





<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)				
Parameter			Limit	Unit
Reference $V_+$ to GND			- 0.3 to + 6	V
IN, COM, NC, NO <sup>a</sup>			- 0.3 to ( $V_+ + 0.3$ )	
Current (Any terminal except NO, NC or COM)			30	mA
Continuous Current (NO, NC, or COM)			$\pm 200$	
Peak Current (Pulsed at 1 ms, 10 % duty cycle)			$\pm 300$	
Storage Temperature (D Suffix)			- 65 to 150	$^\circ\text{C}$
Package Solder Reflow Conditions <sup>d</sup>	16-pin QFN (4 mm x 4 mm)		240	
Power Dissipation (Packages) <sup>b</sup>	QFN-16 (4 mm x 4 mm)		1880	

Notes:

- a. Signals on NC, NO, or COM or IN exceeding  $V_+$  will be clamped by internal diodes. Limit forward diode current to maximum current ratings.
- b. All leads welded or soldered to PC Board.
- c. Derate 23.5 mW/ $^\circ\text{C}$  above 70  $^\circ\text{C}$ .
- d. Manual soldering with iron is not recommended for leadless components. The QFN is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper lip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

<b>SPECIFICATIONS</b> ( $V_+ = 3\text{ V}$ )							
Parameter	Symbol	Test Conditions Otherwise Unless Specified $V_+ = 3\text{ V}$ , $\pm 10\%$ , $V_{IN} = 0.4\text{ V}$ or $1.6\text{ V}^e$	Temp. <sup>a</sup>	Limits - 40 $^\circ\text{C}$ to 85 $^\circ\text{C}$			Unit
				Min. <sup>b</sup>	Typ. <sup>c</sup>	Max. <sup>b</sup>	
<b>Analog Switch</b>							
Analog Signal Range <sup>d</sup>	$V_{NO}, V_{NC}$ $V_{COM}$		Full	0		$V_+$	V
<b>DC Characteristics</b>							
On-Resistance	$R_{ON}$ ( $SW_1, SW_2$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 10\text{ mA}$	Room Full		3.2	3.7 4.3	$\Omega$
	$R_{ON}$ ( $SW_3, SW_4$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 100\text{ mA}$	Room Full		0.67	1.1 1.2	
$R_{ON}$ Flatness <sup>d</sup>	$R_{ON}$ ( $SW_1, SW_2$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 10\text{ mA}$	Room Full		1.4	2	
	$R_{ON}$ ( $SW_3, SW_4$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 100\text{ mA}$	Room Full		0.12	0.3	
$R_{ON}$ Match <sup>d</sup>	$\Delta R_{ON}$ ( $SW_1, SW_2$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 10\text{ mA}$	Room Full			0.3	
	$\Delta R_{ON}$ ( $SW_3, SW_4$ )	$V_+ = 2.7\text{ V}$ , $V_{COM} = 0.2\text{ V}/1.5\text{ V}$ , $I_{NO}, I_{NC} = 100\text{ mA}$	Room Full			0.3	
Switch Off Leakage Current	$I_{NO(off)}$ $I_{NC(off)}$	$V_+ = 3.3\text{ V}$ $V_{NO}, V_{NC} = 0.3\text{ V}/3\text{ V}$ , $V_{COM} = 0.3\text{ V}/3\text{ V}$	Room Full	- 0.5 5		0.5 5	nA
	$I_{COM(off)}$		Room Full	- 0.5 5		0.5 5	
Channel-On Leakage Current	$I_{COM(on)}$	$V_+ = 3.3\text{ V}$ , $V_{NO} = V_{NC}$ , $V_{COM} = 0.3\text{ V}/3\text{ V}$	Room Full	- 0.5 5		0.5 5	
<b>Digital Control</b>							
Input High Voltage	$V_{INH}$		Full	1.6			V
Input Low Voltage	$V_{INL}$		Full			0.4	
Input Capacitance	$C_{in}$		Full		6		pF
Input Current	$I_{INL}$ or $I_{INH}$	$V_{IN} = 0\text{ V}$ or $V_+$	Full	- 1		1	$\mu\text{A}$



