MICROPOWER, ULTRA-SENSITIVE OMNIPOLAR HALL-EFFECT SENSOR SWITCH

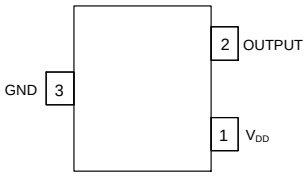
Description

The AH1802 is a high-sensitivity, micropower, omnipolar Hall Effect switch integrated circuit (IC) designed for portable and battery-powered equipment, such as cellular phones, PDAs, and portable PCs. Based on two sensitive Hall Effect plates and a chopper-stabilized architecture, the AH1802 provides a reliable solution over the whole operating range. To support portable and battery-powered equipment, the design has been optimized to operate over the supply range of 2.5V to 5.5V and consumes only 24µW with a supply of 3V.

The single open-drain output can be switched on with either a north or south pole of sufficient strength. When the magnetic flux density (B) perpendicular to the part marking surface is larger than operate point (Bop), the output is switched on (pulled low). The output is turned off when B becomes lower than the release point (Brp). The output remains off when there is no magnetic field.

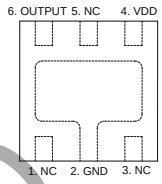
Pin Assignments

(Top View)



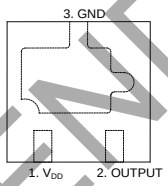
SC59

(Top View)



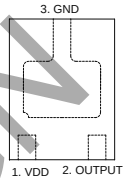
U-DFN2020-6

(Top View)



U-DFN2020-3

(Top View)



X2-DFN2015-3

Features

- Omnipolar (North or South Pole) Operation
- 2.5V to 5.5V Operating Range
- High Sensitivity
- Single Open-Drain Output
- Micropower Operation
- Chopper-Stabilized Design Provides
  - Superior Temperature Stability
  - Minimal Switch Point Drift
  - Enhanced Immunity to Stress
- Good RF Noise Immunity
- -40°C to +85°C Operating Temperature
- ESD > 5kV for U-DFN2020-6, U-DFN2020-3 and X2- DFN2015-3
- ESD > 6kV for SC59
- Low Profile SC59, U-DFN2020-6, U-DFN2020-3 and X2-DFN2015-3 packages
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Applications

- Open and Close Detect for Flip/Slide Cellular Phones
- Smart Cover or Dock Detect for Cellular Phones and Tablets
- Cover or Display Switch in Portable PCs (such as Ultrabook™)
- Display Switch for Portable PCs
- On/Off switch for PDAs and Digital Cameras
- Contactless Switch in Consumer Products

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

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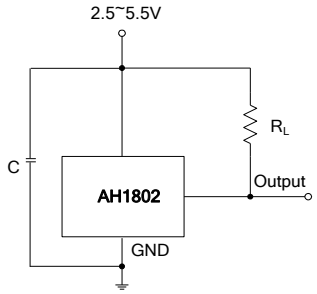
Typical Applications Circuit



Pin Descriptions

Package: SC59

Pin Number	Pin Name	Function
1	V_{DD}	Power Supply Input
2	OUTPUT	Output Pin
3	GND	Ground Pin

Package: U-DFN2020-3 and X2-DFN2015-3

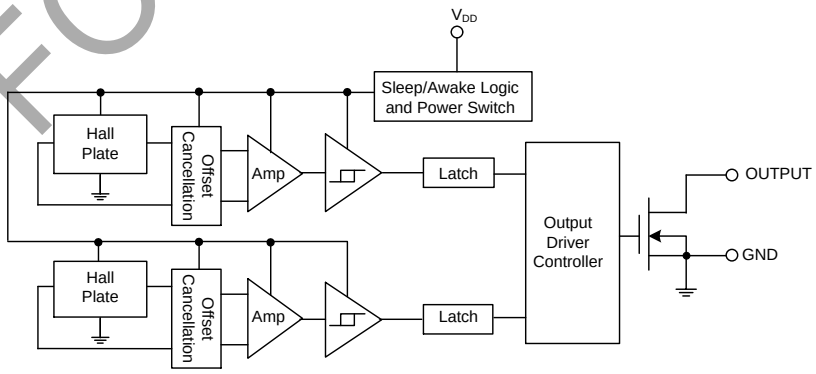
Pin Number	Pin Name	Function
1	V_{DD}	Power Supply Input
2	OUTPUT	Output Pin
3	GND	Ground Pin

