300mA, Low Noise, High PSRR CMOS LDO

■ General Description

OCP1303 is a low dropout, low power linear regulator which operates from 2.2V to 5.5V input voltage. OCP1303 provides high power supply rejection ratio (PSRR) and delivers up to 300mA output current.OCP1303 also offers low current consumption for battery operated applications.
The device is a RoHS compliant DFN1 x 1-4L package.

■ Features

- Input Voltage Range: 2.2V to 5.5V
- Output Voltage Range: 1.0V to 3.8V
- Output Current: 300mA
- Low Quiescent Current: 40μA(Typ)
- Shut Down Current: <1μA
- Auto-Discharge function
- Available in DFN package
- -40°C to +85°C Operating Temperature Range

■ Applications

- Smart phones, Cell phone, PDAs
- Bluetooth, wireless handsets
- Portable equipment

■ Pin Configuration

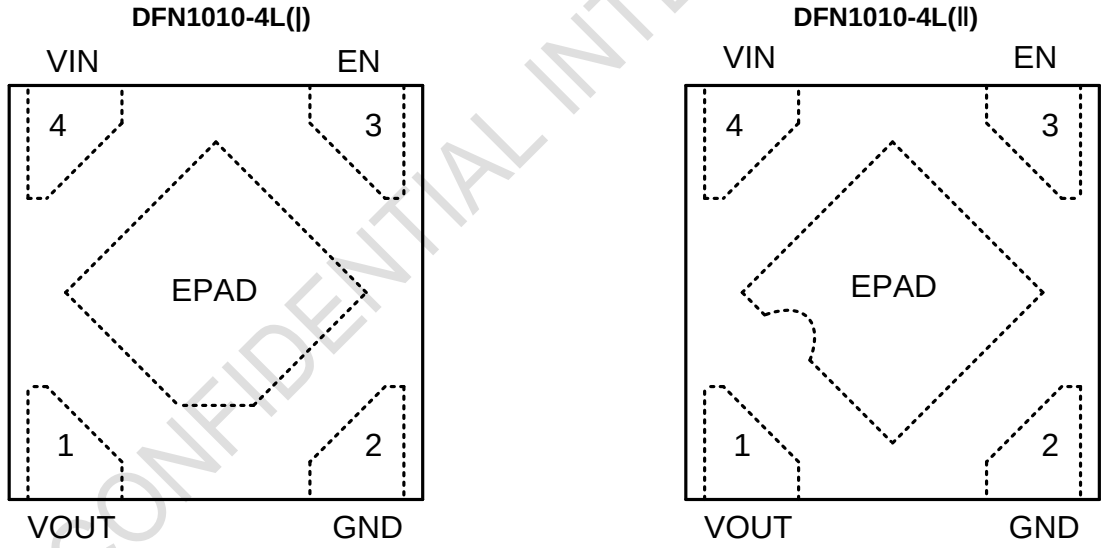


Figure 1, Pin Assignments of OCP1303 (Top View)

Pin No.	Pin Name	Pin Function
1	VOUT	Regulator Output Pin. Bypass a 1μF capacitor to ground
2	GND	Ground
3	EN	Enable control pin, active high. When EN pin is floating, it will be shutdown mode.
4	VIN	Regulator Input Pin. 1μF decouple capacitor is needed.
Exposed PAD	-	The exposed pad should be connected to a large ground plane to maximize thermal performance.

