

Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

Texas Instruments CDCVF2505D

For any questions, you can email us directly: <u>sales@integrated-circuit.com</u>



SCAS640E - JULY 2000 - REVISED MARCH 2005

- Phase-Lock Loop Clock Driver for Synchronous DRAM and General-Purpose Applications
- Spread Spectrum Clock Compatible
- **Operating Frequency: 24 MHz to 200 MHz**
- Low Jitter (Cycle-cycle): <|150 ps| Over the Range 66 MHz-200 MHz
- **Distributes One Clock Input to One Bank of** Five Outputs (CLKOUT Is Used to Tune the Input-Output Delay)
- Three-States Outputs When There Is no **Input Clock**
- **Operates From Single 3.3-V Supply**
- Available in 8-Pin TSSOP and 8-Pin SOIC Packages
- Consumes Less Than 100 µA (Typically) in **Power Down Mode**
- Internal Feedback Loop Is Used to Synchronize the Outputs to the Input Clock
- **25-** Ω On-Chip Series Damping Resistors
- Integrated RC PLL Loop Filter Eliminates the Need for External Components

description

The CDCVF2505 is a high-performance, low-skew, low-jitter, phase-lock loop (PLL) clock driver. It uses a PLL to precisely align, in both frequency and phase, the output clocks (1Y[0-3] and CLKOUT) to the input clock signal (CLKIN). The CDCVF2505 operates at 3.3 V. It also provides integrated series-damping resistors that make it ideal for driving point-to-point loads.

One bank of five outputs provides low-skew, low-jitter copies of CLKIN. Output duty cycles are adjusted to 50 percent, independent of duty cycle at CLKIN. The device automatically goes in power-down mode when no input signal is applied to CLKIN.

Unlike many products containing PLLs, the CDCVF2505 does not require an external RC network. The loop filter for the PLLs is included on-chip, minimizing component count, space, and cost.

Because it is based on the PLL circuitry, the CDCVF2505 requires a stabilization time to achieve phase lock of the feedback signal to the reference signal. This stabilization is required following power up and application of a fixed-frequency, fixed-phase signal at CLKIN, and following any changes to the PLL reference.

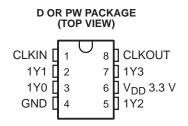
The CDCVF2505 is characterized for operation from -40°C to 85°C.



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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.





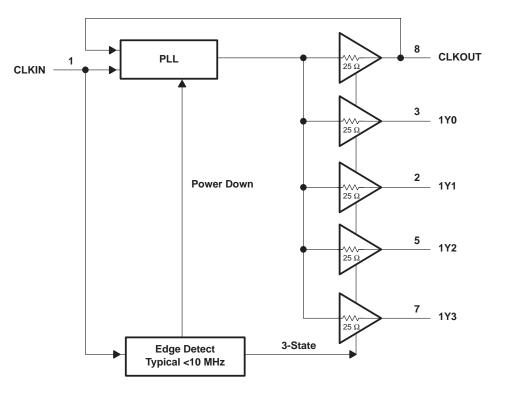


SCAS640E - JULY 2000 - REVISED MARCH 2005

FUNCTION TABLE										
INPUT	OUTPUTS									
CLKIN	1Y (0:3)	CLKOUT								
L	L	L								
Н	Н	Н								
<10 MHz†	Z	Z								

[†] Typically, below 2 MHz the device goes in power-down mode in which the PLL is turned off and the outputs enter into Hi-Z mode. If a >10-MHz signal is applied at CLKIN the PLL turns on, reacquires lock, and stabilizes after approximately 100 μ s. The outputs will then be enabled.

functional block diagram







SCAS640E - JULY 2000 - REVISED MARCH 2005

Terminal Functions

TERM	INAL		
NAME	NO.	I/O	DESCRIPTION
1Y[0–3]	2, 3, 5, 7	0	Clock outputs. These outputs are low-skew copies of CLKIN. Each output has an integrated 25- Ω series damping resistor.
CLKIN	1	I	Clock input. CLKIN provides the clock signal to be distributed by the CDCVF2505 clock driver. CLKIN is used to provide the reference signal to the integrated PLL that generates the clock output signals. CLKIN must have a fixed frequency and fixed phase for the PLL to obtain phase lock. Once the circuit is powered up and a valid signal is applied, a stabilization time (100 μ s) is required for the PLL to phase lock the feedback signal to CLKIN.
CLKOUT	8	0	Feedback output. CLKOUT completes the internal feedback loop of the PLL. This connection is made inside the chip and an external feedback loop should NOT be connected. CLKOUT can be loaded with a capacitor to achieve zero delay between CLKIN and the Y outputs.
GND	4	Power	Ground
V _{DD3.3V} 6 Pow			3.3-V Supply

absolute maximum ratings over operating free-air temperature (unless otherwise noted)[†]

