

## 16 位双电源总线收发器

### 此收发器具有可配置电压转换和 3 态输出

查询样品: [SN74AVCB164245-EP](#)

#### 特性

- 德州仪器 (TI) Widebus™ 系列
- **DOC™** 电路产品成员动态改变输出阻抗, 从而在不降低速度的情况下达到降噪的目的。
- 动态驱动能力与 2.5V  $V_{CC}$  时  $I_{OH}$  和  $I_{OL}$  为  $\pm 24mA$  的标准输出等效
- 控制输入  $V_{IH}$  和  $V_{IL}$  电平以  $V_{CCB}$  电压为基准
- 如果任何一个  $V_{CC}$  输入接地 (GND), 那么两个端口都处于高阻抗状态
- 过压耐受输入和输出可实现混合电压模式数据通信
- $I_{关闭}$  支持部分断电模式运行
- 完全可配置双电源轨设计可使每个端口在整个 1.4V-3.6V 电源电压范围内运行
- 锁断性能超过 100mA (符合 JESD 78, II 类规范的要求)
- 静电放电 (ESD) 保护性能超过 JESD 22 规范要求
  - 2000V 人体模型 (A114-A)
  - 200V 机器模型 (A115-A)
  - 750V 充电器件模型 (C101)

#### 支持国防、航空航天、和医疗应用

- 受控基线
  - 一个组装和测试场所
  - 一个制造场所
  - 军用 (-55°C 至 125°C) 温度范围内可用 (1)
  - 延长的产品生命周期
  - 延长的产品变更通知
  - 产品可追溯性
- (1) 可定制工作温度范围

#### 说明

这个 16 位 (双八进制) 非反相总线收发器使用两个独立的可配置电源轨。

A 端口被设计用于跟踪  $V_{CCA}$ 。  $V_{CCA}$  可接受从 1.4V 到 3.6V 范围内的任一电源电压。 B 端口被设计用于跟踪  $V_{CCB}$ 。  $V_{CCB}$  可接受从 1.4 至 3.6V 间的任一电源电压值。 这可实现 1.5V, 1.8V, 2.5V 和 3.3V 电压节点间的通用低压双向转换。

SN74AVCB164245 被设计用来实现数据总线间的异步通信。 根据方向控制 (DIR) 输入上的逻辑电平, 此器件将数据从 A 总线发送至 B 总线, 或者将数据从 B 总线发送至 A 总线。 输出使能 ( $\overline{OE}$ ) 可被用来禁用输出, 这样可有效隔离总线。

SN74AVCB164245 的设计方式决定了控制引脚 (1DIR, 2DIR,  $\overline{1OE}$  和  $\overline{2OE}$ ) 由  $V_{CCB}$  供电。

为了确保加电或断电期间的高阻抗状态,  $\overline{OE}$  应通过一个上拉电阻器连接至  $V_{CC}$ ; 该电阻器的最小值由驱动器的电流吸收能力来决定。

该器件完全符合使用  $I_{关闭}$  的部分断电应用的规范要求。  $I_{关闭}$  电路禁用输出, 从而可防止其断电时破坏性电流从该器件回流。 如果任何一个  $V_{CC}$  输入接地 (GND), 那么两个端口都处于高阻抗状态。

**Table 1. ORDERING INFORMATION<sup>(1)</sup>**

$T_A$	PACKAGE		ORDERABLE PART NUMBER	TOP-SIDE MARKING	VID NUMBER
-55°C to 125°C	TSSOP-DGG	Reel of 2000	CAVCB164245MDGGREP	AVCB164245M	V62/13602-01XE
		Tube of 40	CAVCB164245MDGGEP		V62/13602-01XE-T

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at [www.ti.com](http://www.ti.com).