Package: U-DFN2020-6 and X2-DFN2015-3

Pin Number	Pin Name	Function
1	NC	No Connection (Note 4)
2	GND	Ground Pin
3	NC	No Connection (Note 4)
4	V_{DD}	Power Supply Input
5	NC	No Connection (Note 4)
6	OUTPUT	Output Pin

Note: 4. NC is *No Connection*—recommendation is to connect the NC pin to ground externally.

Functional Block Diagram



Absolute Maximum Ratings (Note 6) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Values	Unit
V_{DD}	Supply Voltage (Note 7)	7	V
B	Magnetic Flux Density	Unlimited	
Ts	Storage Temperature Range	-65 to +150	°C
P_D	Package Power Dissipation	230	mW
T_J	Maximum Junction Temperature	150	°C

Notes:
6. Stresses greater than the 'Absolute Maximum Ratings' specified above may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time.
7. The absolute maximum V_{DD} of 7V is a transient stress rating and is not meant as a functional operating condition. It is not recommended to operate the device at the absolute maximum rated conditions for any period of time.

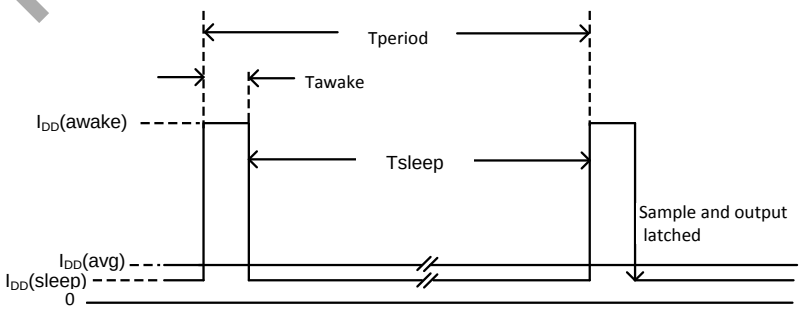
Recommended Operating Conditions (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Rating	Unit
V_{DD}	Supply Voltage	Operating	2.5 to 5.5	V
T_A	Operating Temperature Range	Operating	-40 to +85	°C

Electrical Characteristics (@ V_{DD} = 3V, T_A = +25°C, unless otherwise specified.)

Symbol	Characteristic	Conditions	Min	Typ	Max	Unit
V_{OUT}	Output On Voltage (V_{OL})	I_{OUT} = 1mA	—	0.1	0.3	V
I_{OFF}	Output Leakage Current	V_{OUT} = 5.5V, B < Brp	—	<0.1	1	µA
I_{DD}(awake)	Supply Current	During 'Awake' Period, T_A = +25°C, V_{DD} = 3V	—	3	6	mA
		During 'Awake' Period, T_A= -40 to +85°C, V_{DD} = 2.5 to 5.5V	—	3	10	mA
I_{DD}(sleep)		During 'Sleep' Period, T_A= +25°C, V_{DD} = 3V	—	5	10	µA
		During 'Sleep' Period, T_A= -40 to +85°C, Vdd = 2.5~5.5V	—	5	18	µA
I_{DD}(avg)		Average Supply Current , T_A= +25°C, V_{DD} = 3V	—	8	16	µA
		Average Supply Current , T_A= -40 to +85°C, Vdd = 2.5 to 5.5V	—	8	23	µA
F_C	Chopping Frequency	For Design Information Only	—	300	—	kHz
Tawake	Awake Time	(Note 8)	—	75	150	µs
Tperiod	Period	(Note 8)	—	75	150	ms
D.C.	Duty Cycle	—	—	0.1	—	%

Note:
8. When power is initially turned on, V_{DD} must be within its correct operating range (2.5V to 5.5V) to guaranteed the output sampling. The output state is valid after the second operating cycle (typical 150ms).