Supply voltage range, V _{DD}	–0.5 V to 4.3 V
Input voltage range, VI (see Notes 1 and 2)	
Output voltage range, V _O (see Notes 1 and 2)	$\dots -0.5 \text{ V to V}_{\text{DD}} + 0.5 \text{ V}$
Input clamp current, I _{IK} (V _I < 0 or V _I > V _{DD})	±50 mA
Output clamp current, I_{OK} (V _O < 0 or V _O > V _{DD})	±50 mA
Continuous total output current, I _O (V _O = 0 to V _{DD})	±50 mA
Package thermal impedance, θ_{JA} (see Note 3): D package	165.5°C/W
PWR package	230.5°C/W
Storage temperature range, T _{stg}	–65°C to 150°C

[†] 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.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

2. This value is limited to 4.3 V maximum.

3. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, V _{DD}	3	3.3	3.6	V
High-level input voltage, VIH	0.7 V _{DD}			V
Low-level input voltage, VIL			0.3 V _{DD}	V
Input voltage, VI	0		V _{DD}	V
High-level output current, I _{OH}			-12	mA
Low-level output current, IOL			12	mA
Operating free-air temperature, T _A	-40		85	°C





SCAS640E - JULY 2000 - REVISED MARCH 2005

timing requirements over recommended ranges of supply voltage and operating free-air temperature

			MIN	NOM	MAX	UNIT
fclk	Clock frequency	24		200	MHz	
	logist algebraic dute availa	24 MHz – 85 MHz (see Note 4)	30%		85%	
Input clock duty cycle		86 MHz – 200 MHz	40%	50%	60%	
	Stabilization time (see Note			100	μs	

NOTES: 4. Ensured by design but not 100% production tested.

5. Time required for the integrated PLL circuit to obtain phase lock of its feedback signal to its reference signal. For phase lock to be obtained, a fixed-frequency, fixed-phase reference signal must be present at CLKIN. Until phase lock is obtained, the specifications for propagation delay, skew, and jitter parameters given in the switching characteristics table are not applicable. This parameter does not apply for input modulation under SSC application.

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

	PARAMETER		TEST CONDITIONS	V _{DD}	MIN	TYP [†]	MAX	UNIT		
VIK	Input voltage	Input voltage II = -18 mA					-1.2	V		
			I _{OH} = -100 μA	MIN to MAX	V _{DD} -0.2					
∨он	High-level output voltage		I _{OH} = -12 mA	3 V	2.1			V		
			I _{OH} = -6 mA	3 V	2.4					
			I _{OL} = 100 μA	MIN to MAX			0.2			
VOL	Low-level output voltage		I _{OL} = 12 mA	3 V			0.8	V		
			I _{OL} = 6 mA	3 V			0.55			
			V _O = 1 V	3 V	-27					
ЮН	High-level output current		V _O = 1.65 V	3.3 V		-36		mA		
			V _O = 2 V	3 V	27					
IOL	Low-level output current		V _O = 1.65 V	3.3 V		40		mA		
lj	Input current		$V_{I} = 0 V \text{ or } V_{DD}$				±5	μΑ		
Ci	Input capacitance		$V_I = 0 V \text{ or } V_{DD}$	3.3 V		4.2		pF		
_		Yn				2.8		pF		
Co	Output capacitance	CLKOUT	$V_{I} = 0 V \text{ or } V_{DD}$	3.3 V		5.2				

[†] All typical values are at respective nominal V_{DD} and 25°C.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 25 pF, V_{DD} = 3.3 V \pm 0.3 V (see Note 5)