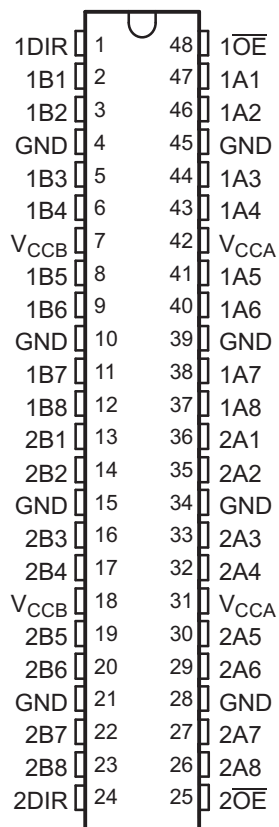


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## TERMINAL ASSIGNMENTS

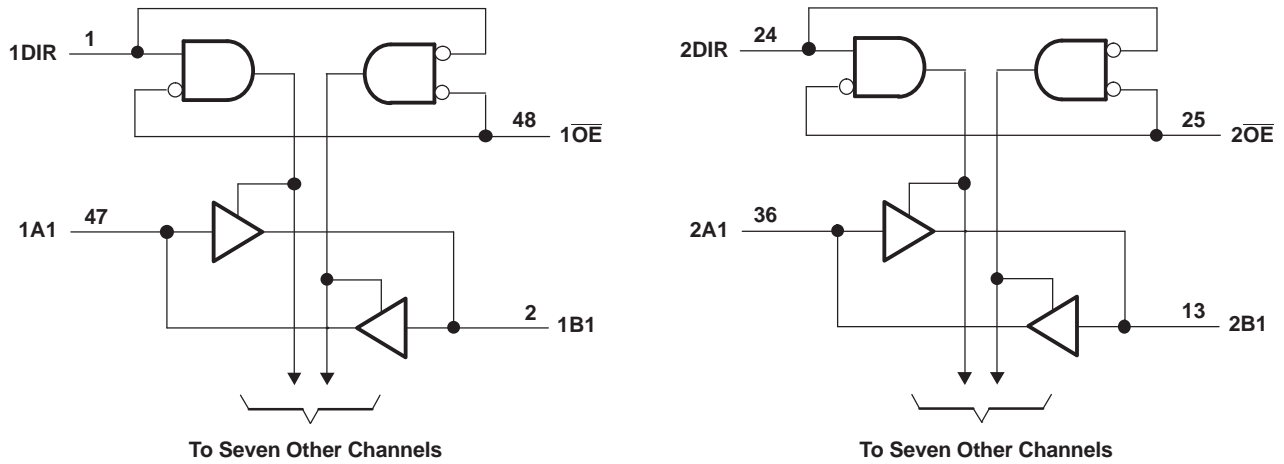
**DGG PACKAGE  
(TOP VIEW)**



**FUNCTION TABLE  
(EACH 8-BIT SECTION)**

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

Figure 1. LOGIC DIAGRAM (POSITIVE LOGIC)



Pin numbers shown are for the DGG and DGV packages.

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

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

		MIN	MAX	UNIT	
$V_{CCA}$ $V_{CCB}$	Supply voltage range	-0.5	4.6	V	
$V_I$	Input voltage range <sup>(2)</sup>	I/O ports (A port)	-0.5	4.6	V
		I/O ports (B port)	-0.5	4.6	
		Control inputs	-0.5	4.6	
$V_O$	Voltage range applied to any output in the high-impedance or power-off state <sup>(2)</sup>	A port	-0.5	4.6	V
		B port	-0.5	4.6	
$V_O$	Voltage range applied to any output in the high or low state <sup>(2) (3)</sup>	A port	-0.5	$V_{CCA} + 0.5$	V
		B port	-0.5	$V_{CCB} + 0.5$	
$I_{IK}$	Input clamp current	$V_I < 0$	-50	mA	
$I_{OK}$	Output clamp current	$V_O < 0$	-50	mA	
$I_O$	Continuous output current		±50	mA	
		Continuous current through $V_{CCA}$ , $V_{CCB}$ , or GND	±100		
$T_J$	Maximum junction temperature		150	°C	
$T_{stg}$	Storage temperature range	-65	150	°C	

- (1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The output positive-voltage rating may be exceeded up to 4.6 V maximum if the output current rating is observed.

**THERMAL INFORMATION**

THERMAL METRIC <sup>(1)</sup>		SN74AVCB164245		UNITS
		DGG		
		48 PINS		
$\theta_{JA}$	Junction-to-ambient thermal resistance <sup>(2)</sup>	59.9		°C/W
$\theta_{JCTop}$	Junction-to-case (top) thermal resistance <sup>(3)</sup>	13.9		
$\theta_{JB}$	Junction-to-board thermal resistance <sup>(4)</sup>	27.1		
$\psi_{JT}$	Junction-to-top characterization parameter <sup>(5)</sup>	0.5		
$\psi_{JB}$	Junction-to-board characterization parameter <sup>(6)</sup>	26.8		
$\theta_{JCbot}$	Junction-to-case (bottom) thermal resistance <sup>(7)</sup>	N/A		

- (1) 有关传统和新的热 度量的更多信息，请参阅 *IC 封装热量应用报告*，[SPRA953](#)。
- (2) 在 JESD51-2a 描述的环境中，按照 JESD51-7 的指定，在一个 JEDEC 标准高 K 电路板上进行仿真，从而获得自然 对流条件下的结至环境热阻。
- (3) 通过在封装顶部模拟一个冷板测试来获得结至芯片外壳（顶部）的热阻。不存在特定的 JEDEC 标准测试，但可在 ANSI SEMI 标准 G30-88 中找到内容接近的说明。
- (4) 按照 JESD51-8 中的说明，通过 在配有用于控制 PCB 温度的环形冷板夹具的环境中进行仿真，以获得结板热阻。
- (5) 结至顶部特征参数， $\psi_{JT}$ ，估算真实系统中器件的结温，并使用 JESD51-2a（第 6 章和第 7 章）中 描述的程序从仿真数据中 提取出该参数以便获得  $\theta_{JA}$ 。
- (6) 结至电路板特征参数， $\psi_{JB}$ ，估算真实系统中器件的结温，并使用 JESD51-2a（第 6 章和第 7 章）中 描述的程序从仿真数据中 提取出该参数以便获得  $\theta_{JA}$ 。
- (7) 通过在外露（电源）焊盘上进行冷板测试仿真来获得 结至芯片外壳（底部）热阻。不存在特定的 JEDEC 标准 测试，但可在 ANSI SEMI 标准 G30-88 中找到内容接近的说明。

