SGM2241
40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

GENERAL DESCRIPTION

The SGM2241 is a high voltage, low quiescent current and low dropout voltage linear regulator. It is capable of supplying 300mA output current with typical dropout voltage of 900mV. The operating input voltage range is from 2.5V to 40V and output voltage range is from 1.215V to 39V.

Other features include current limit and thermal shutdown protection. The SGM2241 is suitable for various applications.

The SGM2241 is available in Green MSOP-8 (Exposed Pad) and TDFN-2×2-6AL packages. It operates over an operating temperature range of -40℃ to +125℃.

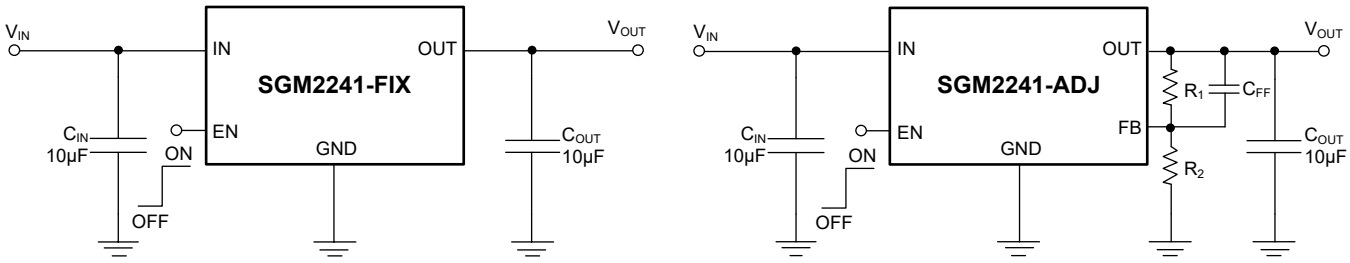
APPLICATIONS

Industrial Equipment
Battery-Powered Equipment
Medical Equipment

FEATURES

- **Operating Input Voltage Range: 2.5V to 40V**
- **Enable Pin Accept Voltages Higher than the Supply Voltage and up to 40V**
- **Fixed Output from 1.8V to 12V**
- **Adjustable Output from 1.215V to 39V**
- **300mA Output Current**
- **Output Voltage Accuracy: ±1% at +25℃**
- **Low Quiescent Current: 3.2μA (TYP)**
- **Low Dropout Voltage:**
  900mV (TYP) at 300mA, V_{OUT} = 5.0V
- **Current Limiting and Thermal Protection**
- **With Output Automatic Discharge**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green MSOP-8 (Exposed Pad) and TDFN-2×2-6AL Packages**

TYPICAL APPLICATION



Fixed Output Voltage Version **Adjustable Output Voltage Version**

Figure 1. Typical Application Circuits

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2241-1.8	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-1.8XPMS8G/TR	SGM21S XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-2.5	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-2.5XPMS8G/TR	SGM21T XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-3.0	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-3.0XPMS8G/TR	SGM21U XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-3.3	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-3.3XPMS8G/TR	SGM21V XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-3.6	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-3.6XPMS8G/TR	SGM21W XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-4.2	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-4.2XPMS8G/TR	SGM21X XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-5.0	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-5.0XPMS8G/TR	SGM21Y XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-8.0	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-8.0XPMS8G/TR	SGM21Z XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-9.0	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-9.0XPMS8G/TR	SGM220 XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-12	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-12XPMS8G/TR	SGM1S6 XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-ADJ	MSOP-8 (Exposed Pad)	-40℃ to +125℃	SGM2241-ADJXPMS8G/TR	SGM1S7 XPMS8 XXXXX	Tape and Reel, 4000
SGM2241-1.8	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-1.8XTDI6G/TR	221 XXXX	Tape and Reel, 3000
SGM2241-2.5	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-2.5XTDI6G/TR	222 XXXX	Tape and Reel, 3000
SGM2241-3.0	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-3.0XTDI6G/TR	223 XXXX	Tape and Reel, 3000
SGM2241-3.3	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-3.3XTDI6G/TR	224 XXXX	Tape and Reel, 3000
SGM2241-3.6	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-3.6XTDI6G/TR	225 XXXX	Tape and Reel, 3000
SGM2241-4.2	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-4.2XTDI6G/TR	226 XXXX	Tape and Reel, 3000
SGM2241-5.0	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-5.0XTDI6G/TR	227 XXXX	Tape and Reel, 3000
SGM2241-8.0	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-8.0XTDI6G/TR	228 XXXX	Tape and Reel, 3000
SGM2241-9.0	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-9.0XTDI6G/TR	229 XXXX	Tape and Reel, 3000

