SGM2236xQ
Automotive
40V, 200mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

GENERAL DESCRIPTION

The SGM2236xQ is a high voltage, low quiescent current and low dropout voltage linear regulator. It is capable of supplying 200mA output current with typical dropout voltage of 500mV. The operating input voltage range is from 2.5V to 40V and output voltage range is from 1.215V to 35V.

Other features include current limit and thermal shutdown protection. The SGM2236xQ is suitable for various automotive applications.

This device is AEC-Q100 qualified (Automotive Electronics Council (AEC) standard Q100 Grade 1) and it is suitable for automotive applications.

The SGM2236xQ is available in Green TDFN-2×2-6AL and TDFN-3×3-8JL packages. It operates over an operating temperature range of -40℃ to +125℃.

FEATURES

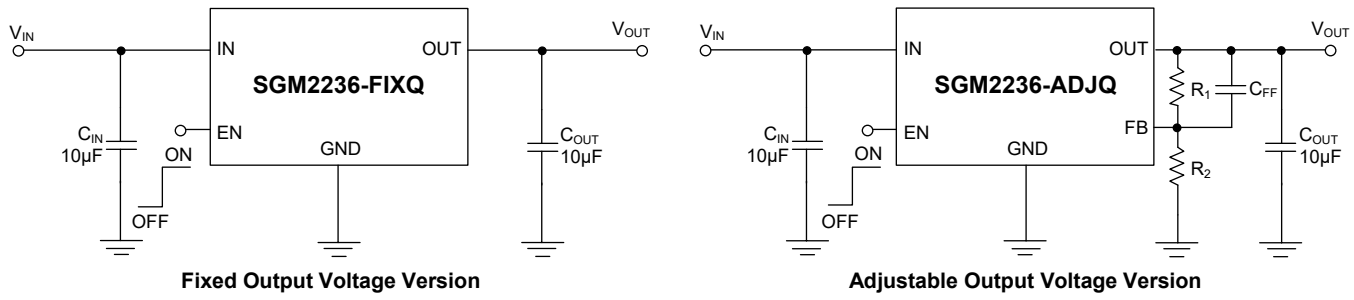
- **AEC-Q100 Qualified for Automotive Applications**
  Device Temperature Grade 1
  T_A = -40℃ to +125℃
- **Operating Input Voltage Range: 2.5V to 40V**
- **Enable Pin Accept Voltages Higher than the Supply Voltage and up to 40V**
- **Fixed Output from 1.8V to 12V**
- **Adjustable Output from 1.215V to 35V**
- **200mA Output Current**
- **Output Voltage Accuracy: ±1% at +25℃**
- **Low Quiescent Current: 3.2μA (TYP)**
- **Low Dropout Voltage:**
  500mV (TYP) at 200mA, 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 TDFN-2×2-6AL and TDFN-3×3-8JL Packages**

APPLICATIONS

Industrial Equipment
Automotive Applications
Battery-Powered Equipment
Medical Equipment

代理商 威尔边 www.vsvie.com 联系电话 138 0526 5270

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
SGM2236-1.8Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-1.8QTDI6G/TR	1A1 XXXX	Tape and Reel, 3000
SGM2236-2.5Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-2.5QTDI6G/TR	1A2 XXXX	Tape and Reel, 3000
SGM2236-3.0Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-3.0QTDI6G/TR	1A3 XXXX	Tape and Reel, 3000
SGM2236-3.3Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-3.3QTDI6G/TR	0UN XXXX	Tape and Reel, 3000
SGM2236-3.6Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-3.6QTDI6G/TR	1A4 XXXX	Tape and Reel, 3000
SGM2236-4.2Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-4.2QTDI6G/TR	1A5 XXXX	Tape and Reel, 3000
SGM2236-5.0Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-5.0QTDI6G/TR	1A6 XXXX	Tape and Reel, 3000
SGM2236-8.0Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-8.0QTDI6G/TR	1A7 XXXX	Tape and Reel, 3000
SGM2236-9.0Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-9.0QTDI6G/TR	1A8 XXXX	Tape and Reel, 3000
SGM2236-12Q	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-12QTDI6G/TR	1A9 XXXX	Tape and Reel, 3000
SGM2236-ADJQ	TDFN-2×2-6AL	-40℃ to +125℃ (T_A)	SGM2236-ADJQTDI6G/TR	0UM XXXX	Tape and Reel, 3000
SGM2236-1.8Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-1.8QTHI8G/TR	1AATHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-2.5Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-2.5QTHI8G/TR	1ABTHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-3.0Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-3.0QTHI8G/TR	1ACTHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-3.3Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-3.3QTHI8G/TR	158THI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-3.6Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-3.6QTHI8G/TR	1ADTHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-4.2Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-4.2QTHI8G/TR	1AETHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-5.0Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-5.0QTHI8G/TR	170THI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-8.0Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-8.0QTHI8G/TR	1AFTHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-9.0Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-9.0QTHI8G/TR	1AGTHI XXXXX YYYYYY	Tape and Reel, 4000

