

# WL2841D

**500mA ,Ultra Low Drop-Out, CMOS LDO  
With BIAS Supply**

[Http://www.ovt.com](http://www.ovt.com)

## Descriptions

The WL2841D is a high accuracy, low noise, high speed, low dropout CMOS Linear regulator with high ripple rejection. It is equipped with NMOS pass transistor and a separate bias supply voltage ( $V_{BIAS}$ ). The devices offer a new level of cost effective performance in cellular phones, laptop and other portable devices.

The WL2841D are available in fixed output voltages between 0.8V and 2.1V, and capable of driving up to 500mA. Other features include over temperature protection and over current protection.

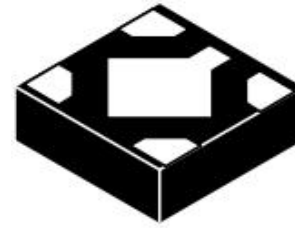
The WL2841D regulators are available in DFN1212-4L Package. Standard products are Pb-free and Halogen-free.

## Features

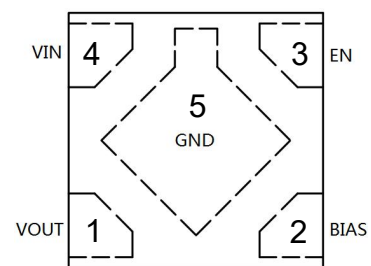
- Input voltage : 0.8V~5.5V
- Bias voltage : 2.4V~5.5V
- Output range : 0.8V~2.1V
- Output current : 500mA Typ.
- PSRR : 85dB @ 1kHz
- Low Noise : 20uVrms(10Hz to 100kHz)
- Dropout voltage : 150mV @  $I_{OUT}=500mA$
- Quiescent current : 65µA Typ.
- Shut-down current : < 1.0µA
- Stable with a Ceramic capacitor : 2.2uF

## Applications

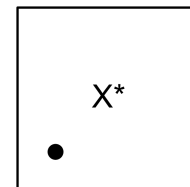
- MP3/MP4 Players
- Cellphones, radiophone, digital cameras
- Bluetooth, wireless handsets
- Others portable electronics device



DFN1212-4L



**Pin Configuration (Top View)**



**X: Voltage Code**

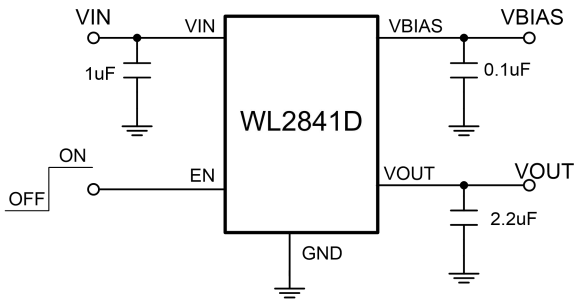
**\* : Month Code**

For detail marking information, please see page 10.