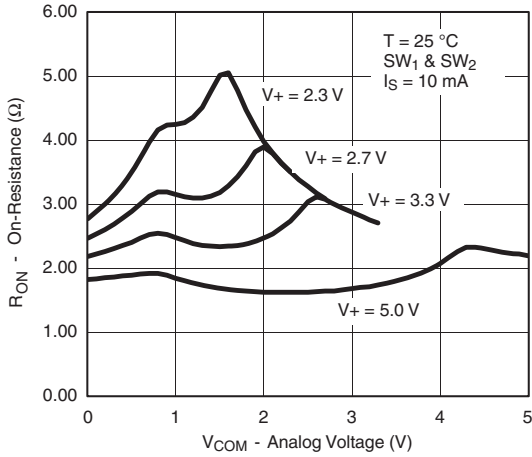
SPECIFICATIONS (V+ = 3 V)									
Parameter	Symbol	Test Conditions Otherwise Unless Specified V+ = 3 V, ± 10 %, VIN = 0.4 V or 1.6 V <sup>e</sup>	Temp. <sup>a</sup>	Limits - 40 °C to 85 °C			Unit		
				Min. <sup>b</sup>	Typ. <sup>c</sup>	Max. <sup>b</sup>			
<b>Dynamic Characteristics</b>									
Turn-On Time	t <sub>ON</sub> (SW <sub>1</sub> , SW <sub>2</sub> )	V <sub>NO</sub> or V <sub>NC</sub> = 2 V, R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF (fig. 1, 2)	Room Full		62	85 91	ns		
	t <sub>ON</sub> (SW <sub>3</sub> , SW <sub>4</sub> )		Room Full		46	74 79			
Turn-Off Time	t <sub>ON</sub> (SW <sub>1</sub> , SW <sub>2</sub> )		Room Full		12	35 36			
	t <sub>ON</sub> (SW <sub>3</sub> , SW <sub>4</sub> )		Room Full		21	46 48			
Break-Before-Make Time	t <sub>d</sub> (SW <sub>1</sub> , SW <sub>2</sub> )		Full	5	45				
	t <sub>d</sub> (SW <sub>3</sub> , SW <sub>4</sub> )		Full	5	26				
Charge Injection <sup>d</sup>	Q <sub>INJ</sub> (SW <sub>1</sub> , SW <sub>2</sub> )		C <sub>L</sub> = 1 nF, V <sub>GEN</sub> = 0 V, R <sub>GEN</sub> = 0 Ω (fig. 3)	Room		2			pC
	Q <sub>INJ</sub> (SW <sub>3</sub> , SW <sub>4</sub> )					1			
Off-Isolation <sup>d</sup>	OIRR (SW <sub>1</sub> , SW <sub>2</sub> )	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz (fig. 4)	Room		- 68		dB		
	OIRR (SW <sub>3</sub> , SW <sub>4</sub> )				- 51				
Crosstalk <sup>d</sup>	X <sub>TALK</sub> (SW <sub>1</sub> , SW <sub>2</sub> )					- 69			
	X <sub>TALK</sub> (SW <sub>3</sub> , SW <sub>4</sub> )					- 51			
N <sub>O</sub> , N <sub>C</sub> Off Capacitance <sup>d</sup>	C <sub>OFF</sub> (SW <sub>1</sub> , SW <sub>2</sub> )	V <sub>IN</sub> = 0 V or V+, f = 1 MHz	Room		12		pF		
	C <sub>OFF</sub> (SW <sub>3</sub> , SW <sub>4</sub> )				43				
Channel-On Capacitance <sup>d</sup>	C <sub>ON</sub> (SW <sub>1</sub> , SW <sub>2</sub> )					86			
	C <sub>ON</sub> (SW <sub>3</sub> , SW <sub>4</sub> )					283			
<b>Power Supply</b>									
Power Supply Range	V+			2		5.5	V		
Power Supply Current	I+					1	μA		

Notes:

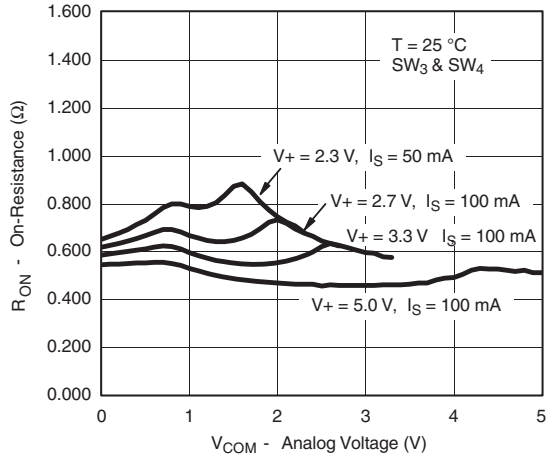
- a. Room = 25 °C, full = as determined by the operating suffix.
- b. Typical values are for design aid only, not guaranteed nor subject to production testing.
- c. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- d. Guarantee by design, nor subjected to production test.
- e. VIN = input voltage to perform proper function.
- f. Guaranteed by 5 V leakage testing, not production tested.

