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## Low Cost Linear Hall Effect Sensor IC

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### FEATURES

- Single current sourcing output
- Low noise output eliminates the need for filtering
- -40°C to 105°C wide ambient temperature range
- Responds to either positive or negative Magnetic Field
- Resistant to mechanical stress
- 3-pin SIP, SOT23 and 6-pin DFN1616 package is available

### APPLICATIONS

- Motor control
- Keyboard
- Position sensing
- Current sensing
- Weigh and liquid level sensing

### DESCRIPTION

The SC4011 is a small, economical, linear Hall sensor chip with an output voltage proportional to the supply voltage and to the intensity of the magnetic field it induces.

The SC4011's zero output voltage (without magnetic field) defaults to half of the supply voltage, with a typical sensitivity of 2.9mV/Gs at 5.0V supply voltage and 1.6mV/Gs at 3.3V supply voltage.

The typical working voltage of the chip is 3.3V or 5.0V, the limit voltage can be up to 25V, the working temperature range supports -40--105 °C , suitable for commercial, consumer and industrial fields

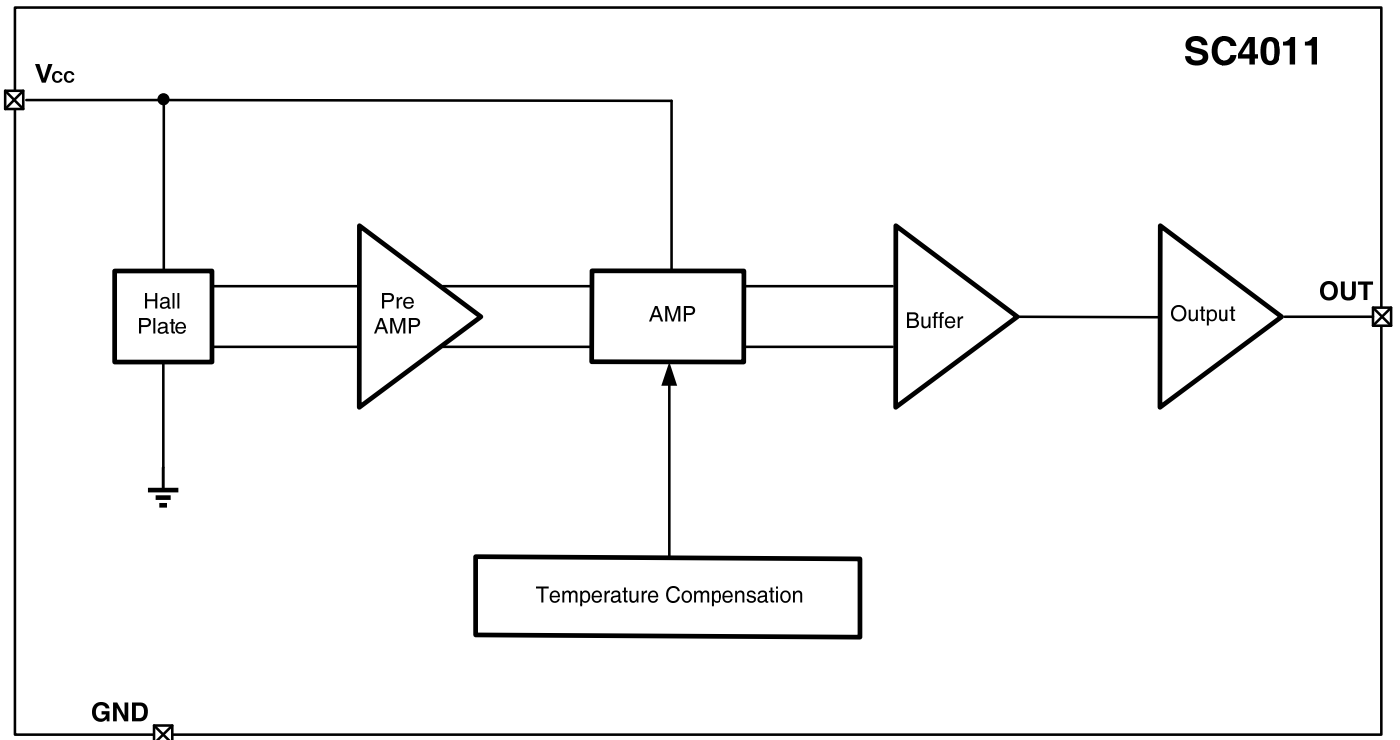
These devices are available in a 3-pin SIP package (UA) , a 3-pin SOT-23 package (SO) And a 6-pin DFN1616 package (DN) . Both packages are lead (Pb) free, with 100% matte tin lead frame plating.



