36V High Side Over Voltage Protector

Features

- 36V standoff voltage
- Fixed and programmable protection voltage
- Integrated SCP and OTP
- Enable pin available for switch on and off
- 30mΩ on resistance
- Input OVP with 0.1us reaction time
- Environment Temperature: -40℃~85℃
- SOT-23-3, SOT23-5, SOT23-6, SON763 package

Applications

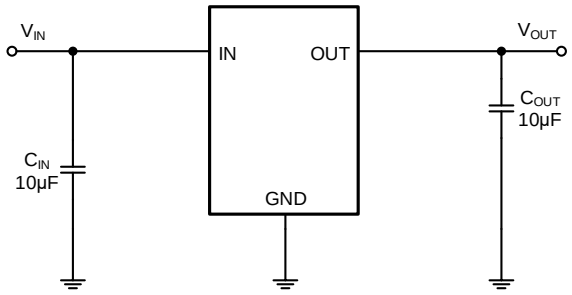
- All electronic devices with input DC power plug
- E-Cigarette
- Car Camera
- Cellphone

General Description

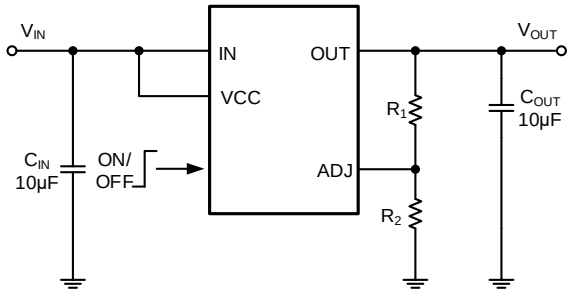
RY2334 is a high voltage 36V over voltage protector (OVP) which has a very low 30mΩ on resistance, by only change the external connecting. It can be used as an OVP device or a high voltage switch. RY2334 consists of a charge pump, a configurable power MOSFET, a voltage reference, a gate driver and some logics and protection modules. RY2334 can react to an input surge very fast and shut off the switch in less than 0.1us.

RY2334 series include fixed OVP voltage device and adjustable OVP voltage device. RY2334 is available in SOT-23-3, SOT23-5, SOT23-6, SON763 package.

Typical Application Circuit



RY2334 fixed version application circuit



RY2334 ADJ version application circuit

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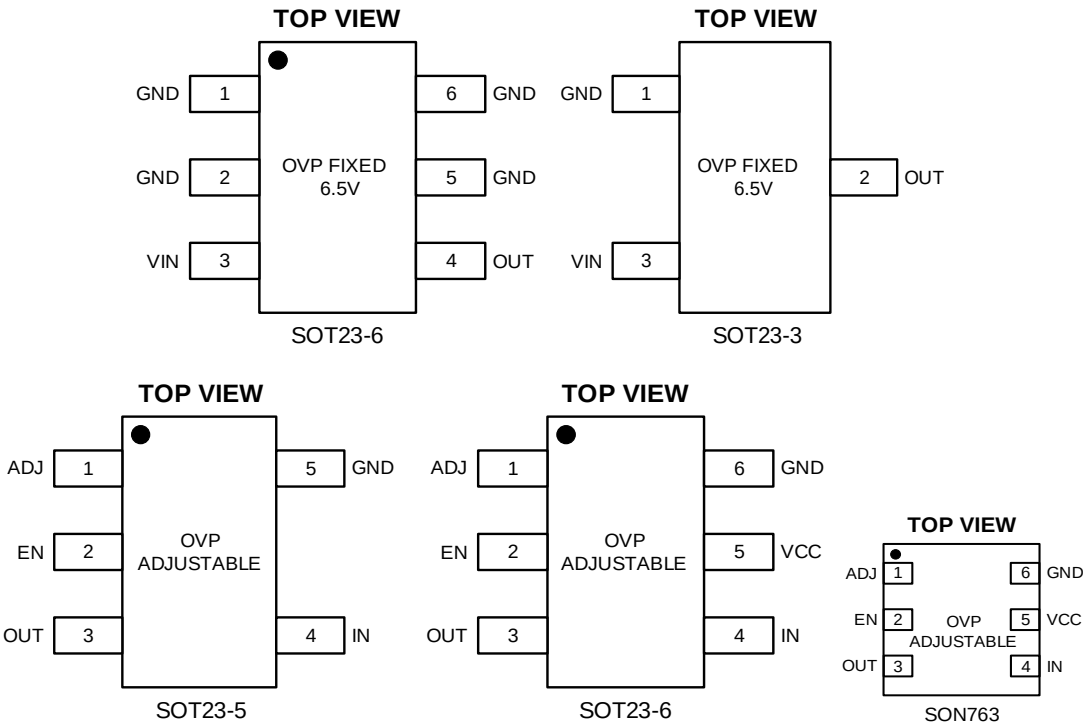
Pin Description