**RECOMMENDED OPERATING CONDITIONS**<sup>(1)(2)(3)</sup>
 $T_A = -55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ , over recommended input voltage range (unless otherwise noted)

		$V_{CCI}$	$V_{CCO}$	MIN	MAX	UNIT
$V_{CCA}$	Supply voltage			1.4	3.6	V
$V_{CCB}$	Supply voltage			1.4	3.6	V
$V_{IH}$	High-level input voltage	Data inputs	1.4 V to 1.95 V		$V_{CCI} \times 0.65$	V
			1.95 V to 2.7 V		1.7	
			2.7 V to 3.6 V		2	
$V_{IL}$	Low-level input voltage	Data inputs	1.4 V to 1.95 V		$V_{CCI} \times 0.35$	V
			1.95 V to 2.7 V		0.7	
			2.7 V to 3.6 V		0.8	
$V_{IH}$	High-level input voltage	Control inputs (referenced to $V_{CCB}$ )	1.4 V to 1.95 V		$V_{CCB} \times 0.65$	V
			1.95 V to 2.7 V		1.7	
			2.7 V to 3.6 V		2	
$V_{IL}$	Low-level input voltage	Control inputs (referenced to $V_{CCB}$ )	1.4 V to 1.95 V		$V_{CCB} \times 0.35$	V
			1.95 V to 2.7 V		0.7	
			2.7 V to 3.6 V		0.8	
$V_I$	Input voltage			0	3.6	V
$V_O$	Output voltage	Active state		0	$V_{CCO}$	V
		3-state		0	3.6	
$I_{OH}$	High-level output current		1.4 V to 1.6 V		-2	mA
			1.65 V to 1.95 V		-4	
			2.3 V to 2.7 V		-8	
			3 V to 3.6 V		-12	
$I_{OL}$	Low-level output current		1.4 V to 1.6 V		2	mA
			1.65 V to 1.95 V		4	
			2.3 V to 2.7 V		8	
			3 V to 3.6 V		12	
$\Delta t/\Delta v$	Input transition rise or fall rate				5	ns/V
$T_A$	Operating free-air temperature			-55	125	$^{\circ}\text{C}$

(1)  $V_{CCI}$  is the  $V_{CC}$  associated with the data input port.

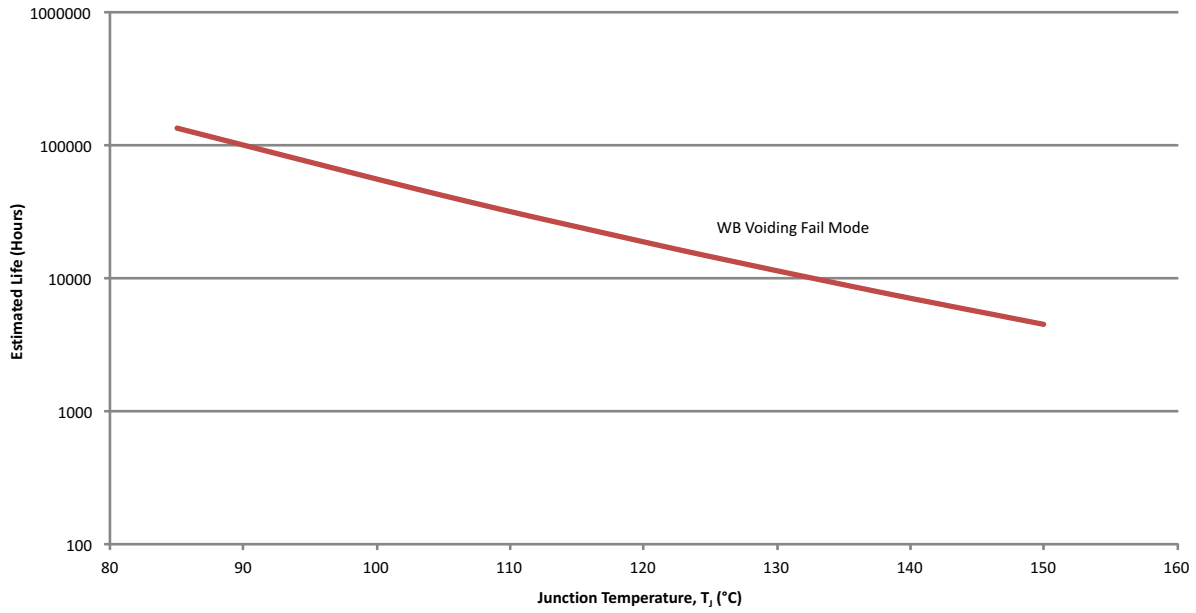
(2)  $V_{CCO}$  is the  $V_{CC}$  associated with the data output port.