■ Typical Application Circuit

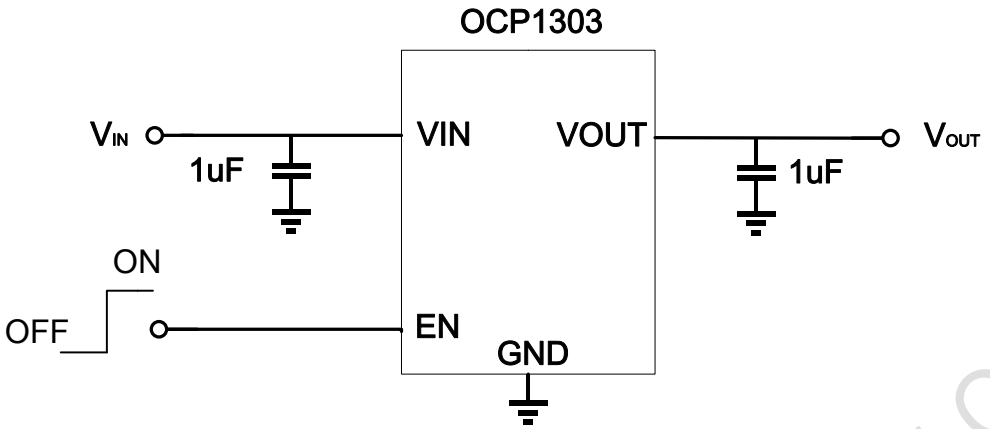
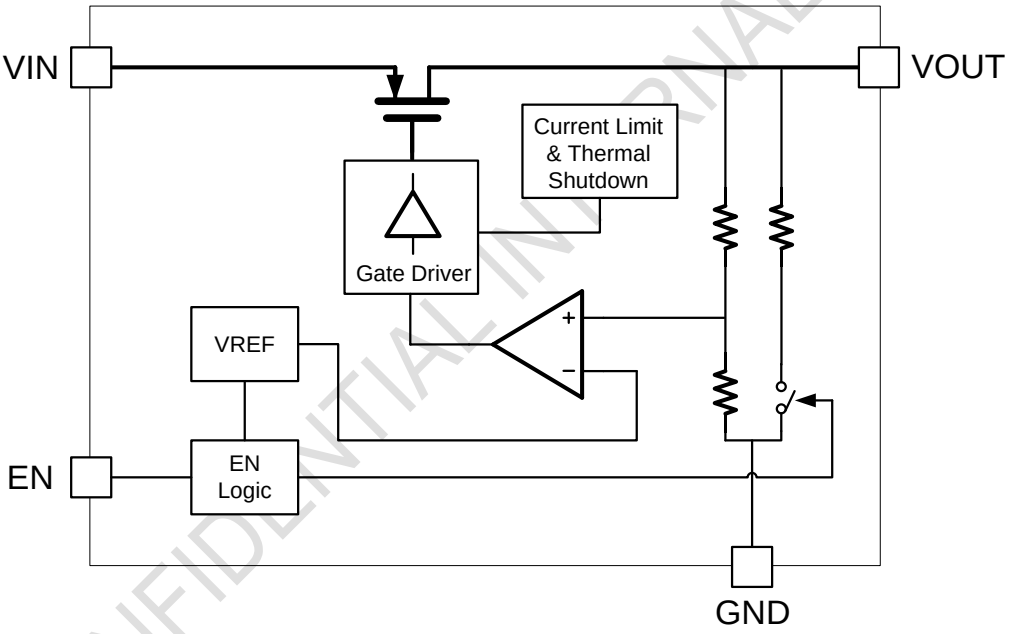


Figure 2, Typical Application Block diagram of OCP1303

■ Block Diagram



■ Absolute Maximum Ratings[1] (T_A=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Input Voltage Range	V_{IN}	-0.3 to 6.5	V
Output Voltage Range	V_{OUT}	-0.3 to V_{IN}	V
Enable Input Voltage Range	V_{EN}	-0.3 to V_{IN}	V
Maximum Load Current	I_{OUT}	400	mA
Human Body Model	HBM	2	kV
Charged Device Model	CDM	0.5	kV
Storage Temperature Range	T_S	-55 to +150	°C
Maximum Operating Junction Temperature Range	T_J	-40 to 125	°C

Notes: 1) Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

■ Recommended Operating Conditions[2](TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Input Voltage	V_{IN}	2.2 ~ 5.5	V
Ambient Operating Temperature	TA	-40 to 85	℃
Thermal Resistance	$R_{\theta JA}$	250	℃/W

Notes: 2) The device is not guaranteed to function outside of its operating conditions

■ Electrical Characteristics[4]