Pin Configuration



Pin Description

SOT23-3 Pin No.	SOT23-6--Fixed Pin No.	SOT23-5 Pin No.	SOT23-6 Pin No.	SON763 Pin No.	Name	Function
2	4	3	3	3	OUT	Output voltage (V_{OUT}) pin for the regulator
3	3	4	4	4	VIN	Input voltage (V_{IN}) pin for the regulator.
1	1/2/5/6	5	6	6	GND	Ground pin
-	-	2	2	2	EN	Enable Control (Active low), Driving EN below 0.8 V turns on the regulator. Driving EN over 1.9V puts the regulator into shutdown mode.
		1	1	1	ADJ	Adjust pin for adjustable output
-	-	-	5	5	VCC	The independent supply voltage for control logic and charge pump, tied to IN in normal application.

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Order Information (1)

Marking(2)	Part No.	Model	Description	Package	T/R Qty
mAYLL	70702300	RY2334AT3	RY2334AT3 OVP IC, VIN 3.35-36V, OVP fixed 6.5V, 4A, SOT23-3	SOT23-3	3000PCS
mBYLL	70702301	RY2334AT6	RY2334AT6 OVP IC, VIN 3.35-36V, OVP fixed 6.5V, 4A, SOT23-6	SOT23-6	3000PCS
mCYLL	70702310	RY2334ADT5	RY2334ADT5 OVP IC, VIN 3.35-36V, OVP defualt, 4A, SOT23-5	SOT23-5	3000PCS
mDYLL	70702311	RY2334ADT6	RY2334ADT6 OVP IC, VIN 3.35-36V, OVP defualt, 4A, SOT23-6	SOT23-6	3000PCS
mEYLL	70702312	RY2334ADS6	RY2334ADS6 OVP IC, VIN 3.35-36V, OVP defualt, 4A, SON763	SON763	3000PCS

Note (1): All RYCHIP parts are Pb-Free and adhere to the RoHS directive.

Note (2): Top Marking: mxYLL [device code: mx (x=A, B, C, D, E), Y=year code, LL= lot number code)

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Specifications

Absolute Maximum Ratings (1) (2)

Item	Min	Max	Unit
Maximum V_{IN} voltage		36	V
Power dissipation (3)	Internally Limited		
Operating junction temperature, $T_{J(MAX)}$		150	°C
Storage temperature, T_{stg}	–65	150	°C
Lead Temperature (Soldering, 10sec.)		260	°C

Note (1): Exceeding these ratings may damage the device.

Note (2): The device is not guaranteed to function outside of its operating conditions.

Note (3): The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(MAX)}$, the junction-to-ambient thermal resistance, $R_{\theta JA}$, and the ambient temperature, T_A. The maximum allowable power dissipation at any ambient temperature is calculated using: $P_{D\,(MAX)} = (T_{J(MAX)} - T_A)/R_{\theta JA}$. Exceeding the maximum allowable power dissipation causes excessive die temperature, and the regulator goes into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage. Thermal shutdown engages at T_J=160°C (typical) and disengages at T_J= 130°C (typical).

ESD Ratings

Item	Description	Value	Unit
$V_{(ESD-HBM)}$	Human Body Model (HBM) ANSI/ESDA/JEDEC JS-001-2014 Classification, Class: 2	±2000	V
$V_{(ESD-CDM)}$	Charged Device Mode (CDM) ANSI/ESDA/JEDEC JS-002-2014 Classification, Class: C0b	±200	V
$I_{LATCH-UP}$	JEDEC STANDARD NO.78E APRIL 2016 Temperature Classification, Class: I	±150	mA

Recommended Operating Conditions

Item	Min	Max	Unit
Operating junction temperature (1)	-40	125	°C
Operating temperature range	-40	85	°C
Input voltage V_{IN}	3.35	6	V

Note (1): All limits specified at room temperature (TA = 25°C) unless otherwise specified. All room temperature limits are 100% production tested. All limits at temperature extremes are ensured through correlation using standard Statistical Quality Control (SQC) methods. All limits are used to calculate Average Outgoing Quality Level (AOQL).