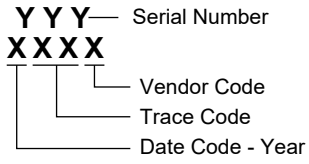
PACKAGE/ORDERING INFORMATION (continued)

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2236-12Q	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-12QTHI8G/TR	1AHTHI XXXXX YYYYYY	Tape and Reel, 4000
SGM2236-ADJQ	TDFN-3×3-8JL	-40℃ to +125℃ (T_A)	SGM2236-ADJQTHI8G/TR	1AITHI XXXXX YYYYYY	Tape and Reel, 4000

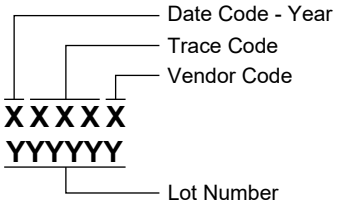
MARKING INFORMATION

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

TDFN-2×2-6AL



TDFN-3×3-8JL



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
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
TDFN-3×3-8JL, θ_{JA} ..... 50.2℃/W
TDFN-3×3-8JL, θ_{JB} ..... 22.5℃/W
TDFN-3×3-8JL, $\theta_{JC(TOP)}$ ..... 52.2℃/W
TDFN-3×3-8JL, $\theta_{JC(BOT)}$ ..... 11℃/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 AEC-Q100-002 specification.

2. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

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 Ambient Temperature Range ..... -40℃ to +125℃
Operating Junction Temperature Range ..... -40℃ to +150℃

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

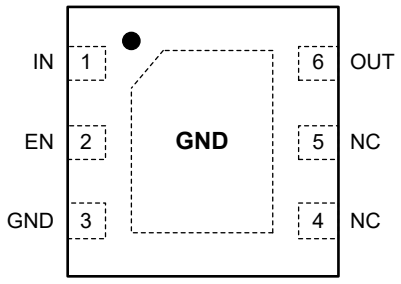
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

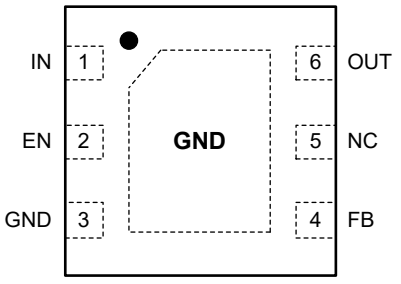
PIN CONFIGURATIONS

SGM2236-FIXQ (TOP VIEW)



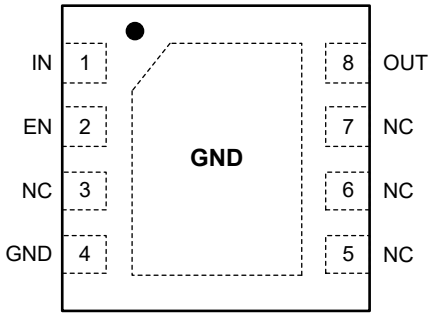
TDFN-2×2-6AL

SGM2236-ADJQ (TOP VIEW)



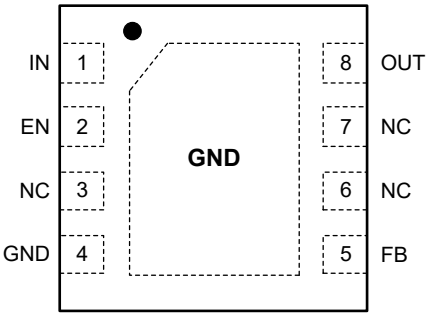
TDFN-2×2-6AL

SGM2236-FIXQ (TOP VIEW)



