GS2858 Series

500mA Low I_Q High PSRR LDO Linear Regulator

Product Description

The GS2858 series is a Sub-μA power consumption, high accuracy, low drop-out voltage regulator with Chip Enable Pin, high ripple rejection and fast discharge function.
The GS2858 series is available in SOT-23, SOT-23-5L and DFN1x1-4L package.

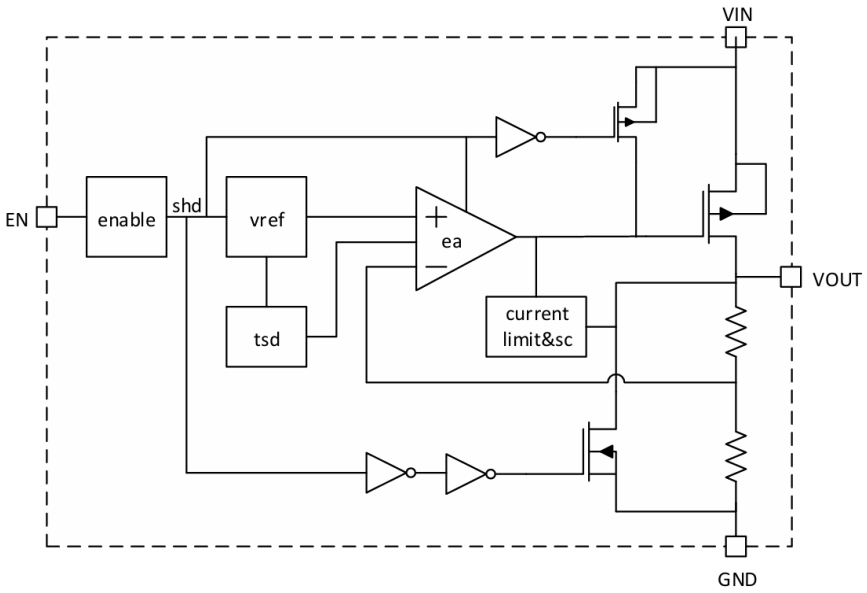
Features

- Max Input Voltage 6V
- Output Accuracy: ±1.5%
- Low Power Consumption: 0.7μA (Typical)
- High PSRR: 90dB@1KHz, 10mA
- Available in SOT-23, SOT-23-5L and DFN1x1-4L Packages
- RoHS Compliant and Halogen Free

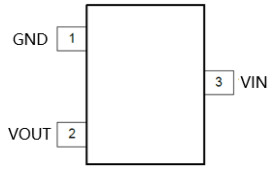
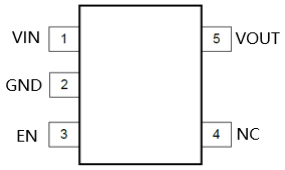
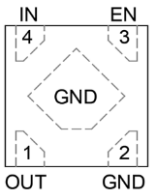
Applications

- Portable and Battery-Powered Equipment
- IP Cameras
- Ultra Low Power Applications

Functional Block Diagram



Packages & Pin Assignments

SOT-23	SOT-23-5L	DFN1x1-4L
		

Pin Name	Description
GND	Ground Pin
V_{OUT}	Output
V_{IN}	Power Supply Input
EN	Chip Enable (Must NOT be left floating.)
NC	Not Connect

Ordering and Marking Information

Ordering Information						
Vout	SOT-23		SOT-23-5L		DFN1x1-4L	
	P/N	Marking	P/N	Marking	P/N	Marking
1.2V	*GS2858JZ12F	5812□□	GS2858L12F	LW5812 □□□□□	*GS2858F12F	58C
1.8V	*GS2858JZ18F	5818□□	GS2858L18F	LW5818 □□□□□	GS2858F18F	58G
2.8V	*GS2858JZ28F	5828□□	GS2858L28F	LW5828 □□□□□	GS2858F28F	58J
3.3V	GS2858JZ33F	5833□□	GS2858L33F	LW5833 □□□□□	GS2858F33F	58M
5.0V	*GS2858JZ50F	5850□□	GS2858L30F	LW5850 □□□□□	*GS2858F50F	58T

NOTE:
Please check the availability of the one marked * with sales representative.

Quantity/Reel		
SOT-23	SOT-23-5L	DFN1x1-4L
3,000 PCS	3,000 PCS	10,000 PCS

GS2858 1 1 2 2 F

Product Code:
GS2858

Package Code:
1 1 is JZ, L and F
- JZ is SOT-23
- L is SOT-23-5L
- F is DFN1x1-4L

Voltage Code:
2 2 is 12, 18, 33 and so on.
- 12 for 1.2V, 18 for 1.8V, 33 for 3.3V and so on.