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Thermal Information

Item	Description	SOT23 3 Pin	SOT23 5 Pin	SOT23 6 Pin	SON763 6 Pin	Unit
$R_{\theta JA}$	Junction-to-ambient thermal resistance (1)(2)	208	180	180	95	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	112	130	130	49.5	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	56	45	45	15.5	°C/W
ψ_{JT}	Junction-to-top characterization parameter	9.2	35	35	3.2	°C/W
ψ_{JB}	Junction-to-board characterization parameter	52	45	45	15.5	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	°C/W

Note (1): The package thermal impedance is calculated in accordance to JESD 51-7.

Note (2): Thermal Resistances were simulated on a 4-layer, JEDEC board

Electrical Characteristics

V_{IN} =75V, T_A=25℃, unless otherwise noted.

Parameter	Test Conditions	Min	Typ.	Max	Units
Input Voltage		3.35		6	V
UVLO	Hys=400mV		3.35		V
OVP	Default OVP=6.1V when floating fb,		6.1		V
OVP FB	Vin=5V	1.22	1.26	1.30	V
OVP Range		3.35		36	V
Ron	VCC=5V, Iout=2A	-	30		mΩ
Iq	Standby current, IN and Vcc < OVP voltage		150		uA
Isd	Shutdown current		10		μA
Thermal Shutdown	Rising, Hys=50℃		135		℃

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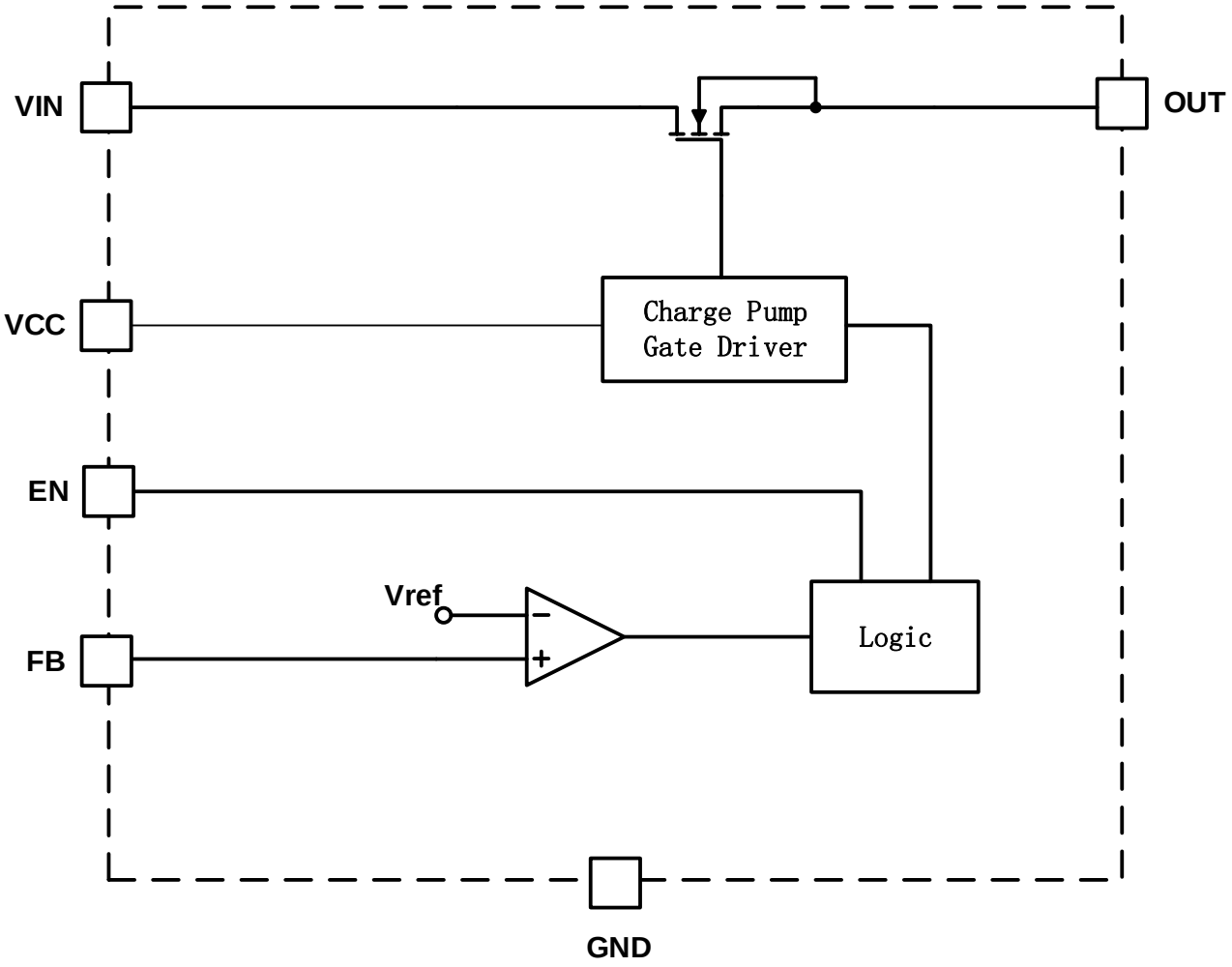
Block Diagram



