DIO20891/2

Ultra Low Power Comparator

Features

- Ultra Low Power Consumption: 0.3μA (TYP) at V+ = 1.4V
- Wide Supply Voltage Range: 1.4V to 5.5V
- Propagation Delay: 8μs (TYP) at V+ = 1.4V
- Push-Pull Output Current Drive: 23mA (TYP) at V+ = 5V
- Rail-to-Rail Input
- -40°C to 85°C Operating Temperature Range
- Available in the Green SC70-5, DFN1*1-6, DFN0.8*0.8-4 and DFN1.6*1.2-8 Packages

Applications

- RC Timers
- Window Detectors
- IR Receiver
- Multi-vibrators
- Alarm and Monitoring Circuits

Descriptions

The DIO20891/2 is an ultra low-power comparator with a typical power supply current of 0.3μA. It has the best-in-class power supply current versus propagation delay performance. The propagation delay is as low as 8μs with 100mV overdrive at 1.4V supply.

Designed to operate over a wide range of supply voltages, from 1.4V to 5.5V, with guaranteed operation at 1.4V, 1.8V, 2.5V and 5.0V, the DIO20891/2 is ideal for use in a variety of battery-powered applications. With rail-to-rail common mode voltage range, the DIO20891/2 is well suited for single-supply or dual-supply operation.

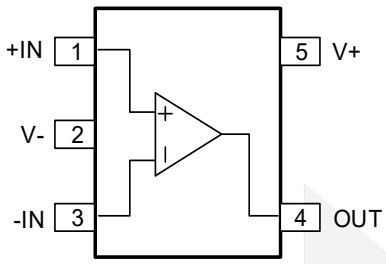
Featuring a push-pull output stage, the DIO20891/2 allows for operation with absolute minimum power consumption when driving any capacitive or resistive load.

DIO20891/2 is available in the Green SC70-5, DFN1*1-6, DFN0.8*0.8-4 and DFN1.6*1.2-8 packages. The DIO20891/2 is ideal for use in handheld electronics and mobile phone applications. It is rated over the -40°C to 85°C temperature range.

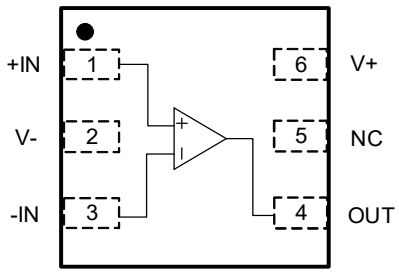
Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO20891SC5	YW91	Green or RoHS	-40 to 85°C	SC70-5	Tape & Reel, 3000
DIO20891EN6	9	Green or RoHS	-40 to 85°C	DFN1*1-6	Tape & Reel, 10000
DIO20891CN4	9	Green or RoHS	-40 to 85°C	DFN0.8*0.8-4	Tape & Reel, 5000
DIO20892EN8	YWJ2	Green or RoHS	-40 to 85°C	DFN1.6*1.2-8	Tape & Reel, 5000

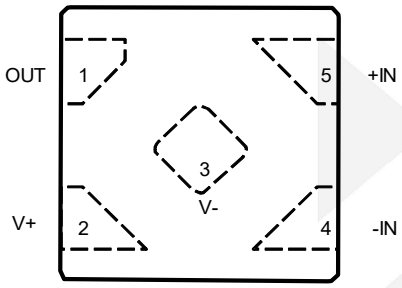
Pin Assignments



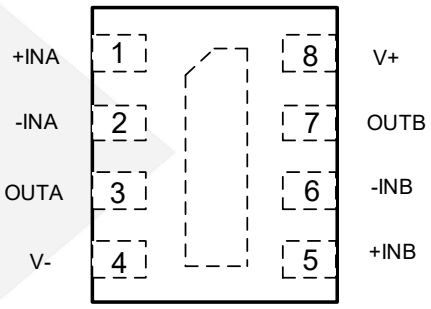
SC70-5



DFN1*1-6



DFN0.8*0.8-4



DFN1.6*1.2-8

Figure 1 Pin Assignment (Top View)

Pin Description

Pin name	Description
+IN	Positive Input
V-	Negative supply
-IN	Negative Input
OUT	Output
V+	Positive supply
NC	No Connect

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maxim rating conditions for extended periods may affect device reliability.