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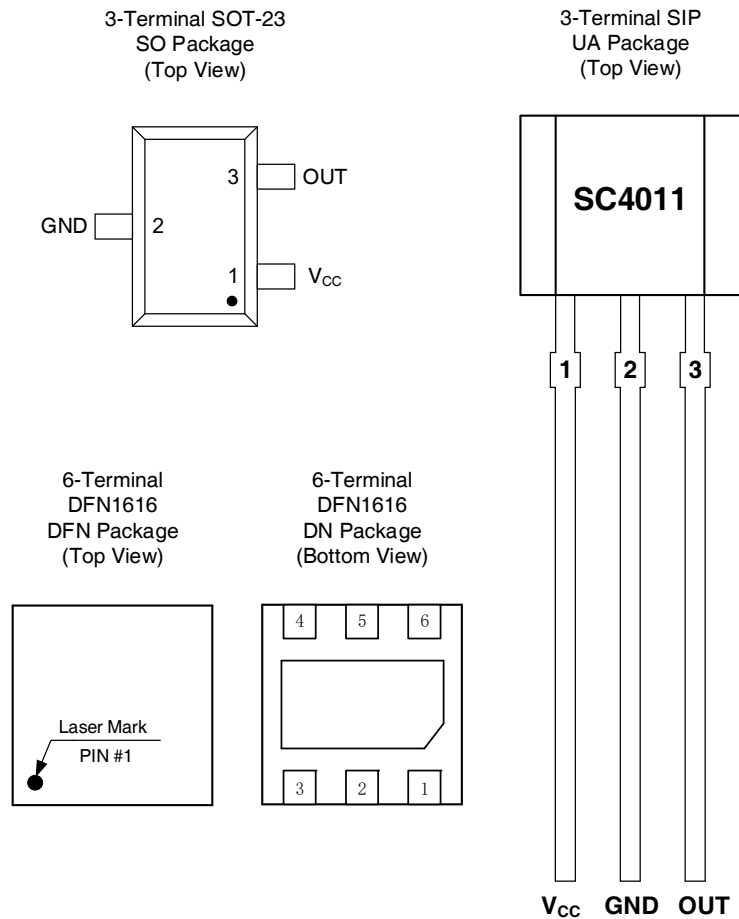
## BLOCK DIAGRAM



## ORDERING INFORMATION

Part Number	Packing	Mounting	Ambient, TA	Marking
SC4011UA	1000 pcs/Bag	SIP3	-40°C to 105°C	4011
SC4011SO-N	3000 pcs/Reel	SOT23	-40°C to 105°C	4011
SC4011DN	4000 pcs/Reel	DFN1616	-40°C to 105°C	4011

## TERMINAL CONFIGURATION



PIN			Name	Type	Description
SIP-3	SOT-23	DFN1616			
1	1	1	V <sub>CC</sub>	PWR	2.5V ~ 18V power supply
2	2	3	GND	Ground	Ground terminal
3	3	6	OUT	Output	Output terminal
-	-	2	NC	NC	Not connect
-	-	4	NC	NC	Not connect
-	-	5	NC	NC	Not connect

## ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range

Parameter	Symbol	Min.	Max.	Units
Power supply voltage	V <sub>CC</sub>	-0.3	25.0	V
Output terminal voltage	V <sub>OUT</sub>	-0.3	25.0	V
Supply current	I <sub>CC</sub>	--	15	mA
Output current	I <sub>OUT</sub>	--	2	mA
Operating ambient temperature	T <sub>A</sub>	-40	105	°C
Operating junction temperature	T <sub>J</sub>	-50	165	°C
Storage temperature	T <sub>STG</sub>	-65	165	°C

Note: Stresses above those listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ESD PROTECTION

