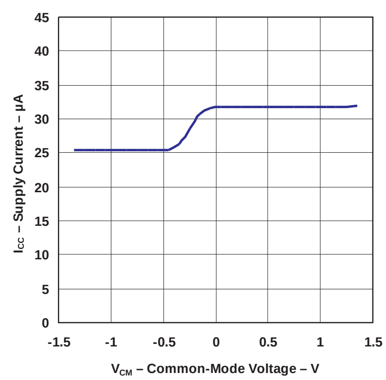
SUPPLY CURRENT vs FREQUENCY V_{CC} = 1.8 V



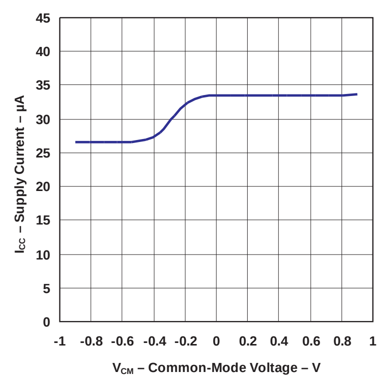
SUPPLY CURRENT vs COMMON-MODE VOLTAGE V_{CC} = ±2.5 V



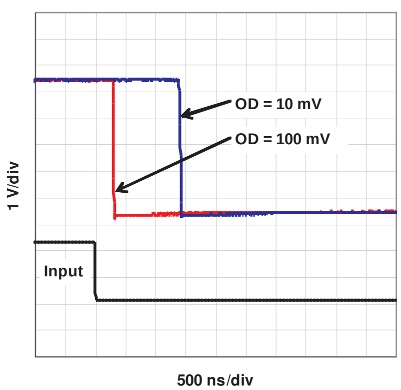
SUPPLY CURRENT vs COMMON-MODE VOLTAGE V_{CC} = ±1.35 V



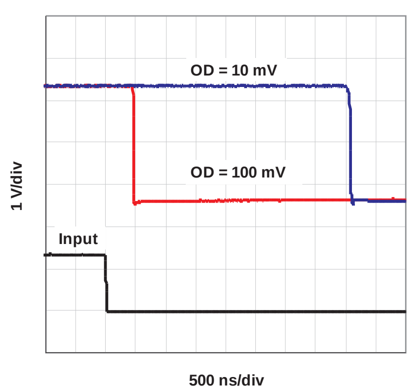
SUPPLY CURRENT vs COMMON-MODE VOLTAGE V_{CC} = ±0.9 V



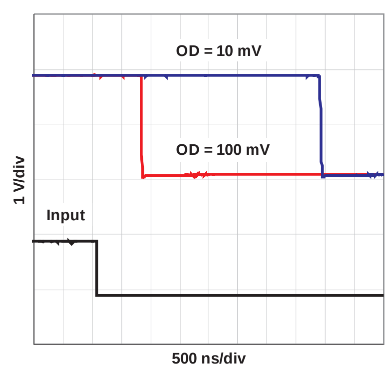
PROPAGATION DELAY TIME, HIGH TO LOW V_{CC} = 5 V



PROPAGATION DELAY TIME, HIGH TO LOW V_{CC} = 2.7 V

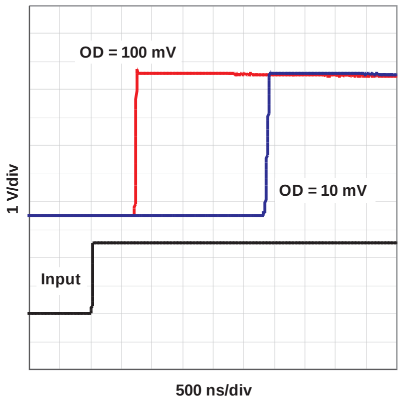


PROPAGATION DELAY TIME, HIGH TO LOW V_{CC} = 1.8 V

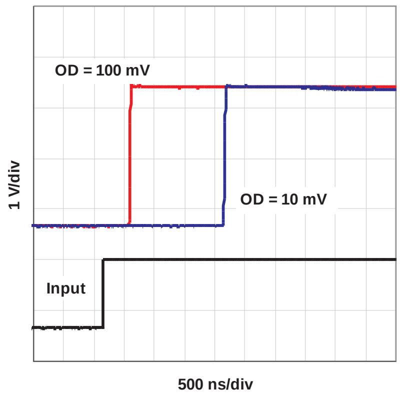


TYPICAL CHARACTERISTICS (continued)

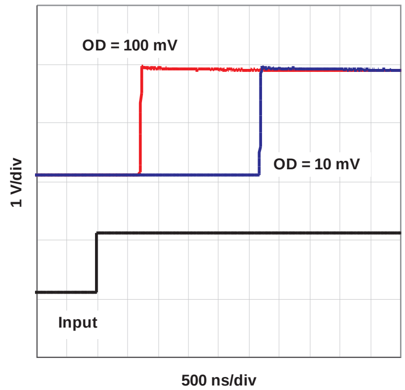
PROPAGATION DELAY TIME, LOW TO HIGH V_{CC} = 5 V



PROPAGATION DELAY TIME, LOW TO HIGH V_{CC} = 2.7 V



PROPAGATION DELAY TIME, LOW TO HIGH V_{CC} = 1.8 V



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TLV7256IDDUR	ACTIVE	VSSOP	DDU	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
TLV7256IDDURG4	ACTIVE	VSSOP	DDU	8	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

(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.