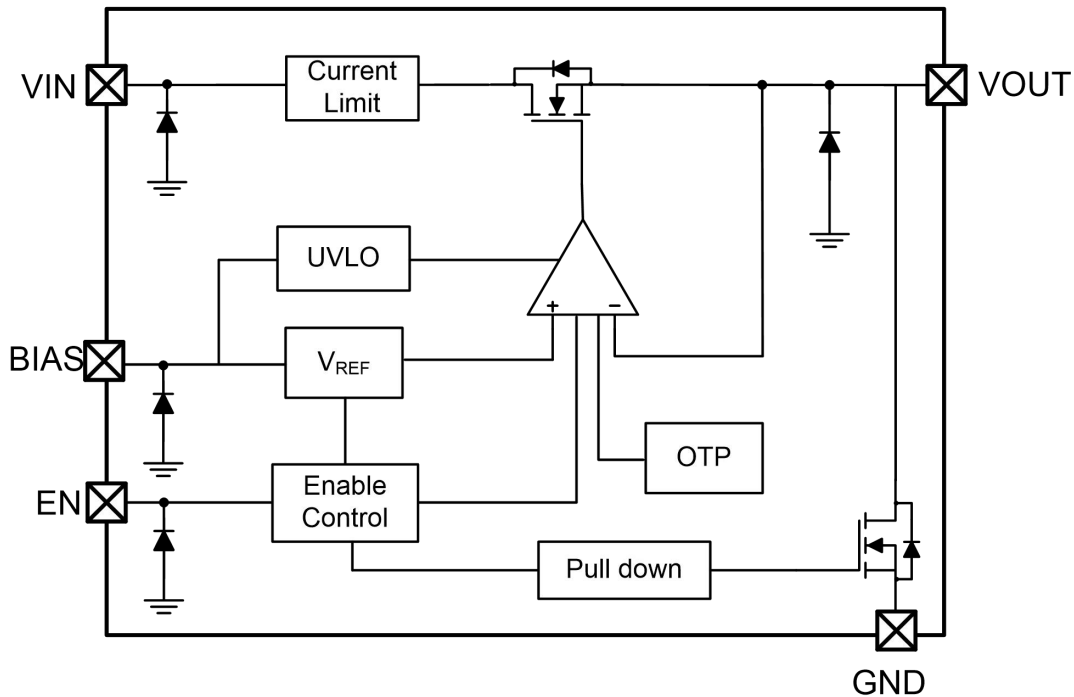
### Marking

### ORDER INFORMATION

For detail order information, please see page 10.

**Typical Application**

**Pin Description**
**DFN1212-4L**

PIN	Symbol	Description
1	VOUT	Output
2	BIAS	Bias voltage supply for internal control circuits
3	EN	Enable (Active high)
4	VIN	Input Voltage Supply pin
5	GND	Ground

**Block Diagram**


**Absolute Maximum Ratings**

Parameter	Value	Unit	
V <sub>IN</sub> Range	-0.3~6.0	V	
V <sub>BIAS</sub> Range	-0.3~6.0	V	
V <sub>EN</sub> Range	-0.3~V <sub>IN</sub>	V	
V <sub>OUT</sub> Range	-0.3~V <sub>IN</sub>	V	
I <sub>OUT</sub>	600	mA	
Lead Temperature Range	260	°C	
Storage Temperature Range	-55 ~ 150	°C	
Operating Junction Temperature Range	150	°C	
ESD Ratings	HBM	2000	V
	CDM	1500	V

**Recommend Operating Ratings**

Parameter	Value	Unit
Operating Supply voltage	2.4~5.5	V
Operating Temperature Range	-40~85	°C
Thermal Resistance, R <sub>θJA</sub> (DFN1212-4L),Note1	230	°C/W

Note1. Surface mounted on FR-4 Board using 2 oz, 1 square inch Cu area, PCB board size 1.5\*1.5 square inches.

**Electronics Characteristics**

1.  $T_a=25^{\circ}\text{C}$ ,  $V_{IN}=V_{OUT}+0.5\text{V}$ ,  $V_{BIAS}=\max(3\text{V}, V_{OUT}+1.7\text{V})$ ,  $V_{EN}=V_{BIAS}$ ,  $C_{IN}=1.0\mu\text{F}$ ,  $C_{BIAS}=0.1\mu\text{F}$ ,  $C_{OUT}=2.2\mu\text{F}$ , unless otherwise noted

