

## Micropower Supply Voltage Supervisors

Check for Samples: [TLC7701](#), [TLC7725](#), [TLC7703](#), [TLC7733](#), [TLC7705](#)

### FEATURES

- Power-On Reset Generator
- Automatic Reset Generation After Voltage Drop
- Precision Voltage Sensor
- Temperature-Compensated Voltage Reference
- Programmable Delay Time by External Capacitor
- Supply Voltage Range . . . 2 V to 6 V
- Defined RESET Output from  $V_{DD} \geq 1$  V
- Power-Down Control Support for Static RAM With Battery Backup
- Maximum Supply Current of 16  $\mu$ A
- Power Saving Totem-Pole Outputs
- Temperature Range . . . Up to  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$

### APPLICATIONS

- Medical Imaging

### DESCRIPTION

The TLC77xx family of micropower supply voltage supervisors provide reset control, primarily in microcomputer and microprocessor systems.

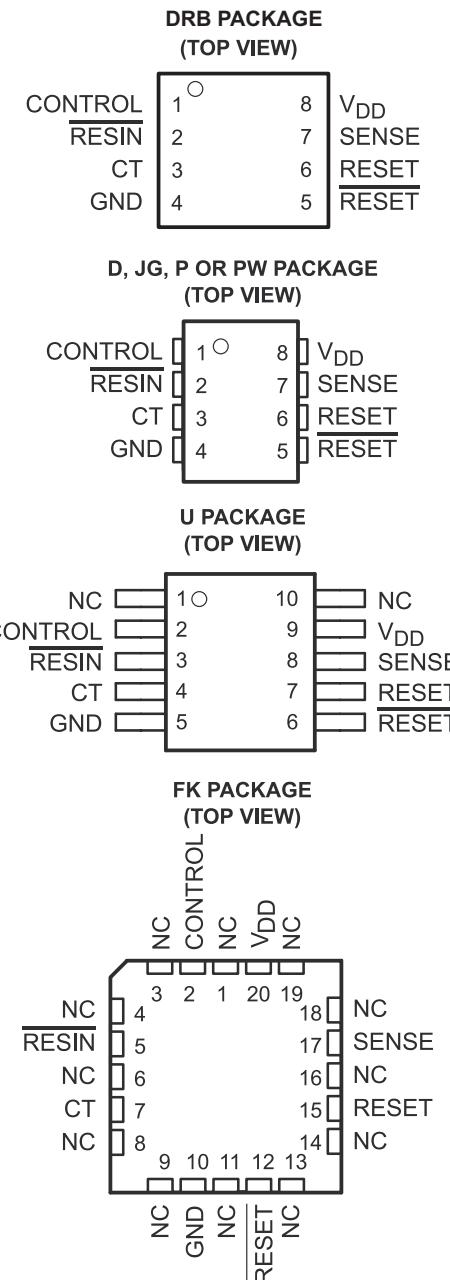
During power-on,  $\overline{\text{RESET}}$  is asserted when  $V_{DD}$  reaches 1 V. After minimum  $V_{DD}$  ( $\geq 2$  V) is established, the circuit monitors SENSE voltage and keeps the reset outputs active as long as SENSE voltage ( $V_{I(\text{SENSE})}$ ) remains below the threshold voltage. An internal timer delays return of the output to the inactive state to ensure proper system reset. The delay time,  $t_d$ , is determined by an external capacitor:

$$t_d = 2.1 \times 10^4 \times C_T$$

Where

$C_T$  is in farads

$t_d$  is in seconds



Except for the TLC7701, which can be customized with two external resistors, each supervisor has a fixed sense threshold voltage set by an internal voltage divider. When SENSE voltage drops below the threshold voltage, the outputs become active and stay in that state until SENSE voltage returns above threshold voltage and the delay time,  $t_d$ , has expired.



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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.

## DESCRIPTION (CONTINUED)

In addition to the power-on-reset and undervoltage-supervisor function, the TLC77xx adds power-down control support for static RAM. When CONTROL is tied to GND, RESET will act as active high. The voltage monitor contains additional logic intended for control of static memories with battery backup during power failure. By driving the chip select (CS) of the memory circuit with the RESET output of the TLC77xx and with the CONTROL driven by the memory bank select signal (CSH1) of the microprocessor (see [Figure 10](#)), the memory circuit is automatically disabled during a power loss. (In this application the TLC77xx power has to be supplied by the battery.)

The TLC77xx is characterized for operation over a temperature range of  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ; the TLC77xxQ is characterized for operation over a temperature range of  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ; and the TLC77xxM is characterized for operation over the full Military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

The 3x3 mm DRB package is also available as a non-magnetic package for medical imaging application.

## AVAILABLE OPTIONS

T <sub>A</sub>	THRESHOLD VOLTAGE (V)	PACKAGED DEVICES					
		SMALL OUTLINE (D) <sup>(1)</sup>	CHIP CARRIER (FK)	CERAMIC DIP (JG)	CERAMIC DUAL FLATPACK (U)	PLASTIC DIP (P)	THIN SHRINK SMALL OUTLINE (PW) <sup>(2)</sup>
-40°C to 85°C	1.1	TCLC7701ID	—	—	—	TCLC7701IP	TCLC7701IPWR
	2.25	TLC7725ID	—	—	—	TLC7725IP	TLC7725IPWR
	2.63	TLC7703ID	—	—	—	TLC7703IP	TLC7703IPWR
	2.93	TLC7733ID	—	—	—	TLC7733IP	TLC7733IPWR
	4.55	TLC7705ID	—	—	—	TLC7705IP	TLC7705IPWR
	1.1	TLC7701IDBR	—	—	—	—	TLC7701IDRBT-NM
-40°C to 125°C	1.1	TLC7701QD	—	—	—	TLC7701QP	TLC7701QPWR
	2.25	TLC7725QD	—	—	—	TLC7725QP	TLC7725QPWR
	2.63	TLC7703QD	—	—	—	TLC7703QP	TLC7703QPWR
	2.93	TLC7733QD	—	—	—	TLC7733QP	TLC7733QPWR
	4.55	TLC7705QD	—	—	—	TLC7705QP	TLC7705QPWR
-55°C to 125°C	2.93	—	—	—	—	—	—
	4.55	—	—	—	—	—	—

(1) The D package is available taped and reeled. Add the suffix R to the device type when ordering (e.g., TLC7705QDR).

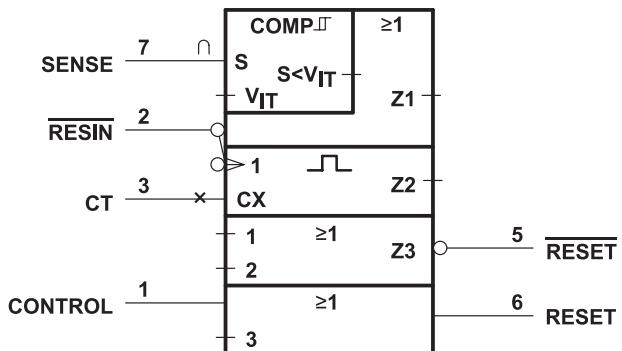
(2) The PW package is only available left-end taped and reeled (indicated by the R suffix on the device type; e.g., TLC7705QPWR).

**Table 1. FUNCTION TABLE**

CONT ROL	RESIN	V <sub>I(SENSE)&gt;V<sub>IT+</sub></sub>	RESE T	RESET
L	L	False	H	L
L	L	True	H	L
L	H	False	H	L
L	H	True	L <sup>(1)</sup>	H <sup>(1)</sup>
H	L	False	H	L
H	L	True	H	L
H	H	False	H	L
H	H	True	H	H <sup>(1)</sup>

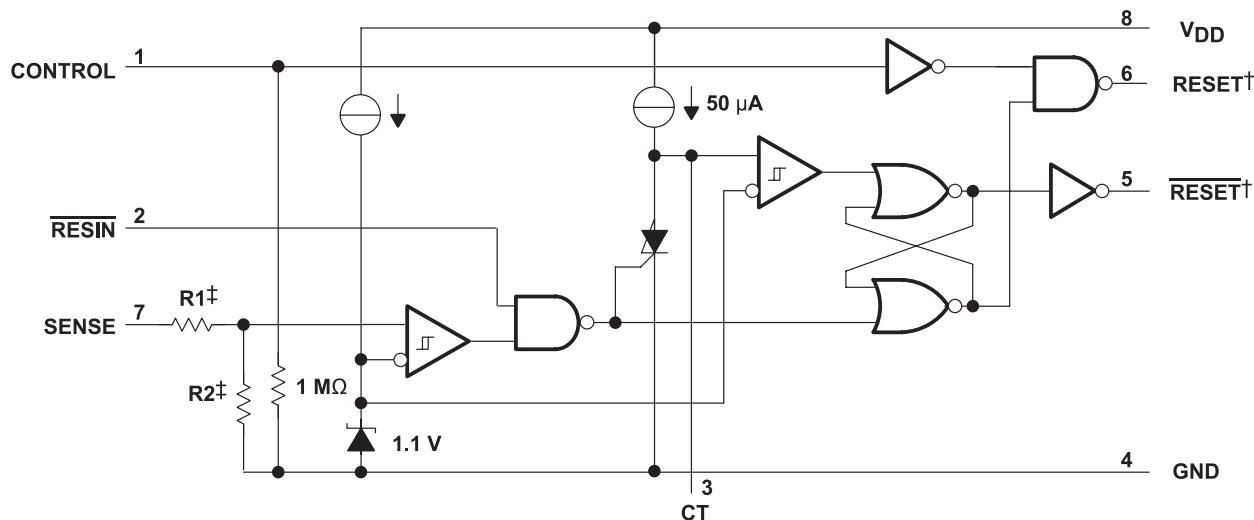
(1) RESET and RESET states shown are valid for  $t > t_d$ .

## LOGIC SYMBOL



(1) This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

## FUNCTIONAL BLOCK DIAGRAM

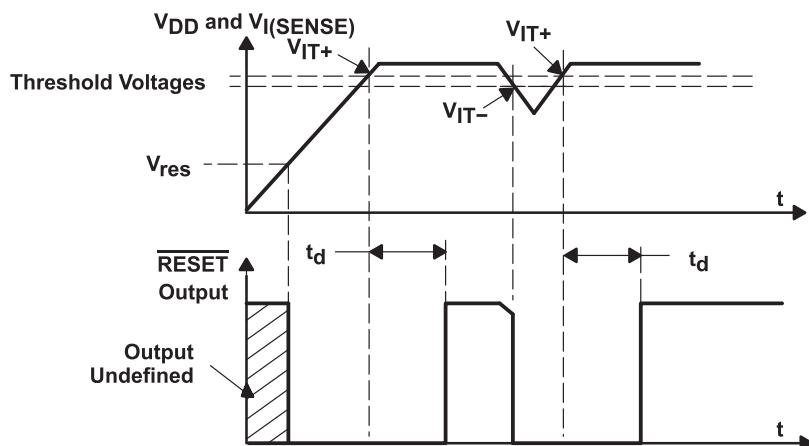


† Outputs are totem-pole configuration. External pullup or pulldown resistors are not required.