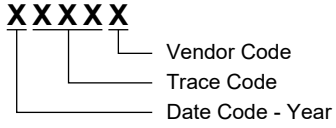
PACKAGE/ORDERING INFORMATION (continued)

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2241-12	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-12XTDI6G/TR	22A XXXX	Tape and Reel, 3000
SGM2241-ADJ	TDFN-2×2-6AL	-40℃ to +125℃	SGM2241-ADJXTDI6G/TR	1S5 XXXX	Tape and Reel, 3000

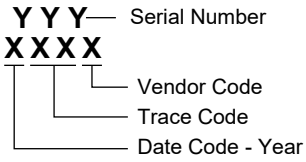
MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code. XXXX = Date Code, Trace Code and Vendor Code.

MSOP-8 (Exposed Pad)



TDFN-2×2-6AL



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

IN, EN to GND ..... -0.3V to 45V
OUT to GND ..... -0.3V to 45V
FB to GND ..... -0.3V to 45V
Package Thermal Resistance
MSOP-8 (Exposed Pad), θ_{JA} ..... 48.5℃/W
MSOP-8 (Exposed Pad), θ_{JB} ..... 22.7℃/W
MSOP-8 (Exposed Pad), $\theta_{JC(TOP)}$ ..... 56.5℃/W
MSOP-8 (Exposed Pad), $\theta_{JC(BOT)}$ ..... 8.4℃/W
TDFN-2×2-6AL, θ_{JA} ..... 62.9℃/W
TDFN-2×2-6AL, θ_{JB} ..... 28.9℃/W
TDFN-2×2-6AL, $\theta_{JC(TOP)}$ ..... 77.8℃/W
TDFN-2×2-6AL, $\theta_{JC(BOT)}$ ..... 11.6℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility (1) (2)
HBM ..... ±6000V
CDM ..... ±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{IN} ..... 2.5V to 40V
Enable Input Voltage Range ..... 0V to 40V
Input Effective Capacitance, C_{IN} ..... 0.5μF (MIN)
Output Effective Capacitance, C_{OUT} ..... 1μF to 100μF
Operating Junction Temperature Range ..... -40℃ to +125℃

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

ESD SENSITIVITY CAUTION

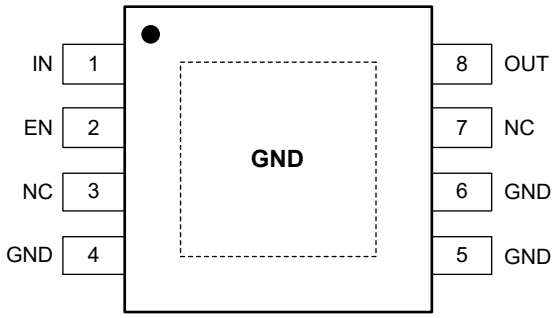
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