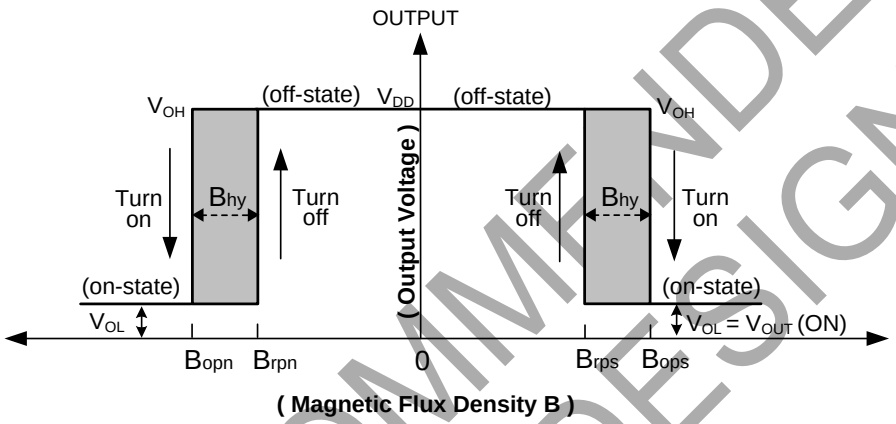


Magnetic Characteristics (Notes 9 & 10) (@ V_{DD} = 3V, T_A = +25°C, unless otherwise specified.)

(1mT=10 Gauss)

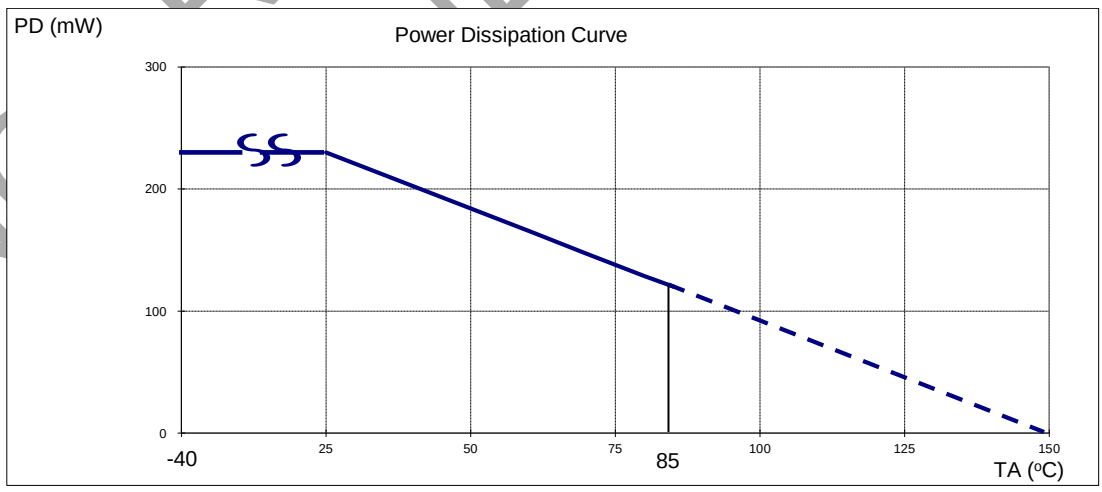
Symbol	Characteristic	Min	Typ	Max	Unit
Bops(South Pole to Part Marking Side)	Operate Point	20	28	40	Gauss
Bopn(North Pole to Part Marking Side)		-40	-28	-20	
Brps(South Pole to Part Marking Side)	Release Point	10	20	—	
Brpn(North Pole to Part Marking Side)		—	-20	-10	
Bhy(|Bopx−Brpx|)	Hysteresis	5	8	—	

Notes: 9. Typical data is at T_A = +25°C, V_{DD} = 3V, and for design information only.
10. The magnetic characteristics may vary with supply voltage, operating temperature, and after soldering.