‡ Nominal values:

	R1 (Typ)	R2 (Typ)
TLC7701	0	$\infty$
TLC7725	600 k $\Omega$	600 k $\Omega$
TLC7703	698 k $\Omega$	502 k $\Omega$
TLC7733	750 k $\Omega$	450 k $\Omega$
TLC7705	910 k $\Omega$	290 k $\Omega$

## TIMING DIAGRAM



## ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>

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

		VALUE	UNIT
V <sub>DD</sub>	Supply voltage <sup>(2)</sup>	7	V
	Input voltage range, CONTROL, RESIN, SENSE <sup>(2)</sup>	–0.3 to 7	V
I <sub>OL</sub>	Maximum low output current	10	mA
I <sub>OH</sub>	Maximum high output current,	–10	mA
I <sub>IK</sub>	Input clamp current, (VI < 0 or VI > VDD)	±10	mA
I <sub>OK</sub>	Output clamp current, (VO 0 or VO > VDD)	±10	mA
	Continuous total power dissipation	See Dissipation Rating Table	
T <sub>A</sub>	TL77xxL	–40 to 84	°C
	TL77xxQ	–40 to 125	°C
	TL77xxM	–55 to 125	°C
T <sub>stg</sub>	Storage temperature range	–65 to 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 are with respect to GND.

## DISSIPATION RATINGS

PACKAGE	T <sub>A</sub> ≤ 25°C POWER RATING	DERATING FACTOR ABOVE T <sub>A</sub> = 25°C	T <sub>A</sub> = 85°C POWER RATING	T <sub>A</sub> = 125°C POWER RATING
D	725 mW	5.8 mW/°C	377 mW	145 mW
DRB				
FK	1375 mW	11.0 mW/°C	715 mW	275 mW
JG	1050 mW	8.4 mW/°C	546 mW	210 mW
P	1000 mW	8.0 mW/°C	520 mW	200 mW
PW	525 mW	4.2 mW/°C	273 mW	105 mW
U	700 mW	5.5 mW/°C	370 mW	150 mW

## RECOMMENDED OPERATING CONDITIONS

at specified temperature range

		MIN	MAX	UNIT
V <sub>DD</sub>	Supply voltage	2	6	V
V <sub>I</sub>	Input voltage	0	V <sub>DD</sub>	V
V <sub>IH</sub>	High-level input voltage at RESIN and CONTROL <sup>(1)</sup>	0.7×V <sub>DD</sub>		V
V <sub>IL</sub>	Low-level input voltage at RESIN and CONTROL <sup>(1)</sup>		0.2×V <sub>DD</sub>	V
I <sub>OH</sub>	High-level output current		–2	mA
I <sub>OL</sub>	Low-level output current		2	mA
Δt/ΔV	input transition rise and fall rate at RESIN and CONTROL		100	ns/ V
T <sub>A</sub>	TL77xxL	–40	85	°C
	TL77xxQ	–40	125	
	TL77xxM	–55	125	

(1) To ensure a low supply current, V<sub>IL</sub> should be kept <0.3 V and V<sub>IH</sub> > V<sub>DD</sub> –0.3 V.

## ELECTRICAL CHARACTERISTICS

over recommended operating conditions<sup>(1)</sup> (unless otherwise noted)

PARAMETER		TEST CONDITIONS	TLC77xx			UNIT	
			MIN	TYP	MAX		
V <sub>OH</sub>	High-level output voltage	I <sub>OH</sub> = -20 $\mu$ A	V <sub>DD</sub> = 2 V	1.8		V	
			V <sub>DD</sub> = 2.7 V	2.5			
			V <sub>DD</sub> = 4.5 V	4.3			
		I <sub>OH</sub> = 2 mA	V <sub>DD</sub> = 4.5 V	3.7			
V <sub>OL</sub>	Low-Level output voltage	I <sub>OL</sub> = 20 $\mu$ A	V <sub>DD</sub> = 2 V		0.2	V	
			V <sub>DD</sub> = 2.7 V		0.2		
			V <sub>DD</sub> = 4.5 V		0.2		
		I <sub>OL</sub> = 2 mA	V <sub>DD</sub> = 4.5 V		0.5		
V <sub>IT-</sub>	Negative-going input threshold voltage, SENSE <sup>(2)</sup>	TCLC7701	V <sub>DD</sub> = 2 V to 6 V	1.04	1.1	1.16	mV
		TLC7725		2.18	2.25	2.32	
		TLC7703		2.56	2.63	2.70	
		TLC7733		2.86	2.93	3	
		TLC7705		4.47	4.55	4.63	
V <sub>hus</sub>	Hysteresis voltage, SENSE	TCLC7701	V <sub>DD</sub> = 2 V to 6 V		30		mV
		TLC7725				70	
		TLC7703					
		TLC7733					
		TLC7705					
V <sub>res</sub>	Power-up reset voltage <sup>(3)</sup>	I <sub>OL</sub> = 20 $\mu$ A			1	V	
I <sub>I</sub>	Input current	RESIN	V <sub>I</sub> = 0 V to V <sub>DD</sub>		2		$\mu$ A
		CONTROL	V <sub>I</sub> = V <sub>DD</sub>		7	15	
		SENSE	V <sub>I</sub> = 5 V		5	10	
		SENSE, TLC7701 only	V <sub>I</sub> = 5 V		2		
I <sub>DD</sub>	Supply current	$\bar{RESIN} = V_{DD}$ , SENSE = V <sub>DD</sub> $\geq V_{IT\max} + 0.2$ V, CONTROL = 0 V, Outputs open			9	16	$\mu$ A
I <sub>DD(d)</sub>	Supply current during t <sub>d</sub>	V <sub>DD</sub> = 5 V, V <sub>CT</sub> = 0, $\bar{RESIN} = V_{DD}$ , SENSE = V <sub>DD</sub> , CONTROL = 0 V, Outputs open			120	150	$\mu$ A
C <sub>I</sub>	Input capacitance, SENSE	V <sub>I</sub> = 0 V to V <sub>DD</sub>			50	pF	

(1) All characteristics are measured with C<sub>T</sub> = 0.1  $\mu$ F.  
 (2) To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 mF) should be connected near the supply terminals.  
 (3) The lowest supply voltage at which RESIN becomes active. The symbol V<sub>res</sub> is not currently listed within EIA or JEDEC standards for semiconductor symbology. Rise time of V<sub>DD</sub>  $\geq$  15  $\mu$ s/V.

## ELECTRICAL CHARACTERISTICS

over recommended operating conditions<sup>(1)</sup> (unless otherwise noted)

PARAMETER		TEST CONDITIONS	TLC77xxM			UNIT		
			MIN	TYP <sup>(2)</sup>	MAX			
V <sub>OH</sub> High-level output voltage	I <sub>OH</sub> = -20 µA	V <sub>DD</sub> = 2 V	T <sub>A</sub> = 25°C	1.8		V		
			T <sub>A</sub> = -55°C to 125°C	1.7				
		V <sub>DD</sub> = 2.7 V	T <sub>A</sub> = 25°C	2.5		V		
			T <sub>A</sub> = -55°C to 125°C	2.3				
	I <sub>OH</sub> = -2 µA	V <sub>DD</sub> = 4.5 V	T <sub>A</sub> = 25°C	4.3		V		
			T <sub>A</sub> = -55°C to 125°C	4.2				
		V <sub>DD</sub> = 4.5 V	T <sub>A</sub> = 25°C	3.7		V		
			T <sub>A</sub> = -55°C to 125°C	3.6				
V <sub>OL</sub> Low-level output voltage	I <sub>OL</sub> = -20 µA	V <sub>DD</sub> = 2 V	T <sub>A</sub> = 25°C	0.2		V		
			T <sub>A</sub> = -55°C to 125°C	0.2				
		V <sub>DD</sub> = 2.7 V	T <sub>A</sub> = 25°C	0.2		V		
			T <sub>A</sub> = -55°C to 125°C	0.2				
	I <sub>OL</sub> = 2 mA	V <sub>DD</sub> = 4.5 V	T <sub>A</sub> = 25°C	0.2		V		
			T <sub>A</sub> = -55°C to 125°C	0.2				
		V <sub>DD</sub> = 4.5 V	T <sub>A</sub> = 25°C	0.5		V		
			T <sub>A</sub> = -55°C to 125°C	0.5				
V <sub>IT-</sub> Negative-going input threshold voltage, SENSE <sup>(3)</sup>	TLC7733	V <sub>DD</sub> = 2 V to 6 V	2.86	2.93	3.1	V		
	TLC7705		4.3	4.5	4.8			
V <sub>hys</sub>	Hysteresis voltage, SENSE		V <sub>DD</sub> = 2 V to 6 V			70	mV	
V <sub>res</sub>	Power-up reset voltage <sup>(2)</sup>		I <sub>OL</sub> = 20 µA			1	V	
I <sub>I</sub> Input current	RESIN	V <sub>I</sub> = 0 V to V <sub>DD</sub>				2	µA	
	CONTROL	V <sub>I</sub> = V <sub>DD</sub>				7 15		
	SENSE	V <sub>I</sub> = 5 V				5 10		
	SENSE, TLC7701 only	V <sub>I</sub> = 5 V				2		
I <sub>DD</sub>	Supply current		RESIN = V <sub>DD</sub> , SENSE = V <sub>DD</sub> ≥ V <sub>ITmax</sub> + 0.2 V CONTROL = 0 V, Outputs open			9 16	µA	
I <sub>DD(d)</sub> Supply current during t <sub>d</sub>	TLC7733	V <sub>CT</sub> = 0 , RESIN = V <sub>DD</sub> , CONTROL = 0 V, SENSE = V <sub>DD</sub> , Outputs open	V <sub>DD</sub> = 3.3 V			250	µA	
	TLC7705		V <sub>DD</sub> = 5 V			120 150		
C <sub>I</sub>	Input capacitance, SENSE		V <sub>I</sub> = 0 V to V <sub>DD</sub>			50	pF	

(1) All characteristics are measured with C<sub>T</sub> = 0.1 µF.

(2) Typical values apply at T<sub>A</sub> = 25°C.

(3) To ensure best stability of the threshold voltage, a bypass capacitor (ceramic, 0.1 mF) should be connected near the supply terminals.

## SWITCHING CHARACTERISTICS

at  $V_{DD} = 5 \text{ V}$ ,  $R_L = 2 \text{ k}\Omega$ ,  $C_L = 50 \text{ pF}$ ,  $T_A = 25^\circ\text{C}$  (unless otherwise noted)

PARAMETER	MEASURED		TEST CONDITIONS	TLC77xx			UNIT	
	FROM (INPUT)	TO (OUTPUT)		MIN	TYP	MAX		
$t_d$ Delay time	$V_{I(SENSE)} \geq V_{IT+}$	RESET and <u>RESET</u>	$RESIN = 0.7 \times V_{DD}$ , CONTROL = $0.2 \times V_{DD}$ , $C_T = 100 \text{ nF}$ , $T_A = \text{Full range}$ , See timing diagram	1.1	2.1	4.2	ms	
$t_{PLH}$ Propagation delay time, low-to-high-level output	SENSE	<u>RESET</u>	$V_{IH} = V_{IT+max} + 0.2 \text{ V}$ , $V_{IL} = V_{IT+min} - 0.2 \text{ V}$ , $RESIN = 0.7 \times V_{DD}$ , CONTROL = $0.2 \times V_{DD}$ , CT = NC <sup>(1)</sup>	20	μs			
$t_{PHL}$ Propagation delay time, high-to-low-level output				5				
$t_{PLH}$ Propagation delay time, low-to-high-level output		RESET		5				
$t_{PHL}$ Propagation delay time, high-to-low-level output				20				
$t_{PLH}$ Propagation delay time, low-to-high-level output	RESIN	<u>RESET</u>	$V_{IH} = 0.7 \times V_{DD}$ , $V_{IL} = 0.2 \times V_{DD}$ , SENSE = $V_{IT+max} + 0.2 \text{ V}$ , CONTROL = $0.2 \times V_{DD}$ , CT = NC <sup>(1)</sup>	20	μs			
$t_{PHL}$ Propagation delay time, high-to-low-level output				40				
$t_{PLH}$ Propagation delay time, low-to-high-level output		RESET		45				
$t_{PHL}$ Propagation delay time, high-to-low-level output				20				
$t_{PLH}$ Propagation delay time, low-to-high-level output	CONTROL	RESET	$V_{IH} = 0.7 \times V_{DD}$ , $V_{IL} = 0.2 \times V_{DD}$ , SENSE = $V_{IT+max} + 0.2 \text{ V}$ , RESIN = $0.7 \times V_{DD}$ , CT = NC <sup>(1)</sup>	38	ns			
$t_{PHL}$ Propagation delay time, high-to-low-level output				38				
Low-level minimum pulse duration to switch RESET and RESET	SENSE		$V_{IH} = V_{IT+max} + 0.2 \text{ V}$ , $V_{IL} = V_{IT+min} - 0.2 \text{ V}$ ,					
	RESIN		$V_{IL} = 0.2 \times V_{DD}$ , $V_{IH} = 0.7 \times V_{DD}$					
$t_r$ Rise time		RESET and <u>RESET</u>	10% to 90%					
$t_f$ Fall time			90% to 10%					

(1) NC = No capacitor, and includes up to 100-pF probe and jig capacitance.