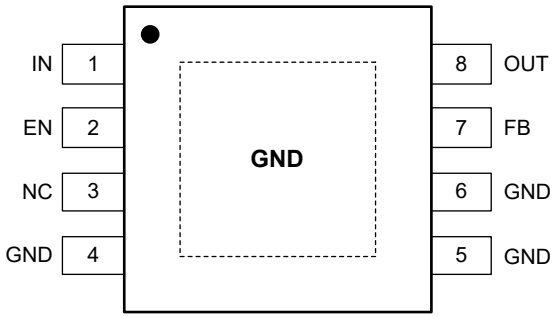
PIN CONFIGURATIONS

SGM2241-FIX (TOP VIEW)



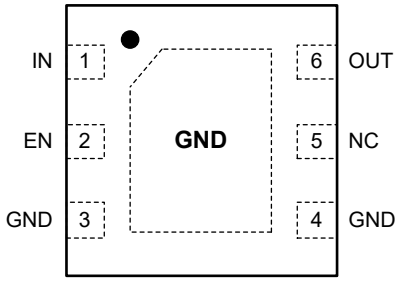
MSOP-8 (Exposed Pad)

SGM2241-ADJ (TOP VIEW)



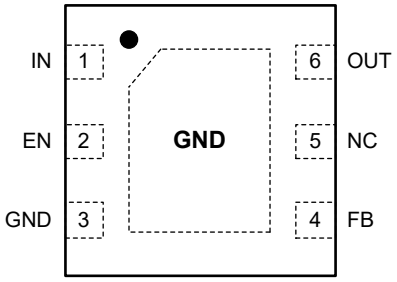
MSOP-8 (Exposed Pad)

SGM2241-FIX (TOP VIEW)



TDFN-2×2-6AL

SGM2241-ADJ (TOP VIEW)



TDFN-2×2-6AL

PIN DESCRIPTION

PIN		NAME	FUNCTION
MSOP-8 (Exposed Pad)	TDFN-2×2-6AL		
1	1	IN	Input Supply Voltage Pin. It is recommended to use a 1μF or larger ceramic capacitor from IN pin to ground to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to IN pin.
2	2	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator.
3	5	NC	No Connection.
4, 5, 6	3	GND	Ground.
7	—	NC	No Connection (Fixed Version Only).
	4	FB	Feedback Voltage Input Pin (adjustable voltage version only). Connect this pin to the midpoint of an external resistor divider to adjust the output voltage. Place the resistors as close as possible to this pin.
—		GND	Ground (Fixed Version Only).
8	6	OUT	Regulator Output Pin. It is recommended to use a ceramic capacitor with effective capacitance in the range of 1μF to 100μF to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin.
Exposed Pad	Exposed Pad	GND	Exposed Pad. Connect it to GND internally. Connect it to a large ground plane to maximize thermal performance. This pad is not an electrical connection point.