	PARAMETER	TEST CONDITIONS	MIN	түр†	MAX	UNIT	
^t pd	Propagation delay (normalized (see Figure 3)	CLKIN to Yn, f= 66 MHz to 200 MHz	-150		150	ps	
^t sk(o)	Output skew (see Note 6)	Yn to Yn			150	ps	
		f = 66 MHz to 200 MHz		70	150		
^t c(jit_cc)	Jitter (cycle to cycle) (see Figure 5)	f = 24 MHz to 50 MHz		200	400	ps	
odc	Output duty cycle (see Figure 4)	f = 24 MHz to 200 MHz at 50% V _{DD}	45%		55%		
t _r	Rise time	$V_{O} = 0.4 V$ to 2 V	0.5		2	ns	
t _f	Fall time	$V_{O} = 2 V \text{ to } 0.4 V$	0.5		2	ns	

[†] All typical values are at respective nominal V_{DD} and 25°C.

NOTE 6: The t_{sk(0)} specification is only valid for equal loading of all outputs.





SCAS640E - JULY 2000 - REVISED MARCH 2005

ESD information

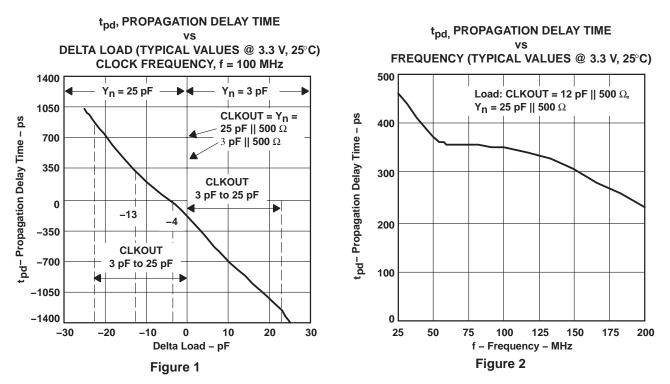
ESD MODELS	LIMIT
Human Body Model (HBM)	2.0 kV
Machine Model (MM)	300 V
Charge Device Model (CDM)	1 kV

thermal information

		THE					
	CDCVF2505 8-PIN SOIC	0	150	250	500	UNIT	
$R_{\theta JA}$	High K		97	87	83	77	°C/W
$R_{\theta JA}$	Low K		165	126	113	97	°C/W
$R_{\theta JC}$	High K	39					°C/W
$R_{\theta JC}$	Low K	42					°C/W

		THE					
	CDCVF2505 8-PIN TSSOP	0	150	250	500	UNIT	
$R_{\theta JA}$	High K		149	142	138	132	°C/W
$R_{\theta JA}$	Low K		230	185	170	150	°C/W
R _{0JC}	High K	65					°C/W
$R_{\theta JC}$	Low K	69					°C/W

TYPICAL CHARACTERISTICS



NOTE: Delta Load = CLKOUT Load - Yn Load



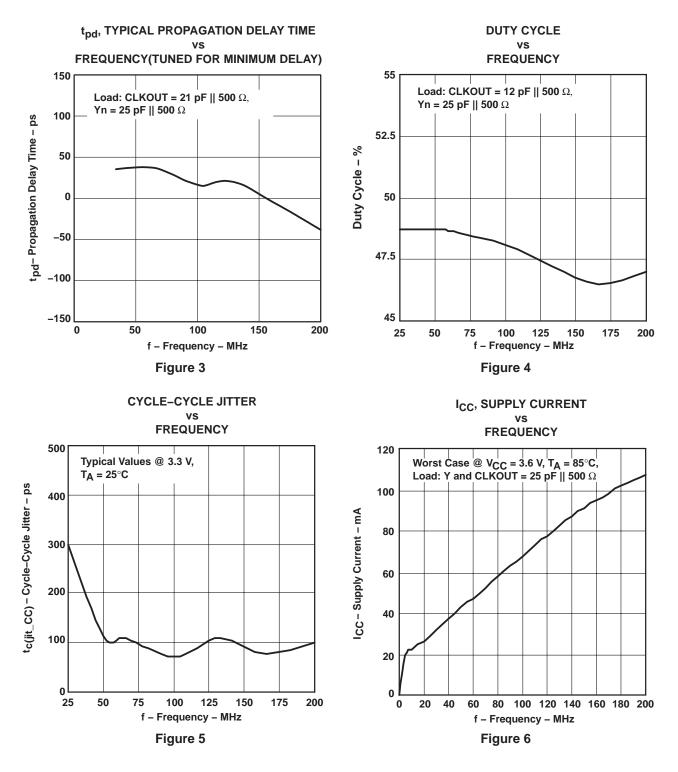


Distributor of Texas Instruments: Excellent Integrated System Limited Datasheet of CDCVF2505D - IC 3.3V PLL CLOCK DRVR 8-SOIC Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com