(Unless otherwise noted, typical values are at T_A=25℃, V_{IN}=V_{OUT} + 1V, C_{IN}=C_{OUT}=1μF)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input Voltage		2.2		5.5	V
V_{OUT}	Output Voltage	I_{OUT}=1mA	0.97* V_{OUT}	V_{OUT}	1.03* V_{OUT}	V
I_{LIM}	Current Limit		300			mA
V_{DROP}	Dropout Voltage	V_{OUT}=3.3V, I_{OUT}=300mA		220	330	mV
		V_{OUT}=2.5V, I_{OUT}=300mA		280	420	
		V_{OUT}=1.8V, I_{OUT}=300mA		400	600	
		V_{OUT}≤1.5V, I_{OUT}=300mA	Vin-min=2.2V			
Reg-LINE	Line Regulation	V_{IN}=2.2V~5.5V, I_{OUT}=1mA		0.01	0.1	%/V
Reg-LOAD	Load Regulation	V_{OUT}=1.2V,I_{OUT}=1~300mA		10	30	mV
ISHDN	Shut-down Current	V_{EN}=0V			1	μA
I_Q	Quiescent Current	V_{OUT}=1.2V ,I_{OUT}=0mA		40	60	μA
I_{SHORT}	Short Current Limit	V_{OUT}=0V		160		mA
PSRR	Power Supply Rejection Rate	VIN=(VOUT+1V)DC+0.5V P-P, F=217Hz,Iout=10mA, C_{OUT}=1μF		70		dB
		VIN=(VOUT+1V)DC+0.5V P-P, F=1kHz,Iout=10mA, C_{OUT}=1μF		68		
eno	Output Voltage Noise	10Hz to 100kHz,IOUT =10mA,V_{OUT}=1.2V,C_{OUT}=1 μF		40		μVRMS
V_{IH}	EN Input Logic High	V_{IN}: 2.2 V to 5.5 V	1.2			V
V_{IL}	EN Input Logic Low	V_{IN}: 2.2 V to 5.5 V			0.4	V
R_{PD}	EN pull-down resistance		0.6	1	1.3	MΩ
RDIS	RON of Discharge path	V_{IN}=4V,V_{EN}=0V		137		Ω
TSHDN	Thermal-Shutdown Temperature			160		℃
TSDH	Thermal Shutdown Hysteresis			30		℃

■ Application Information

Input Capacitor:

A 1μF ceramic capacitor is recommended to connect V_{IN} pin as close as possible which is used to provide low impedance path to unwanted signal or noise. Larger input capacitor may be necessary if fast and large load transients are encountered in the application. For PCB layout, a wide copper trace is required for both V_{IN} and GND.

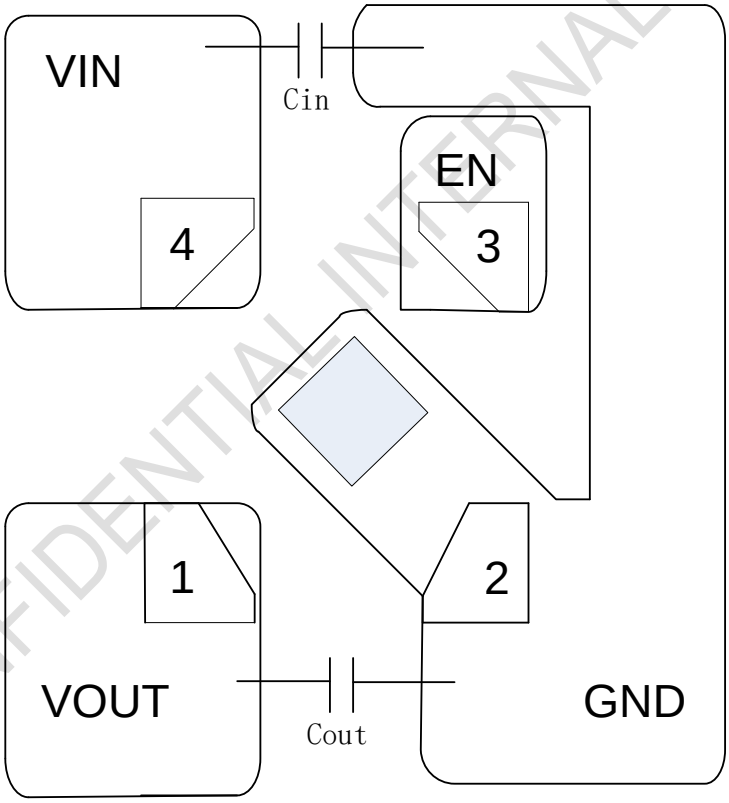
Output Capacitor:

The output capacitor is required for the LDO stability. The recommended output capacitance is from 1μF to 4.7μF, Place output capacitor as close as possible to V_{OUT} pin，Equivalent Series Resistance (ESR) is from 5mΩ to 100mΩ, and temperature characteristics are X7R or X5R. Place output capacitor as close as possible to V_{OUT} and GND pins.