Human Body Model (HBM) tests according to: standard JEDEC JS-001-2017

Parameter	Symbol	Min.	Max.	Units
HBM ESD stress voltage	V <sub>ESD</sub>	-4000	4000	V

## THERMAL CHARACTERISTICS

Parameter	Symbol	Test Conditions	Rating	Units
Package thermal resistance	R <sub>θJA</sub>	Single-layer PCB, with copper limited to solder pads	166	°C/W

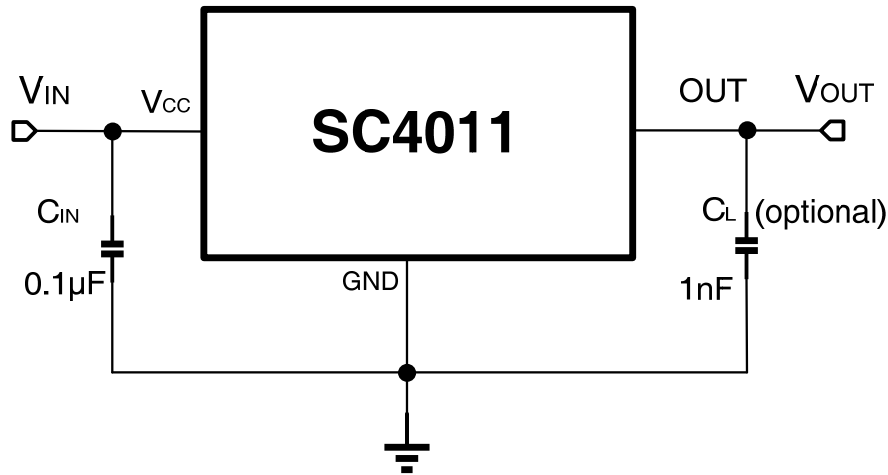
## OPERATING CHARACTERISTICS

over operating free-air temperature range ( $V_{CC}=5V$ , unless otherwise noted)

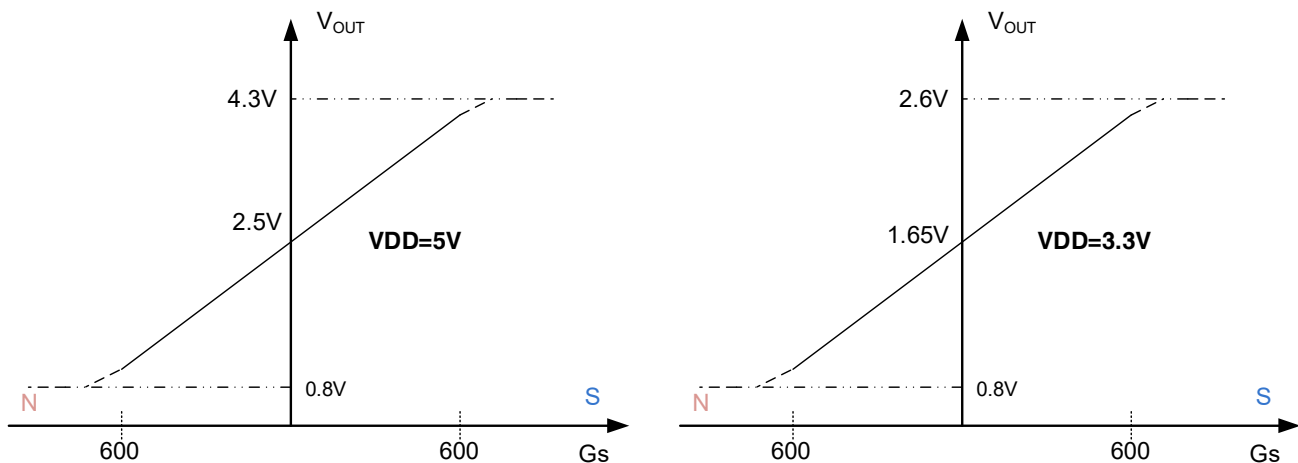
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Supply voltage	$V_{CC}$	$T_J < T_{J(Max)}$	3.0	5.0	5.5	V
Supply current	$I_{CC}$	$V_{CC}=5.0V, T_A=25^\circ C$	-	2.5	6.0	mA
Output load resistance	$R_L$	OUT to GND	4	--	--	k $\Omega$
Output voltage range	$V_{OUT(H)}$	$V_{CC}=5V, T_A=25^\circ C, B=1000Gs$	4.0	4.3	--	V
		$V_{CC}=3.3V, T_A=25^\circ C, B=1000Gs$	2.3	2.6	--	
	$V_{OUT(L)}$	$V_{CC}=5V, T_A=25^\circ C, B=-1000Gs$	0.75	0.8	0.95	
		$V_{CC}=3.3V, T_A=25^\circ C, B=-1000Gs$	0.75	0.8	0.95	
Quiescent voltage output	$V_{OUT(Q)}$	$V_{CC}=5V, B=0\ Gs, T_A=25^\circ C$	-	2.5	-	V
		$V_{CC}=3.3V, B=0\ Gs, T_A=25^\circ C$	-	1.65	-	V
Sensitivity	Sens	$V_{CC}=5V, T_A=25^\circ C$	2.3	2.9	3.5	mV/Gs
		$V_{CC}=3.3V, T_A=25^\circ C$	1.1	1.6	2.1	mV/Gs
Step response time	$t_{resp}$	Delay the output signal reaching 90%	--	1	--	$\mu S$
Power on time	$t_{PO}$		--	--	0.8	$\mu S$