Parameter		Rating	Unit
Supply Voltage (V+ – V-)		7	V
Input Voltage		(V-)-0.3 to (V+)+0.3	V
Signal input terminals current		±10	mA
Output short circuit		Continuous	mA
Operating Temperature Range (T_A)		-40 to 85	°C
Storage Temperature Range (T_{STO})		-65 to 150	°C
Junction Temperature (Tj)		160	°C
Lead Temperature Range		260	°C
ESD	HBM, JEDEC: JESD22-A114	8000	V

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation to ensure optimal performance to the datasheet specifications. DIOO does not recommend exceeding them or designing to Absolute Maximum Ratings.

Parameter		Rating	Unit
Supply Voltage		1.4 to 5.5	V
Common-mode voltage range (V_{CM})		(V-)-0.1 to (V+)+0.1	V
Quiescent current (per channel)	T_A = 25°C	500 (Max)	nA
	T_A = –40°C to 85°C	1000 (Max)	nA

Electrical Characteristics:

At T_A = 25°C, V_S = 1.4V to 5.5V, V_{CM} = V_S/2 and C_L = 15pF, unless otherwise noted.

Parameter	Symbol	Condition	MIN	TYP	MAX	Unit
OFFSET VOLTAGE						
Input Offset Voltage (1)	V_{OS}	T_A = 25°C		±3	±5	mV
		T_A = –40°C to 85°C			±7	mV
Hysteresis	V_{HYS}	V_{CM} = 0.225V		20	22	mV
		V_{CM} = V_S/2		20.5	23	mV
Input offset voltage drift (1)	dV_{OS}/dT	T_A = –40°C to 85°C			±70	µV/°C
Power Supply Rejection Ratio(2)	PSRR	V_{CC}=1.4V to 5.5V			500	µV/V
Common Mode Rejection Ratio(2)	CMRR	V_{CC}=5V, V_{CM}=0.1V to 4.9V			1000	µV/V
INPUT BIAS CURRENT						
Input bias current	I_B	T_A = –40°C to 85°C			20	nA
Input offset current (1)				8		pA
Capacitive load drive	C_{LOAD}			60		pF
OUTPUT						
Voltage output swing from upper rail	V_{OH}	I_O = 2.5mA, input overdrive ≥ 50mV, V_S = 5.5V		155	165	mV
		I_O = 2.5mA, input overdrive ≥ 50mV, V_S = 5.5V, T_A = –40°C to 85°C			200	mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 5.5V			6	mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 5.5V, T_A = –40°C to 85°C			8	mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 1.8V		20		mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 1.8V, T_A = –40°C to 85°C			26	mV
Voltage output swing from lower rail	V_{OL}	I_O = 2.5mA, input overdrive ≥ 50mV, V_S = 5.5V		150		mV
		I_O = 2.5mA, input overdrive ≥ 50mV, V_S = 5.5V, T_A = –40°C to 85°C			200	mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 5.5V		6		mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 5.5V, T_A = –40°C to 85°C			8	mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 1.8V		16		mV
		I_O ≤ 100µA, input overdrive ≥ 50mV, V_S = 1.8V, T_A = –40°C to 85°C			23	mV

Short circuit sink current	I_{SC}	V_S = 5V		24		mA
Short circuit source current		V_S = 5V		23		mA

Note (1): Guaranteed by Design.

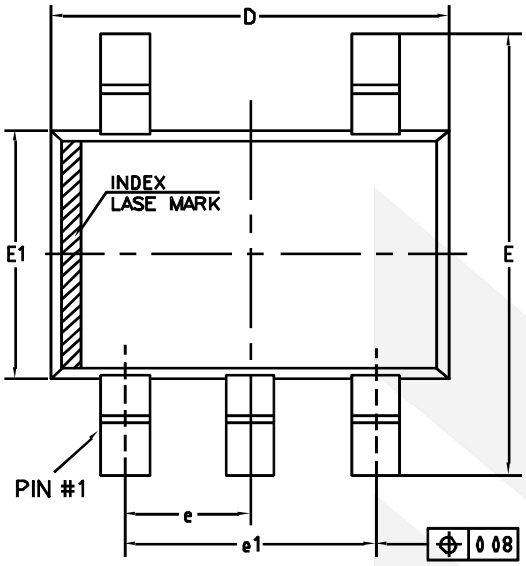
Note (2): Guaranteed by Lab Test Data.

