

LDR6015T USB Type-C PD Controller

REV1.3

Document History

REV1.0	New data sheet.	2018-09-12
REV1.1	Revise Application Solution	2019-03-06
REV1.2	Revise Features	2019-03-21
REV1.3	Revise PD Voltage Trigger	2019-07-11

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1. General Description

LDR6015T or LDR6015TS is a single port UFP device with USB PD controller. It can be easily configured to request No.1 to No.7 PDO of attached DFP device, or output the information of PDO by pulse (low) wide. Besides, It will automatically poll to the highest PDO without any operating.

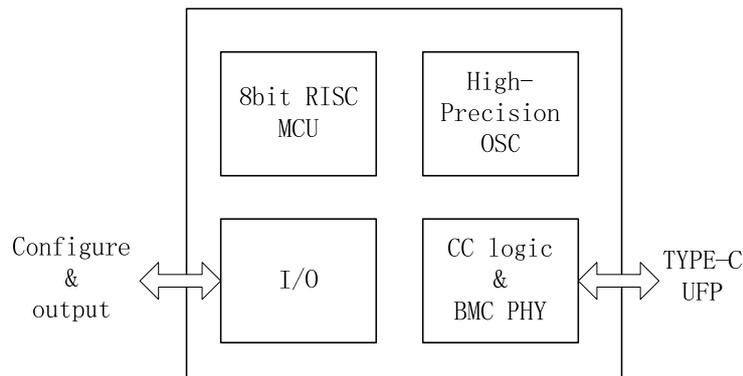


Figure 1. LDR6015T Block Diagram

1.1 Features

- ◇ USB PD Spec Rev3.0 compatible
- ◇ Support USB PD Spec Rev 2.0
- ◇ Configurable request order by pin
- ◇ OVP,OCP support

1.2 Applications

- ◇ Power Banks
- ◇ UFP Device

1.3 Pin-outs

1.3.1. LDR6015T Pin-out Diagram

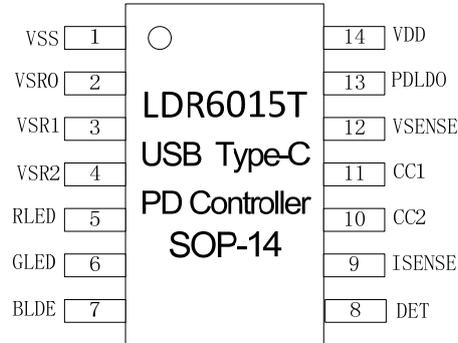


Figure 2. LDR6015T Pin-out

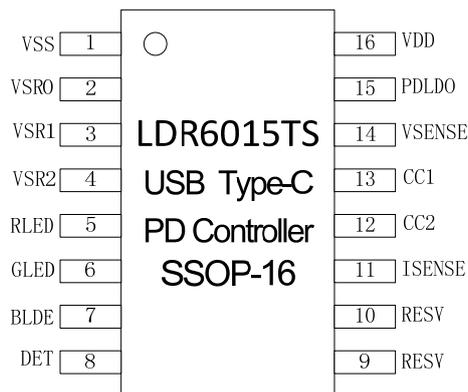


Figure 3. LDR6015TS Pin-out

1.3.2. LDR6015T Pin-out Description

Pin No.	Name	Type	Description
1	VSS	–	Ground
2	VSR0	I	PDO SELECT BIT0
3	VSR1	I	PDO SELECT BIT1
4	VSR2	I	PDO SELECT BIT2
5	RLED	O	Drive the red of the RGB LED
6	GLED	O	Drive the green of the RGB LED
7	BLED	O	Drive the blue of the RGB LED
8	DET	I	PDO Order Increase detect
9	ISENSE	I	Reserved for Current detect
10	CC2	IO	Configure Channel of USB-C
11	CC1	IO	Configure channel of USB-C
12	VSENSE	I	Reserved for VBUS detect
13	PDLDO	O	LDO for PD pin out, should connect to capacitor
14	VDD	–	Power Supply

1.3.3. LDR6015TS Pin-out Description

Pin No.	Name	Type	Description
1	VSS	-	Ground
2	VSR0	I	PDO SELECT BIT0
3	VSR1	I	PDO SELECT BIT1
4	VSR2	I	PDO SELECT BIT2
5	RLED	0	Drive the red of the RGB LED
6	GLED	0	Drive the green of the RGB LED
7	BLED	0	Drive the blue of the RGB LED
8	DET	I	PDO Order Increase detect
9	RESV	-	Reserved
10	RESV	-	Reserved
11	ISENSE	I	Reserved for Current detect
12	CC2	I0	Configure Channel of USB-C
13	CC1	I0	Configure channel of USB-C
14	VSENSE	I	Reserved for VBUS detect
15	PDLDO	0	LDO for PD pin out, should connect to capacitor
16	VDD	-	Power Supply