(3) All unused data inputs of the device must be held at  $V_{CCI}$  or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

**ELECTRICAL CHARACTERISTICS<sup>(1)(2)</sup>**
 $T_A = -55^\circ\text{C}$  to  $125^\circ\text{C}$ , over recommended input voltage range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		$V_{CCA}$	$V_{CCB}$	MIN	TYP <sup>(3)</sup>	MAX	UNIT
$V_{OH}$		$I_{OH} = -100\ \mu\text{A}$	$V_I = V_{IH}$	1.4 V to 3.6 V	1.4 V to 3.6 V	$V_{CCO} - 0.2$			V
		$I_{OH} = -2\ \text{mA}$	$V_I = V_{IH}$	1.4 V	1.4 V	1.05			
		$I_{OH} = -4\ \text{mA}$	$V_I = V_{IH}$	1.65 V	1.65 V	1.2			
		$I_{OH} = -8\ \text{mA}$	$V_I = V_{IH}$	2.3 V	2.3 V	1.7			
		$I_{OH} = -12\ \text{mA}$	$V_I = V_{IH}$	3 V	3 V	2.2			
$V_{OL}$		$I_{OH} = 100\ \mu\text{A}$	$V_I = V_{IL}$	1.4 V to 3.6 V	1.4 V to 3.6 V			0.2	V
		$I_{OH} = 2\ \text{mA}$	$V_I = V_{IL}$	1.4 V	1.4 V			0.35	
		$I_{OH} = 4\ \text{mA}$	$V_I = V_{IL}$	1.65 V	1.65 V			0.45	
		$I_{OH} = 8\ \text{mA}$	$V_I = V_{IL}$	2.3 V	2.3 V			0.6	
		$I_{OH} = 12\ \text{mA}$	$V_I = V_{IL}$	3 V	3 V			0.75	
$I_I$	Control inputs	$V_I = V_{CCB}$ or GND		1.4 V to 3.6 V	3.6 V			$\pm 2.5$	$\mu\text{A}$
$I_{off}$	A port	$V_I$ or $V_O = 0$ to 3.6 V		0 V	0 to 3.6 V			$\pm 10$	$\mu\text{A}$
	B port			0 to 3.6 V	0 V		$\pm 10$		
$I_{OZ}$ <sup>(4)</sup>	A or B ports	$V_O = V_{CCO}$ or GND, $V_I = V_{CCI}$ or GND	$\overline{OE} = V_{IH}$	3.6 V	3.6 V			$\pm 12.5$	$\mu\text{A}$
	B port		$\overline{OE} = \text{don't care}$	0 V	3.6 V			$\pm 12.5$	
	A port			3.6 V	0 V			$\pm 12.5$	
$I_{CCA}$	$V_I = V_{CC1}$ or GND, $I_O = 0$			1.6 V	1.6 V			35	$\mu\text{A}$
				1.95 V	1.95 V			35	
				2.7 V	2.7 V			45	
				0 V	3.6 V			-50	
				3.6 V	0 V			50	
				3.6 V	3.6 V			50	
$I_{CCB}$	$V_I = V_{CC1}$ or GND, $I_O = 0$			1.6 V	1.6 V			35	$\mu\text{A}$
				1.95 V	1.95 V			35	
				2.7 V	2.7 V			45	
				0 V	3.6 V			50	
				3.6 V	0 V			-50	
				3.6 V	3.6 V			50	
$C_i$	Control inputs	$V_I = 3.3\ \text{V}$ or GND		3.3 V	3.3 V		4		pF
$C_{io}$	A or B ports	$V_O = 3.3\ \text{V}$ or GND		3.3 V	3.3 V		5		pF

- (1)  $V_{CCO}$  is the  $V_{CC}$  associated with the output port.
- (2)  $V_{CCI}$  is the  $V_{CC}$  associated with the input port.
- (3) All typical values are at  $T_A = 25^\circ\text{C}$ .
- (4) For I/O ports, the parameter  $I_{OZ}$  includes the input leakage current.



(1) See datasheet for absolute maximum and minimum recommended operating conditions.