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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

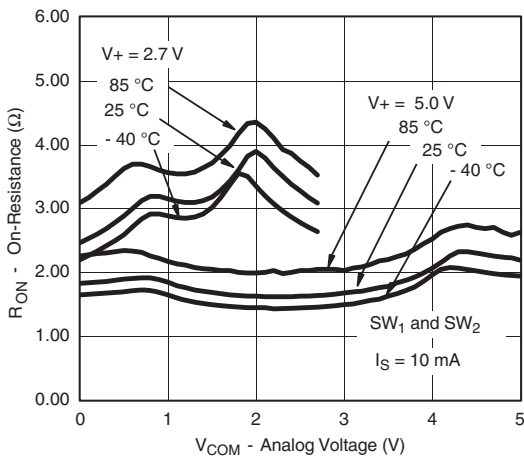
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



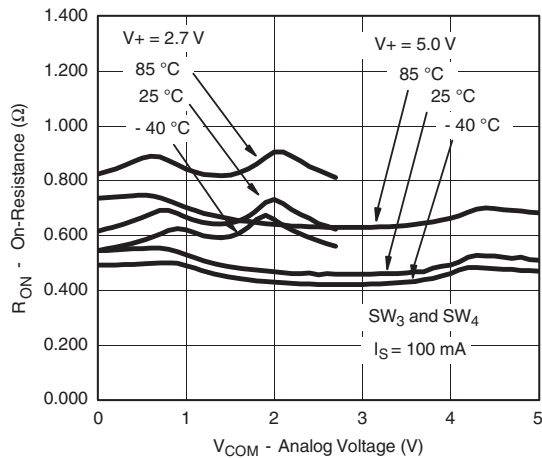
**R<sub>ON</sub> vs. V<sub>COM</sub> and Single Supply Voltage**



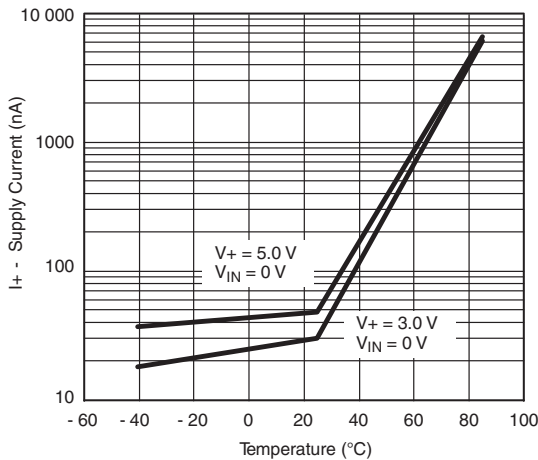
**R<sub>ON</sub> vs. V<sub>COM</sub> and Single Supply Voltage**



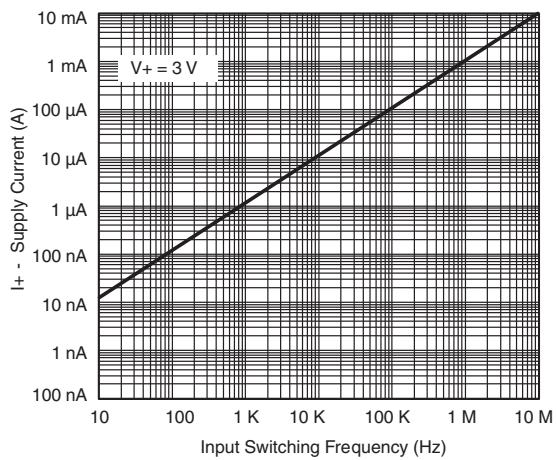
**R<sub>ON</sub> vs. Analog Voltage and Temperature**