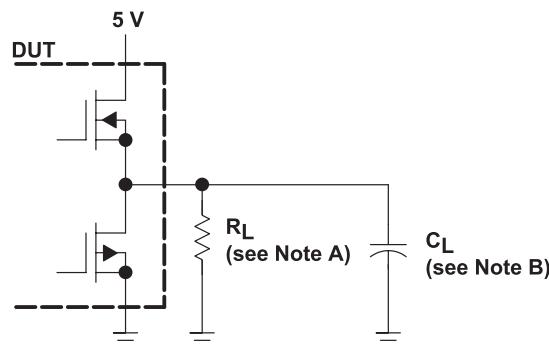
## SWITCHING CHARACTERISTICS

at  $V_{DD} = 5$  V,  $R_L = 2$  k $\Omega$ ,  $C_L = 50$  pF,  $T_A = 25^\circ\text{C}$  (unless otherwise noted)

PARAMETER	MEASURED		TEST CONDITIONS	$T_A$	TLC77xxM			UNIT
	FROM (INPUT)	TO (OUTPUT)			MIN	TYP	MAX	
$t_d$ Delay time	$V_{I(\text{SENSE})} \geq V_{IT+}$	RESET and $\overline{\text{RESET}}$	RESIN = 2.7 V, CONTROL = 0.4 V, $C_T = 100$ nF, See timing diagram	Full range	1.1	2.1	4.2	ms
$t_{PLH}$ Propagation delay time, low-to-high-level output	SENSE	RESET	$V_{IH} = V_{IT+,\text{max}} + 0.2$ V, $V_{IL} = V_{IT-,\text{min}} - 0.2$ V, RESIN = 2.7 V, CONTROL = 0.4 V, $CT = NC^{(1)}$	25°C	20			$\mu\text{s}$
		RESET	$V_{IH} = V_{IT+,\text{max}} + 0.2$ V, $V_{IL} = V_{IT-,\text{min}} - 0.2$ V, RESIN = 2.7 V, CONTROL = 0.4 V, $CT = NC^{(1)}$	Full range	24			
	SENSE	RESET	$V_{IH} = V_{IT+,\text{max}} + 0.2$ V, $V_{IL} = V_{IT-,\text{min}} - 0.2$ V, RESIN = 2.7 V, CONTROL = 0.4 V, $CT = NC^{(1)}$	25°C	5			$\mu\text{s}$
		RESET	$V_{IH} = V_{IT+,\text{max}} + 0.2$ V, $V_{IL} = V_{IT-,\text{min}} - 0.2$ V, RESIN = 2.7 V, CONTROL = 0.4 V, $CT = NC^{(1)}$	Full range	7			
$t_{PLH}$ Propagation delay time, high-to-low-level output	RESIN	RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	25°C	5			$\mu\text{s}$
		RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	Full range	7			
	RESIN	RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	25°C	20			$\mu\text{s}$
		RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	Full range	24			
$t_{PHL}$ Propagation delay time, high-to-low-level output	RESIN	RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	25°C	40			$\mu\text{s}$
		RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, CONTROL = 0.4 V, $CT = NC^{(1)}$	Full range	60			
	CONTROL	RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, RESIN = 2.7 V, $CT = NC^{(1)}$	25°C	20			$\mu\text{s}$
		RESET	$V_{IH} = 2.7$ V, $V_{IL} = 0.4$ V, SENSE = $V_{IT+,\text{max}} + 0.2$ V, RESIN = 2.7 V, $CT = NC^{(1)}$	Full range	24			
Low-level minimum pulse duration	SENSE	RESET	$V_{IH} = V_{IT+,\text{max}} + 0.2$ V, $V_{IL} = V_{IT-,\text{min}} - 0.2$ V	Full range	3			$\mu\text{s}$
	RESIN		$V_{IL} = 0.4$ V, $V_{IH} = 2.7$ V		1			
$t_r$ Rise time		RESET and $\overline{\text{RESET}}$	10% to 90%	Full range	8			ns/V
$t_f$ Fall time			90% to 10%		4			

(1) NC = No capacitor, and includes up to 100-pF probe and jig capacitance.

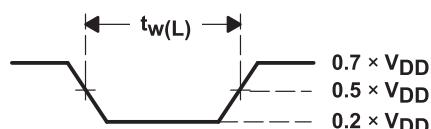
## PARAMETER MEASUREMENT INFORMATION



NOTES: A. For switching characteristics,  $R_L = 2\text{ k}\Omega$ .  
B.  $C_L = 50\text{ pF}$  includes jig and probe capacitance.

Figure 1. RESET and  $\overline{\text{RESET}}$  Output Configurations

I, Q, and Y suffixed devices



M suffixed devices

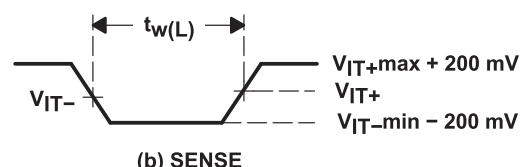
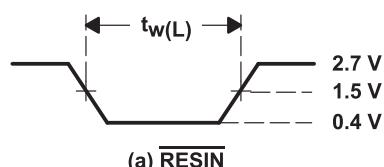


Figure 2. Input Pulse Definition Waveforms

## TYPICAL CHARACTERISTICS

NORMALIZED INPUT THRESHOLD VOLTAGE  
vs  
TEMPERATURE

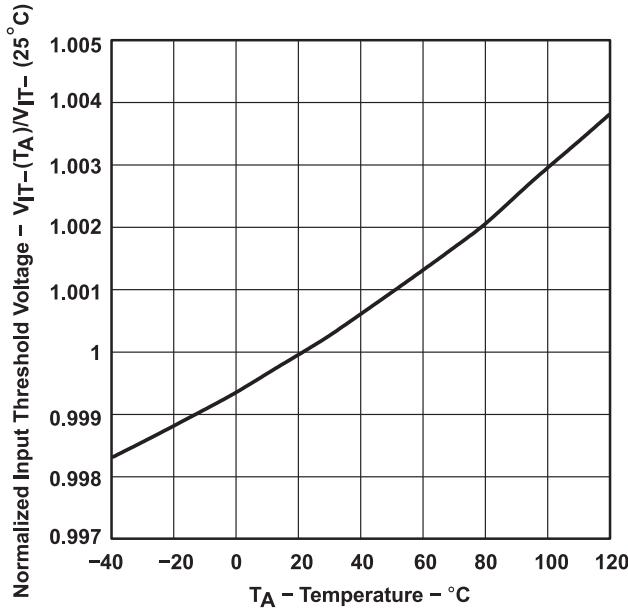


Figure 3.

SUPPLY CURRENT  
vs  
SUPPLY VOLTAGE

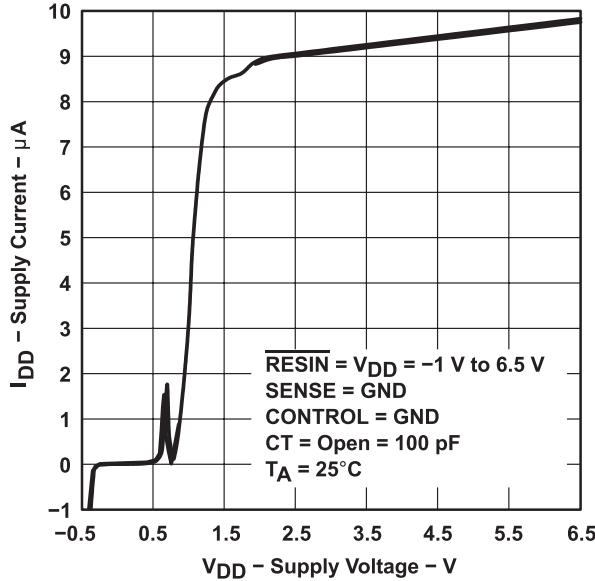


Figure 4.

HIGH-LEVEL OUTPUT VOLTAGE  
vs  
HIGH-LEVEL OUTPUT CURRENT

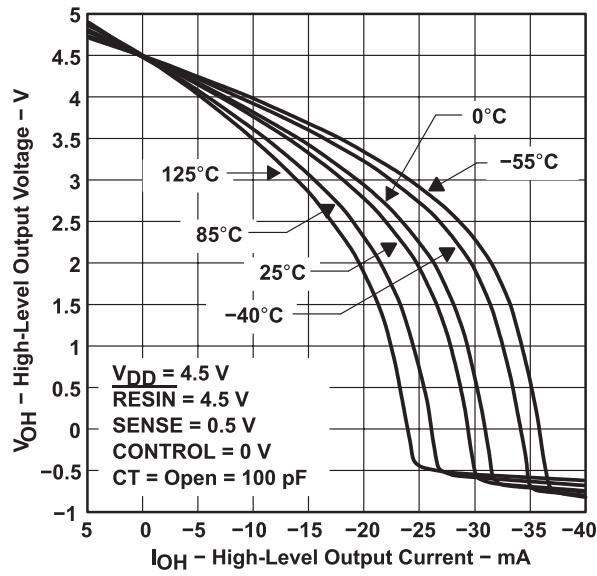


Figure 5.

LOW-LEVEL OUTPUT VOLTAGE  
vs  
LOW-LEVEL OUTPUT CURRENT

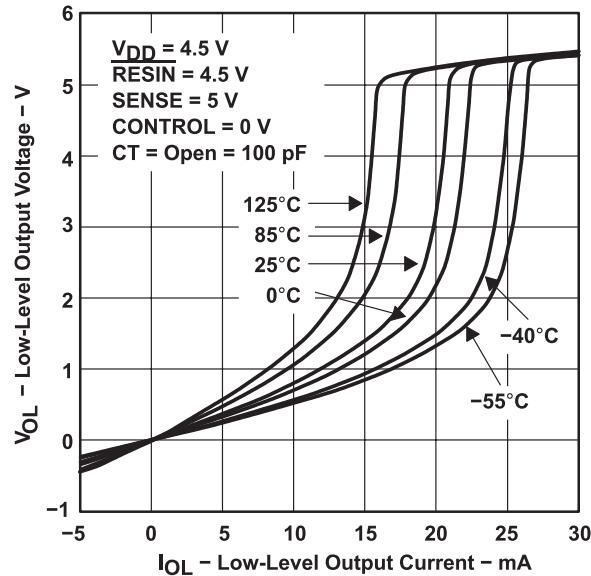


Figure 6.