3.3-V CLOCK PHASE-LOCK LOOP CLOCK DRIVER

SCAS640E – JULY 2000 – REVISED MARCH 2005

TYPICAL CHARACTERISTICS

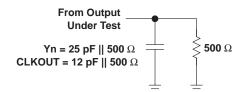






SCAS640E - JULY 2000 - REVISED MARCH 2005

PARAMETER MEASUREMENT INFORMATION





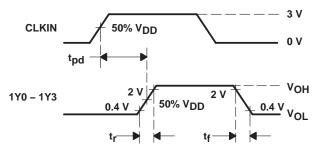


Figure 8. Voltage Threshold for Measurements, Propagation Delay (tpd)

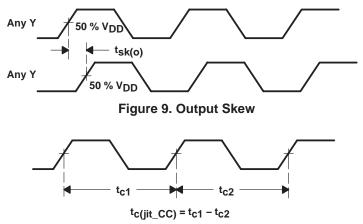


Figure 10. Cycle-to-Cycle Jitter





9-Sep-2014

PACKAGING INFORMATION

www.ti.com

Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
CDCVF2505D	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505DG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505DR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505DRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505PW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505PWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	Samples
CDCVF2505PWRG4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CKV05	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.

information and additional product content details. TBD: The Pb-Free/Green conversion plan has not been defined. Pb-Free (RoHS): This 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.

Addendum-Page 1



www.ti.com

9-Sep-2014

(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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF CDCVF2505 :

• Automotive: CDCVF2505-Q1

NOTE: Qualified Version Definitions:

• Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects



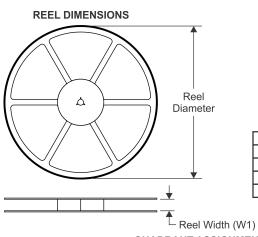
www.ti.com

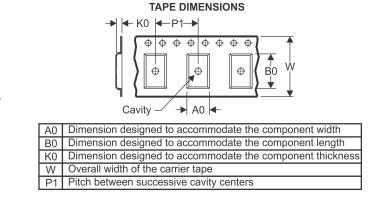
TEXAS INSTRUMENTS

PACKAGE MATERIALS INFORMATION

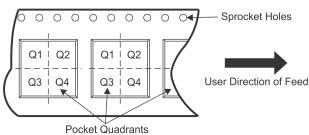
21-Apr-2016

TAPE AND REEL INFORMATION





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*/	All dimensions are nominal												
	Device		Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
	CDCVF2505DR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
	CDCVF2505PWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1



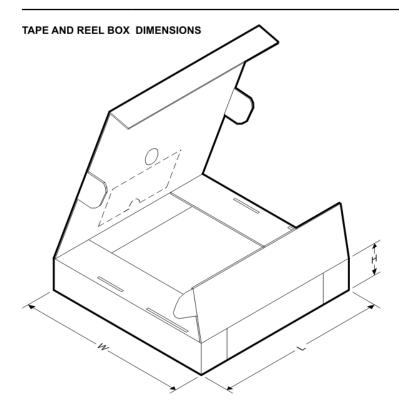
www.ti.com

Distributor of Texas Instruments: Excellent Integrated System Limited Datasheet of CDCVF2505D - IC 3.3V PLL CLOCK DRVR 8-SOIC Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com



PACKAGE MATERIALS INFORMATION

21-Apr-2016



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CDCVF2505DR	SOIC	D	8	2500	367.0	367.0	35.0
CDCVF2505PWR	TSSOP	PW	8	2000	367.0	367.0	35.0