TDFN-3×3-8JL

SGM2236-ADJQ (TOP VIEW)



TDFN-3×3-8JL

PIN DESCRIPTION

PIN		NAME	FUNCTION
TDFN-2×2-6AL	TDFN-3×3-8JL		
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	4	GND	Ground.
4	5	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.
		NC	No Connection (Fixed Version Only).
6	8	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.
5	3, 6, 7	NC	No Connection.
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

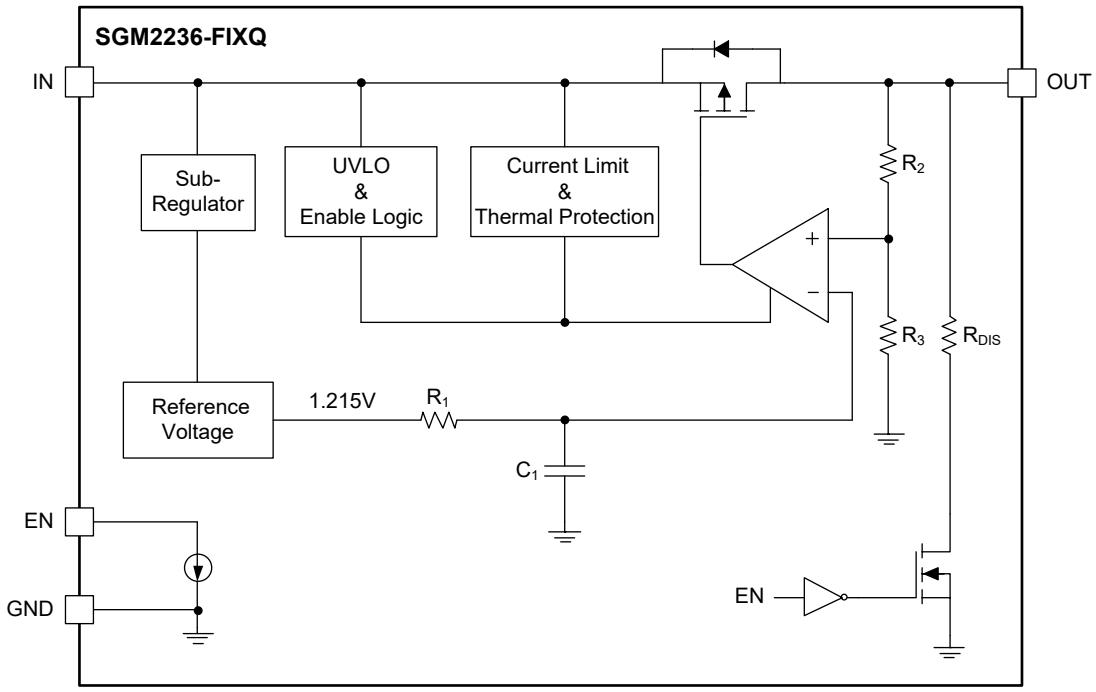


Figure 2. Block Diagram of Fixed Output Version

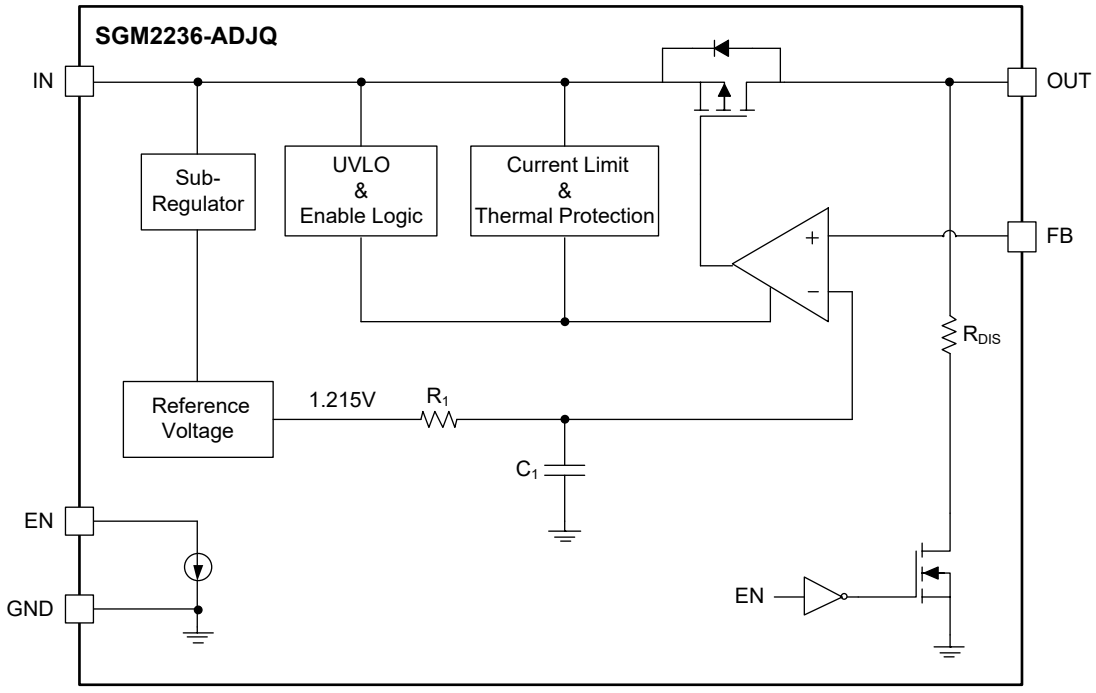
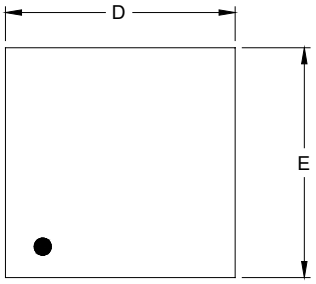


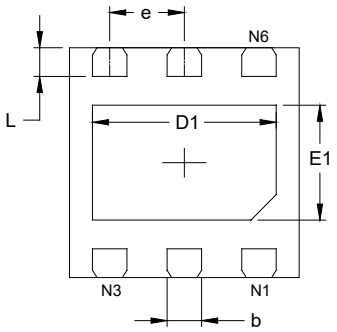