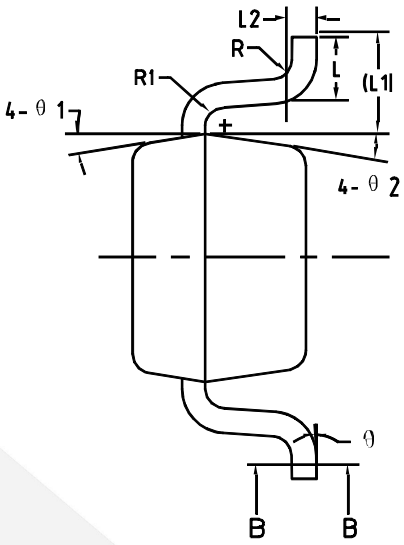
Switching Characteristics

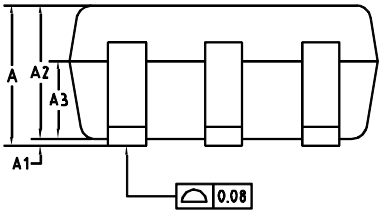
At T_A = 25°C, V_S = 1.4V to 5.5V, V_{CM} = 0.225V, and C_L = 15pF, unless otherwise noted.

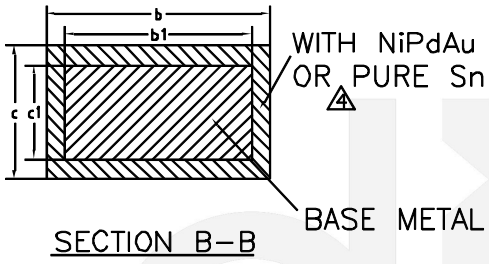
Parameter	Symbol	Condition		MIN	TYP	MAX	Unit
Propagation delay time	t_{PHL}	High-to-low	V_S = 1.8V, Input overdrive = 50mV		10		µs
			V_S = 1.8V, Input overdrive = 100mV		7		
	t_{PLH}	Low-to-high	V_S = 1.8V, Input overdrive = 50mV		10		
			V_S = 1.8V, Input overdrive = 100mV		8		
Rise time	t_R	V_S = 1.8V, Input overdrive = 100mV			40		ns
Fall time	t_F	V_S = 1.8V, Input overdrive = 100mV			35		
Power up time	t_{PU}	VCC=0 to 1.4V, t_R =9ns			5		µs