**TYPICAL CHARACTERISTICS (continued)**

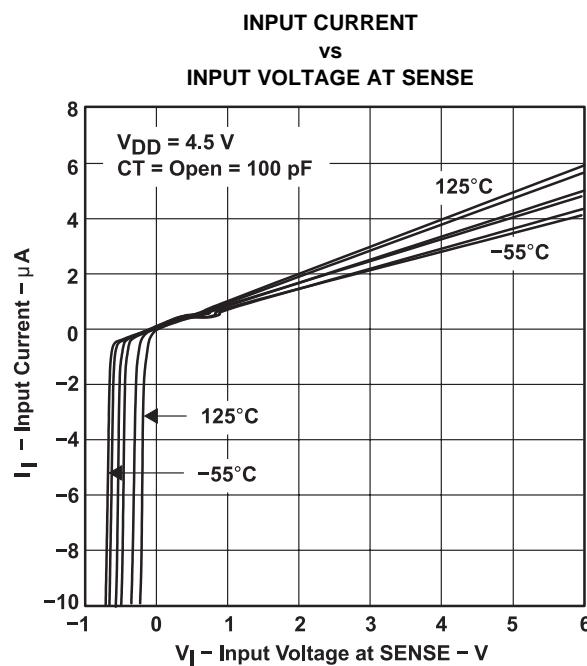


Figure 7.

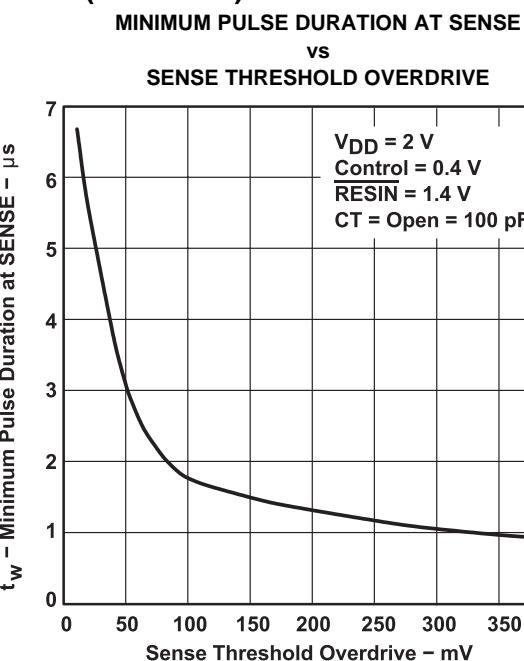


Figure 8.

## APPLICATION INFORMATION

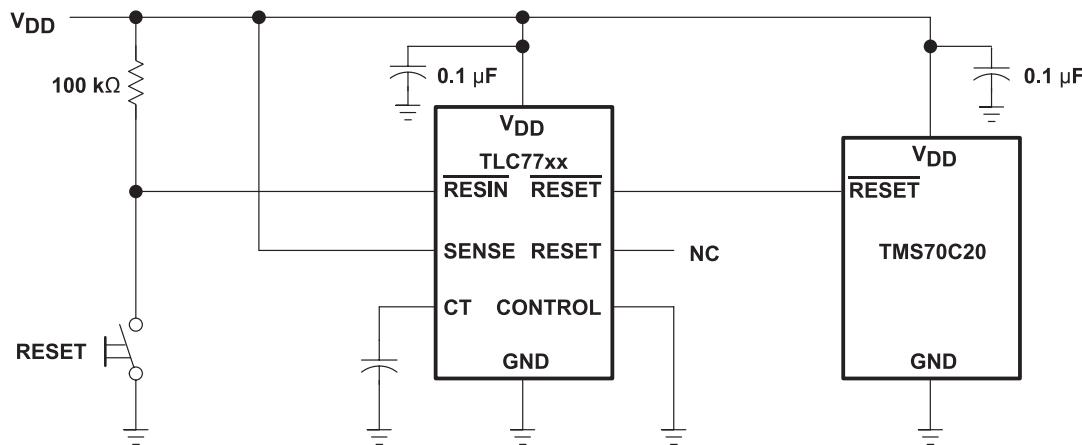


Figure 9. Reset Controller in a Microcomputer System

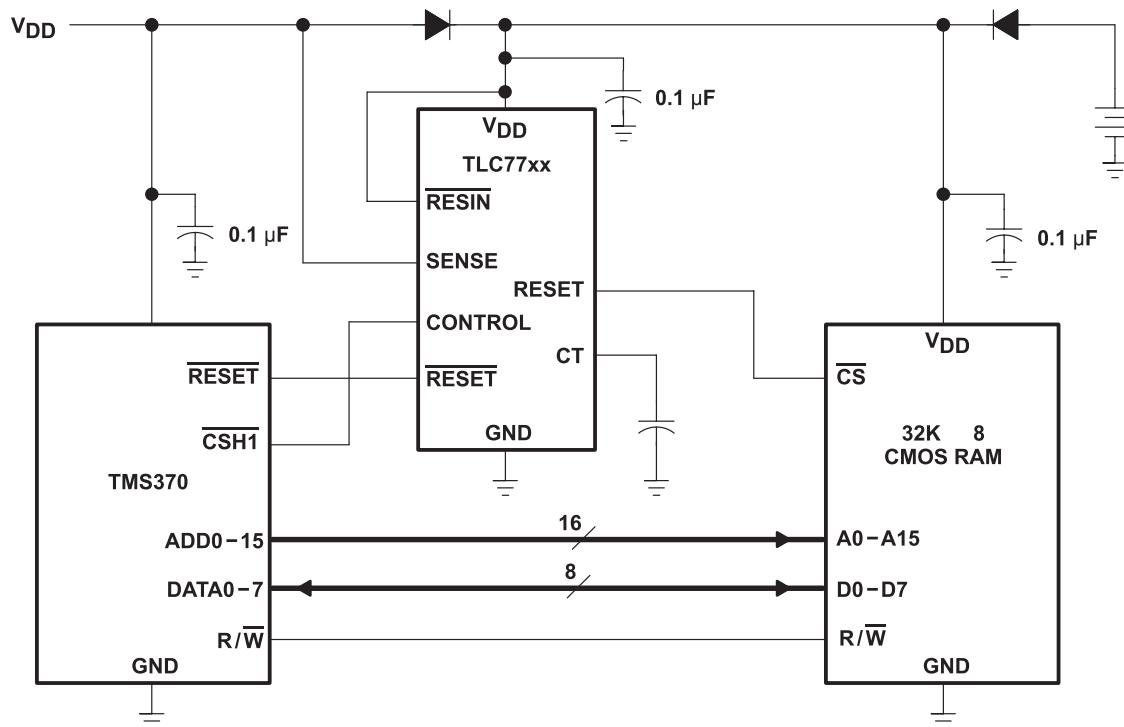


Figure 10. Data Retention During Power Down Using Static CMOS RAMs

**Changes from Revision L (February 2003) to Revision M**

**Page**

• Updated the DRB package Pin Out dimensions and Ordering Information. ....	<a href="#">1</a>
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**PACKAGING INFORMATION**

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
5962-9750901Q2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9750901Q2A TLC7733 MFKB	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
5962-9750901QPA	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9750901QPA TLC7733M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
5962-9751301Q2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9751301Q2A TLC7705 MFKB	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
5962-9751301QHA	ACTIVE	CFP	U	10	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9751301QHA TLC7705M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
5962-9751301QPA	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9751301QPA TLC7705M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701ID	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7701I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IDG4	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7701I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7701I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IDRBT-NM	ACTIVE	SON	DRB	8	250	RoHS & Green	SN	Level-2-260C-1 YEAR	-40 to 125	7701N	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IDRG4	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7701I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7701IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701IPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QD	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7701Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7701Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QDRG4	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7701Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLC7701QP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 125	TLC7701QP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QPWG4	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7701QPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD701	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703ID	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7703I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703IDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7703I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703IP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7703IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703IPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		Y7703	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703IPWG4	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		Y7703	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703IPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7703	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703QD	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7703Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703QDG4	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7703Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703QPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD703	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7703QPWG4	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD703	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705ID	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7705I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705IDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7705I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705IP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7705IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705IPE4	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7705IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705IPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		Y7705	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705IPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7705	<span style="background-color: red; color: white; padding: 2px;">Samples</span>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLC7705MFKB	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962-9751301Q2A TLC7705 MFKB	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705MJG	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	TLC7705 MJG	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705MJGB	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9751301QPA TLC7705M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705MUB	ACTIVE	CFP	U	10	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9751301QHA TLC7705M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705QD	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7705Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705QDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7705Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705QPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD705	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705QPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD705	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7705QPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD705	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725ID	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7725I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725IDG4	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7725I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725IDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7725I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725IDRG4	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7725I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725IPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		Y7725	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725IPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7725	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725QD	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7725Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725QDG4	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7725Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725QDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7725Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7725QPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD725	<span style="background-color: red; color: white; padding: 2px;">Samples</span>

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TLC7725QPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD725	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733ID	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7733I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IDG4	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7733I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7733I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IDRG4	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	C7733I	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7733IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IPE4	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	TLC7733IP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM		Y7733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733IPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	Y7733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733MFKB	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	5962- 9750901Q2A TLC7733 MFKB	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733MJG	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	TLC7733 MJG	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733MJGB	ACTIVE	CDIP	JG	8	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	9750901QPA TLC7733M	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QD	ACTIVE	SOIC	D	8	75	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7733Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QDR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	C7733Q	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QP	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 125	TLC7733QP	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QPW	ACTIVE	TSSOP	PW	8	150	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QPWR	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
TLC7733QPWRG4	ACTIVE	TSSOP	PW	8	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	TD733	<span style="background-color: red; color: white; padding: 2px;">Samples</span>

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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 finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material 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 but may not 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 TLC77 :**

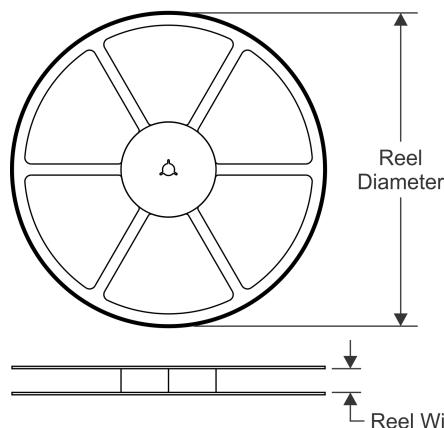
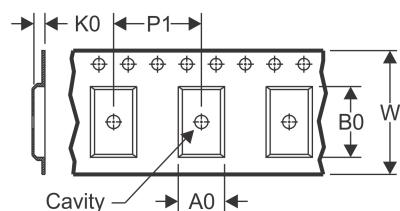
• Automotive : [TLC77-Q1](#)

• Enhanced Product : [TLC77-EP](#)

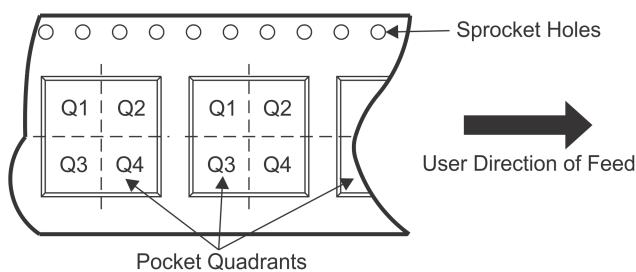
NOTE: Qualified Version Definitions:

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- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

**TAPE AND REEL INFORMATION**
**REEL DIMENSIONS**

**TAPE DIMENSIONS**


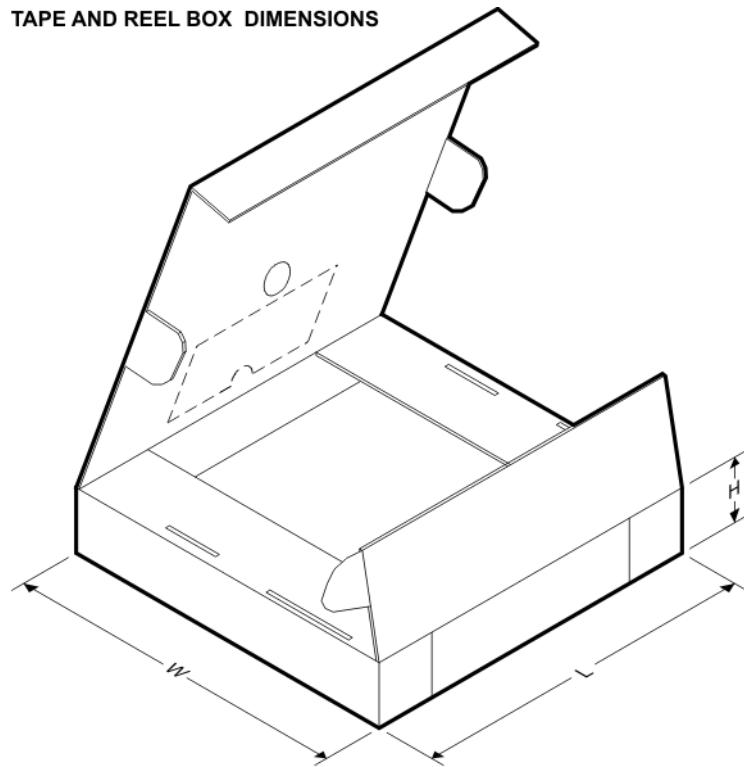
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

**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
TLC7701IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7701IDRBT-NM	SON	DRB	8	250	180.0	12.4	3.3	3.3	1.1	8.0	12.0	Q2
TLC7701IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7701QDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7701QPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7703IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7703IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7705IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7705IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7705QDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7705QPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7725IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7725IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7725QDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7725QPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7733IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC7733IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC7733QDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1

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
TLC7733QPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1

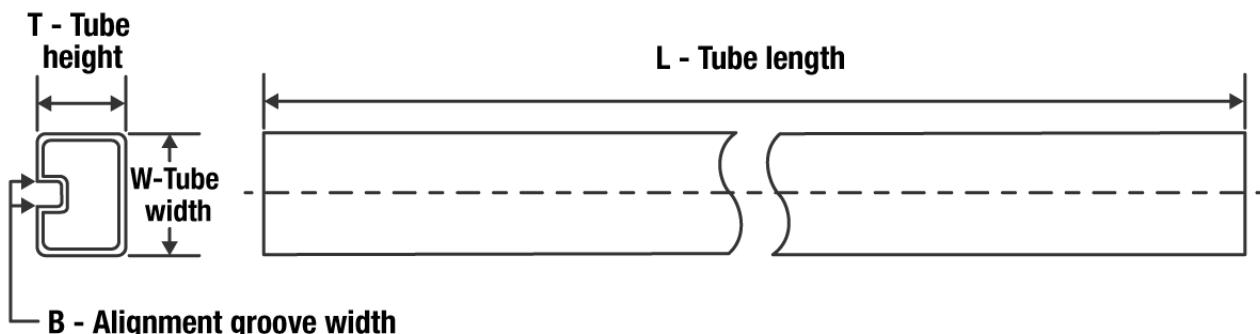
**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLC7701IDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7701IDRBT-NM	SON	DRB	8	250	210.0	185.0	35.0
TLC7701IPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7701QDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7701QPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7703IDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7703IPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7705IDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7705IPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7705QDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7705QPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7725IDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7725IPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7725QDR	SOIC	D	8	2500	350.0	350.0	43.0
TLC7725QPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7733IDR	SOIC	D	8	2500	853.0	449.0	35.0

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Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLC7733IPWR	TSSOP	PW	8	2000	853.0	449.0	35.0
TLC7733QDR	SOIC	D	8	2500	853.0	449.0	35.0
TLC7733QPWR	TSSOP	PW	8	2000	853.0	449.0	35.0

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-9750901Q2A	FK	LCCC	20	1	506.98	12.06	2030	NA
5962-9751301Q2A	FK	LCCC	20	1	506.98	12.06	2030	NA
5962-9751301QHA	U	CFP	10	1	506.98	26.16	6220	NA
TLC7701ID	D	SOIC	8	75	505.46	6.76	3810	4
TLC7701IDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLC7701IP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7701IPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7701QD	D	SOIC	8	75	505.46	6.76	3810	4
TLC7701QP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7701QPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7701QPWG4	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7703ID	D	SOIC	8	75	505.46	6.76	3810	4
TLC7703IP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7703IPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7703IPWG4	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7703QD	D	SOIC	8	75	505.46	6.76	3810	4
TLC7703QDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLC7703QPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7703QPWG4	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7705ID	D	SOIC	8	75	505.46	6.76	3810	4
TLC7705IP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7705IPE4	P	PDIP	8	50	506	13.97	11230	4.32
TLC7705IPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7705MFKB	FK	LCCC	20	1	506.98	12.06	2030	NA
TLC7705MUB	U	CFP	10	1	506.98	26.16	6220	NA
TLC7705QD	D	SOIC	8	75	505.46	6.76	3810	4
TLC7705QPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7725ID	D	SOIC	8	75	505.46	6.76	3810	4

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
TLC7725IDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLC7725IPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7725QD	D	SOIC	8	75	505.46	6.76	3810	4
TLC7725QDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLC7733ID	D	SOIC	8	75	505.46	6.76	3810	4
TLC7733ID	D	SOIC	8	75	506.6	8	3940	4.32
TLC7733IDG4	D	SOIC	8	75	505.46	6.76	3810	4
TLC7733IDG4	D	SOIC	8	75	506.6	8	3940	4.32
TLC7733IP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7733IPE4	P	PDIP	8	50	506	13.97	11230	4.32
TLC7733IPW	PW	TSSOP	8	150	530	10.2	3600	3.5
TLC7733MFKB	FK	LCCC	20	1	506.98	12.06	2030	NA
TLC7733QD	D	SOIC	8	75	505.46	6.76	3810	4
TLC7733QD	D	SOIC	8	75	506.6	8	3940	4.32
TLC7733QP	P	PDIP	8	50	506	13.97	11230	4.32
TLC7733QPW	PW	TSSOP	8	150	530	10.2	3600	3.5