ON/OFF Input Operation

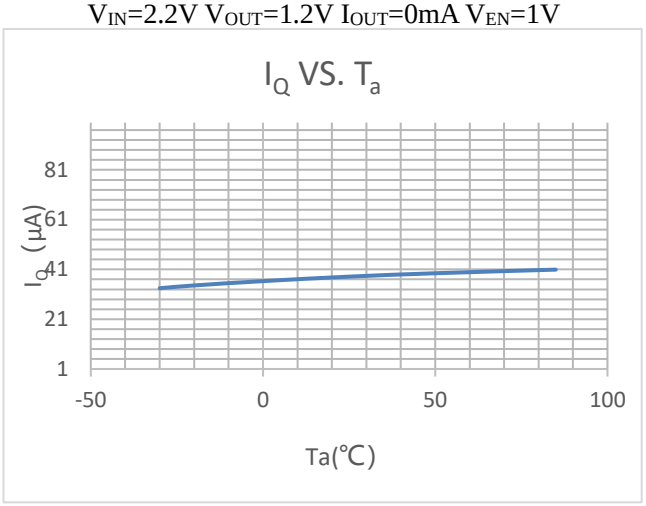
The OCP1303 is turned on by setting the EN pin high, and is turned off by pulling it low or floating. If this feature is not used, the EN pin should be tied to V_{IN} pin to keep the regulator output on at all time.

Recommended PCB Layout

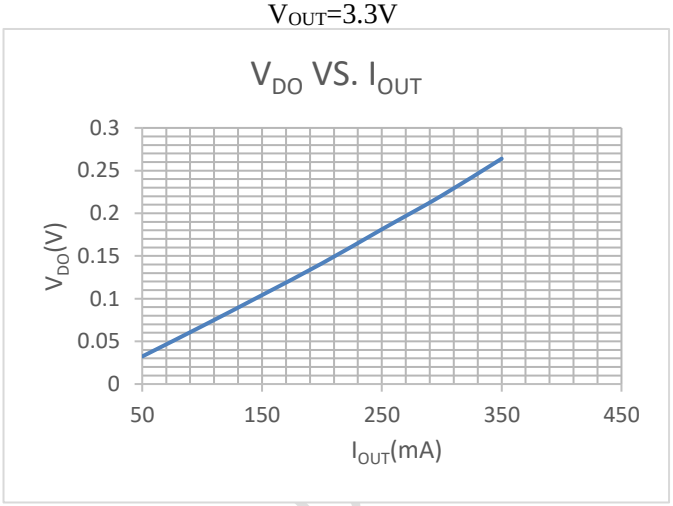


■ Electrical Characteristics

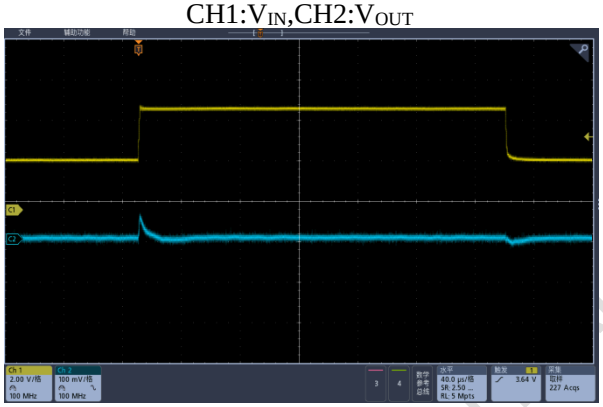
I_Q VS. T_a
V_{IN}=2.2V V_{OUT}=1.2V I_{OUT}=0mA V_{EN}=1V