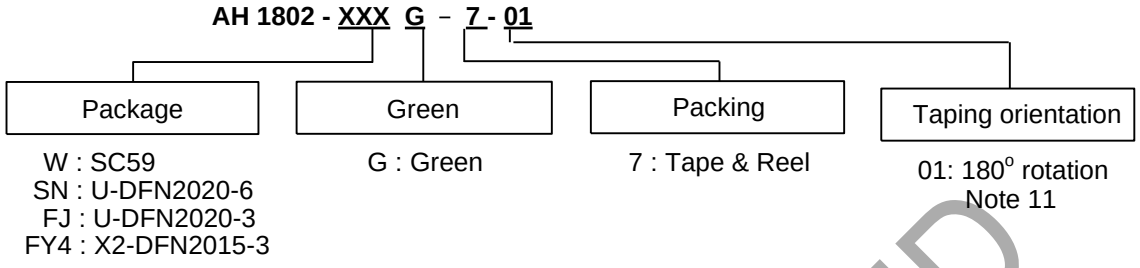


Performance Characteristics

T_A (°C)	25	50	60	70	80	85	90	100	110	120	130	140	150
P_D (mW)	230	184	166	147	129	120	110	92	74	55	37	18	0



Ordering Information



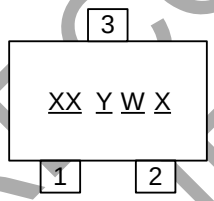
Part Number	Status (Note 12)	Package Code	Packaging	7" Tape and Reel	
				Quantity	Part Number Suffix
AH1802-WG-7	NRND	W	SC59	3000/Tape & Reel	-7
AH1802-SNG-7	NRND	SN	U-DFN2020-6	3000/Tape & Reel	-7
AH1802-FJG-7	NRND	FJ	U-DFN2020-3	3000/Tape & Reel	-7
AH1802-FJG-7-01 (Note 8)	NRND	FJ	U-DFN2020-3	3000/Tape & Reel	-7
AH1802-FY4G-7	NRND	FY4	X2-DFN2015-3	3000/Tape & Reel	-7

Note: 11. AH1802-FJG-7-01 DFN2020-3 package taping orientation is rotated by 180° compared to standard part AH1802-FJG-7. See package orientation diagrams on pages 9 and 10.
12. NRND = Not Recommended for New Design

Marking Information

(1) Package Type: SC59

(Top View)

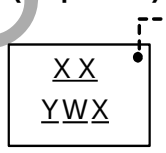


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	SC59	KC

(2) Package Type: U-DFN2020-6

(Top View)



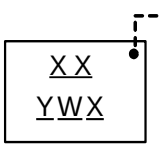
Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	U-DFN2020-6	KC

Marking Information (continued)

(3) Package Type: U-DFN2020-3

(Top View)

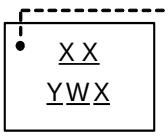


Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	U-DFN2020-3	KE

(4) Package Type: X2-DFN2015-3

(Top View)



Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

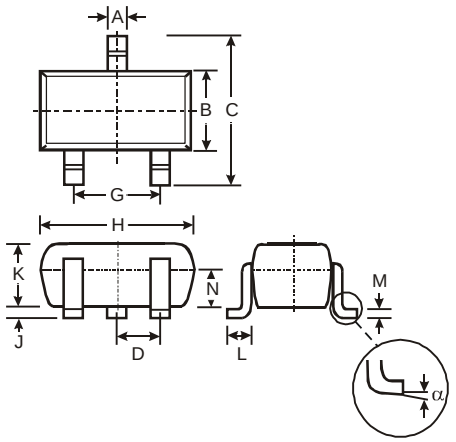
Part Number	Package	Identification Code
AH1802	X2-DFN2015-3	KF

Package Outline Dimensions (All dimensions in mm.)