**Figure 2. SN74AVCB164245-EP Operating Life Derating Chart**

## Switching Characteristics

 $T_A = -40^\circ\text{C to } 85^\circ\text{C}$ ,  $V_{CCA} = 1.5\text{ V} \pm 0.1\text{ V}$  (see )

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B	1.7	6.7	1.9	6.3	1.8	5.5	1.7	5.8	ns
	B	A	1.8	6.8	2.2	7.4	2.1	7.6	2.1	7.3	
$t_{en}$	$\overline{OE}$	A	2.5	8.4	2.4	7.4	2.1	5.2	1.9	4.2	ns
		B	2.1	9	2.9	9.8	3.2	10	3	9.8	
$t_{dis}$	$\overline{OE}$	A	2.2	6.9	2.3	6.1	1.3	3.6	1.3	3	ns
		B	2.1	7.1	2.3	6.4	1.7	5.1	1.6	4.8	

## SWITCHING CHARACTERISTICS

 $T_A = -55^\circ\text{C to } 125^\circ\text{C}$ ,  $V_{CCA} = 1.5\text{ V} \pm 0.1\text{ V}$  (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B		12.7		12.3		11.5		11.8	ns
	B	A		12.8		13.4		13.6		13.3	
$t_{en}$	$\overline{OE}$	A		14.8		13.9		12.4		11.9	ns
		B		15		15.8		16		15.8	
$t_{dis}$	$\overline{OE}$	A		12.9		12.1		9.6		9	ns
		B		13.1		12.4		11.1		10.8	

## Switching Characteristics

 $T_A = -40^\circ\text{C to } 85^\circ\text{C}$ ,  $V_{CCA} = 1.8\text{ V} \pm 0.15\text{ V}$  (see )

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B	1.7	6.7	1.8	6	1.7	4.7	1.6	4.3	ns
	B	A	1.4	5.5	1.8	6	1.8	5.8	1.8	5.5	
$t_{en}$	$\overline{OE}$	A	2.6	8.5	2.5	7.5	2.2	5.3	1.9	4.2	ns
		B	1.8	7.6	2.6	7.7	2.6	7.6	2.6	7.4	
$t_{dis}$	$\overline{OE}$	A	2.3	7	2.3	6.1	1.3	3.6	1.3	3	ns
		B	1.8	7	2.5	6.3	1.8	4.7	1.7	4.4	

## SWITCHING CHARACTERISTICS

 $T_A = -55^\circ\text{C to } 125^\circ\text{C}$ ,  $V_{CCA} = 1.8\text{ V} \pm 0.15\text{ V}$  (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B		12.7		12		10.7		10.3	ns
	B	A		11.5		12		11.8		11.5	
$t_{en}$	$\overline{OE}$	A		14.5		13.5		12.1		11.9	ns
		B		13.6		13.7		13.6		13.4	
$t_{dis}$	$\overline{OE}$	A		13		12.1		9.6		9	ns
		B		13		12.3		10.7		10.4	



### Switching Characteristics

 $T_A = -40^\circ\text{C to } 85^\circ\text{C}, V_{CCA} = 2.5\text{ V} \pm 0.2\text{ V}$  (see )

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B	1.6	6	1.8	5.6	1.5	4	1.4	3.4	ns
	B	A	1.3	4.6	1.7	4.4	1.5	4	1.4	3.7	
$t_{en}$	$\overline{OE}$	A	3.1	8.5	2.5	7.5	2.2	5.3	1.9	4.2	ns
		B	1.7	5.7	2.2	5.5	2.2	5.3	2.2	5.1	
$t_{dis}$	$\overline{OE}$	A	2.4	7	3	6.1	1.4	3.6	1.2	3	ns
		B	1.2	5.8	1.9	5	1.4	3.6	1.3	3.3	

### SWITCHING CHARACTERISTICS

 $T_A = -55^\circ\text{C to } 125^\circ\text{C}, V_{CCA} = 2.5\text{ V} \pm 0.2\text{ V}$  (see [Figure 4](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B		12		11.6		10		9.4	ns
	B	A		10.6		10.4		10		9.7	
$t_{en}$	$\overline{OE}$	A		14.5		13.5		11.3		10.2	ns
		B		11.7		11.5		11.3		11.1	
$t_{dis}$	$\overline{OE}$	A		13		12.1		9.6		9	ns
		B		11.8		11		9.6		9.3	

### Switching Characteristics

 $T_A = -40^\circ\text{C to } 85^\circ\text{C}, V_{CCA} = 3.3\text{ V} \pm 0.3\text{ V}$  (see )

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B	1.5	5.9	1.7	5.4	1.5	3.7	1.4	3.1	ns
	B	A	1.3	4.5	1.6	3.8	1.5	3.3	1.4	3.1	
$t_{en}$	$\overline{OE}$	A	2.6	8.3	2.5	7.4	2.2	5.2	1.9	4.1	ns
		B	1.6	4.9	2	4.5	2	4.3	1.9	4.1	
$t_{dis}$	$\overline{OE}$	A	2.3	7	3	6	1.3	3.5	1.2	3.5	ns
		B	1.3	6.9	2.1	5.5	1.6	3.8	1.5	3.5	