Physical Dimensions: SC70-5



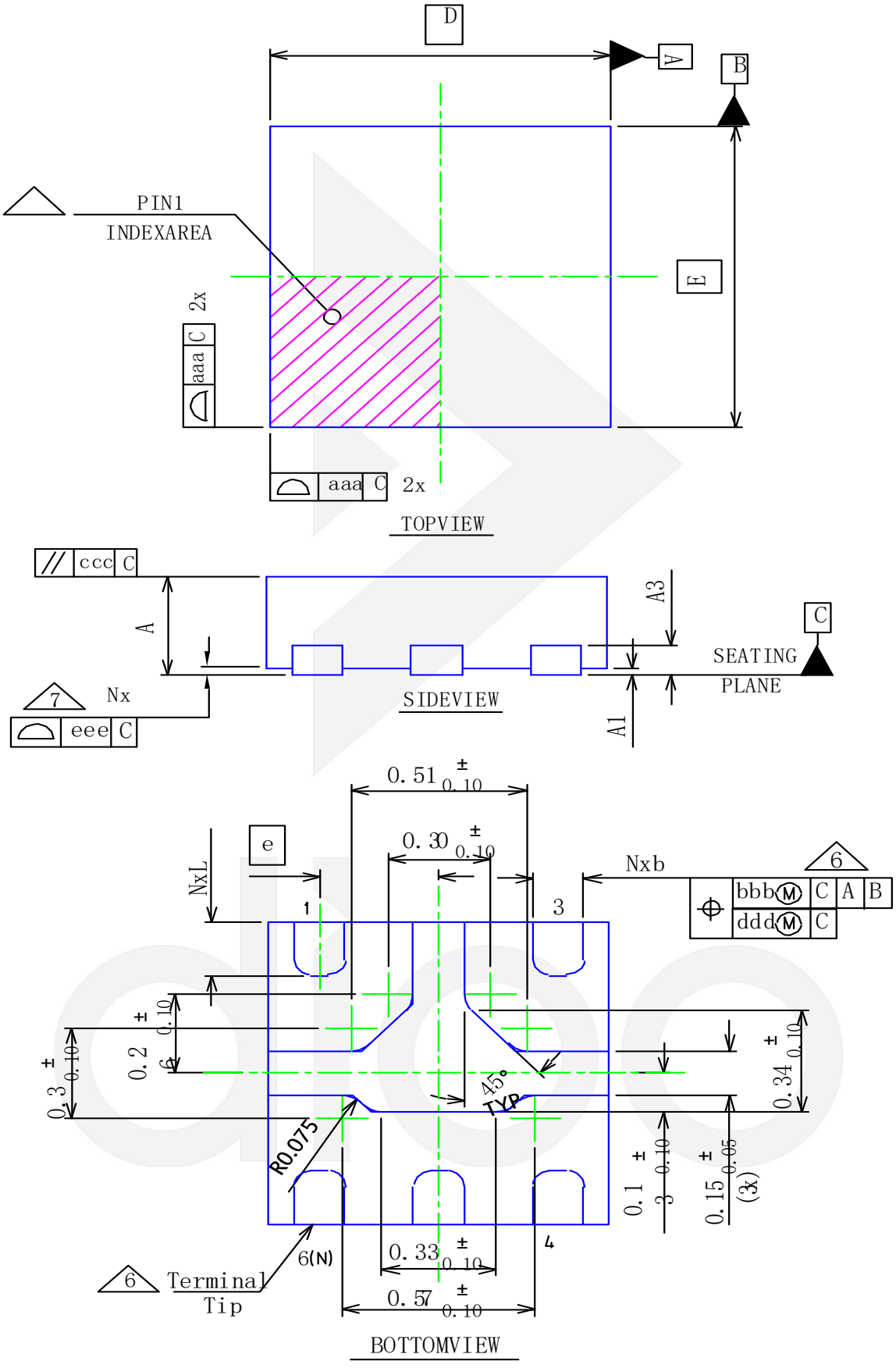






COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	0.85	-	1.05
A1	0	-	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
b	0.22	-	0.29
b1	0.22	0.25	0.28
c	0.115	-	0.15
c1	0.115	0.13	0.14
D	2.02	2.07	2.12
E	2.20	2.30	2.40
E1	1.25	1.30	1.35
e	0.65BSC		
e1	1.30BSC		
L	0.28	0.33	0.38
L1	0.50REF		
L2	0.15BSC		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	-	8°
Θ1	6°	9°	12°
Θ2	6°	9°	12°