2. Functions

2.1. Configurable Request

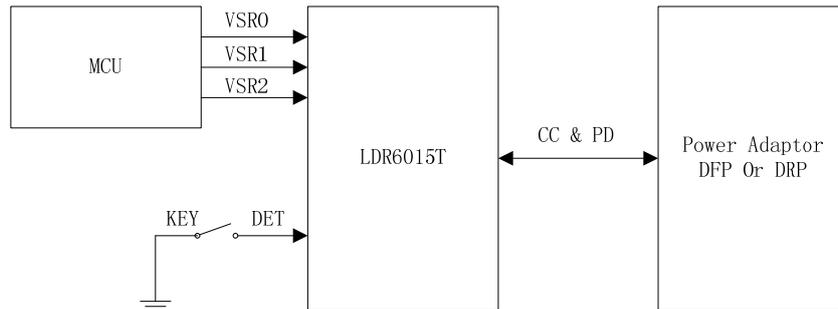


Figure 4. Configurable request Functions

By configuring the VSR, external MCU is able to trigger a *request* USB PD process. LDR6015T will launch a request package when a configuration change in VSR is detected. In this case, if the VSR=1 to 5 is detected, LDR6015T will launch a request message to request the voltage 5V-20V of the PDO of attached DFP device correspondingly; if the VSR=0 is detected after VSR has been configured as above, Hard reset will be sent, otherwise, LDR6015T will do nothing.

VSR			PDO Order
VSR2	VSR1	VSR0	
0	0	0	Send hard reset
0	0	1	Request 5V
0	1	0	Request 9V
0	1	1	Request 12V
1	0	0	Request 15V
1	0	1	Request 20V
1	1	0	Reserved
1	1	1	Reserved

By pulling down the DET pin of LDR6015T 200ms, a request package with an increased PDO Order will be launched. This is special for the use of a physical key.

It will automatically polls to the highest PDO without any operating as above.

2.2 OVP/OCP

The VSENSE/ISENSE pins are reserved for the ADC input pins for the two functions. The tolerance limit of LDR6015T's OVP and OCP can be 20%.

3. Electrical Characteristics

3.1 Maximum Ratings

Parameter	Description	Min/Max	Unit
VCC	Power supply	-0.3/6.0	V
V _I	Voltage input	-0.3/VDD+0.3	V
V _o	Voltage output	-0.3/VDD	V
T _{stg}	Storage temperature	-55/+150	°C

3.2 Operating Ranges

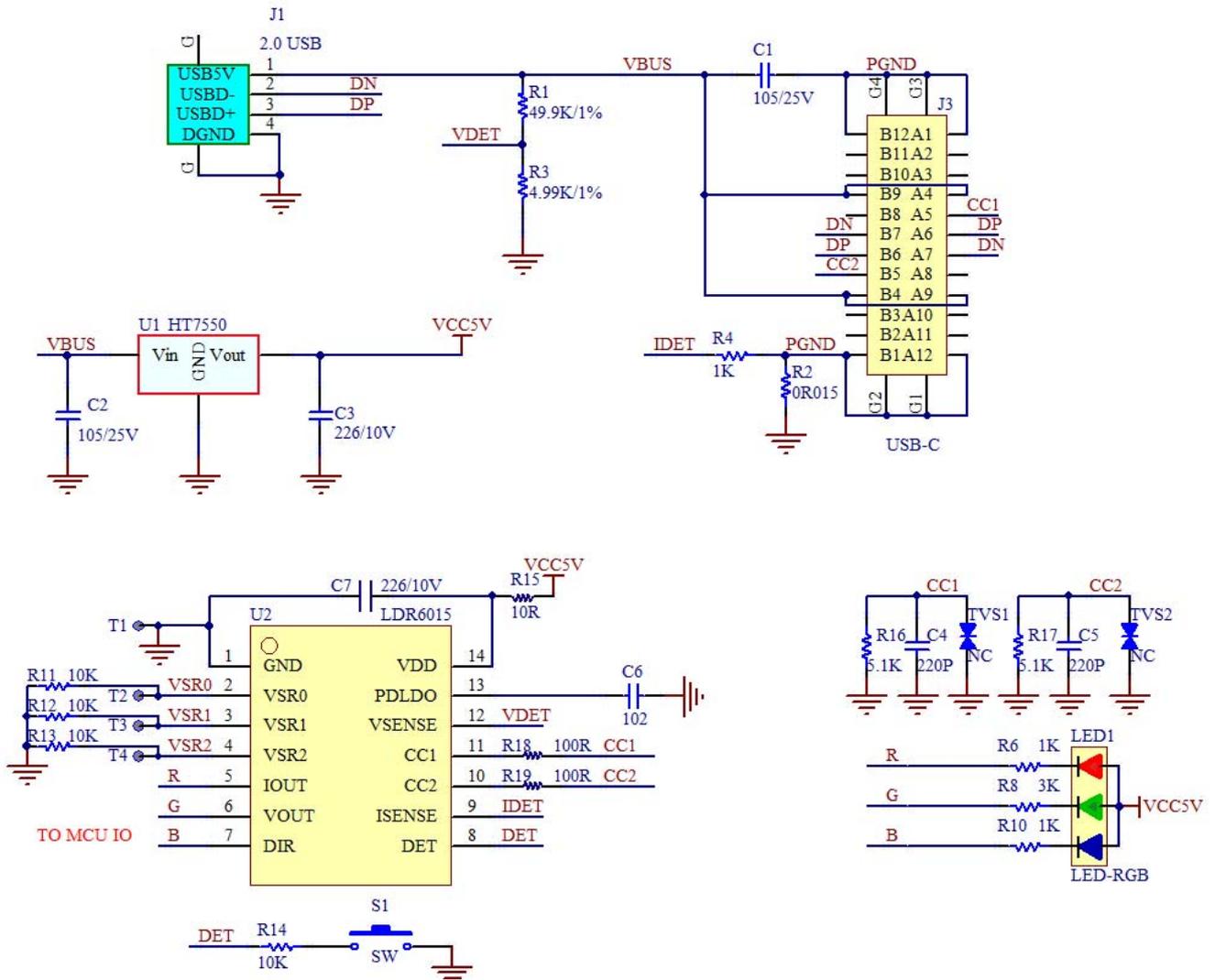
Parameter	Description	Min/Max	Unit
VCC	Power supply	3.0/5.5	V
T _a	Storage temperature	-40/+85	°C