### SWITCHING CHARACTERISTICS

 $T_A = -55^\circ\text{C to } 125^\circ\text{C}, V_{CCA} = 3.3\text{ V} \pm 0.3\text{ V}$  (see [Figure 4](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	B		11.9		11.4		9.7		9.1	ns
	B	A		10.5		9.8		9.3		9.1	
$t_{en}$	$\overline{OE}$	A		14.3		13.4		11.2		10.1	ns
		B		11.3		10.5		10.3		10.1	
$t_{dis}$	$\overline{OE}$	A		13		12		9.5		9.5	ns
		B		12.9		11.5		9.8		9.5	

### OPERATING CHARACTERISTICS

$V_{CCA}$  and  $V_{CCB} = 3.3\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pdA}$ ( $V_{CCA}$ )	Power dissipation capacitance per transceiver, A-port input, B-port output	Outputs enabled	14	pF
		Outputs disabled	7	
	Power dissipation capacitance per transceiver, B-port input, A-port output	Outputs enabled	20	
		Outputs disabled	7	
$C_{pdB}$ ( $V_{CCB}$ )	Power dissipation capacitance per transceiver, A-port input, B-port output	Outputs enabled	20	pF
		Outputs disabled	7	
	Power dissipation capacitance per transceiver, B-port input, A-port output	Outputs enabled	14	
		Outputs disabled	7	

### OUTPUT DESCRIPTION

The DOC™ circuitry is implemented, which, during the transition, initially lowers the output impedance to effectively drive the load and, subsequently, raises the impedance to reduce noise. Figure 1 shows typical  $V_{OL}$  vs  $I_{OL}$  and  $V_{OH}$  vs  $I_{OH}$  curves to illustrate the output impedance and drive capability of the circuit. At the beginning of the signal transition, the DOC circuit provides a maximum dynamic drive that is equivalent to a high-drive standard-output device. For more information, refer to the TI application reports, *AVC Logic Family Technology and Applications*, literature number SCEA006, and *Dynamic Output Control (DOC™) Circuitry Technology and Applications*, literature number SCEA009.

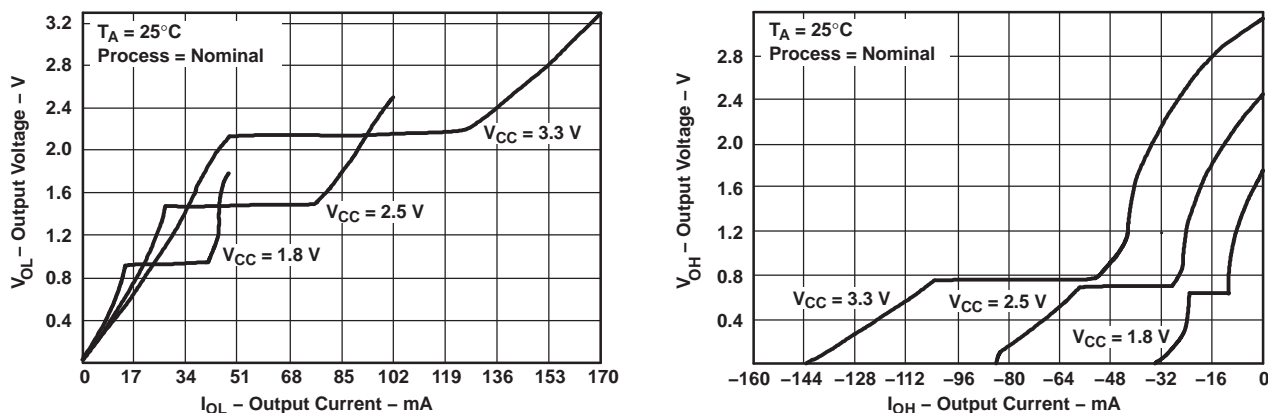
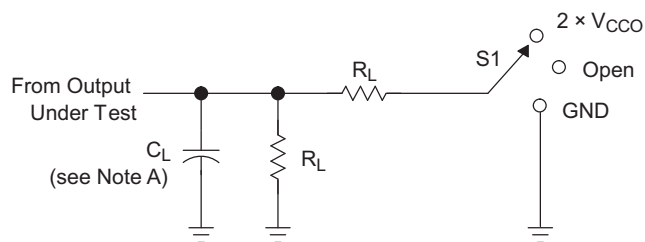