Physical Dimensions: DFN1*1-6

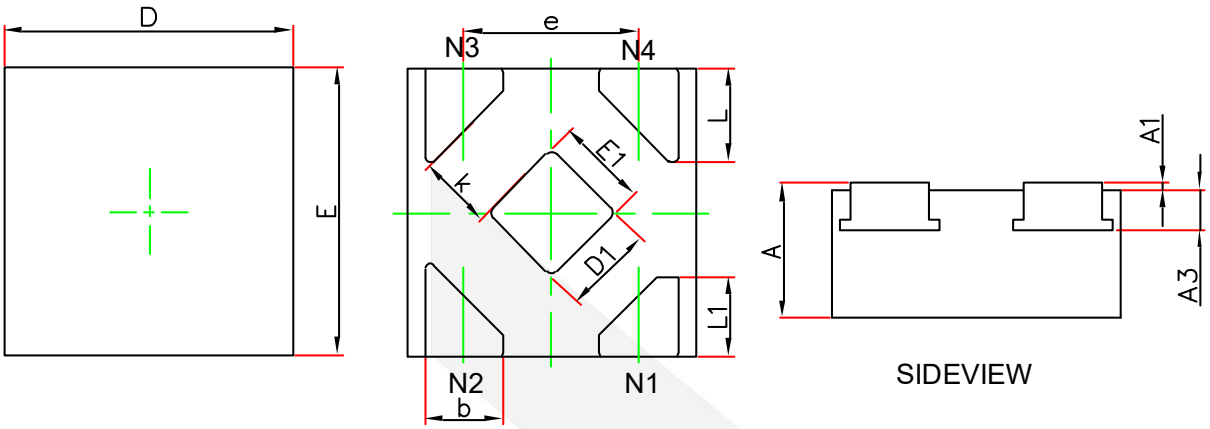


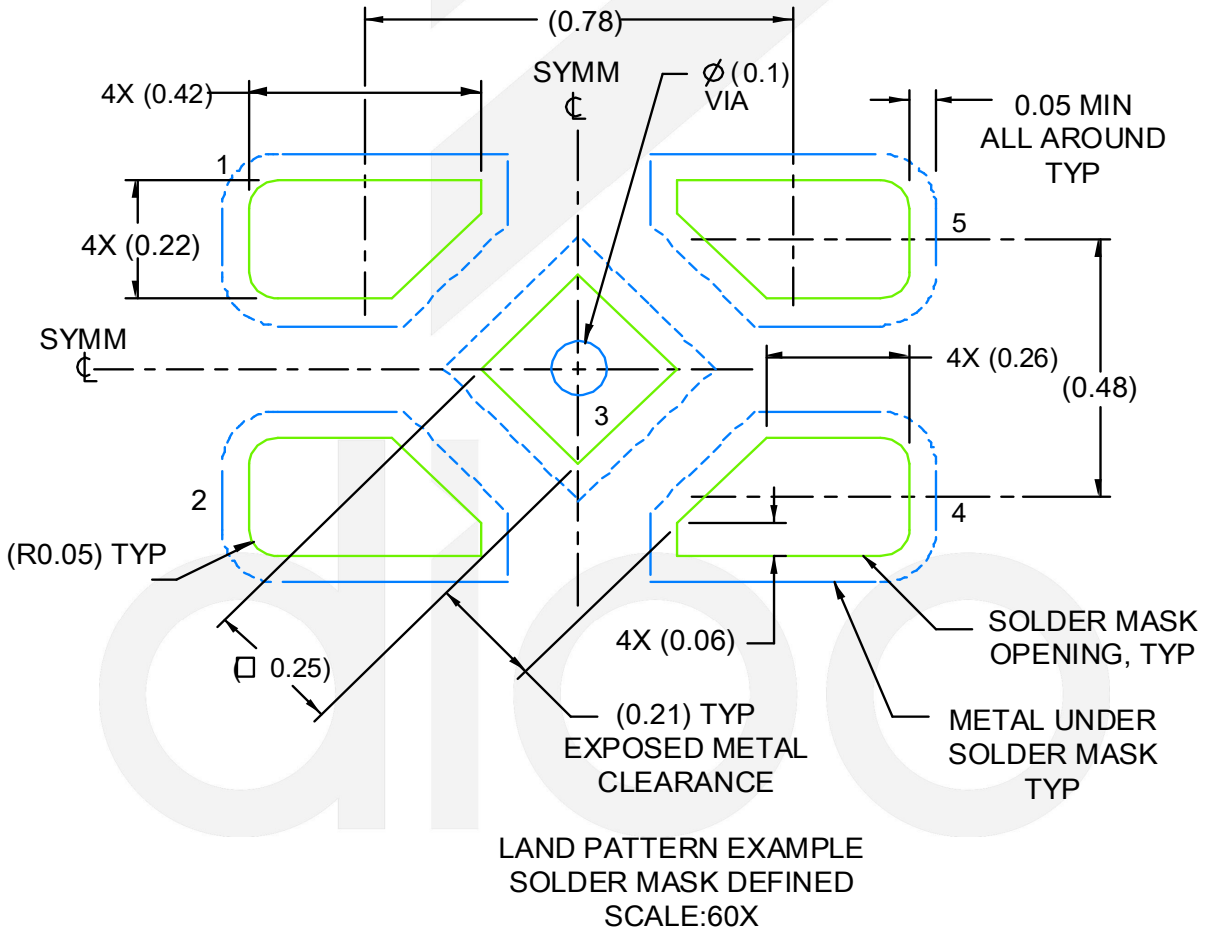
Dimension Table	X1			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	0.41	0.45	0.50	
A1	0.00	0.02	0.05	
A3	---	0.127Ref.	---	
b	0.10	0.15	0.20	6
L	0.100	0.175	0.250	
D	1.00BSC			
E	1.00BSC			
e	0.35BSC			
aaa	0.05			
bbb	0.10			
ccc	0.05			
ddd	0.05			
eee	0.05			
N	6			3
ND	3			5
NOTES	1,2			