Green Level:
F stands for RoHS Compliant and Halogen Free

Marking Information

Package	Marking
SOT-23	58 1 1 2 2
SOT-23-5L	LW58 1 1 2 2 2 2 2
DFN1x1-4L	58 3

Product Code:
- 58 or LW58

Voltage Code:
1 1 is 12, 18, 33 and so on.
3 is B, C and G etc.
- 12 or C for 1.2V
- 18 or G for 1.8V
- 28 or J for 2.8V
- 33 or M for 3.3V
- 50 or T for 5.0V

GS Code:
2 digits are GS Code

Absolute Maximum Ratings [1] (T_A=25ºC, unless otherwise specified)

Symbol	Parameter		Rating	Units
V_{IN}	Supply Voltage		7	V
V_{EN}	Enable Pin Voltage		7	V
P_D	Maximum Power Dissipation [3]	SOT-23	490	mW
		SOT-23-5L	540	
		DFN1x1-4L	550	
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient [3]	SOT-23	255	ºC/W
		SOT-23-5L	230	
		DFN1x1-4L	226	
T_J	Maximum Junction Temperature		-40 - 150	ºC
T_{STG}	Storage Temperature Range		-40 - 150	ºC
T_{LEAD}	Lead Temperature (Soldering 10sec)		260	ºC

NOTE:

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. Per ANSI/ESDA/JEDEC JS-001
3. Device mounted on FR-4 PCB

Recommended Operating Range

Symbol	Parameter	Value	Units
V_{IN}	Max V_{IN} Supply Voltage	6	V
V_{EN}	EN Pin Voltage	0 - 6	V
I_{OUT}	Output Current	0 - 500	mA
T_J	Operating Junction Temperature Range	-40 - 125	ºC

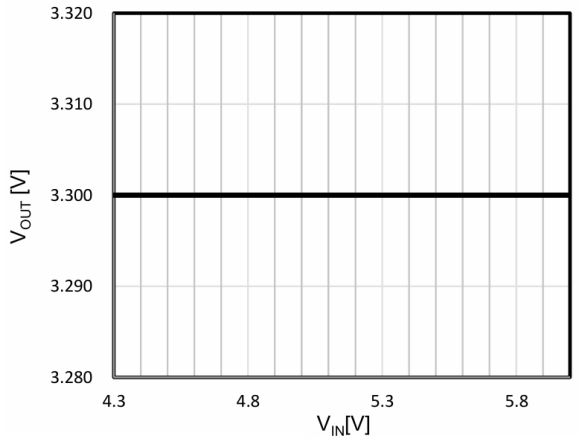
Electrical Characteristics (T_A =25ºC, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{IN}	Input Voltage		-	-	6	V
V_{OUT}	Output Accuracy	I_{OUT}= 1mA	-1.5	-	+1.5	%
I_{LIM}	Current Limit [4]	V_{IN}=4.3V, V_{OUT}=3.3V	530	750	-	mA
I_Q	Quiescent Current	V_{IN}=V_{EN}=V_{OUT}+1V, No Load	-	0.7	1	μA
I_{SHD}	Shutdown Current	V_{IN}==6V , V_{EN}=0V	-	-	0.1	μA
V_{DROP} [5]	Dropout Voltage	I_{OUT}=500mA, V_{OUT}=1.2V	-	1200	-	mV
		I_{OUT}=500mA, V_{OUT}=2.8V	-	530	-	
		I_{OUT}=500mA, V_{OUT}=3.3V	-	450	-	
R_{LINE}	Line Regulation	V_{IN}= V_{OUT} +1V to 6V, I_{OUT}=1mA	-	0.2	0.5	%/V
R_{LOAD}	Load Regulation	I_{OUT}=1mA to 500mA	-	0.004	0.01	%/mA
PSRR	Power Supply Rejection Ratio	C_{IN} None, I_{OUT}=10mA, f=1KHz	-	90	-	dB
t_{st}	Startup Time	From VEN 'L'→'H' to 95%*V_{OUT}, C_{OUT}=1uF, No Load	-	0.4	-	ms
I_{SHORT}	Short Current	V_{IN} > 3V, V_{OUT}=0V	-	90	-	mA
V_{ENH}	EN High Voltage	V_{IN}==6V	1.5	-	-	V
V_{ENL}	EN Low Voltage		-	-	0.5	V
T_{SD}	Thermal Shutdown	Temperature rising	-	165	-	ºC
$\triangle T_{SD}$	T_{SD} Hysteresis	Temperature falling	-	30	-	ºC
R_{DSG}	R_{ON} of Discharge MOSFET	V_{IN}= 6V, V_{EN}=0V	-	100	-	Ω