RY2334 Block Diagram

Detailed Description

RY2334 can disconnect the systems from its output pin (OUT) in case wrong input operating conditions are detected. The system is positive overvoltage protected up to 36V. The internal OVLO is 6.1V and internal over current thresholds (OCP) is 4A. RY2334 also has internal over temperature protect (OTP) function and it can monitor chip temperature to protect the device.

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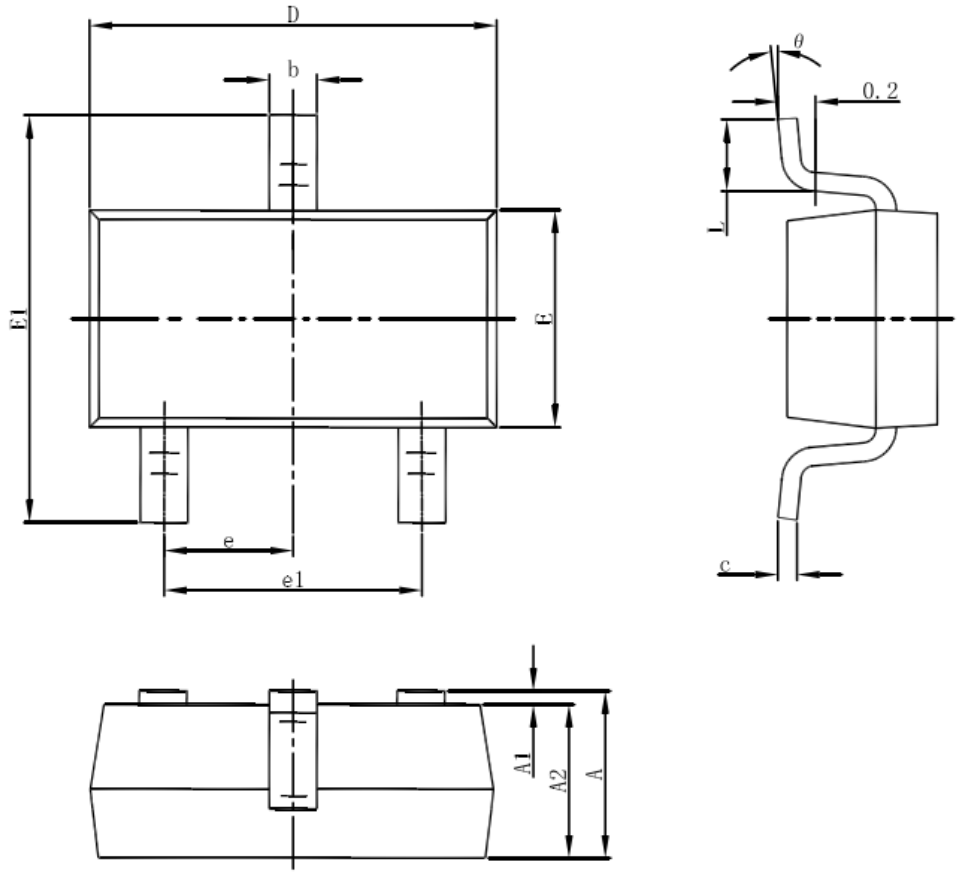
SOT23-3 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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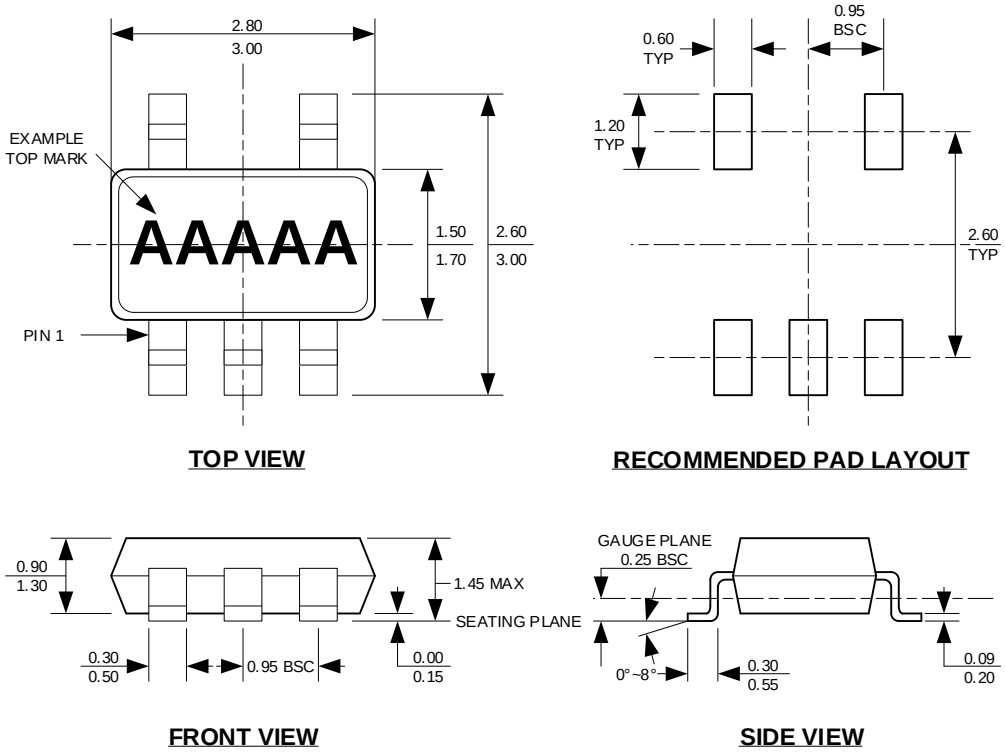
Package Description