FUNCTIONAL BLOCK DIAGRAMS

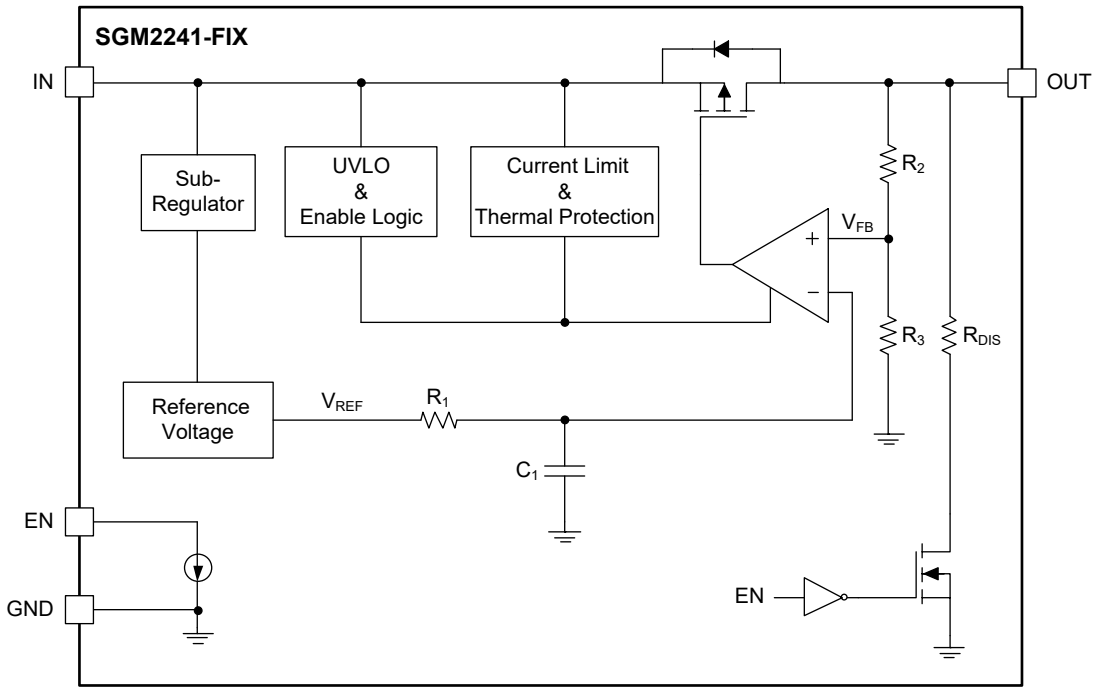


Figure 2. Block Diagram of Fixed Output Version

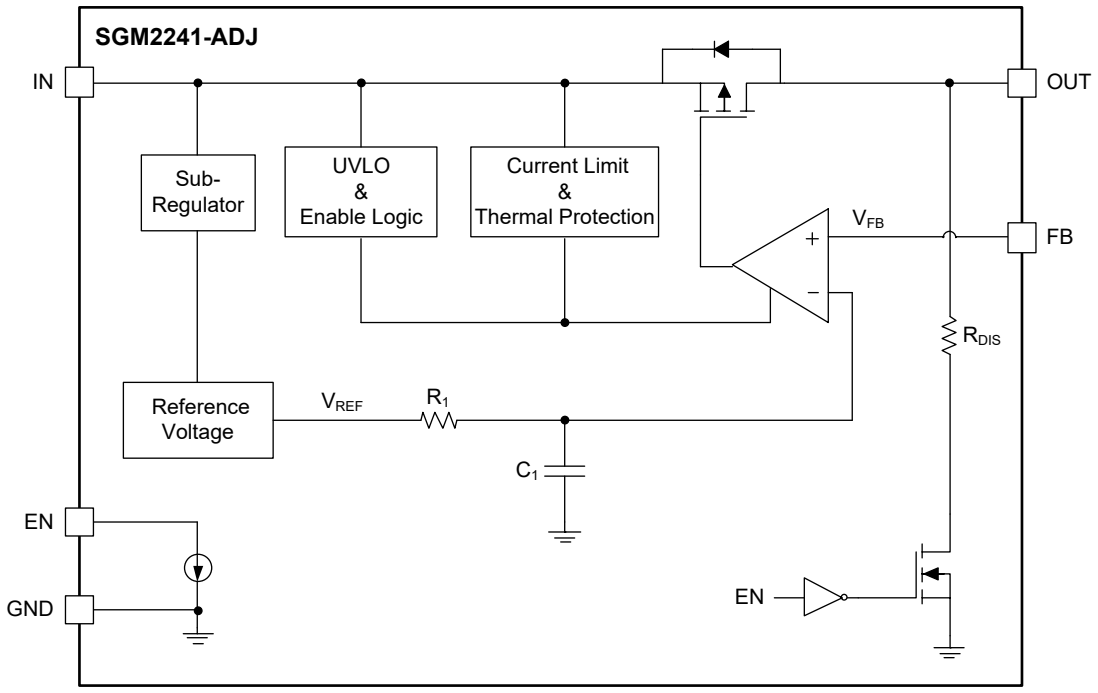
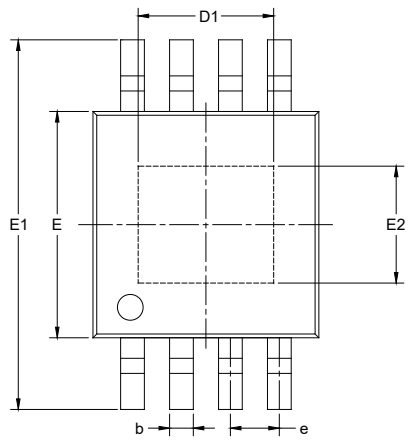
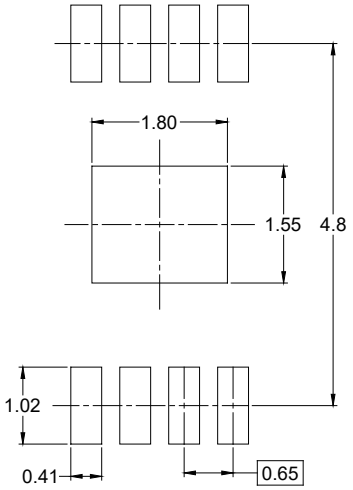