NOTE:

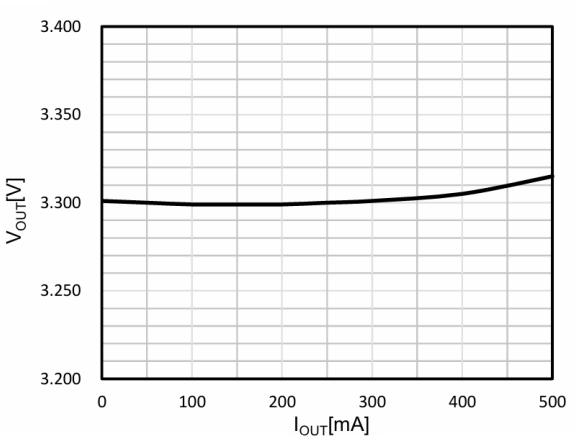
4. Guaranteed by design
5. The dropout voltage is defined as V_{IN} - V_{OUT}, when V_{OUT} =95% x $V_{OUT(NOM)}$

Performance Characteristics (T_A =25ºC, unless otherwise specified.)



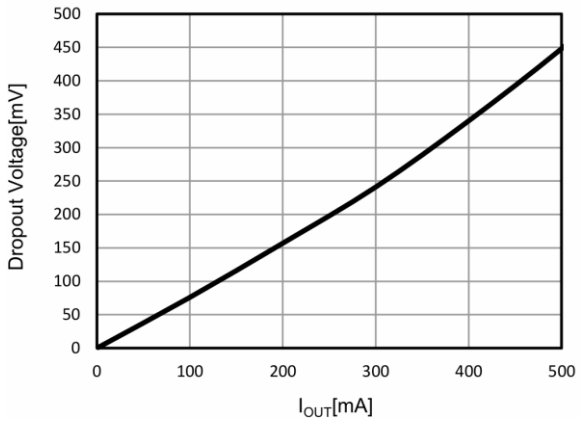
Line Regulation

(V_{OUT} =3.3V, I_{OUT}=1mA, V_{IN}=4.3V to 6.0V)



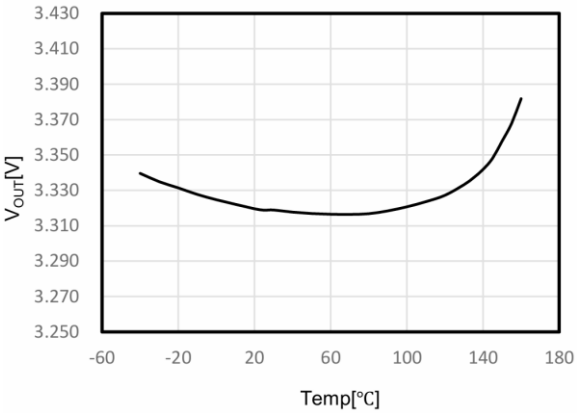
Load Regulation

(V_{OUT} =3.3V, I_{OUT}=0mA to 500mA, V_{IN}=4.3V)



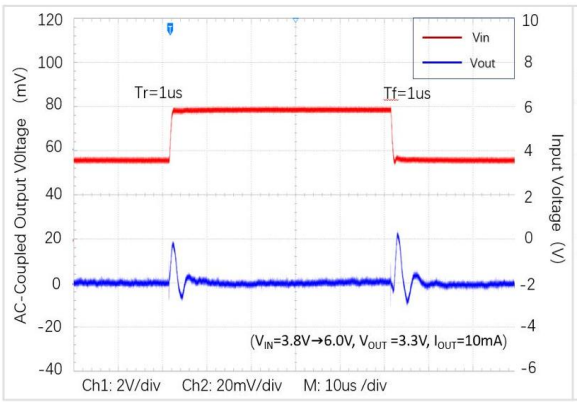
Dropout Voltage

(V_{OUT} = 3.3V*0.95, I_{OUT}=0mA to 500mA,)