SOT23-5



NOTE:
1. CONTROL DIMENSION IS IN INCHES. DIMENSION IN BRACKET IS IN MILLIMETERS.
2. PACKAGE LENGTH DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
3. PACKAGE WIDTH DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
4. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.004" INCHES MAX.
5. DRAWING CONFORMS TO JEDEC MS-012, VARIATION BA.
6. DRAWING IS NOT TO SCALE.

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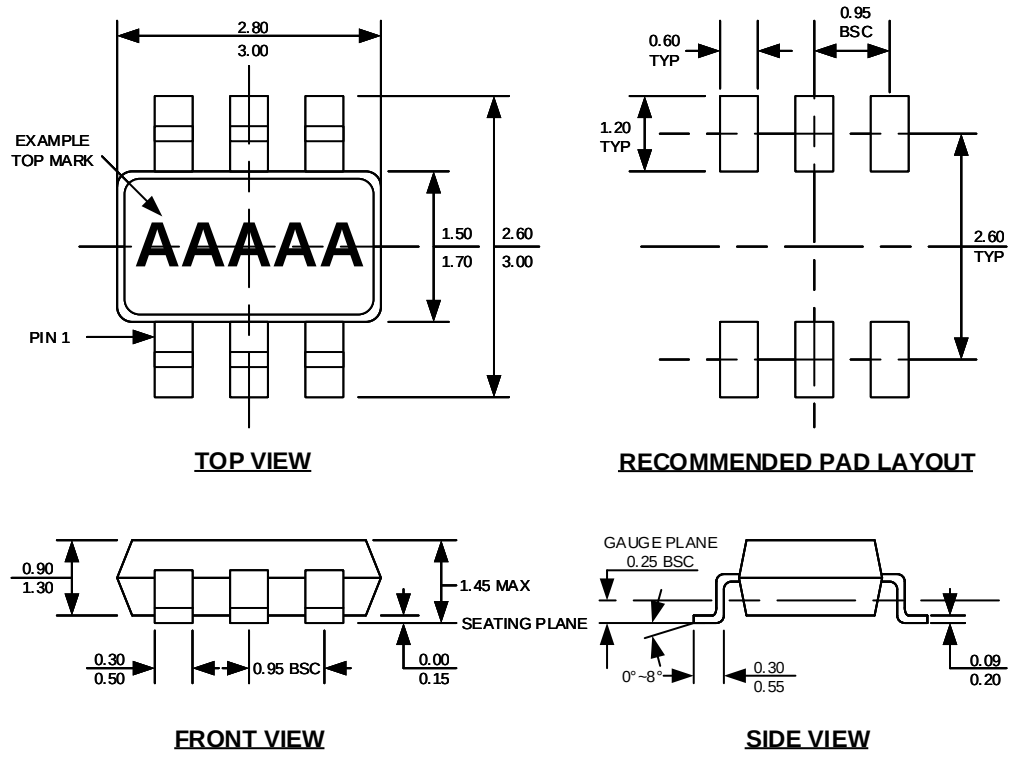
Package Description