PW0008A

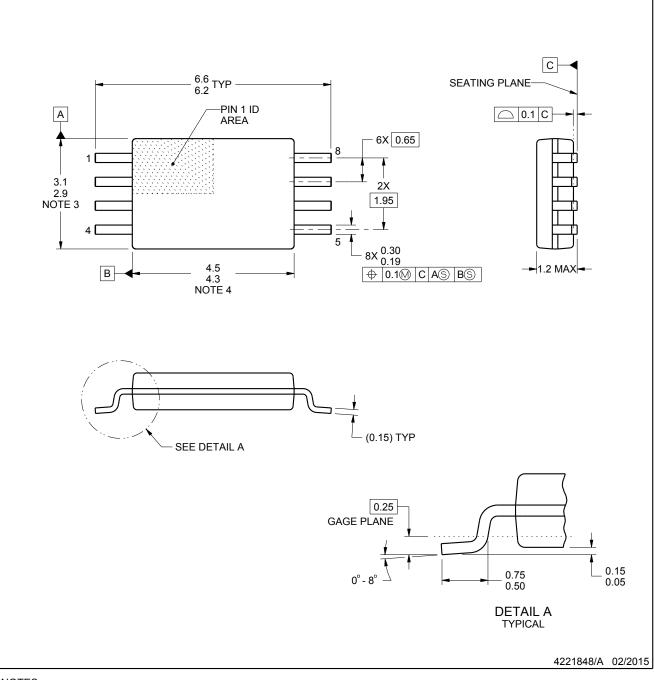
Distributor of Texas Instruments: Excellent Integrated System Limited Datasheet of CDCVF2505D - IC 3.3V PLL CLOCK DRVR 8-SOIC Contact us: sales@integrated-circuit.com Website: www.integrated-circuit.com



PACKAGE OUTLINE

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



NOTES:

- 1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- 2. This drawing is subject to change without notice.
- 3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
- 5. Reference JEDEC registration MO-153, variation AA.