NOTE:

1. Dimensioning and tolerance conform to ASMEY14.5-2009.
2. All dimensions are in millimeters.
3. Nis the total number of terminals.
4. The location of the marked terminal 1 identifier is with in the hatched area.
5. ND refers to the maximum number of terminals on D side.
6. Dimension b applies to the metallized terminal and is measured between 0.10mm and 0.30mm from the terminal tip. If the terminal has radius on the other end of it, dimension b should not be measured in that radius area.
7. Coplanarity applies to the terminals and all other bottom surface metallization.

Physical Dimensions: DFN0.8*0.8-4

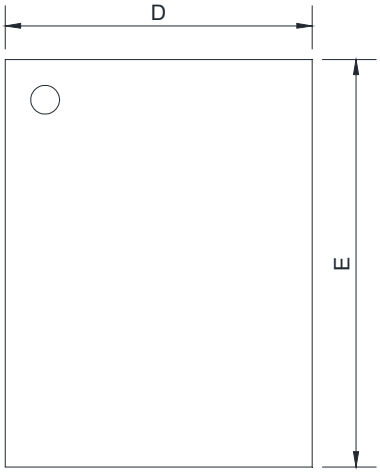




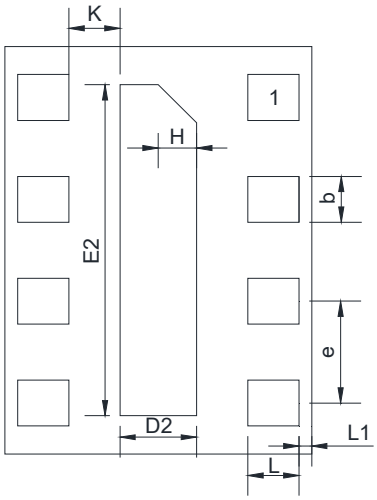
LAND PATTERN EXAMPLE
SOLDER MASK DEFINED
SCALE:60X

COMMON DIMENSIONS (UNITS OF MEASURE=MILLIMETER)			
Symbol	**MIN**	**NOM**	**MAX**
A	0.320	-	0.400
A1	-0.004	-	0.046
A3	0.110REF.		
D	0.750	-	0.850
E	0.750	-	0.850
D1	0.200	-	0.300
E1	0.200	-	0.300
k	0.150MIN.		
b	0.170	-	0.270
e	0.480TYP.		
L	0.210	-	0.320
L1	0.170	-	0.270

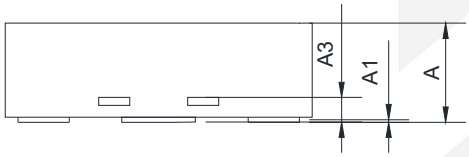
Physical Dimensions: DFN1.6*1.2-8



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min	Nom	Max
A	0.34	0.37	0.40
A1	0.00	0.02	0.05
A3		0.10REF	
b	0.13	0.18	0.23
D	1.10	1.20	1.30
E	1.50	1.60	1.70
D2	0.25	0.30	0.35
E2	1.25	1.30	1.35
e	0.30	0.40	0.50
H		0.15REF	
K	0.15	0.20	0.25
L	0.15	0.20	0.25
L1	0.00	0.05	0.10

CONTACT US

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