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating VIN Voltage Range	$V_{IN}$		$V_{OUT}+$ $V_{drop}$		5.5	V
Operating BIAS Voltage Range	$V_{BIAS}$	$V_{OUT} \leq 1.0\text{V}$	2.4		5.5	V
		$V_{OUT} > 1.0\text{V}$	$V_{OUT}+1.4\text{V}$		5.5	V
Output Voltage accuracy	$V_{OUT}$	$V_{OUT} \leq 1.0\text{V}$ , $I_{OUT}=1\text{mA}$	$V_{OUT}-$ 15mV	$V_{OUT}$	$V_{OUT}+$ 15mV	V
		$V_{OUT} > 1.0\text{V}$ , $I_{OUT}=1\text{mA}$	$V_{OUT}^*$ 0.985	$V_{OUT}$	$V_{OUT}^*$ 1.015	V
Current Limit	$I_{LIM}$	$V_{OUT}=90\%V_{OUT(NOM)}$	600			mA
Output Short Current	$I_{SC}$		130	220	330	mA
VIN Line Regulation	$\Delta V_{LINE}$	$V_{IN}=V_{OUT}+0.5\text{V}\sim 5.5\text{V}$ , $I_{OUT}=1\text{mA}$		0.1	5	mV
VBIAS Line Regulation	$\Delta V_{LINE}$	$V_{BIAS}=2.7\sim 5.5\text{V}$ , $I_{OUT}=1\text{mA}$		0.1	5	mV
Load Regulation	$\Delta V_{Load}$	$I_{OUT}=1\sim 500\text{mA}$ ; $V_{BIAS}=3.3\text{V}$		30	70	mV
Quiescent Current	$I_Q$	$V_{BIAS}=2.7\text{V}$ , $V_{OUT}=1.1\text{V}$ , $I_{OUT}=0$		75	130	$\mu\text{A}$
Shut-down Current	$I_{SHDN}$	$V_{EN}=0\text{V}$			1.0	$\mu\text{A}$
Power Supply Rejection Rate	PSRR( $V_{IN}$ )	$V_{IN}$ to $V_{OUT}$ , $F=1\text{kHz}$ , $I_{OUT}=10\text{mA}$ . $V_{IN} > V_{OUT}+0.5\text{V}$		70		dB
	PSRR( $V_{BIAS}$ )	$V_{BIAS}$ to $V_{OUT}$ , $F=1\text{kHz}$ , $I_{OUT}=10\text{mA}$ . $V_{IN} > V_{OUT}+0.5\text{V}$		85		
EN logic high voltage	$V_{ENH}$	$V_{IN}=5.5\text{V}$ , $I_{OUT}=1\text{mA}$	1.2			V
EN logic low voltage	$V_{ENL}$	$V_{IN}=5.5\text{V}$ , $V_{OUT}=0\text{V}$			0.4	V
EN Input Current	$I_{EN}$	$V_{EN}=0$ to $5.5\text{V}$			1.0	$\mu\text{A}$
Output Noise Voltage	$e_{NO}$	$V_{IN}=V_{OUT}+0.5\text{V}$ , $V_{OUT(NOM)}=1\text{V}$ , $I_{OUT}=10\text{mA}$ , $f=10\text{Hz}$ to $100\text{KHz}$		20		$\mu\text{V}_{rms}$
Thermal shutdown threshold	$T_{SD}$			160		$^{\circ}\text{C}$
Thermal shutdown hysteresis	$\Delta T_{SD}$			20		$^{\circ}\text{C}$
Auto-discharge Nch Tr. ON Resistance	$R_{LOW}$	$V_{BIAS}=3.3\text{V}$ , $V_{EN}=0\text{V}$		50		$\Omega$

Note. About power sequence,  $V_{IN}$  should be no later than Enable, Or else, there will be overshoot on output voltage probably.