**R<sub>ON</sub> vs. Analog Voltage and Temperature**



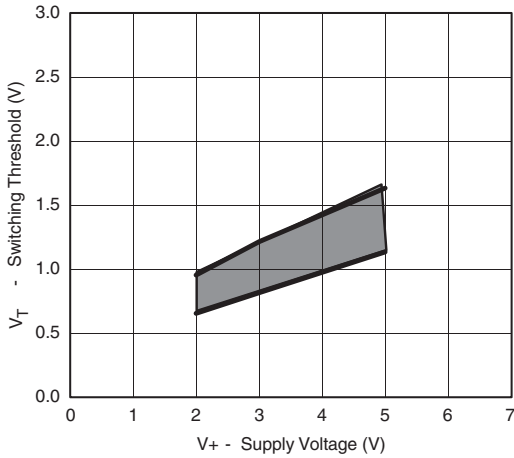
**Supply Current vs. Temperature**



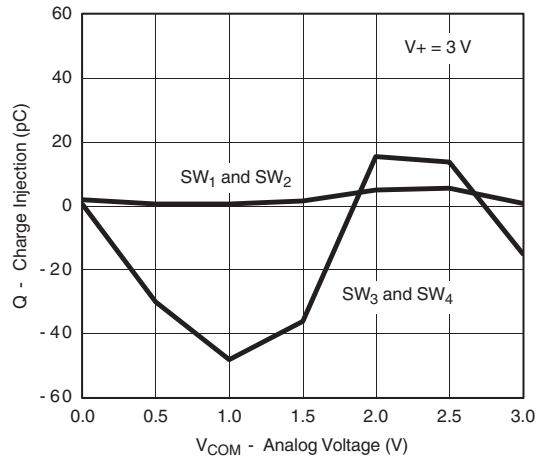
**Supply Current vs. Input Switching Frequency**



**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

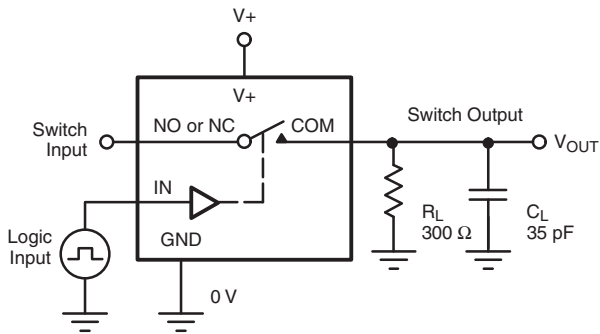


**Switching Threshold vs. Supply Voltage**



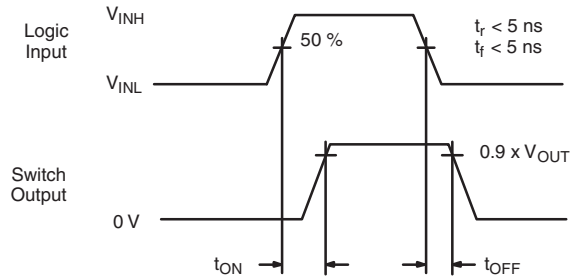
**Charge Injection vs. Analog Voltage**

**TEST CIRCUITS**



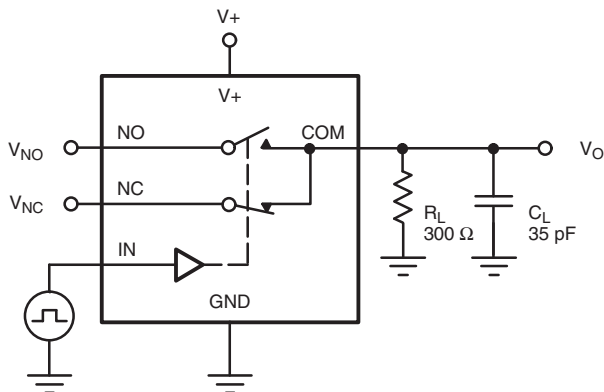
$C_L$  (includes fixture and stray capacitance)

$$V_{OUT} = V_{COM} \left( \frac{R_L}{R_L + R_{ON}} \right)$$

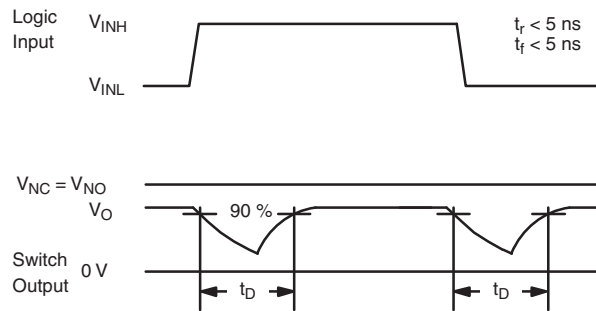


Logic "1" = Switch On  
Logic input waveforms inverted for switches that have the opposite logic sense.