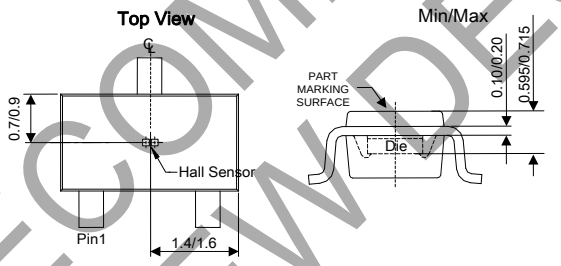
Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SC59

SC59



SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
□.0°	8°	-	
All Dimensions in mm			



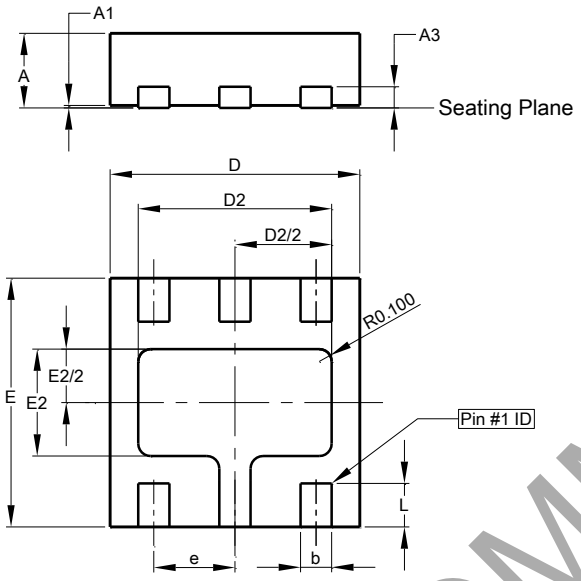
Sensor Location

Package Outline Dimensions (continued) (All dimensions in mm.)

Please see http://www.diodes.com/package-outlines.html for the latest version.

(2) Package Type: U-DFN2020-6

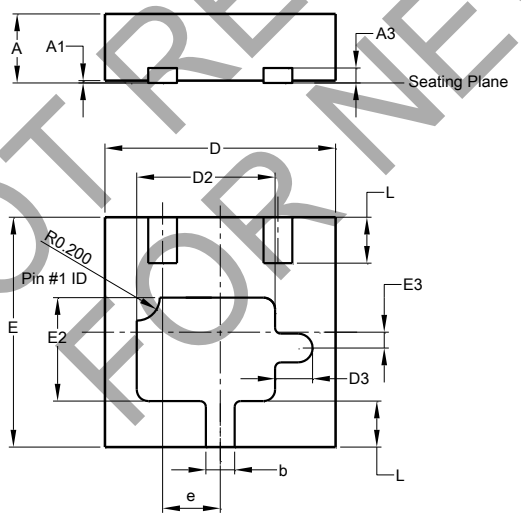
U-DFN2020-6



U-DFN2020-6			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	-	-	0.15
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	1.45	1.65	1.55
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.76	0.96	0.86
L	0.30	0.40	0.35
All Dimensions in mm			

(3) Package type: U-DFN2020-3

U-DFN2020-3



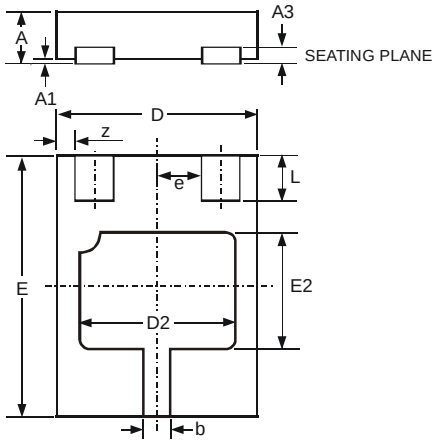
U-DFN2020-3			
Dim	**Min**	**Max**	**Typ**
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	-	-	0.152
b	0.20	0.30	0.25
D	1.950	2.075	2.00
D2	1.10	1.30	1.20
D3	0.325 REF		
e	-	-	0.50
E	1.950	2.075	2.00
E2	0.80	1.00	0.90
E3	0.138 REF		
L	0.35	0.45	0.40
All Dimensions in mm			

Package Outline Dimensions (cont.) (All dimensions in mm.)