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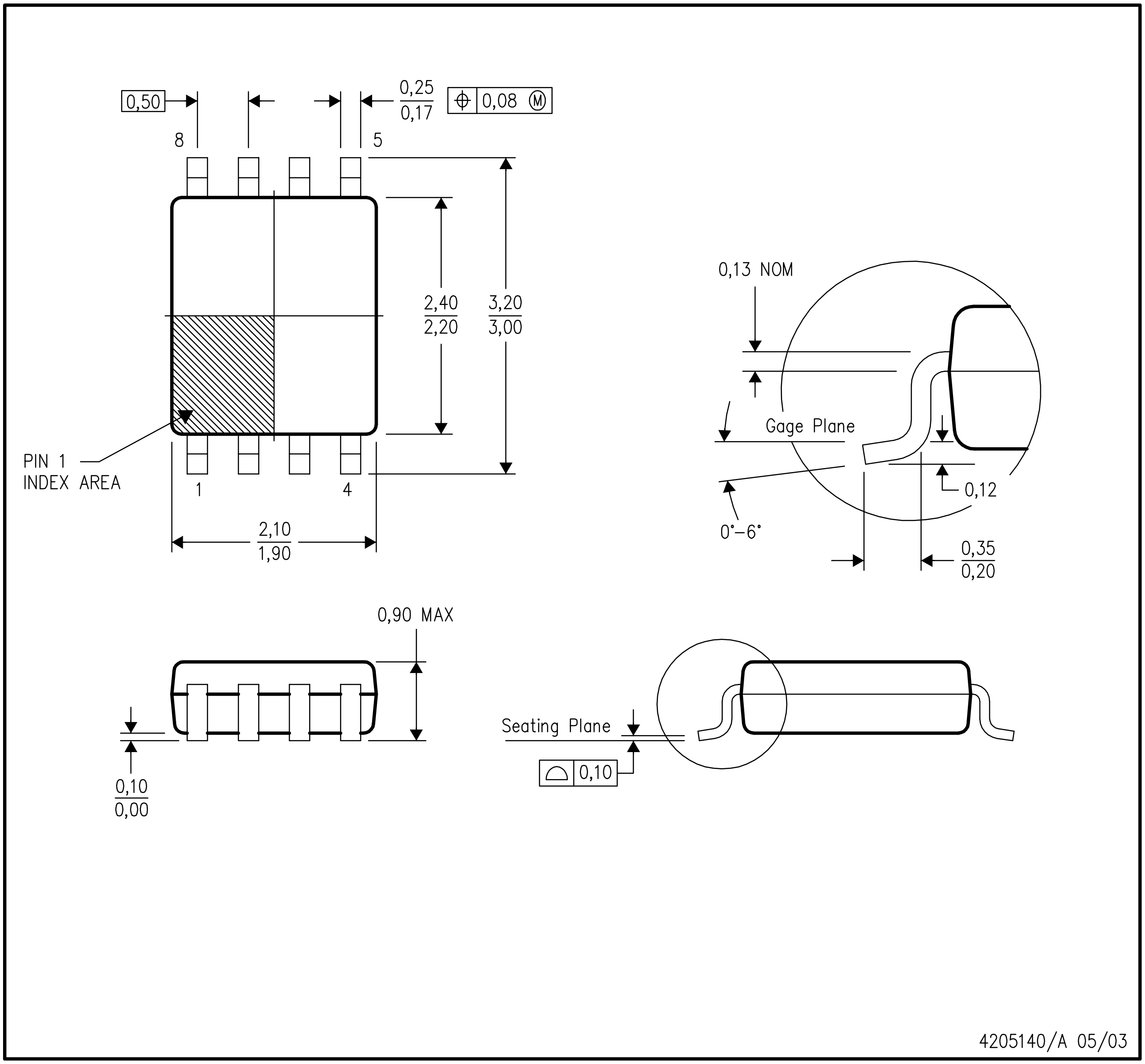
DDU (R–PDSO–G8) PLASTIC SMALL–OUTLINE PACKAGE



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.
- D. Falls within JEDEC MO–187 variation CA.

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265