**Dropout Voltage**

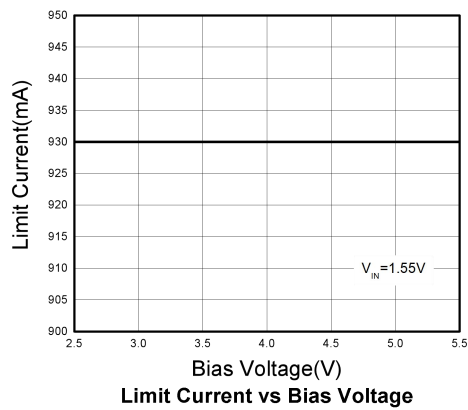
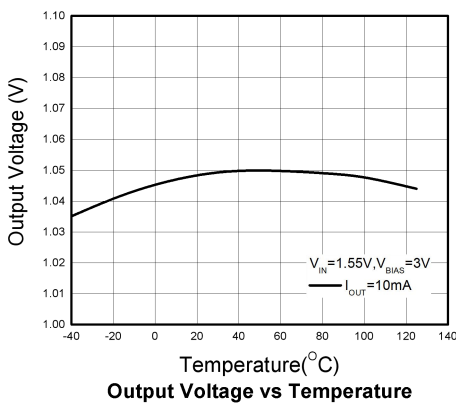
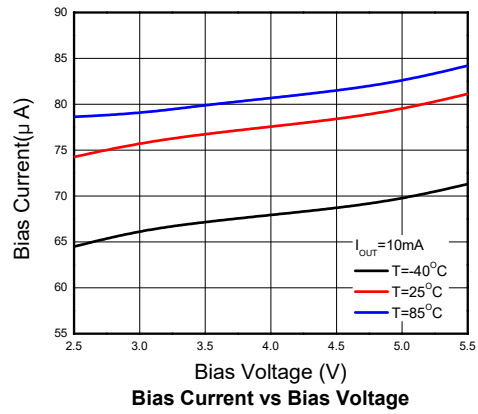
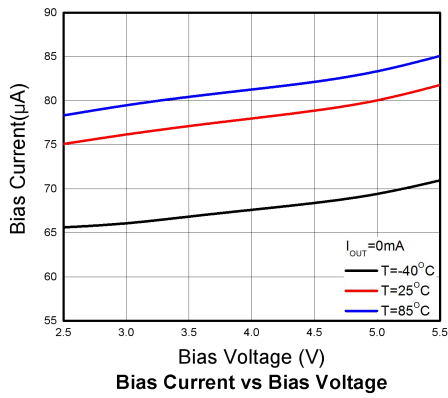
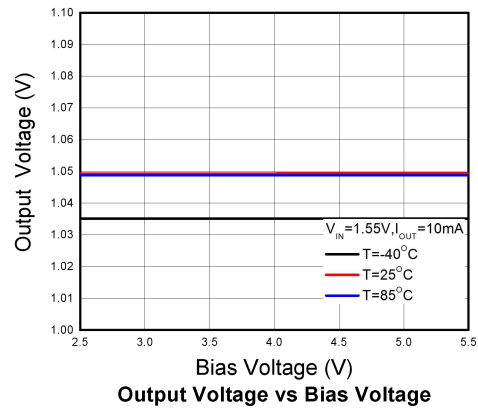
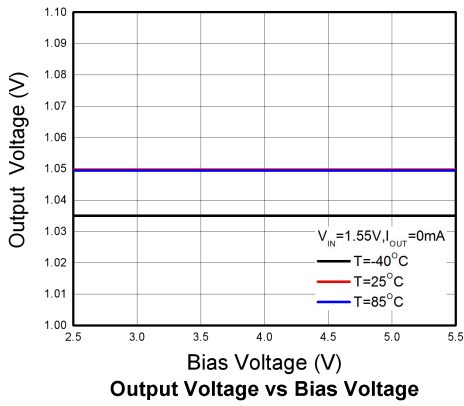
1.  $T_a=25^{\circ}\text{C}$ ,  $V_{\text{IN}}=V_{\text{OUT}}+0.5\text{V}$ ,  $C_{\text{IN}}=1.0\mu\text{F}$ ,  $C_{\text{BIAS}}=0.1\mu\text{F}$ ,  $C_{\text{OUT}}=2.2\mu\text{F}$ , unless otherwise note

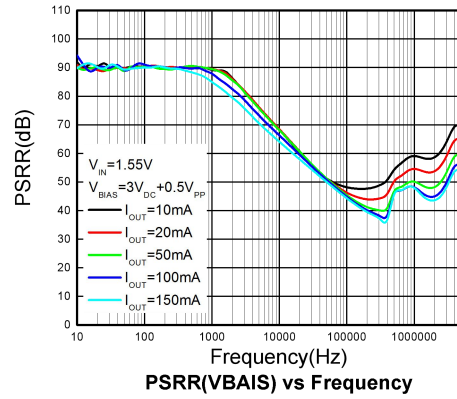
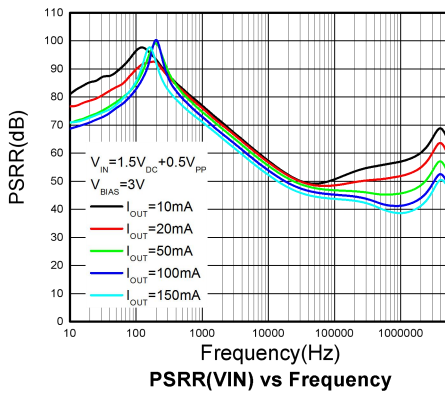
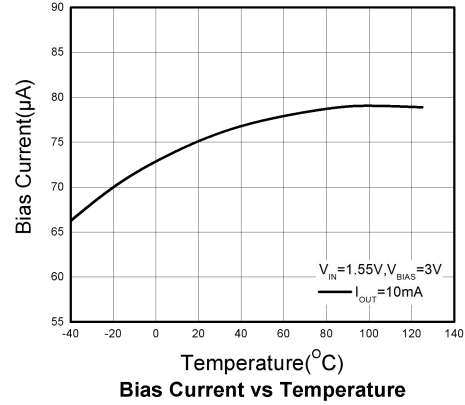
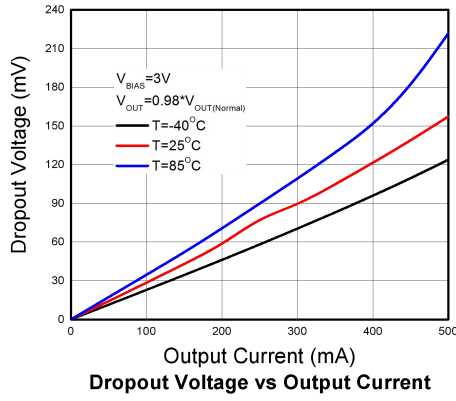
2. The specifications with \* are guaranteed by engineering at  $-40^{\circ}\text{C} \leq T_a \leq 85^{\circ}\text{C}$