Please see http://www.diodes.com/package-outlines.html for the latest version.

(4) Package type: X2-DFN2015-3

X2-DFN2015-3



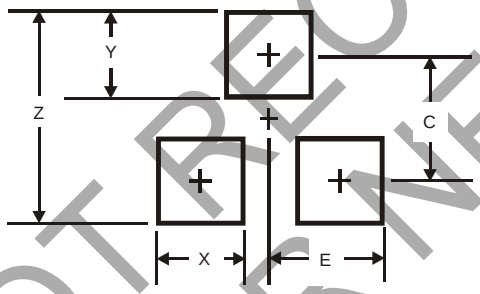
X2-DFN2015-3			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	-
A1	0	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.45	1.575	1.5
D2	1.00	1.20	1.10
e	-	-	0.50
E	1.95	2.075	2.00
E2	0.70	0.90	0.80
L	0.25	0.35	0.30
z	-	-	0.125
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

(1) Package Type: SC59

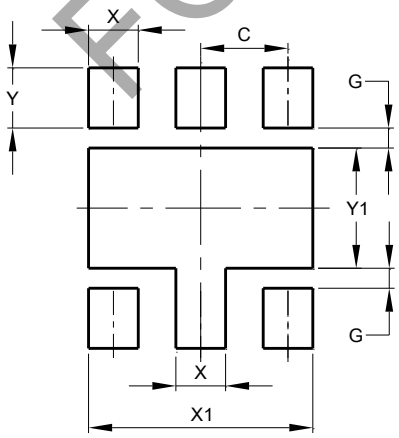
SC59



Dimensions	SC59
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

(2) Package Type: U-DFN2020-6

U-DFN2020-6



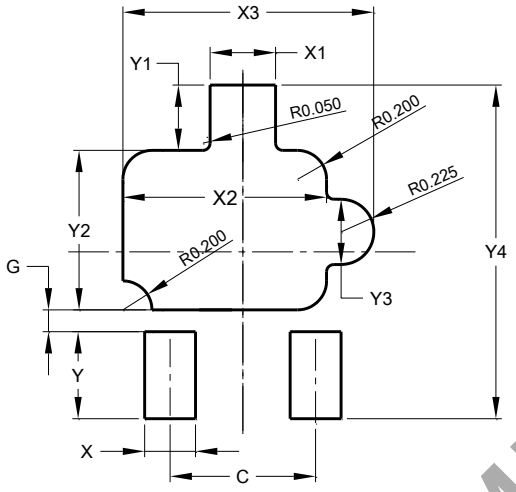
Dimensions	Value (in mm)
C	0.65
G	0.15
X	0.37
X1	1.67
Y	0.45
Y1	0.90

Suggested Pad Layout (continued)

Please see http://www.diodes.com/package-outlines.html for the latest version.

(3) Package Type: U-DFN2020-3

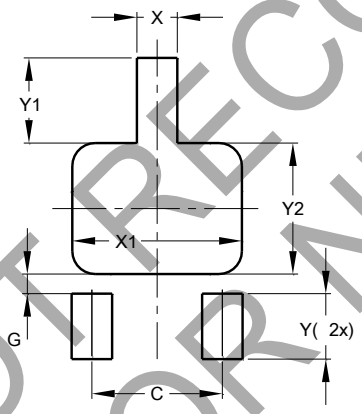
U-DFN2020-3



Dimensions	Value (in mm)
C	1.000
G	0.150
X	0.350
X1	0.450
X2	1.400
X3	1.724
Y	0.600
Y1	0.450
Y2	1.100
Y3	0.450
Y4	2.300

(4) Package Type: X2-DFN2015-3

X2-DFN2015-3



X2-DFN2015-3	
Dimensions	Value (in mm)
C	1.000
G	0.150
X	0.310
X1	1.300
Y	0.500
Y1	0.650
Y2	1.000

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Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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