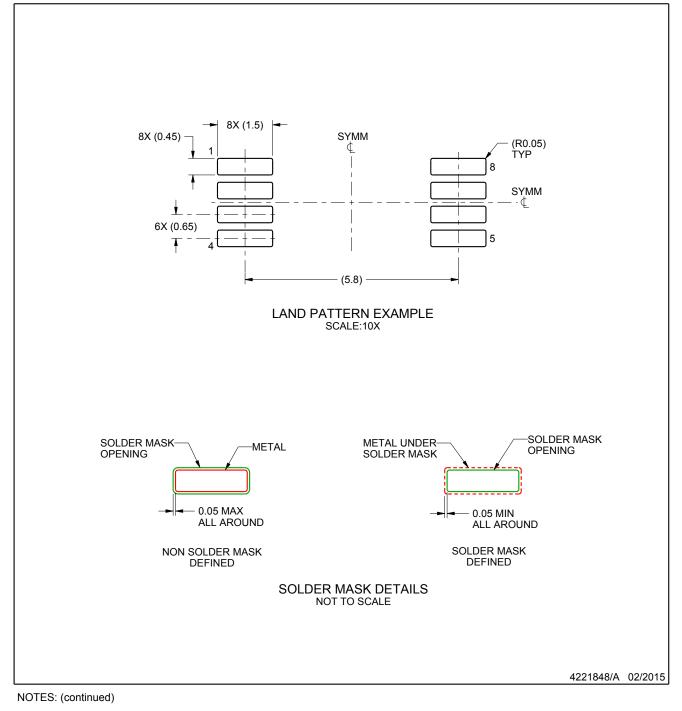


PW0008A

EXAMPLE BOARD LAYOUT

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



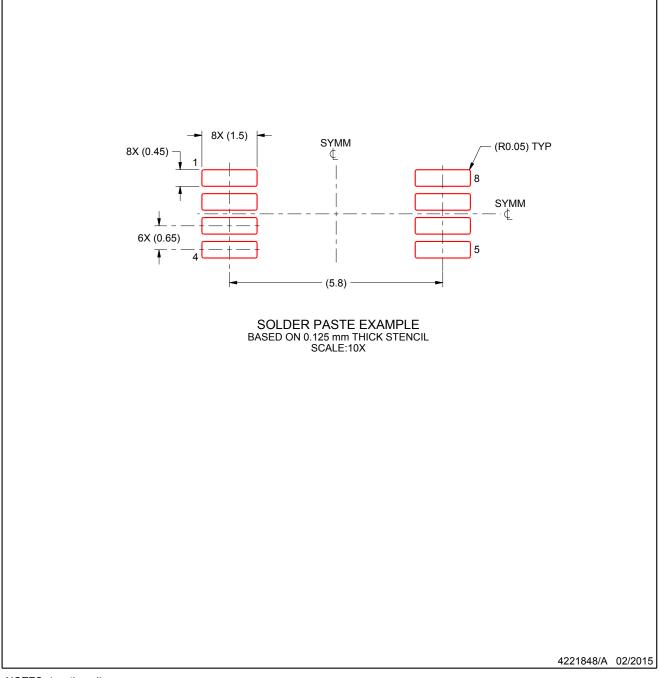


PW0008A

EXAMPLE STENCIL DESIGN

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

9. Board assembly site may have different recommendations for stencil design.

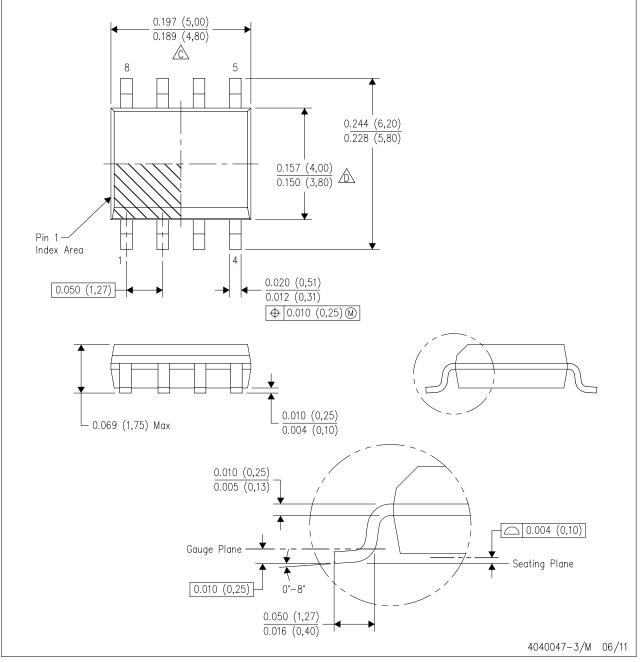




MECHANICAL DATA

D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



NOTES:

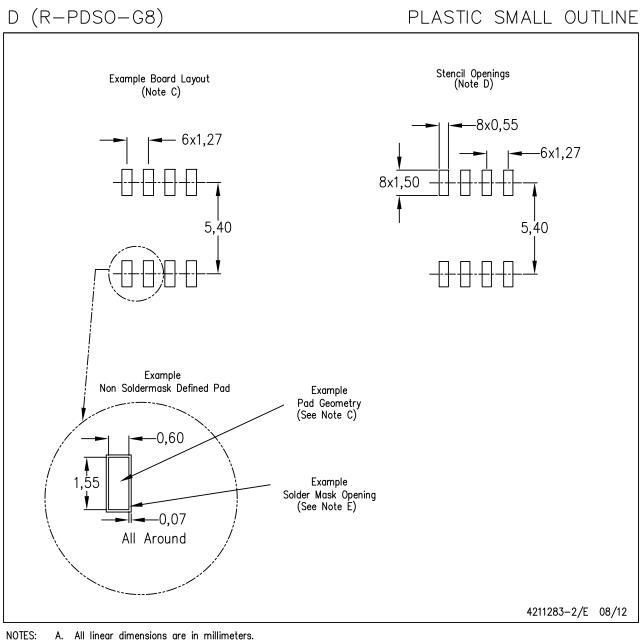
A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- 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.
- 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.





LAND PATTERN DATA



- - This drawing is subject to change without notice. B.
 - 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.

TEXAS Instruments www.ti.com



IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		Applications			
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive		
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications		
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers		
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps		
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy		
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial		
Interface	interface.ti.com	Medical	www.ti.com/medical		
Logic	logic.ti.com	Security	www.ti.com/security		
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense		
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video		
RFID	www.ti-rfid.com				
OMAP Applications Processors	www.ti.com/omap	TI E2E Community	e2e.ti.com		
Wireless Connectivity	www.ti.com/wirelessconnectivity				

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265 Copyright © 2016, Texas Instruments Incorporated