Figure 3. Typical Output Voltage vs Output Current

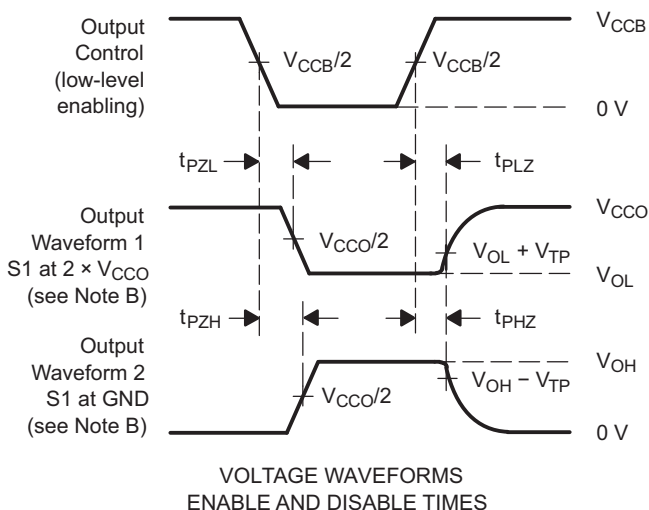
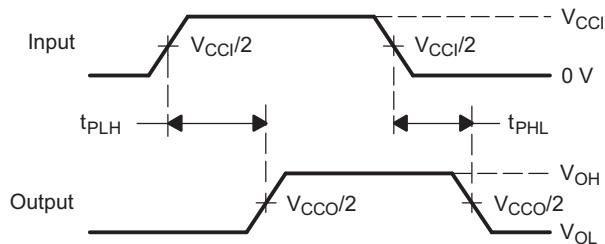
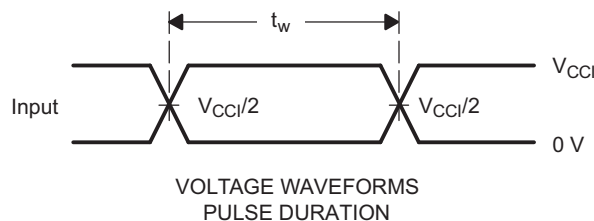
PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

TEST	S1
$t_{pd}$	Open
$t_{PLZ}/t_{PZL}$	$2 \times V_{CCO}$
$t_{PHZ}/t_{PZH}$	GND

$V_{CCO}$	$C_L$	$R_L$	$V_{TP}$
$1.5\text{ V} \pm 0.1\text{ V}$	15 pF	500 $\Omega$	0.1 V
$1.8\text{ V} \pm 0.15\text{ V}$	30 pF	500 $\Omega$	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	30 pF	500 $\Omega$	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	30 pF	500 $\Omega$	0.3 V



- NOTES:
- A.  $C_L$  includes probe and jig capacitance.
  - B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
  - C. All input pulses are supplied by generators having the following characteristics: PRR 10 MHz,  $Z_O = 50\ \Omega$ ,  $dv/dt \geq 1\text{ V/ns}$ .
  - D. The outputs are measured one at a time, with one transition per measurement.
  - E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
  - G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .
  - H.  $V_{CC1}$  is the  $V_{CC}$  associated with the input port.
  - I.  $V_{CCO}$  is the  $V_{CC}$  associated with the output port.

Figure 4. Load Circuit and Voltage Waveforms

## 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
CAVCB164245MDGGEP	ACTIVE	TSSOP	DGG	48	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AVCB164245M	<a href="#">Samples</a>
CAVCB164245MDGGREP	ACTIVE	TSSOP	DGG	48	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AVCB164245M	<a href="#">Samples</a>
V62/13602-01XE	ACTIVE	TSSOP	DGG	48	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AVCB164245M	<a href="#">Samples</a>
V62/13602-01XE-T	ACTIVE	TSSOP	DGG	48	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	AVCB164245M	<a href="#">Samples</a>

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSELETE:** 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.

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**TAPE AND REEL INFORMATION**

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CAVCB164245MDGGRE P	TSSOP	DGG	48	2000	330.0	24.4	8.6	13.0	1.8	12.0	24.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