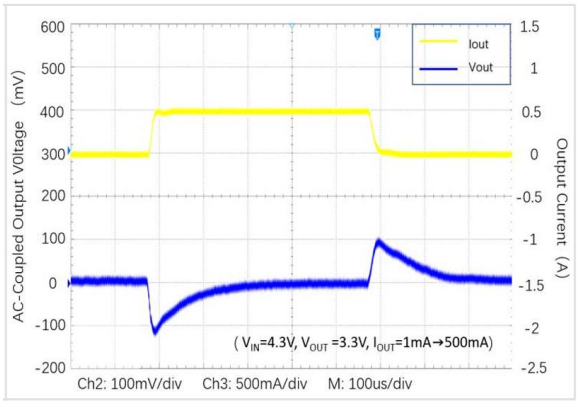
V_{OUT} vs. Temperature

(V_{OUT}=3.3V, I_{OUT}=1mA, V_{IN}=4.3V)



Line Transient

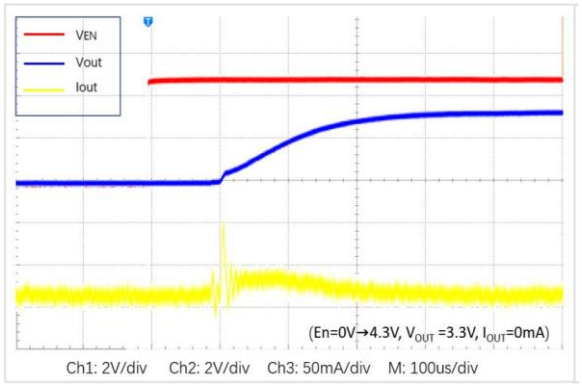
(V_{OUT} =3.3V, I_{OUT}=10mA, V_{IN}=3.8V to 6.0V)



Load Transient

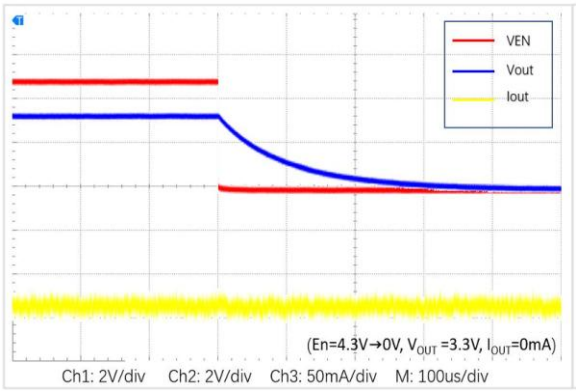
(V_{OUT} =3.3V, I_{OUT}=1mA to 500mA, V_{IN}=4.3V)

Performance Characteristics (Continued)



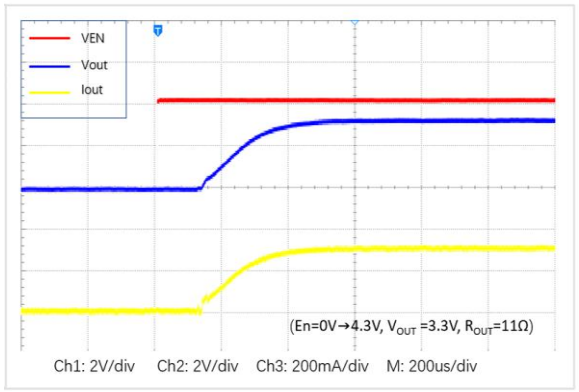
Start Up

(V_{OUT} =3.3V, I_{OUT}=0mA, V_{EN}=0V to.4.3V)



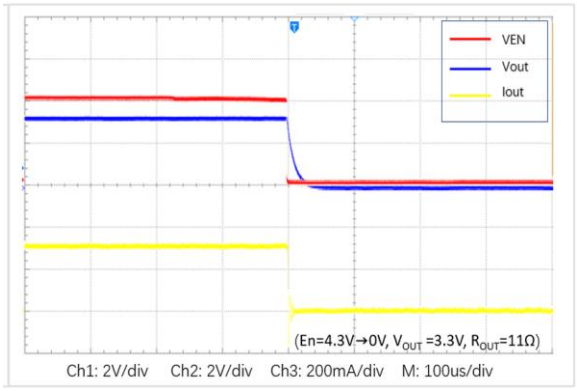
Shut Down

(V_{OUT} =3.3V, I_{OUT}=0mA, V_{EN}=4.3V to 0V)