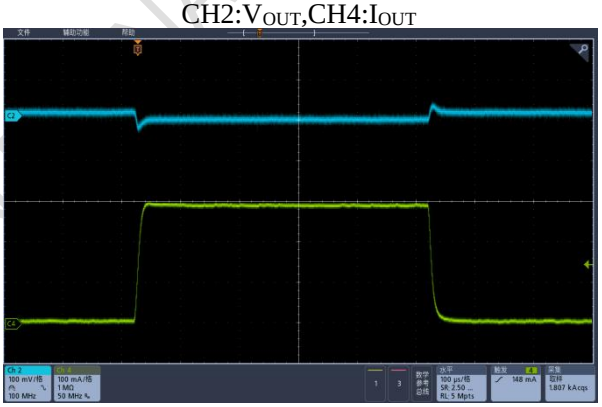
V_{DO} VS. I_{OUT}
V_{OUT}=3.3V



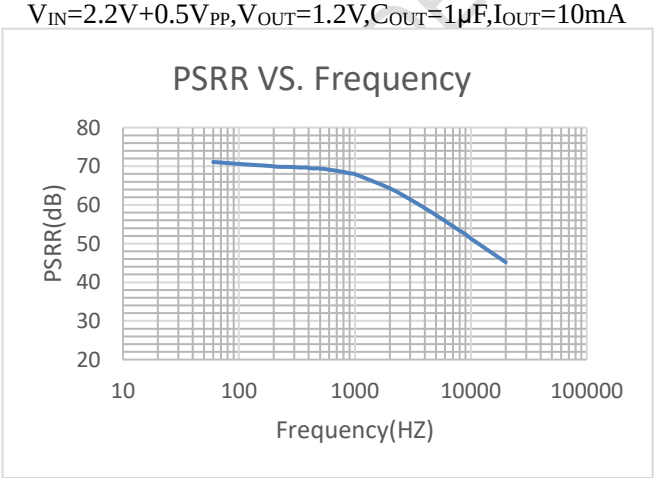
V_{IN} Line Transient Response
V_{IN}=2.5-5V, I_{OUT}=10mA, V_{OUT}=1.2V
CH1:V_{IN},CH2:V_{OUT}



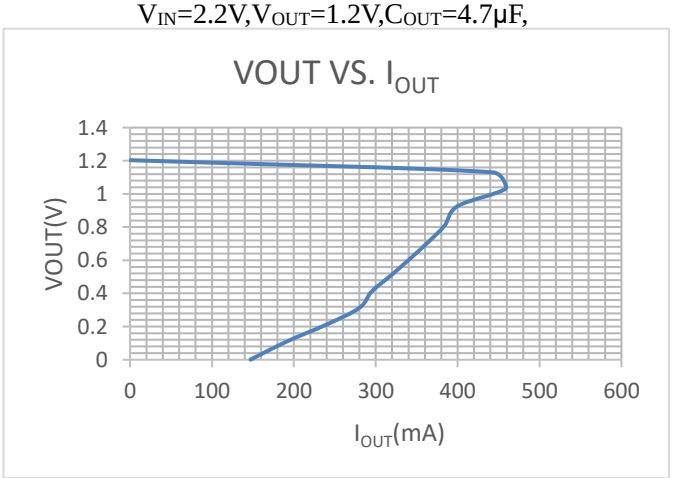
Load Transient Response
V_{IN}=2.2V,V_{OUT}=1.2V,I_{OUT}=1mA-300mA
CH2:V_{OUT},CH4:I_{OUT}

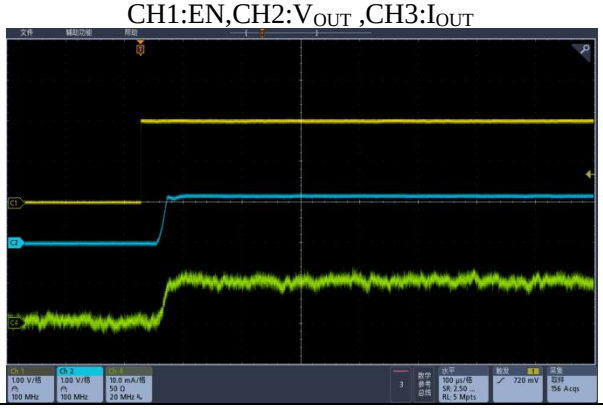
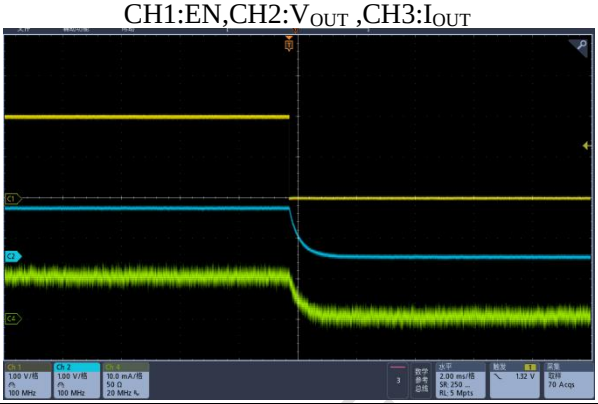