SOT23-6



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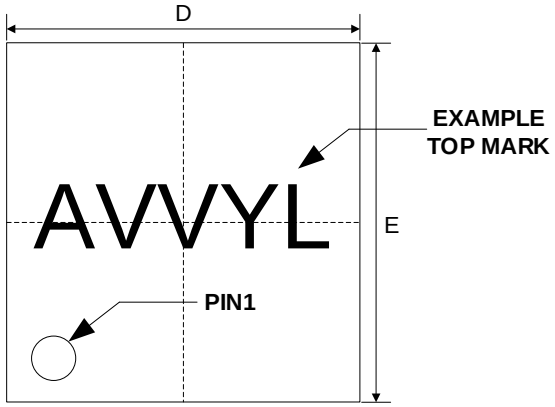
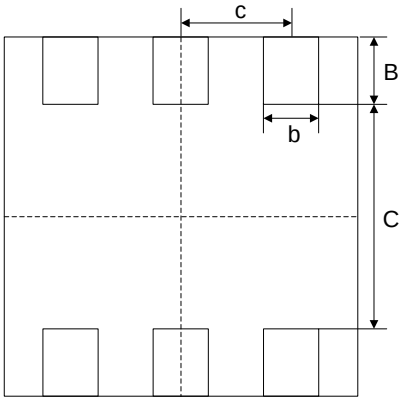
6-Pin SON763 Packaging Information

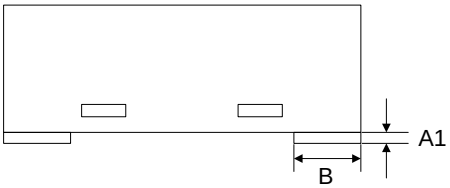
SON763 (1.6mm×1.6mm)



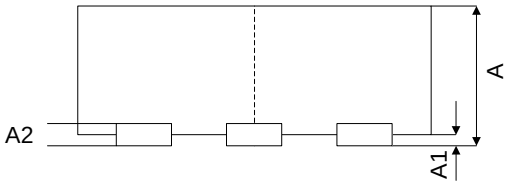
TOP VIEW



BOTTOM VIEW

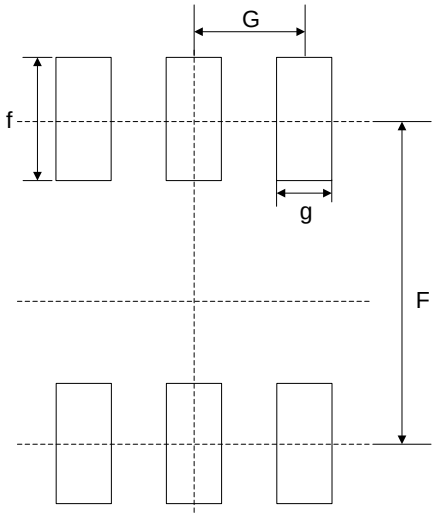


SIDE VIEW A



SIDE VIEW B

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.72	0.76	0.80
A1	0.00	0.03	0.05
A2	0.08	0.13	0.18
B	0.20	0.30	0.40
b	0.17	0.22	0.27
C		1.00	
c		0.50	
D	1.50	1.60	1.70
E	1.50	1.60	1.70
F		1.40	
f		0.55	
G		0.50	
g		0.30	



RECOMMENDED LAND PATTERN

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