Parameter	Symbol	Condition						Unit
		$I_{\text{OUT}}=300\text{mA}$			$I_{\text{OUT}}=500\text{mA}$			
		Min	Typ	Max	Min	Typ	Max	
Output Voltages	$V_{\text{BIAS}}$ input voltages							
$0.8\text{V} \leq V_{\text{OUT}} < 1.0\text{V}$	3.3V	—	100	150*	—	150	240*	mV
$1.0\text{V} \leq V_{\text{OUT}} < 1.2\text{V}$	3.3V	—	110	160*	—	160	240*	mV
$1.2\text{V} \leq V_{\text{OUT}} < 1.4\text{V}$	3.3V	—	120	170*	—	170	250*	mV
$1.4\text{V} \leq V_{\text{OUT}} < 1.6\text{V}$	3.3V	—	125	170*	—	180	260*	mV
$1.6\text{V} \leq V_{\text{OUT}} < 1.8\text{V}$	$V_{\text{OUT}}+1.7\text{V}$	—	130	180*	—	190	270*	mV
$1.8\text{V} \leq V_{\text{OUT}} < 2.1\text{V}$	$V_{\text{OUT}}+1.7\text{V}$	—	135	180*	—	195	280*	mV
$2.1\text{V} \leq V_{\text{OUT}} < 2.5\text{V}$	$V_{\text{OUT}}+1.7\text{V}$	—	135	190*	—	195	290*	mV
$2.5\text{V} \leq V_{\text{OUT}} < 3.3\text{V}$	$V_{\text{OUT}}+1.7\text{V}$	—	135	200*	—	200	300*	mV

**Typical characteristics**

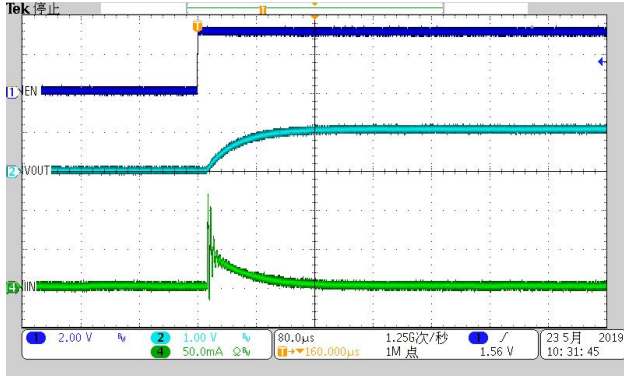
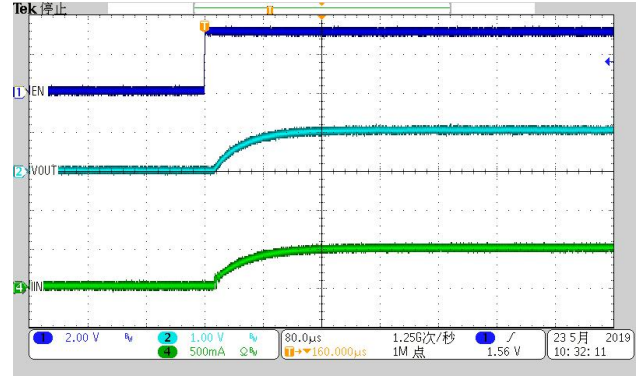
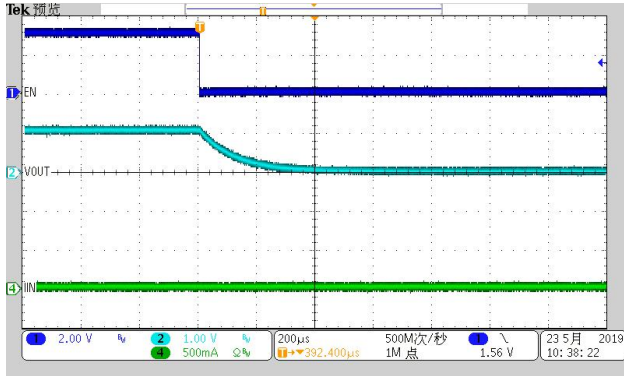
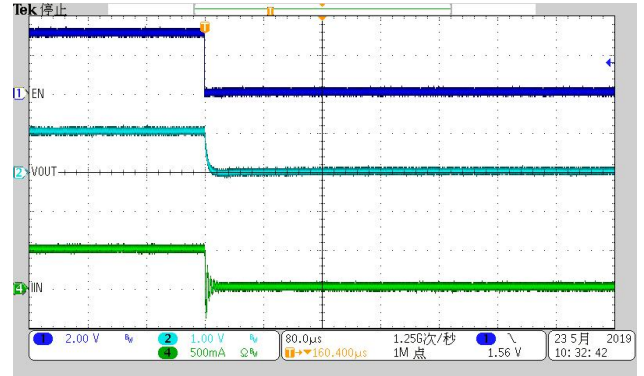
1.  $T_a=25^\circ\text{C}$ ,  $V_{IN}=V_{OUT}+0.5\text{V}$ ,  $V_{BIAS}=\max(3\text{V}, V_{OUT}+1.7\text{V})$ ,  $V_{EN}=V_{BIAS}$ ,  $C_{IN}=1.0\mu\text{F}$ ,  $C_{BIAS}=0.1\mu\text{F}$ ,  $C_{OUT}=2.2\mu\text{F}$ , unless otherwise noted