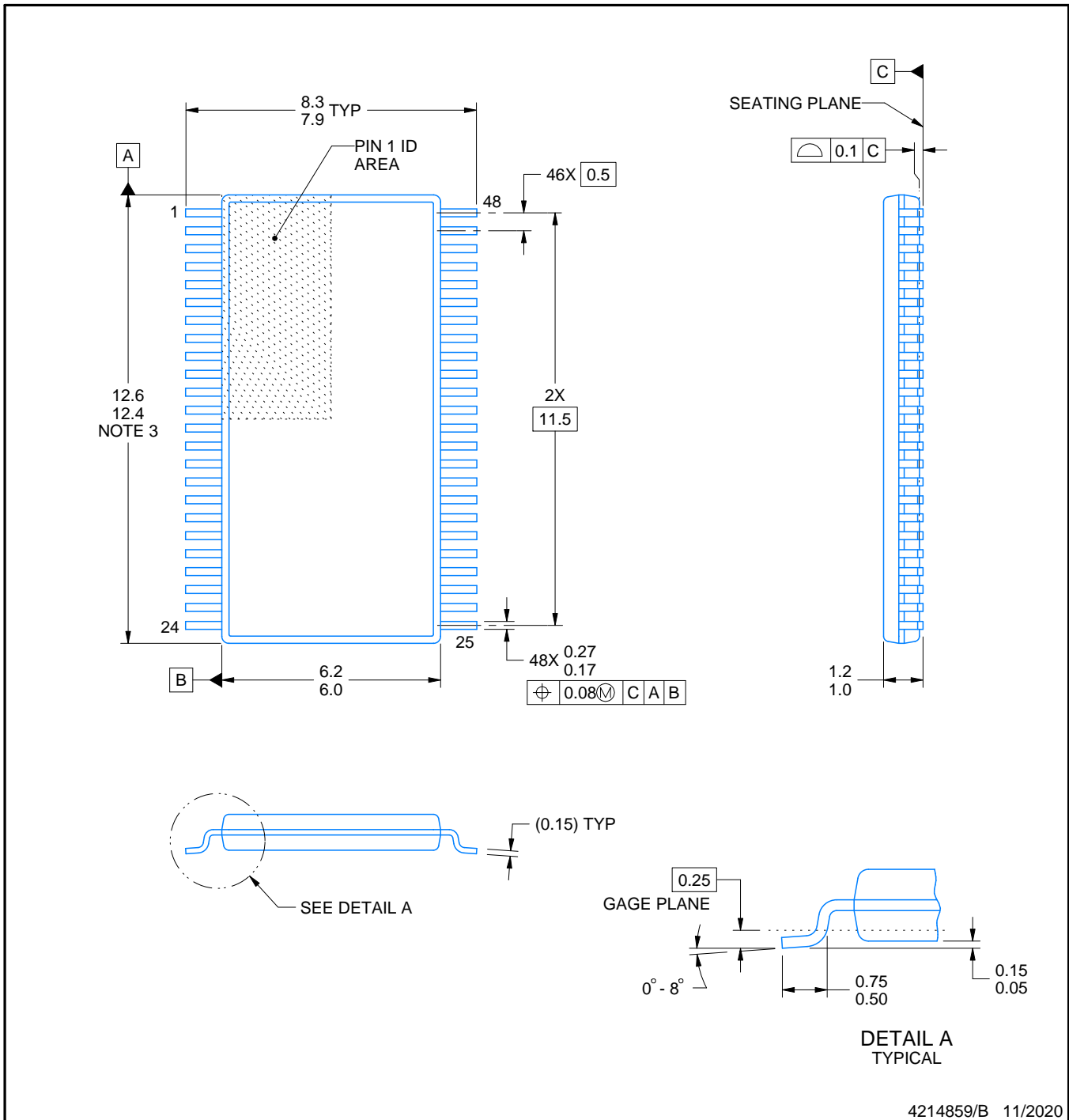
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CAVCB164245MDGGREP	TSSOP	DGG	48	2000	367.0	367.0	45.0

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
CAVCB164245MDGGEP	DGG	TSSOP	48	40	530	11.89	3600	4.9
V62/13602-01XE-T	DGG	TSSOP	48	40	530	11.89	3600	4.9





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NOTES:

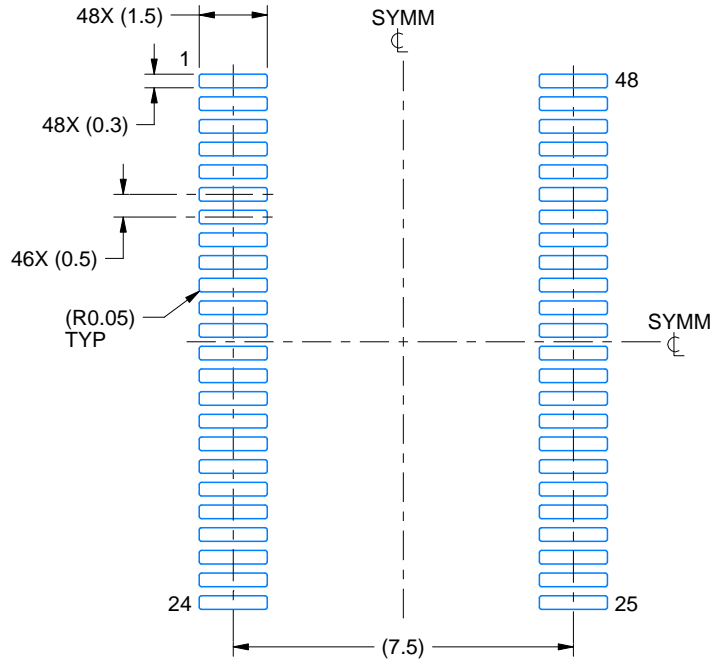
- All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
- This drawing is subject to change without notice.
- This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate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

# EXAMPLE BOARD LAYOUT

DGG0048A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

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NOTES: (continued)

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

# EXAMPLE STENCIL DESIGN

DGG0048A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4214859/B 11/2020

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

DGG (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-153

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