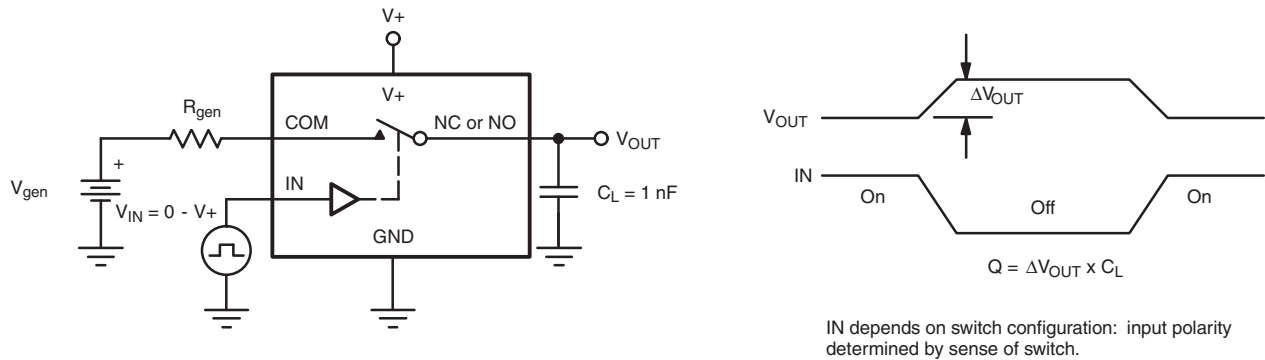
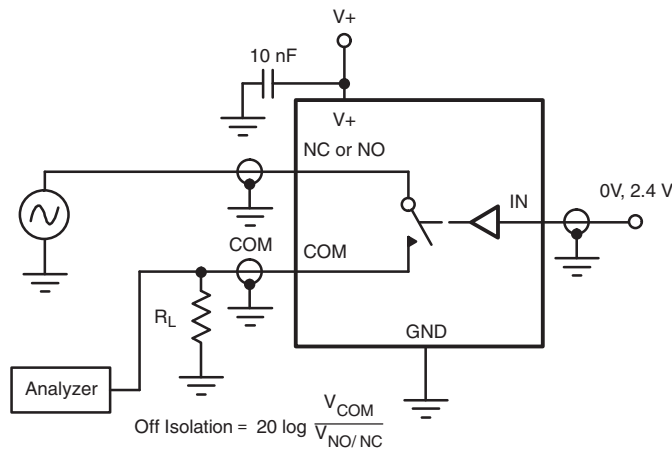
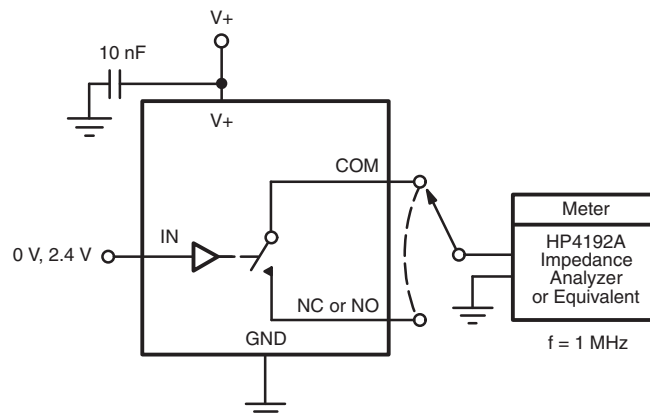
**Figure 1. Switching Time**



$C_L$  (includes fixture and stray capacitance)