**Start-up From EN**

1.  $T_a=25^\circ\text{C}$ ,  $V_{IN}=V_{OUT}+0.5\text{V}$ ,  $V_{BIAS}=\max(3\text{V}, V_{OUT}+1.7\text{V})$ ,  $V_{EN}=V_{BIAS}$ ,  $C_{IN}=1.0\mu\text{F}$ ,  $C_{BIAS}=0.1\mu\text{F}$ ,  $C_{OUT}=2.2\mu\text{F}$ , unless otherwise noted

 **$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=0\text{mA}$ , EN ON**

 **$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=500\text{mA}$ , EN ON**

 **$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=0\text{mA}$ , EN OFF**

 **$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=500\text{mA}$ , EN OFF**


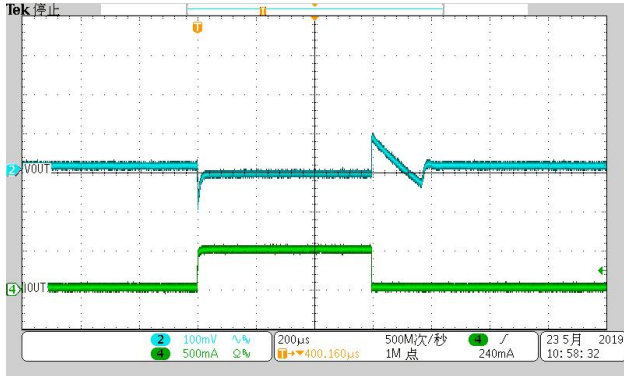


### Load & Line Transient Response

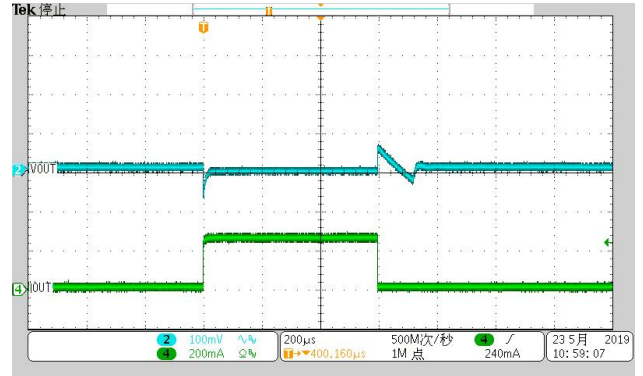
1.  $T_a=25^{\circ}\text{C}$ ,  $V_{IN}=V_{OUT}+0.5\text{V}$ ,  $V_{BIAS}=\max(3\text{V}, V_{OUT}+1.7\text{V})$ ,  $V_{EN}=V_{BIAS}$ ,  $C_{IN}=1.0\mu\text{F}$ ,  $C_{BIAS}=0.1\mu\text{F}$ ,  $C_{OUT}=2.2\mu\text{F}$ , unless otherwise noted)