*VCC is also the reference voltage for output

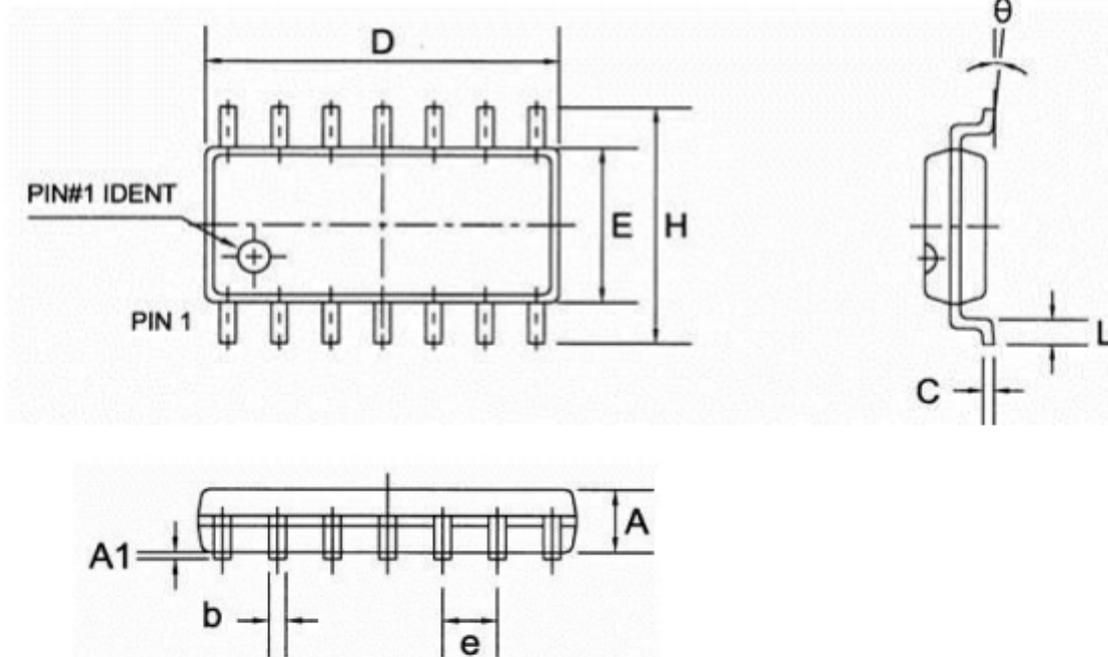
4. Application Solution

NOTE: Information in the following applications sections is not part of the LDR component specification, and LDR does not warrant its accuracy or completeness. Customers of LDR are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