Figure 3. Block Diagram of Adjustable Output Version

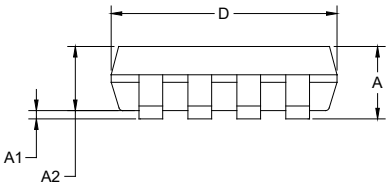
PACKAGE OUTLINE DIMENSIONS

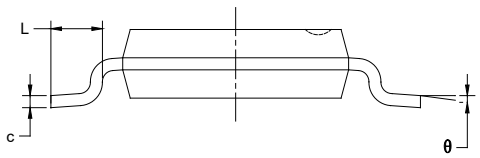
MSOP-8 (Exposed Pad)





RECOMMENDED LAND PATTERN (Unit: mm)



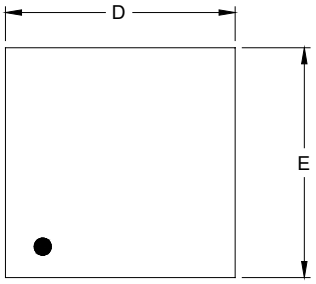


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
D1	1.700	1.900	0.067	0.075
e	0.65 BSC		0.026 BSC	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
E2	1.450	1.650	0.057	0.065
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

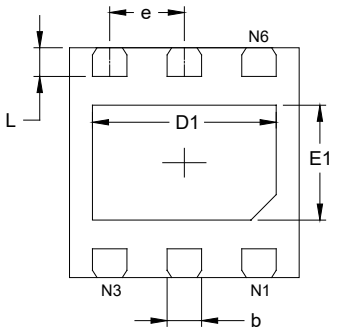
NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