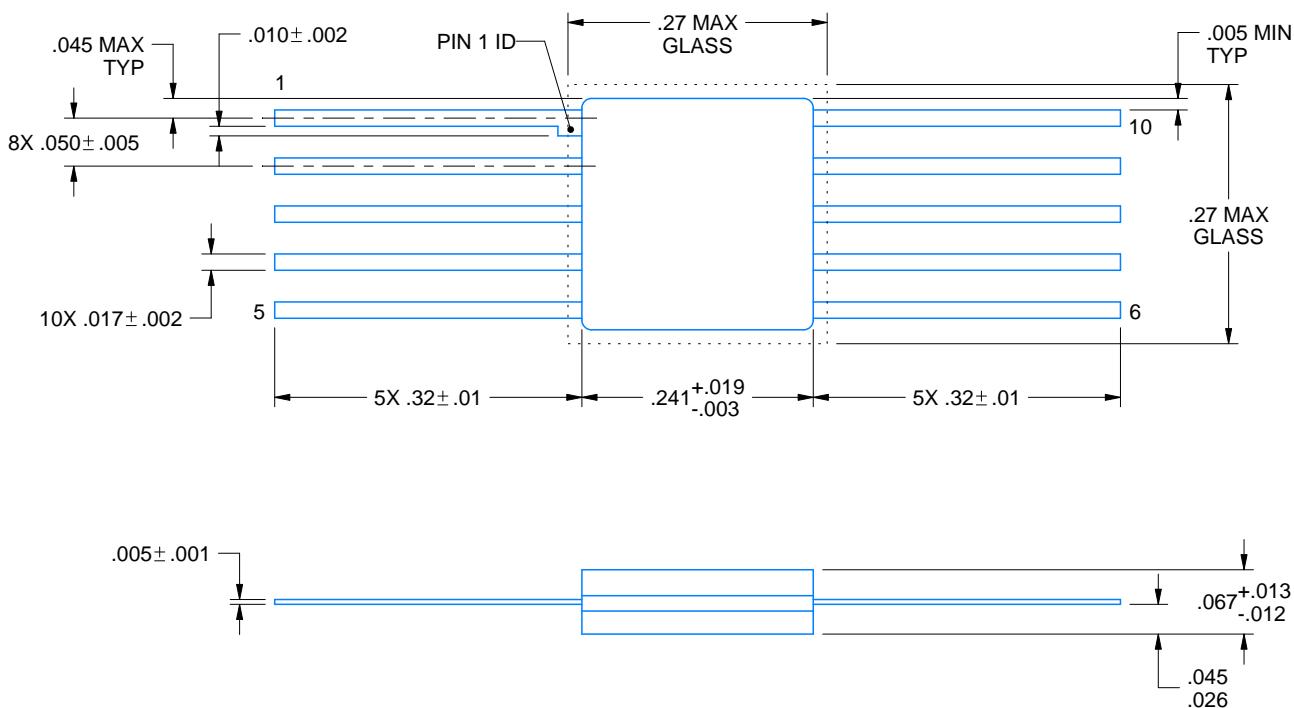
U0010A



# PACKAGE OUTLINE

CFP - 2.03 mm max height

CERAMIC FLATPACK



4225582/A 01/2020

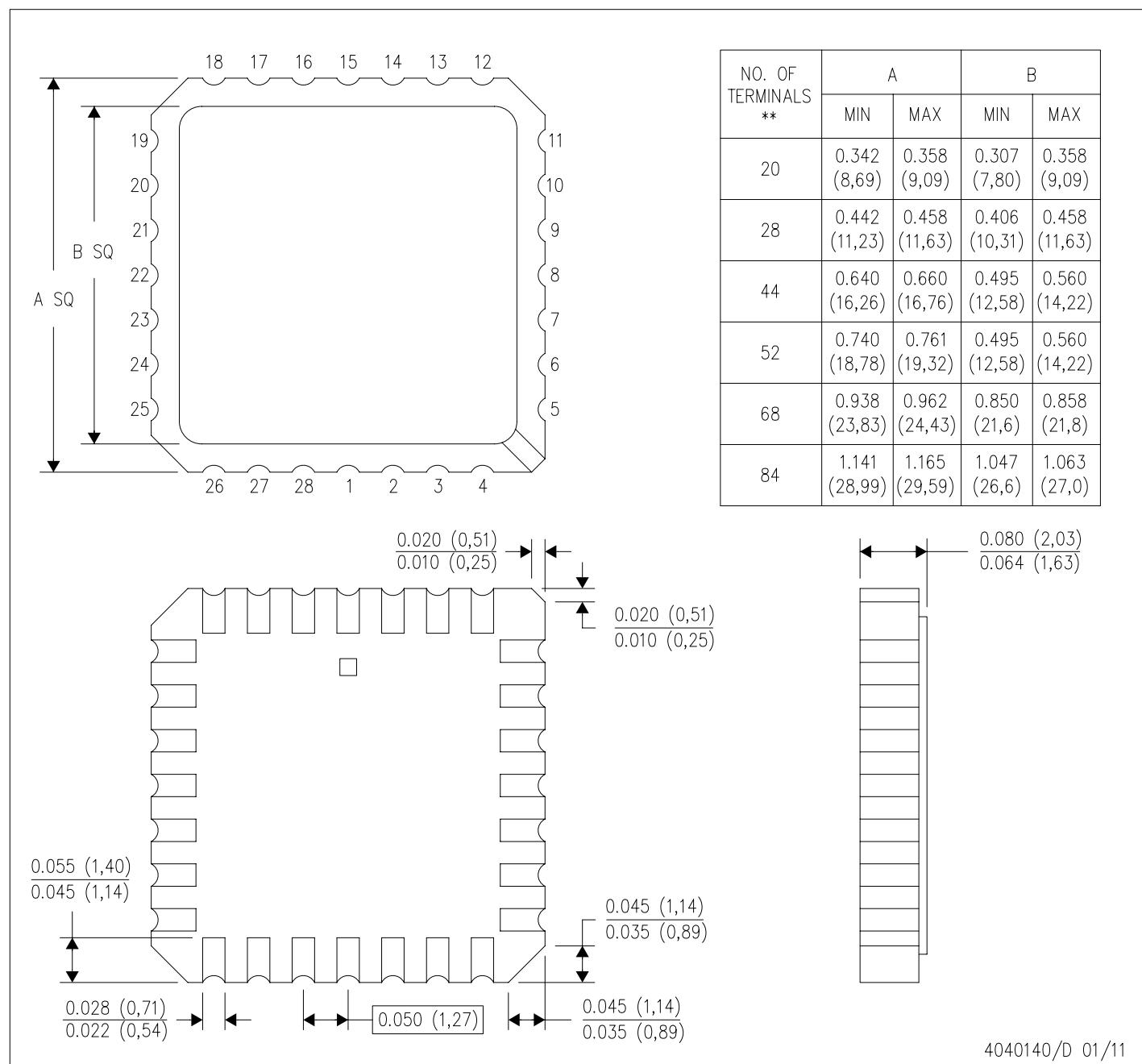
NOTES:

1. All linear dimensions are in inches. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

FK (S-CQCC-N\*\*)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004

4040140/D 01/11

## GENERIC PACKAGE VIEW

**DRB 8**

**VSON - 1 mm max height**

PLASTIC SMALL OUTLINE - NO LEAD



Images above are just a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.

4203482/L

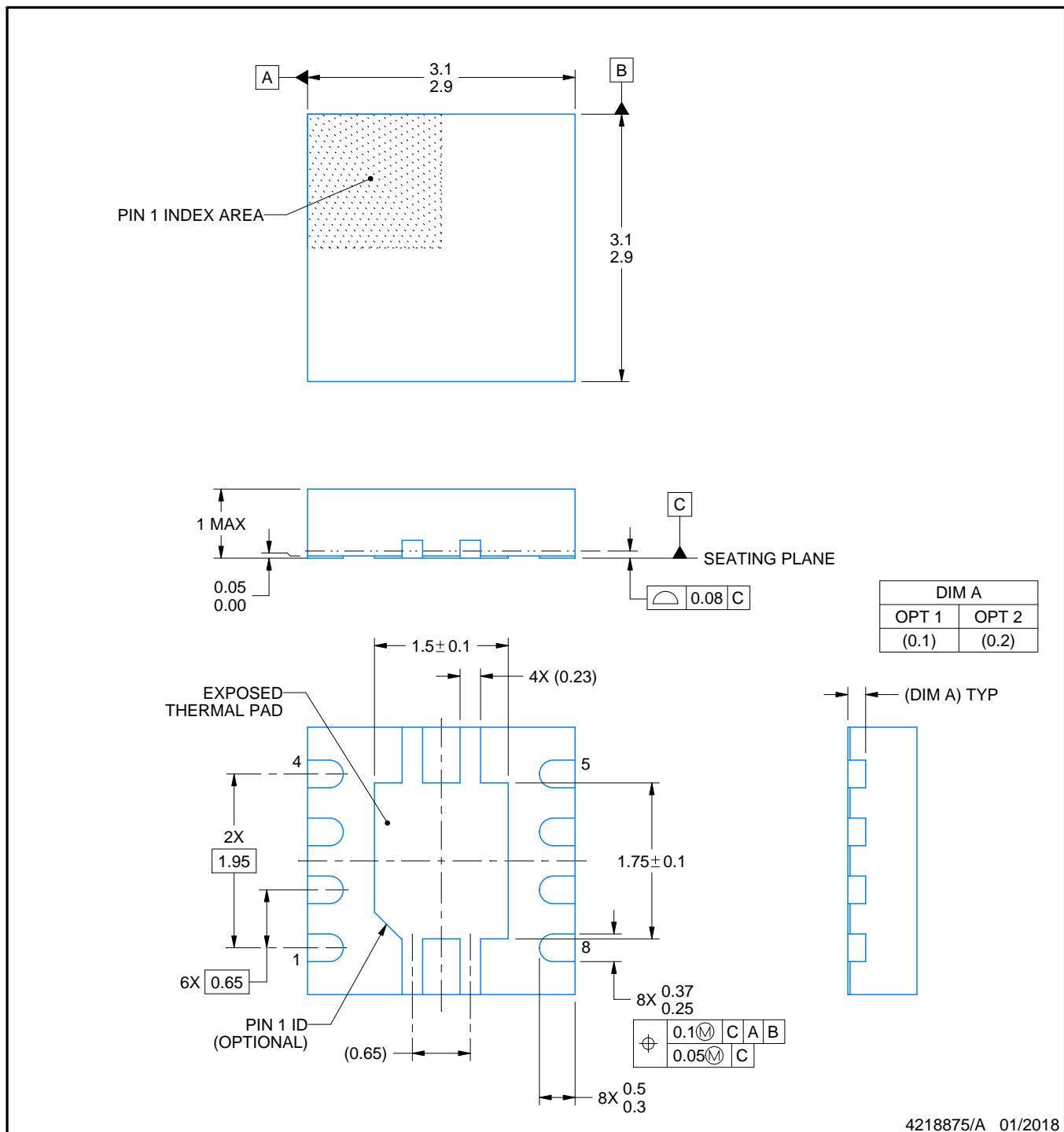
DRB0008A



# PACKAGE OUTLINE

## VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



NOTES:

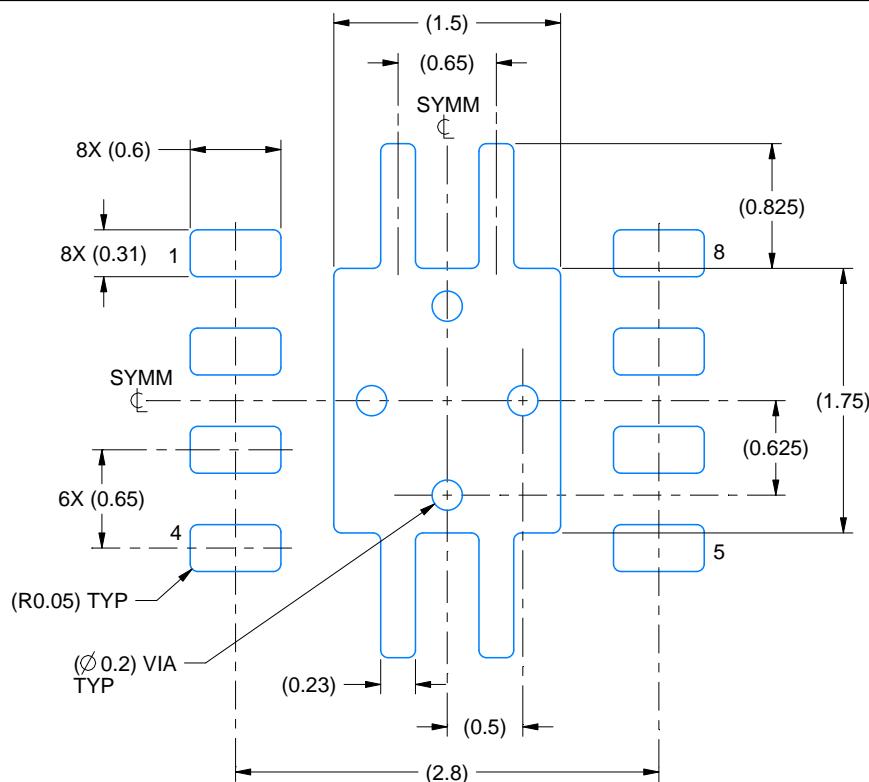
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