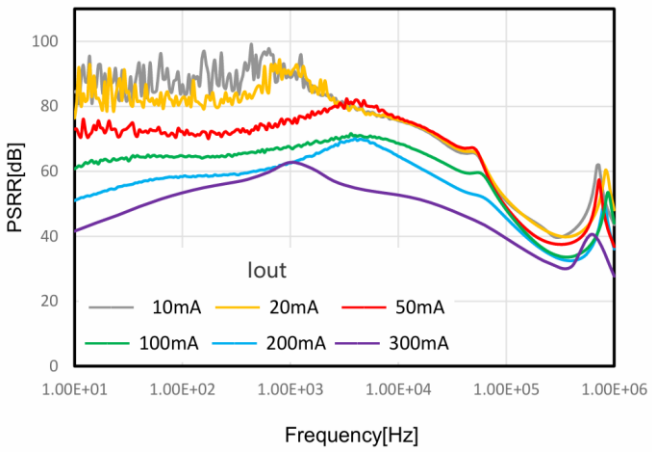
Start Up

(V_{OUT} =3.3V, I_{OUT}=300mA, V_{EN}=0V to.4.3V)



Shut Down

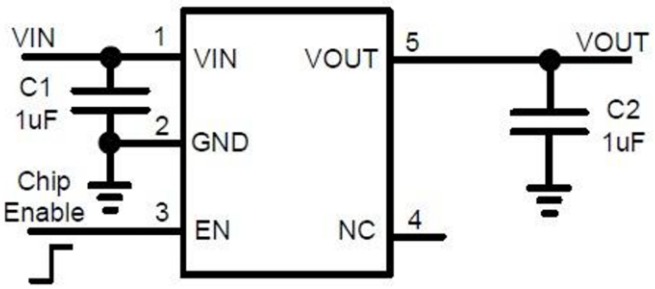
(V_{OUT} =3.3V, I_{OUT}=300mA, V_{EN}=4.3V to 0V)



PSRR

(V_{OUT} =3.3V, C_{IN}=None, C_{OUT} =1uF. V_{IN}=4.3V, V_{PP} =1.0V,)

Typical Application Circuit



Input Capacitor Selection

Like any low-dropout regulator, the external capacitors used with the GS2858 Series must be carefully selected for regulator stability and performance. Using a capacitor whose value is >=1μF on the GS2858 Series input and the amount of capacitance can be increased without limit. An at least 10uF input capacitor is needed if input ripple voltage V_{PP}>1V. The input capacitor must be located a distance less than 0.5 inch from the input pin of the IC and returned to a clean analog ground. Any good quality ceramic or tantalum can be used for this capacitor. The capacitor with larger value and lower ESR (equivalent series resistance) provides better PSRR and line-transient response.

Output Capacitor Selection

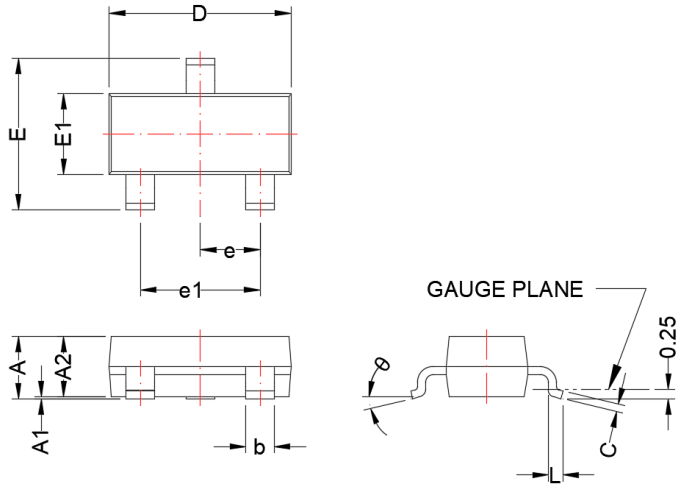
The output capacitor must meet both requirements for minimum amount of capacitance and ESR in all LDOs application. The GS2858 Series is designed specifically to work with low ESR ceramic output capacitor in space-saving and performance consideration. Using a ceramic capacitor whose value is at least 1μF on the GS2858 Series output ensures stability. An appropriate output capacitor can reduce noise and improve load transient response and PSRR. The output capacitor should be located not more than 0.5 inch from the V_{OUT} pin of the GS2858 Series and returned to a clean analog ground.

Layout Recommendation

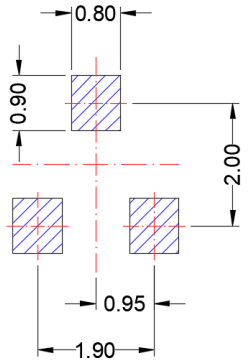
To improve ac performance such as PSRR, output noise, and transient response, it is recommended that the PCB be designed with separate ground planes for V_{IN} and V_{OUT}, with each ground plane connected only at the GND pin of the device.