2.  $T_r=T_f=1\mu\text{s}$

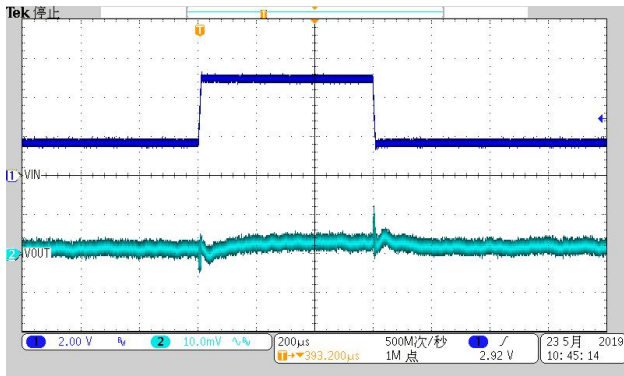
$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=1\text{mA}-500\text{mA}$



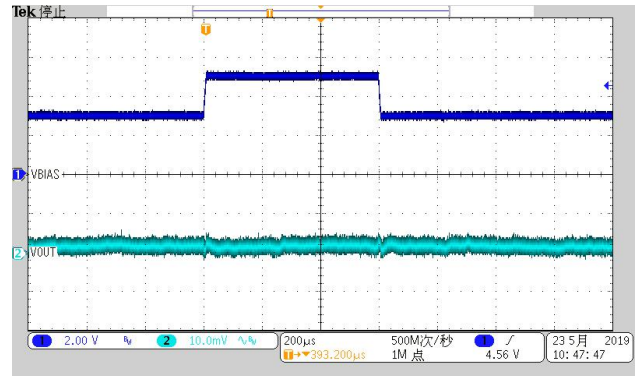
$V_{OUT}=1.05\text{V}$ ,  $I_{OUT}=1\text{mA}-250\text{mA}$



$V_{OUT}=1.05\text{V}$ ,  $V_{IN}=1.55\text{V}-5\text{V}$ ,  $I_{OUT}=1\text{mA}$

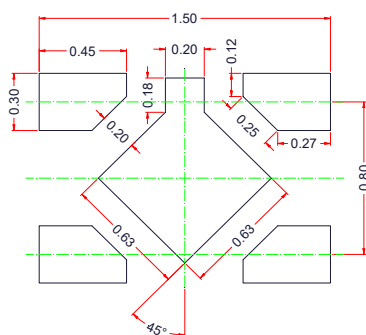


$V_{OUT}=1.05\text{V}$ ,  $V_{BIAS}=3\text{V}-5\text{V}$ ,  $I_{OUT}=1\text{mA}$

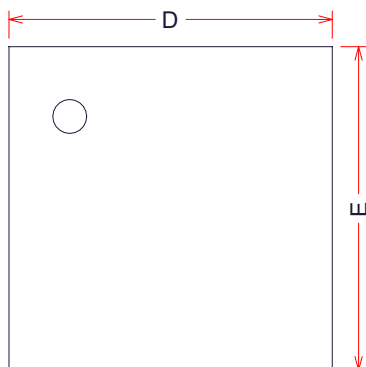


**ORDER INFORMATION**

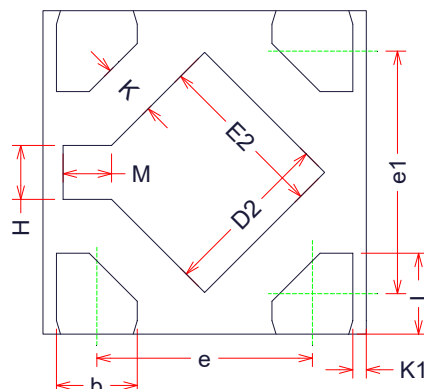
Ordering No.	Vout (V)	Package	Operating Temperature	Marking	Shipping
WL2841D10-4/TR	1.0	DFN1212-4L	-40~+85°C	R*	Tape and Reel, 3,000
WL2841D105-4/TR	1.05	DFN1212-4L	-40~+85°C	J*	Tape and Reel, 3,000
WL2841D11-4/TR	1.1	DFN1212-4L	-40~+85°C	K*	Tape and Reel, 3,000
WL2841D115-4/TR	1.15	DFN1212-4L	-40~+85°C	T*	Tape and Reel, 3,000
WL2841D12-4/TR	1.2	DFN1212-4L	-40~+85°C	S*	Tape and Reel, 3,000