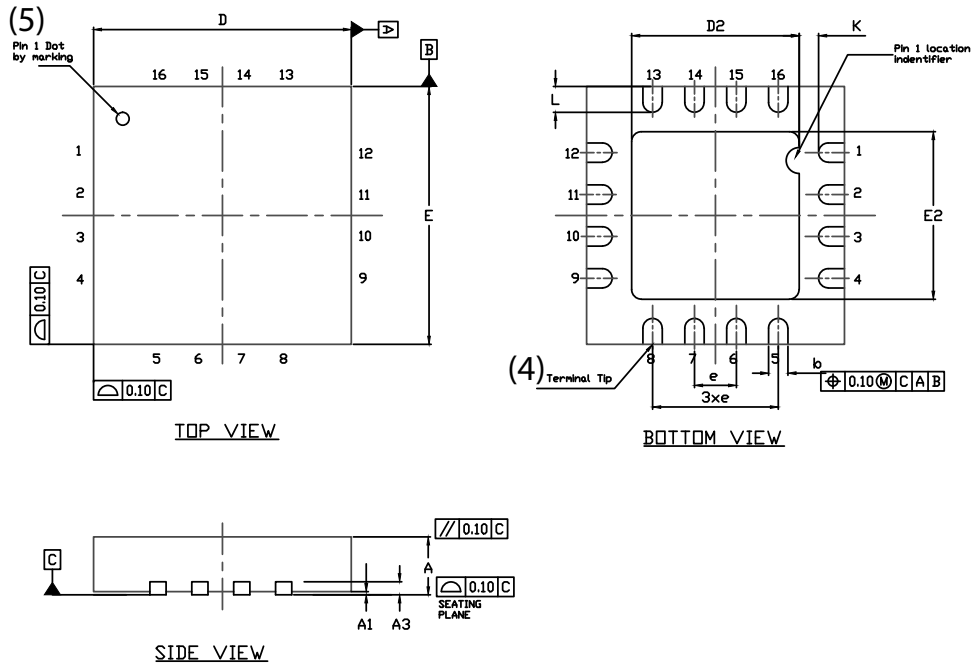


**Figure 2. Break-Before-Make Interval**

**TEST CIRCUITS**

**Figure 3. Charge Injection**

**Figure 4. Off-Isolation**

**Figure 5. Channel Off/On Capacitance**

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### QFN 4x4-16L Case Outline



DIM	VARIATION 1						VARIATION 2					
	MILLIMETERS <sup>(1)</sup>			INCHES			MILLIMETERS <sup>(1)</sup>			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.75	0.85	0.95	0.029	0.033	0.037	0.75	0.85	0.95	0.029	0.033	0.037
A1	0	-	0.05	0	-	0.002	0	-	0.05	0	-	0.002
A3	0.20 ref.			0.008 ref.			0.20 ref.			0.008 ref.		
b	0.25	0.30	0.35	0.010	0.012	0.014	0.25	0.30	0.35	0.010	0.012	0.014
D	4.00 BSC			0.157 BSC			4.00 BSC			0.157 BSC		
D2	2.0	2.1	2.2	0.079	0.083	0.087	2.5	2.6	2.7	0.098	0.102	0.106
e	0.65 BSC			0.026 BSC			0.65 BSC			0.026 BSC		
E	4.00 BSC			0.157 BSC			4.00 BSC			0.157 BSC		
E2	2.0	2.1	2.2	0.079	0.083	0.087	2.5	2.6	2.7	0.098	0.102	0.106
K	0.20 min.			0.008 min.			0.20 min.			0.008 min.		
L	0.5	0.6	0.7	0.020	0.024	0.028	0.3	0.4	0.5	0.012	0.016	0.020
N <sup>(3)</sup>	16			16			16			16		
Nd <sup>(3)</sup>	4			4			4			4		
Ne <sup>(3)</sup>	4			4			4			4		

#### Notes

- (1) Use millimeters as the primary measurement.
- (2) Dimensioning and tolerances conform to ASME Y14.5M. - 1994.
- (3) N is the number of terminals. Nd and Ne is the number of terminals in each D and E site respectively.
- (4) Dimensions b applies to plated terminal and is measured between 0.15 mm and 0.30 mm from terminal tip.
- (5) The pin 1 identifier must be existed on the top surface of the package by using identification mark or other feature of package body.
- (6) Package warpage max. 0.05 mm.

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 DWG: 5890





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