SOT-23

Package Dimension



Recommended Land Pattern



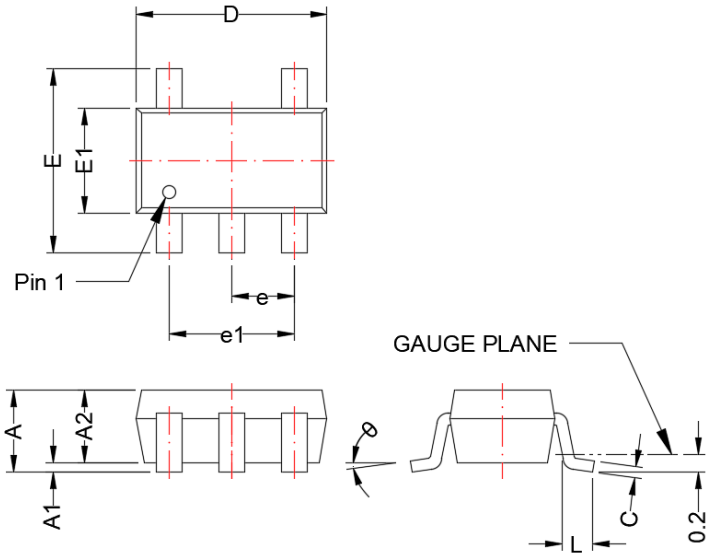
Unit: mm

Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.17	0.030	0.046
A1	0.01	0.15	0.000	0.006
A2	0.70	1.02	0.028	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

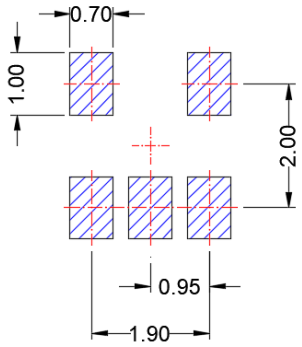
NOTE:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

SOT-23-5L

Package Dimension



Recommended Land Pattern



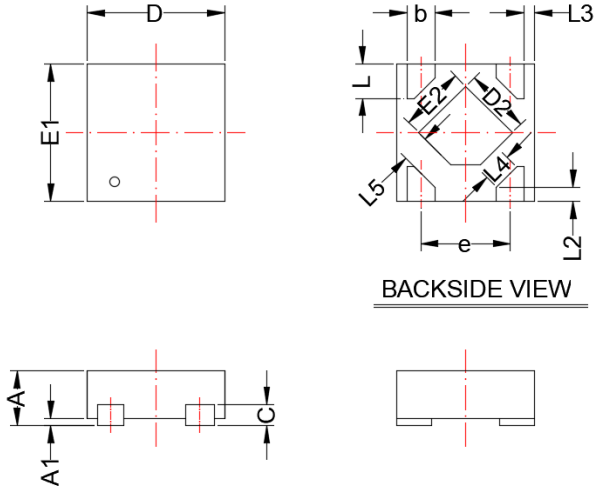
Unit: mm

Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	Min	MIN
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.3	0.6	0.012	0.024
θ	0°	8°	0°	8°

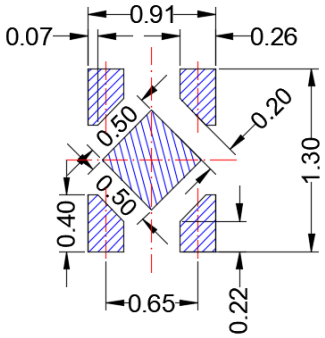
NOTE:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

DFN1x1-4L

Package Dimension



Recommended Land Pattern



Unit: mm

Dimensions				
Symbol	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.35	0.40	0.014	0.016
A1	0.00	0.05	0.000	0.002
b	0.15	0.25	0.006	0.010
c	0.127 REF		0.005 REF	
D	0.95	1.05	0.037	0.041
D2	0.38	0.58	0.015	0.023
E1	0.95	1.05	0.037	0.041
E2	0.38	0.58	0.015	0.023
e	0.65 BSC		0.026 BSC	
L	0.20	0.30	0.008	0.012
L2	0.103 REF		0.004 REF	
L3	0.075 REF		0.003 REF	
L4	0.208 REF		0.008 REF	
L5	0.200 REF		0.008 REF	

NOTE:
Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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