**Marking:**
**X: Voltage Code**
**\* : Month Code**
**Recommend land pattern (Unit: mm)**

**Notes:**

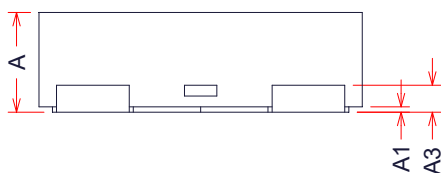
This recommended land pattern is for reference purposes only. Please consult your manufacturing group to ensure your PCB design guidelines are met.

**PACKAGE OUTLINE DIMENSIONS**
**DFN1212-4L**


TOP VIEW

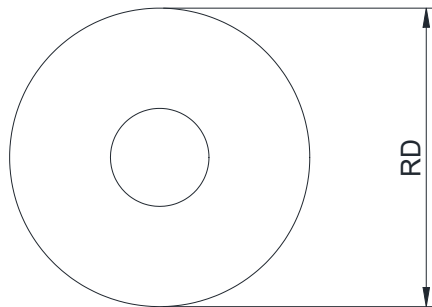
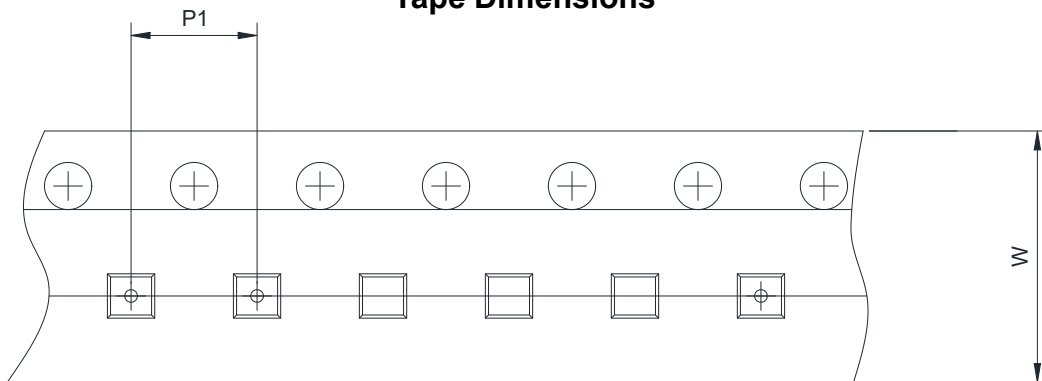
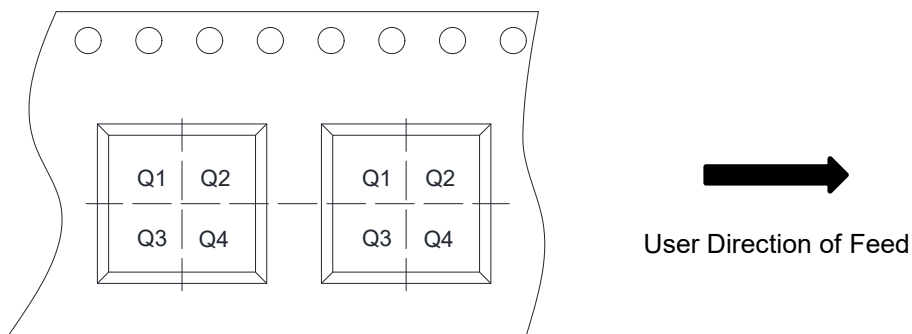


BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.34	0.37	0.40
A1	0.00	0.02	0.05
A3	0.10 Ref.		
b	0.25	0.30	0.35
L	0.25	0.30	0.35
D	1.15	1.20	1.25
E	1.15	1.20	1.25
D2	0.58	0.63	0.68
E2	0.58	0.63	0.68
e	0.75	0.80	0.85
e1	0.80	0.90	1.00
H	0.15	0.20	0.25
M	0.13	0.18	0.23
K	0.15	-	-
K1	0.00	0.05	0.10

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**

**Quadrant Assignments For PIN1 Orientation In Tape**


RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch		
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm		
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm	<input checked="" type="checkbox"/> 4mm	<input type="checkbox"/> 8mm	
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input type="checkbox"/> Q2	<input type="checkbox"/> Q3	<input type="checkbox"/> Q4