## EXAMPLE BOARD LAYOUT

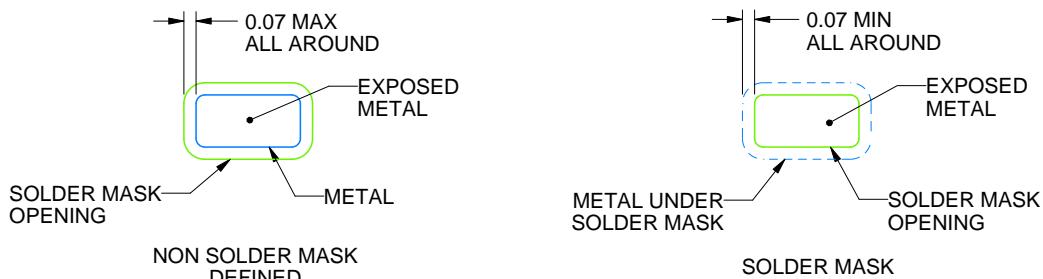
**DRB0008A**

## VSON - 1 mm max height

## PLASTIC SMALL OUTLINE - NO LEAD



**LAND PATTERN EXAMPLE**  
**EXPOSED METAL SHOWN**  
**SCALE:20X**



## SOLDER MASK DETAILS

4218875/A 01/2018

#### NOTES: (continued)

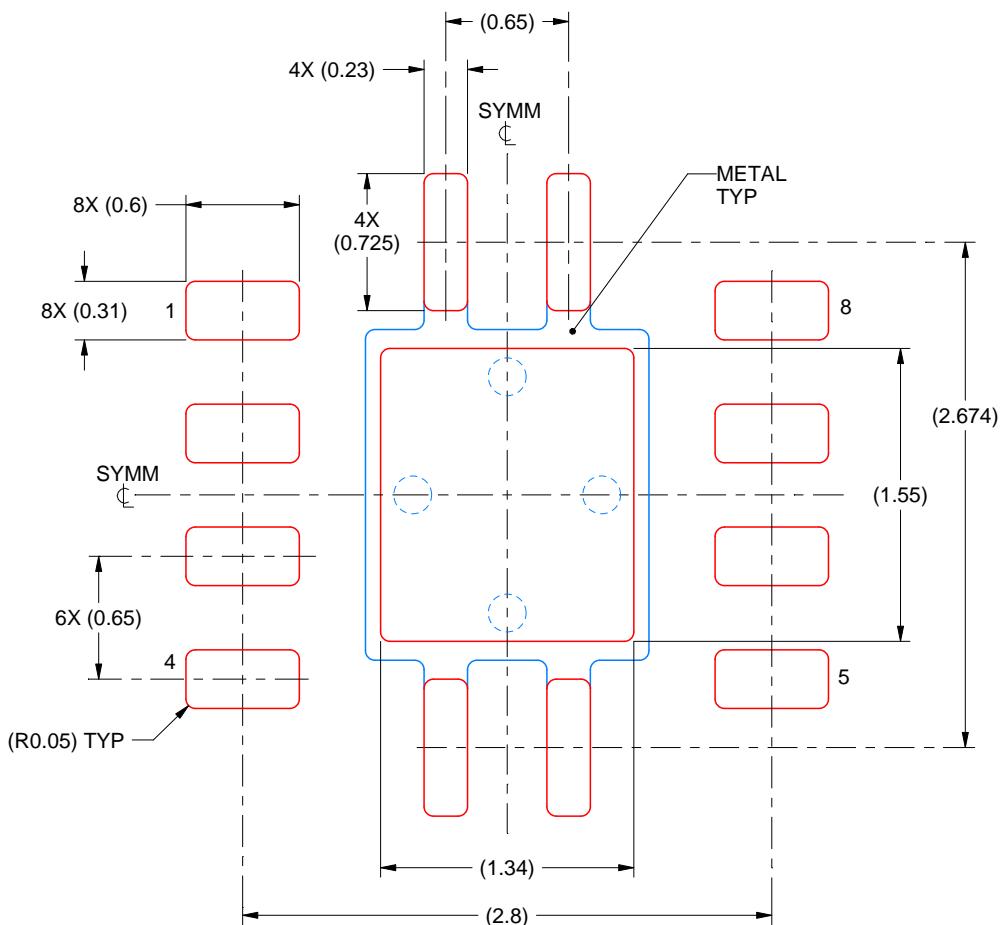
4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 ([www.ti.com/lit/slua271](http://www.ti.com/lit/slua271)).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

# EXAMPLE STENCIL DESIGN

DRB0008A

VSON - 1 mm max height

PLASTIC SMALL OUTLINE - NO LEAD



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD  
84% PRINTED SOLDER COVERAGE BY AREA  
SCALE:25X

4218875/A 01/2018

NOTES: (continued)

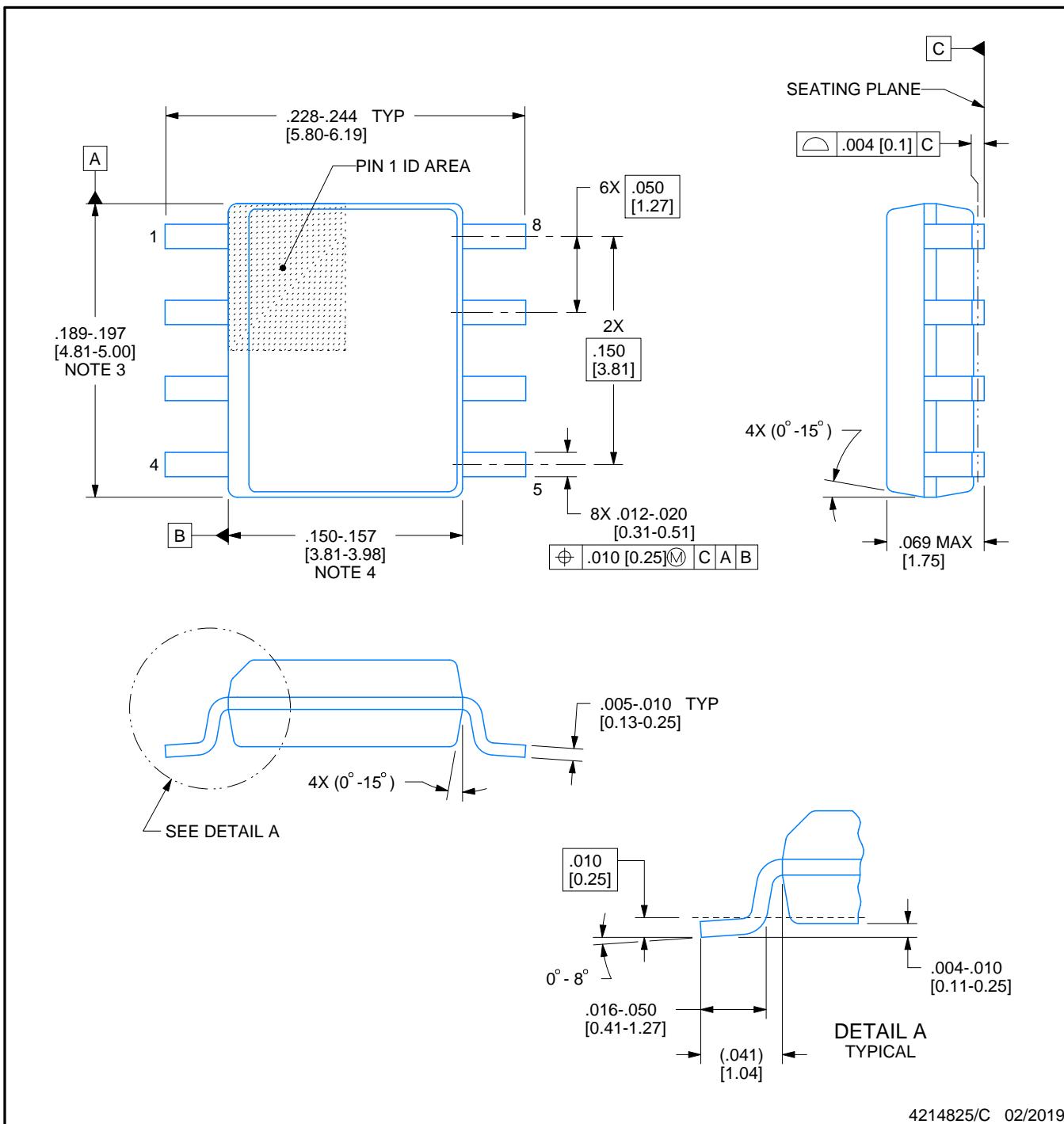
6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.



# PACKAGE OUTLINE

## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



### NOTES:

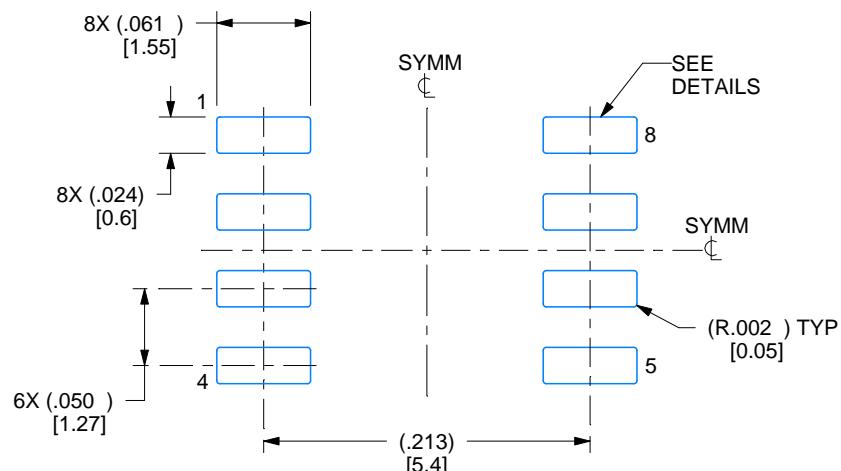
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.

# EXAMPLE BOARD LAYOUT

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE:8X



SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

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

# EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE  
BASED ON .005 INCH [0.125 MM] THICK STENCIL  
SCALE:8X

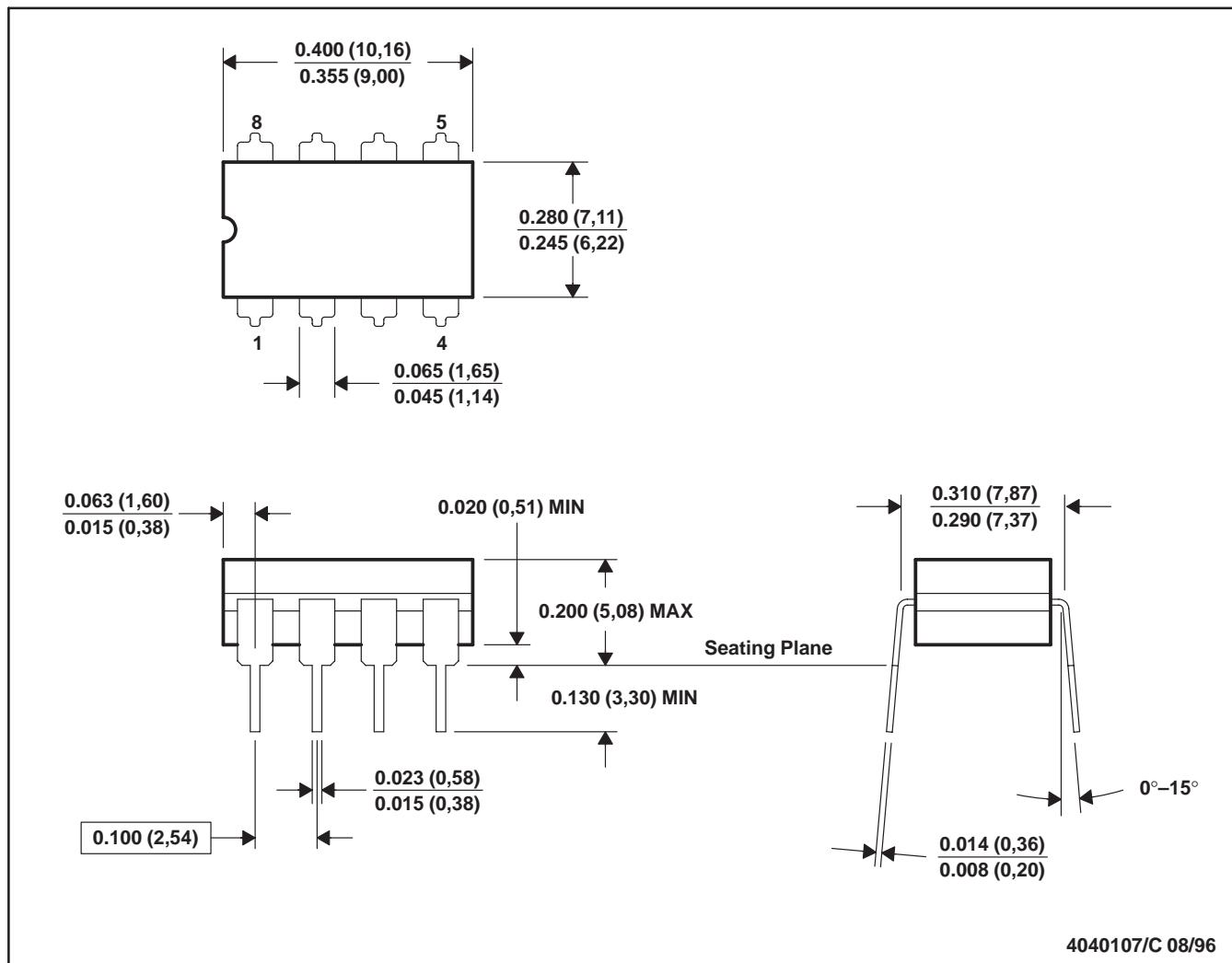
4214825/C 02/2019

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.