1Gs = 0.1mT

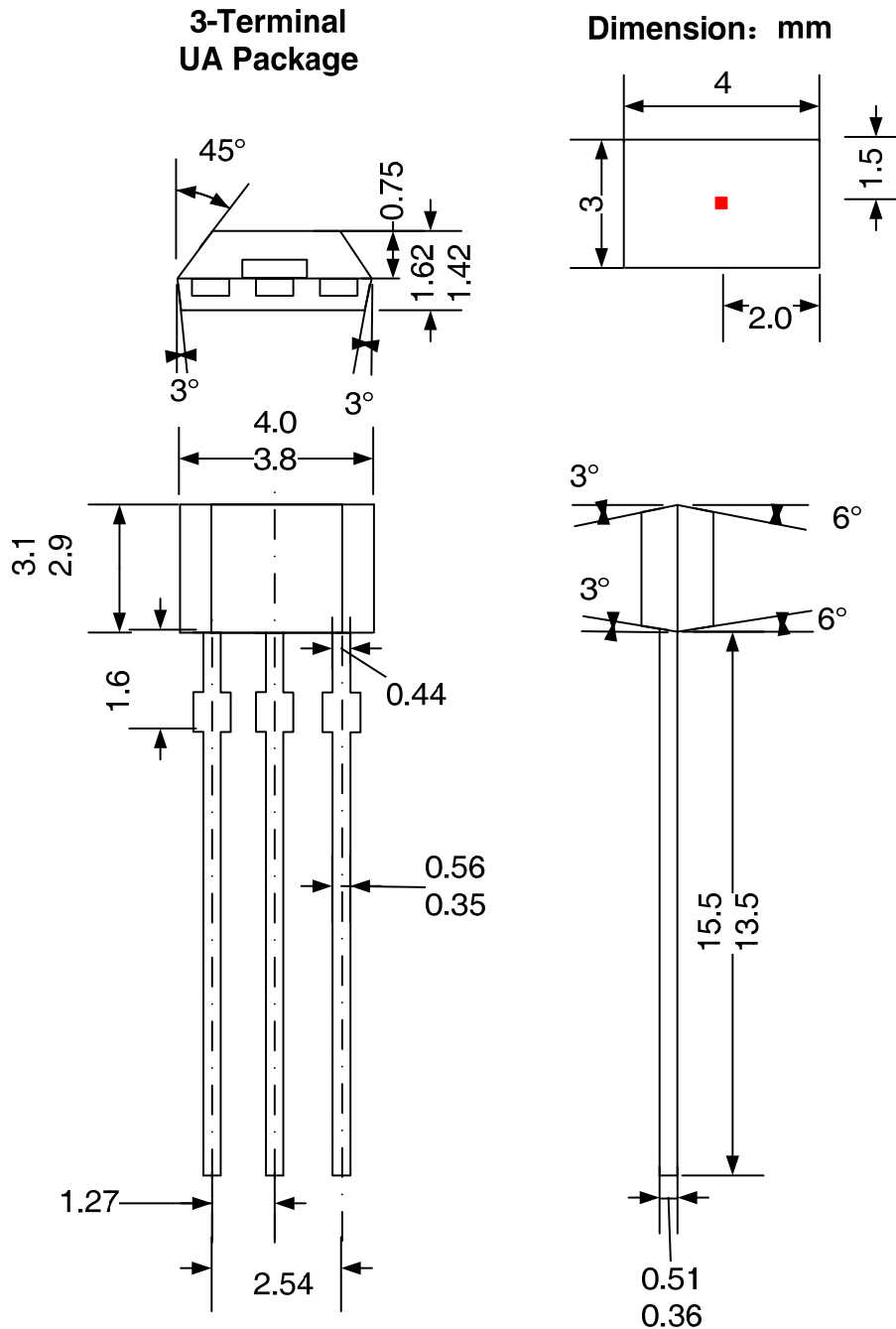
## TYPICAL APPLICATION



The chip's static (zero magnetic field strength) output voltage,  $V_Q$ , is typically half the power supply voltage within the operating voltage range of the supply. When the magnetic field of S pole perpendicular to the screen surface of the chip increases, the output voltage of the chip increases proportionally. On the contrary, when the N electrode acts on the screen surface of the chip, the output voltage decreases synchronously with the same proportion. The maximum output