Figure 3. Block Diagram of Adjustable Output Version

PACKAGE OUTLINE DIMENSIONS

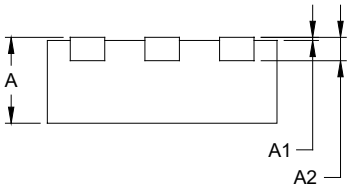
TDFN-2×2-6AL



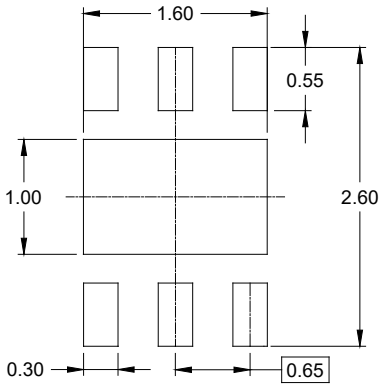
TOP VIEW



BOTTOM VIEW



SIDE VIEW



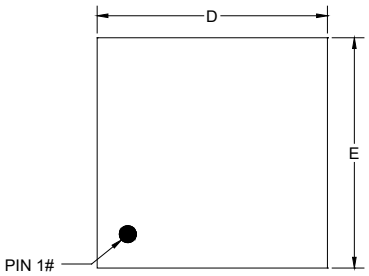
RECOMMENDED LAND PATTERN (Unit: mm)

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

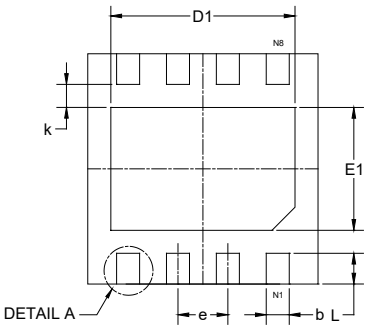
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

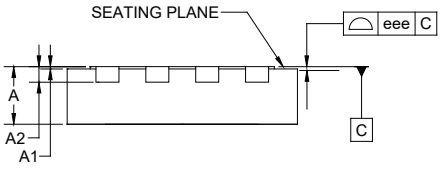
TDFN-3×3-8JL



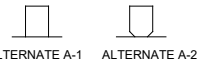
TOP VIEW



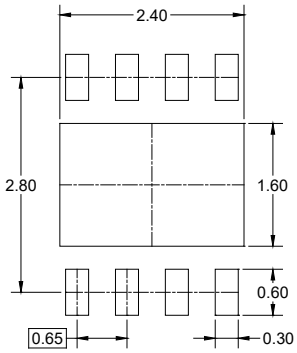
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL CONSTRUCTION