JG (R-GDIP-T8)

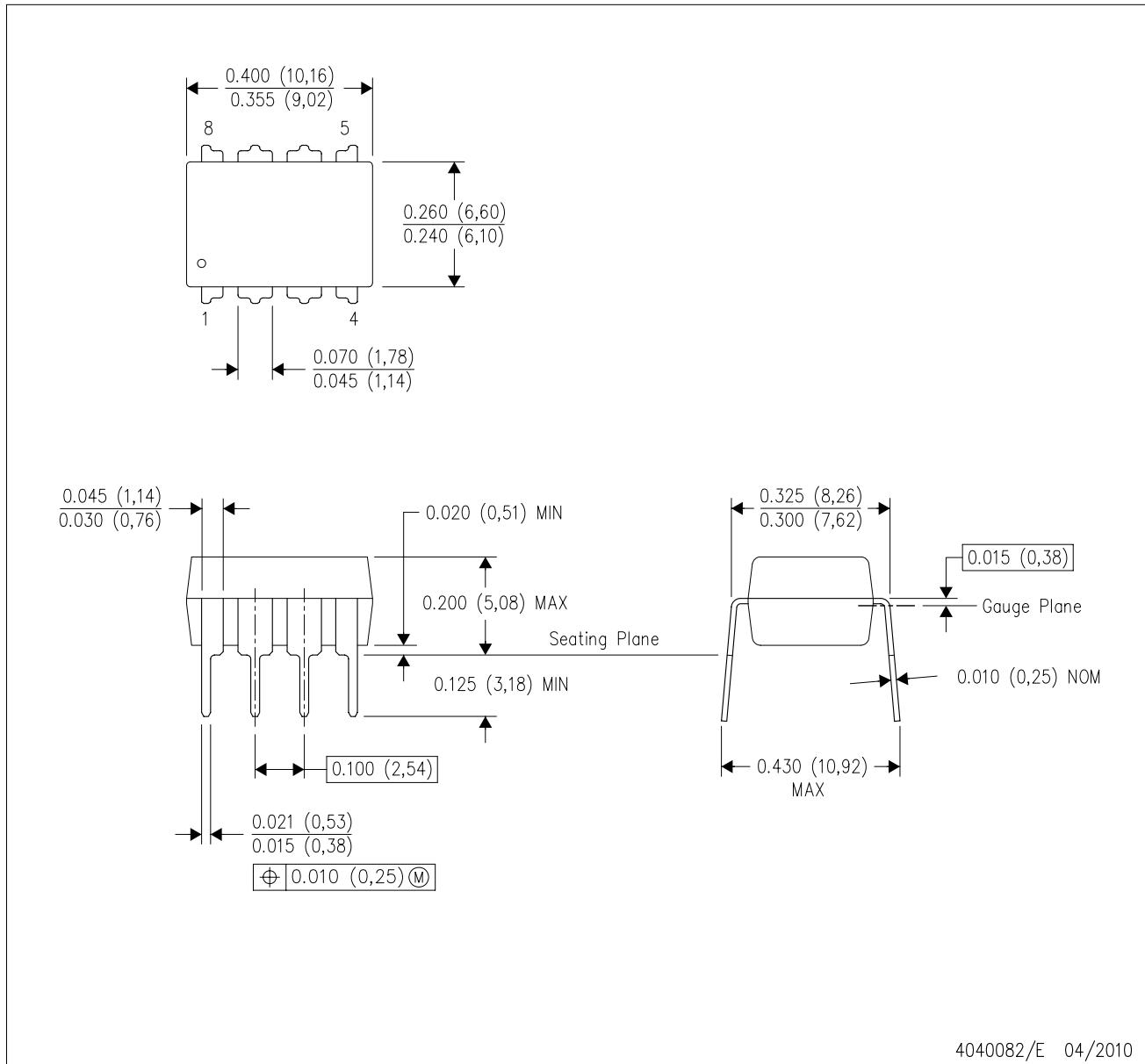
CERAMIC DUAL-IN-LINE



NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. This package can be hermetically sealed with a ceramic lid using glass frit.  
 D. Index point is provided on cap for terminal identification.  
 E. Falls within MIL STD 1835 GDIP1-T8

P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Falls within JEDEC MS-001 variation BA.

4040082/E 04/2010

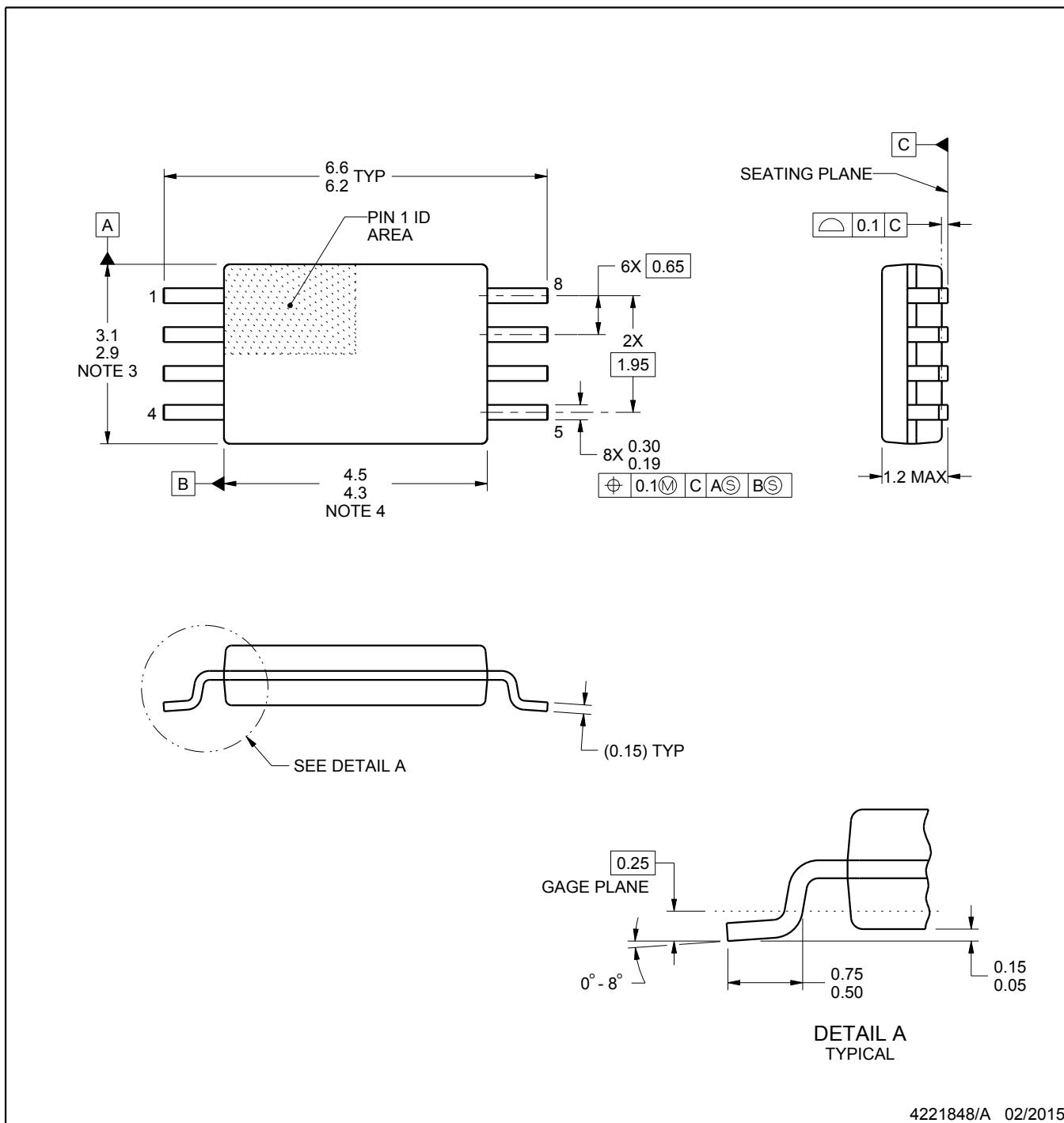
# PACKAGE OUTLINE

PW0008A



TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4221848/A 02/2015

## NOTES:

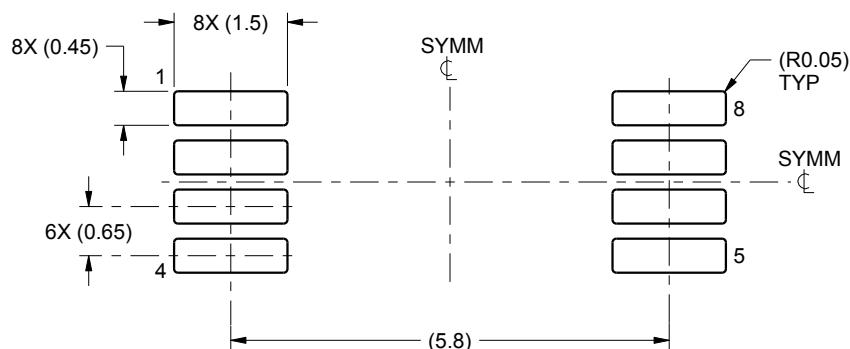
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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.

# EXAMPLE BOARD LAYOUT

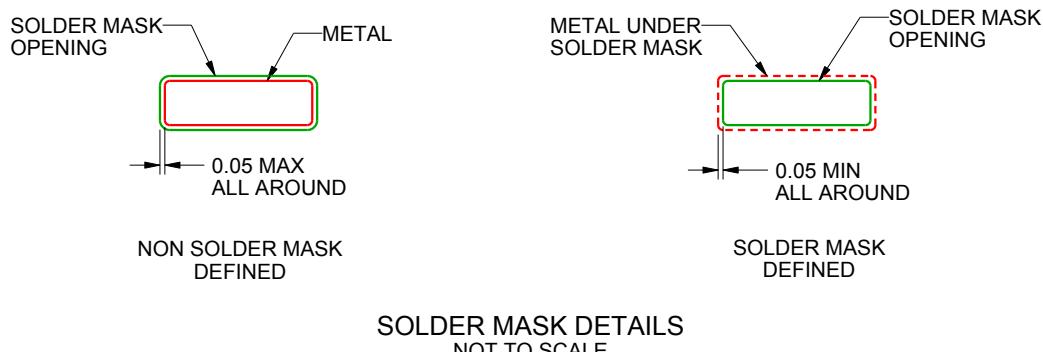
PW0008A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
SCALE:10X



4221848/A 02/2015

NOTES: (continued)

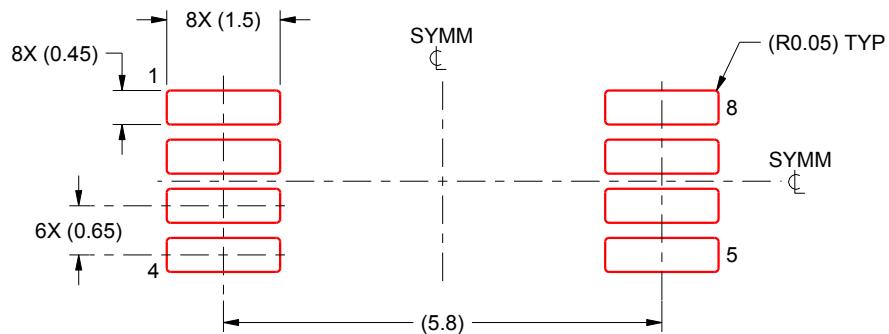
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

PW0008A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:10X

4221848/A 02/2015

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.

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