PSRR VS. Frequency
V_{IN}=2.2V+0.5V_{PP},V_{OUT}=1.2V,C_{OUT}=1μF,I_{OUT}=10mA



V_{OUT} VS. I_{OUT}
V_{IN}=2.2V,V_{OUT}=1.2V,C_{OUT}=4.7μF,



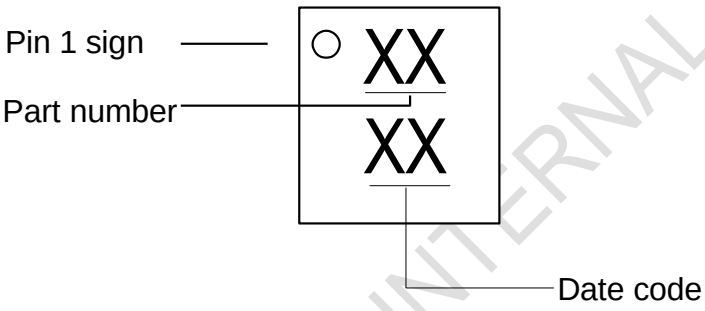
Enable Transient Response V_{IN}=2.2V, I_{OUT}=10mA,C_{IN}=1μF, C_{OUT}=1μF, V_{OUT}=1.2V CH1:EN,CH2:V_{OUT} ,CH3:I_{OUT} 	Enable Transient Response V_{IN}=2.2V, I_{OUT}=10mA,C_{IN}=1μF, C_{OUT}=1μF, V_{OUT}=1.2V CH1:EN,CH2:V_{OUT} ,CH3:I_{OUT} 

■ Ordering Information

Part Number	V_{OUT}(V)	Marking	Package Type	Package Qty	Temperature	Eco Plan	Lead
OCP1303V12AD	1.2	ZL	DFN1010-4L	10000pcs	-40～85°C	Green	Sn
OCP1303V18AD	1.8	ZM	DFN1010-4L	10000pcs	-40～85°C	Green	Sn
OCP1303V25AD	2.5	ZN	DFN1010-4L	10000pcs	-40～85°C	Green	Sn
OCP1303V28AD	2.8	ZP	DFN1010-4L	10000pcs	-40～85°C	Green	Sn
OCP1303V30AD	3.0	ZQ	DFN1010-4L	10000pcs	-40～85°C	Green	Sn
OCP1303V33AD	3.3	ZO	DFN1010-4L	10000pcs	-40～85°C	Green	Sn