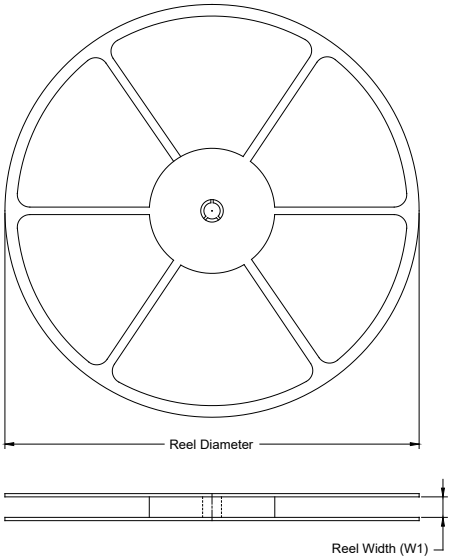
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.250	-	0.350
D	2.900	-	3.100
D1	2.300	-	2.500
E	2.900	-	3.100
E1	1.500	-	1.700
e	0.650 BSC		
k	0.300 REF		
L	0.300	-	0.500
eee	0.080		

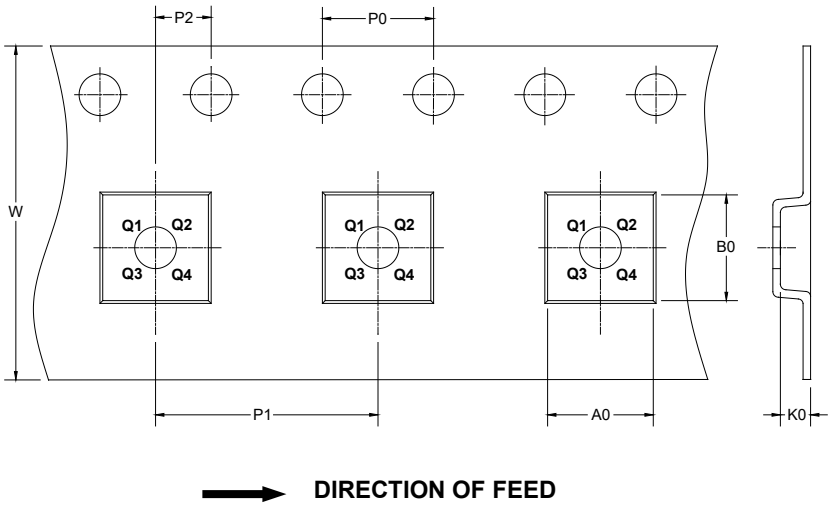
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

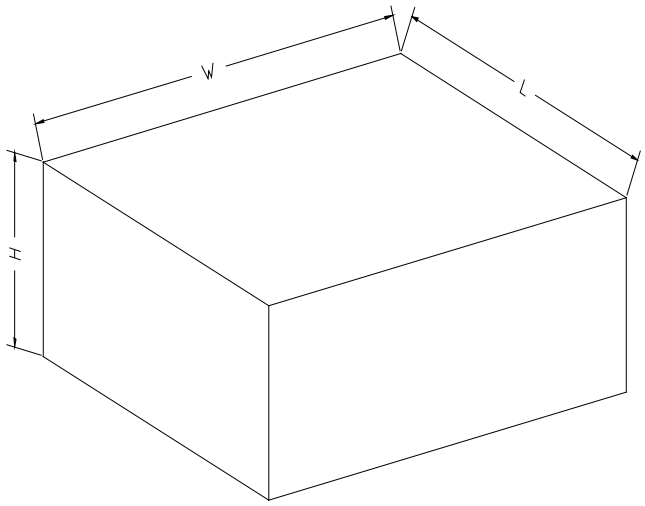
NOTE: The picture is only for reference. Please make the object as the standard.

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
TDFN-2×2-6AL	7"	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q1
TDFN-3×3-8JL	13"	12.4	3.35	3.35	1.13	4.0	8.0	2.0	12.0	Q1

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