4.1. PD Voltage Trigger

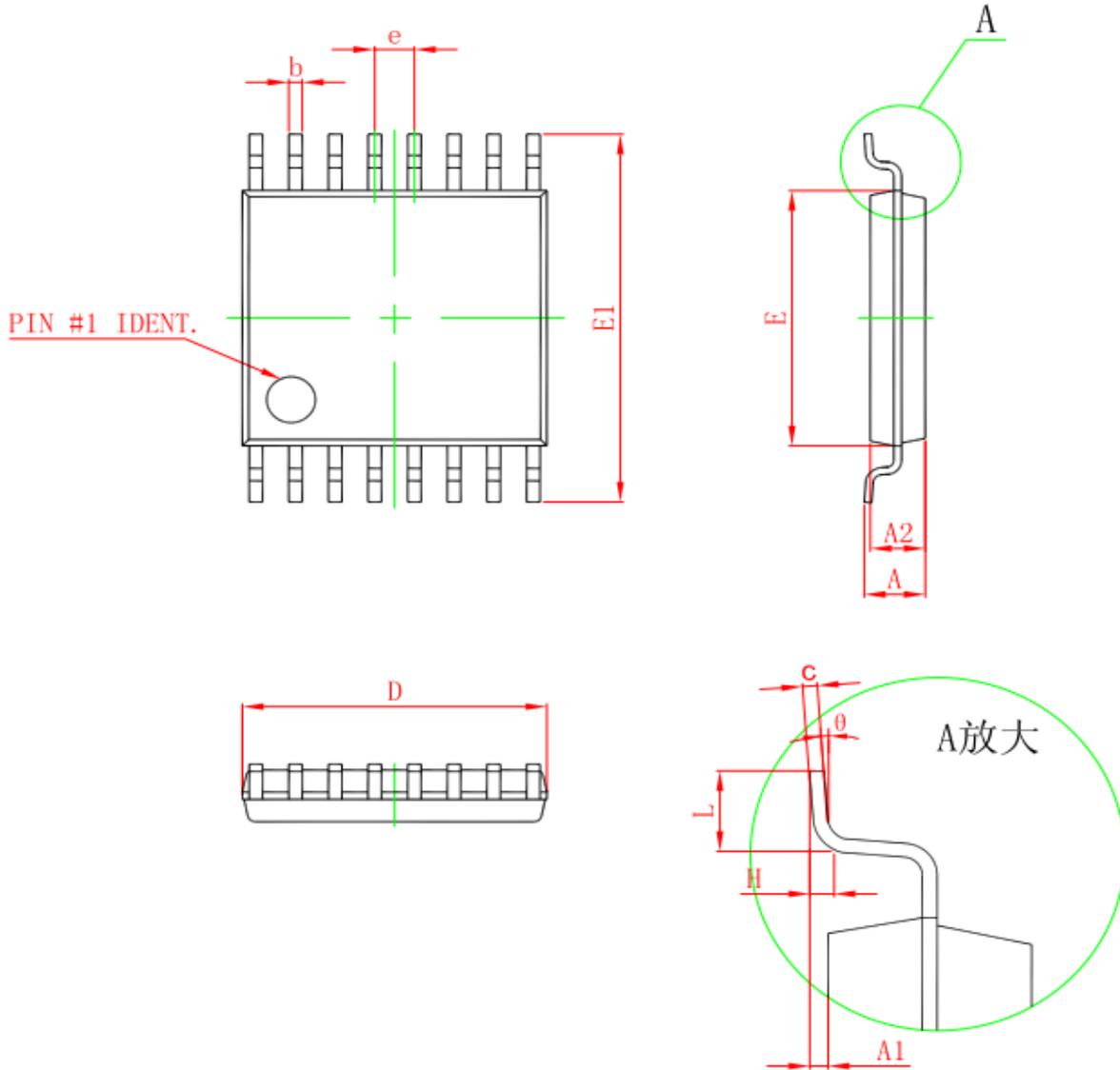


5. Package Dimension



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	1.30	1.50	1.70	0.051	0.059	0.067
A1	0.08	0.16	0.24	0.003	0.006	0.009
b	—	0.40	—	—	0.016	—
C	—	0.25	—	—	0.010	—
D	8.25	8.55	8.85	0.325	0.337	0.348
E	3.75	3.95	4.15	0.148	0.156	0.163
e	—	1.27	—	—	0.050	—
H	5.70	6.00	6.30	0.224	0.236	0.248
L	0.45	0.65	0.85	0.018	0.026	0.033
θ	0°	—	8°	0°	—	8°

Figure 5. LDR6015T Package Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
D	4.900	5.100	0.193	0.201
E	4.300	4.500	0.169	0.177
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
E1	6.250	6.550	0.246	0.258
A		1.100		0.043
A2	0.800	1.000	0.031	0.039
A1	0.020	0.150	0.001	0.006
e	0.65 (BSC)		0.026 (BSC)	
L	0.500	0.700	0.020	0.028
H	0.25 (TYP)		0.01 (TYP)	
θ	1°	7°	1°	7°

Figure 6. LDR6015TS Package Dimension