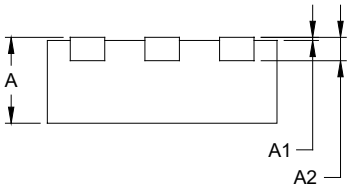
TDFN-2×2-6AL



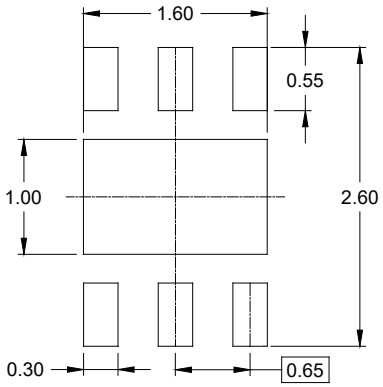
TOP VIEW



BOTTOM VIEW



SIDE VIEW



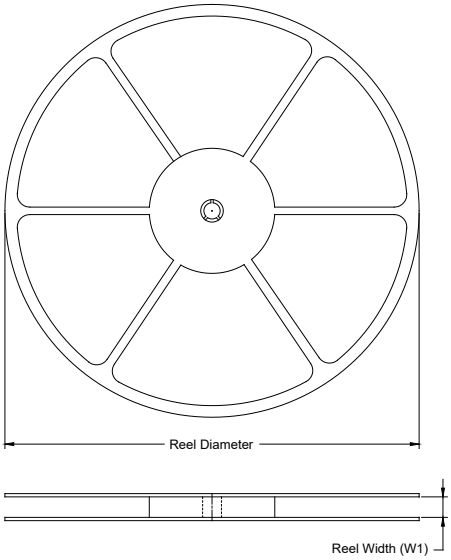
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.500	1.700	0.059	0.067
E	1.900	2.100	0.075	0.083
E1	0.900	1.100	0.035	0.043
b	0.250	0.350	0.010	0.014
e	0.650 BSC		0.026 BSC	
L	0.174	0.326	0.007	0.013

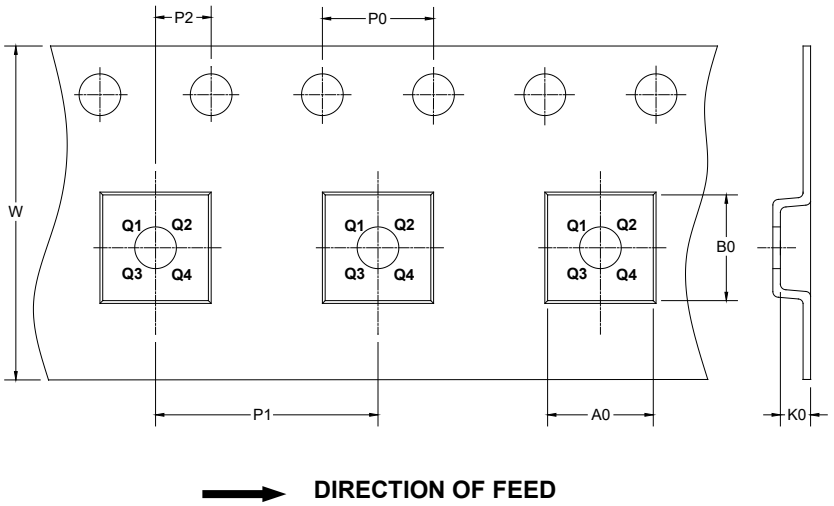
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



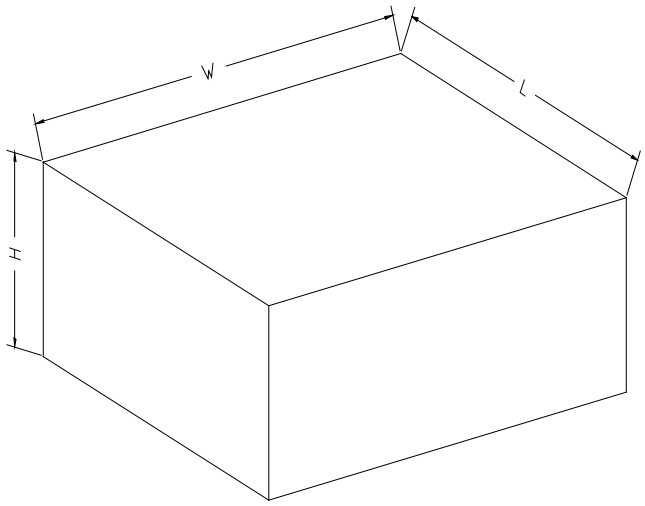
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
MSOP-8 (Exposed Pad)	13"	12.4	5.20	3.30	1.50	4.0	8.0	2.0	12.0	Q1
TDFN-2×2-6AL	7"	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q2

DD0001

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7″ (Option)	368	227	224	8
7″	442	410	224	18
13″	386	280	370	5

DD0002