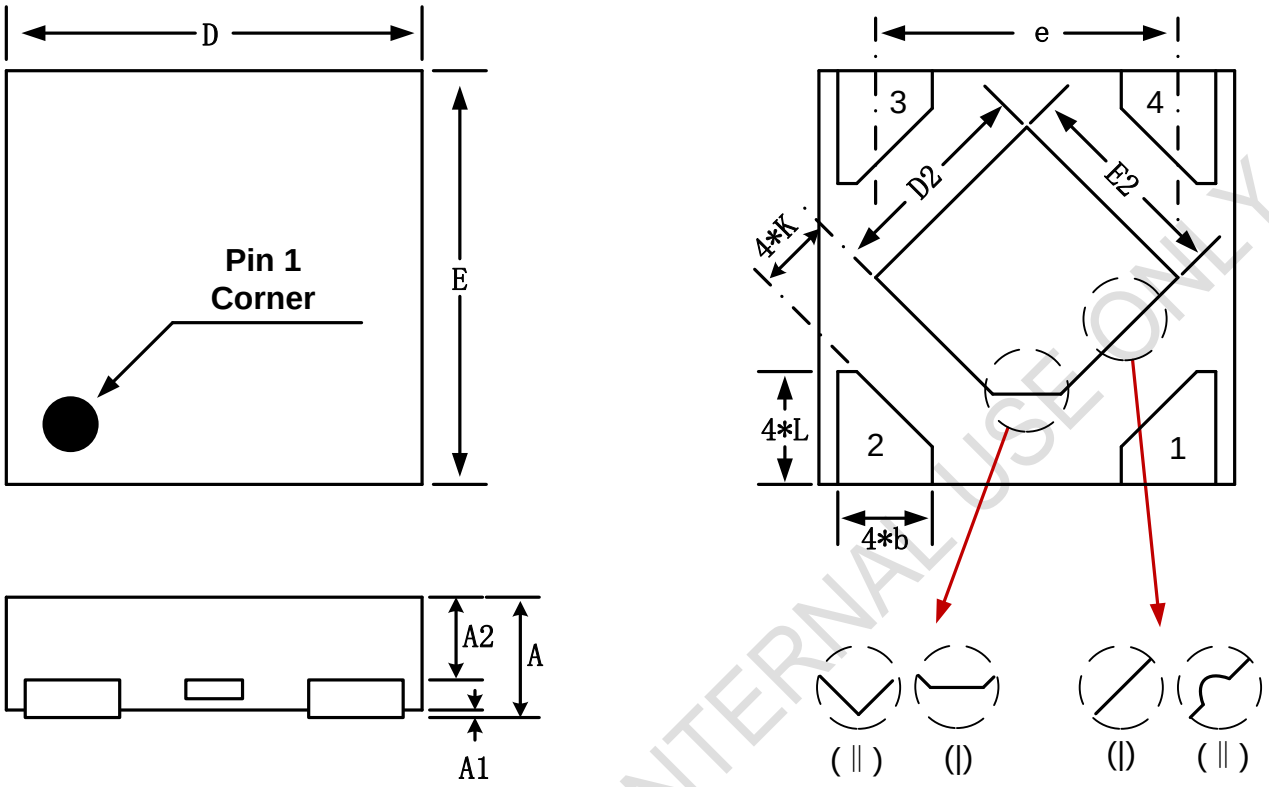
■ Marking Information

DFN1010-4L



■ Package Information

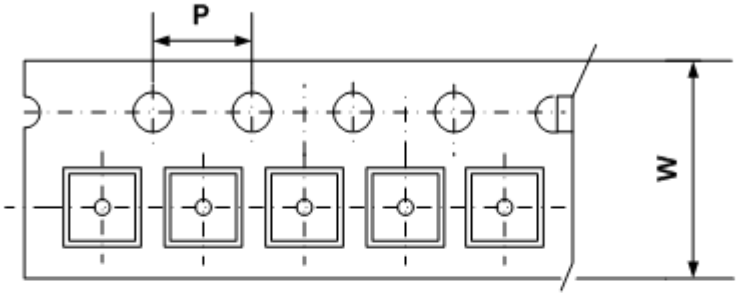
DFN1010-4L

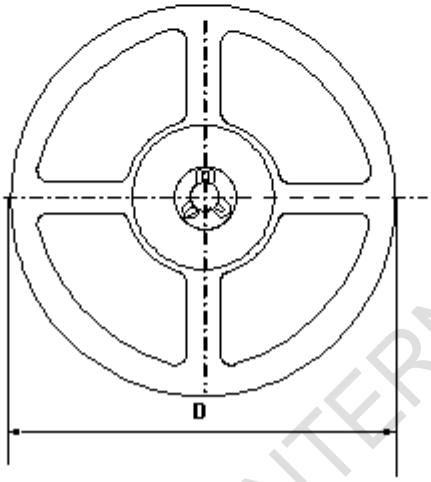


Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0. 4	0.45	0.50
A1	0.00	0.02	0.05
A2	-	0.27	-
b	0.18	0.23	0.28
D	1 BSC		
E	1 BSC		
e	0.65 BSC		
D2	0.43	0.48	0.53
E2	0.43	0.48	0.53
L	0.20	0.25	0.30
K	0.21 REF		

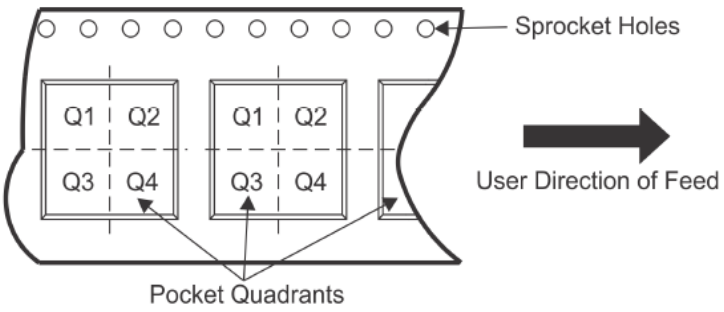
■ Packing Information

DFN1010-4L





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



Package Type	Carrier Width (W)	Pitch (P)	Reel Size(D)	Packing Minimum	PIN A1 Quadrant	MSL
DFN1010-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	10000pcs	Q1	Level-3

Note: Carrier Tape Dimension, Reel Size and Packing Minimum

IMPORTANT NOTICE

Orient-Chip Semiconductor Co., Ltd (OCS) and its subsidiaries reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete .These separate provision won't be provided.