voltage of the chip is  $V_{CC}-0.7\text{V}$  at room temperature, and the minimum output voltage is 0.8V, in which the linear range is 1.0V ~  $V_{CC}-1.0\text{V}$ .



## PACKAGE INFORMATION (UA)



**Notes:**

1. Exact body and lead configuration at vendor's option within limits shown.
2. Height does not include mold gate flash.

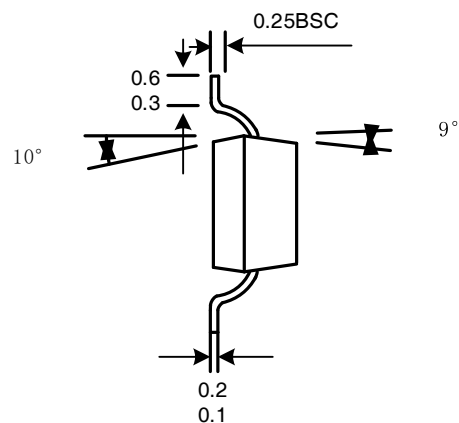
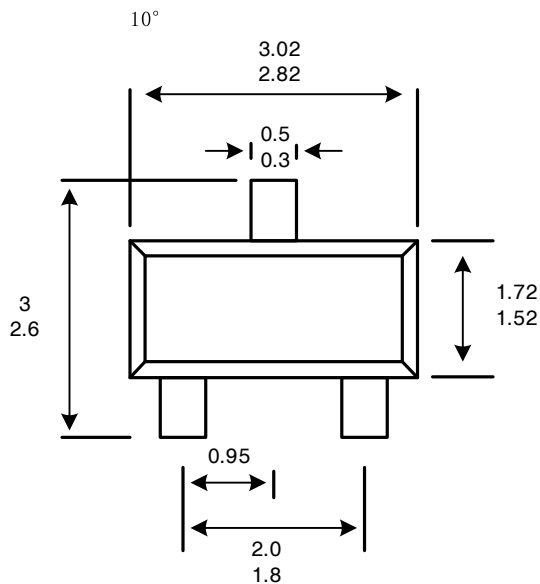
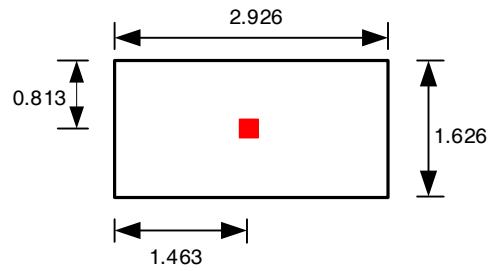
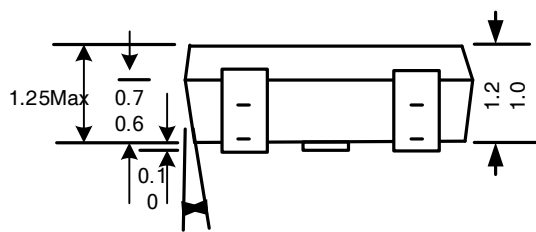
Where no tolerance is specified, dimension is nominal.



## PACKAGE INFORMATION (SO)

**3-Terminal  
SO Package**

**Dimension:mm**



**Notes:**

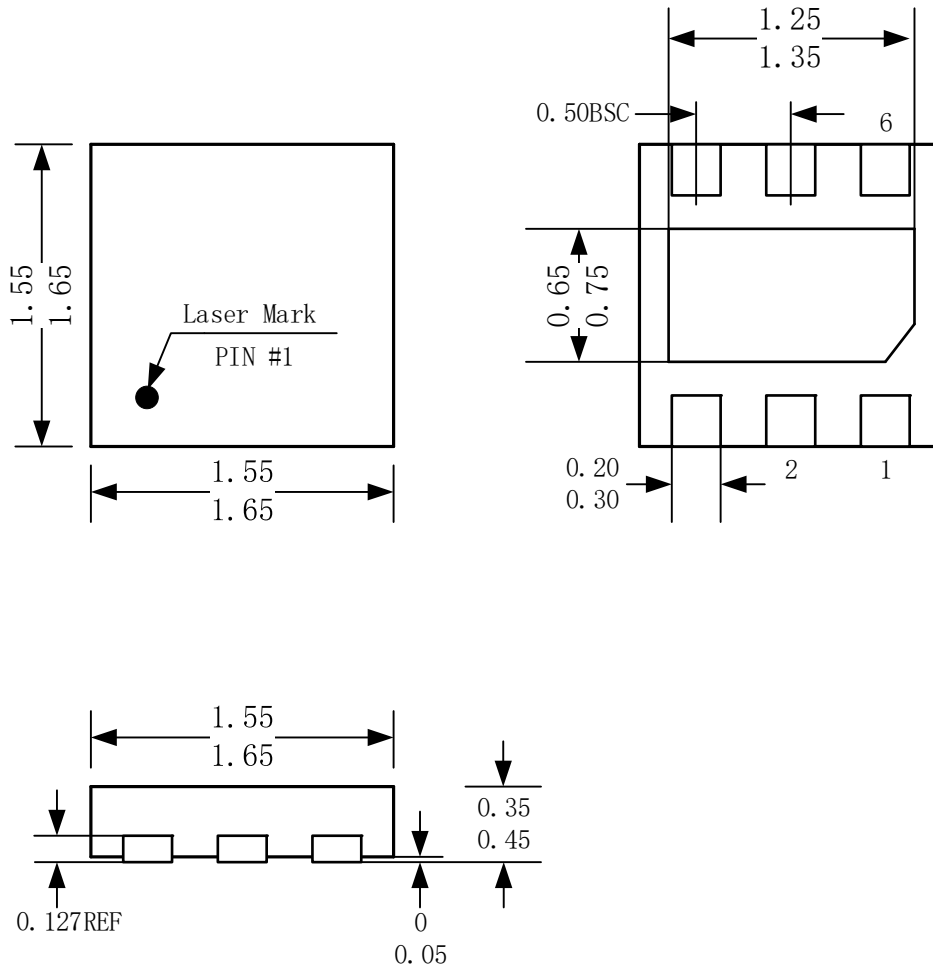
1. Exact body and lead configuration at vendor's option within limits shown.
2. Height does not include mold gate flash.

Where no tolerance is specified, dimension is nominal.

## PACKAGE INFORMATION (DFN)

**6-Terminal  
DFN Package**

**Dimension:mm**



**Notes:**

1. Exact body and lead configuration at vendor's option within limits shown.
2. Height does not include mold gate flash.

Where no tolerance is specified, dimension is nominal.

## REVISION HISTORY

Revision	Date	Description
RevA/1.0	2020-12-19	Preliminary Datasheet
RevA/1.1	2024-02-18	1. Add Parameter :Power on time 2. Add DFN package information