SGM8437-2
Current Feedback, Wide-Band High-Current Output Amplifier

GENERAL DESCRIPTION

The SGM8437-2 is a current feedback, wide-band high-current output amplifier with high voltage, low noise and high slew rate performance. These features make SGM8437-2 very suitable for wide-band heavy load applications.

The SGM8437-2 can operate from 8V to 30V single supply or from ±4V to ±15V dual supplies. And it maintains wide bandwidth and high linearity over the whole full-scale range of power supply.

A disable control (DIS) pin is used to control the operation modes of the device. When DIS pin is high or floating, SGM8437-2 is in power-down mode. When DIS pin is low, SGM8437-2 is in full-power working mode.

The SGM8437-2 is available in a Green TQFN-4×5-24AL package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **Current Feedback Amplifier**
- **Support Single or Dual Power Supplies: 8V to 30V or ±4V to ±15V**
- **Supply Current: 18mA (TYP)**
- **Power-Down Current: 35μA (TYP)**
- **Low Input Voltage Noise Density: 10nV/$\sqrt{Hz}$**
- **High Slew Rate for Differential Signal: 800V/μs**
- **Amplifier A and B are Stable at Gain ≥ 2**
- **Output Over-Voltage Protection and Voltage Clamping Protection**
- **Over-Temperature Protection**
- **Disable Control Pins for Low-Power Design**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in a Green TQFN-4×5-24AL Package**

APPLICATIONS

Test Equipment Amplifiers
Cable Drivers

TYPICAL APPLICATION

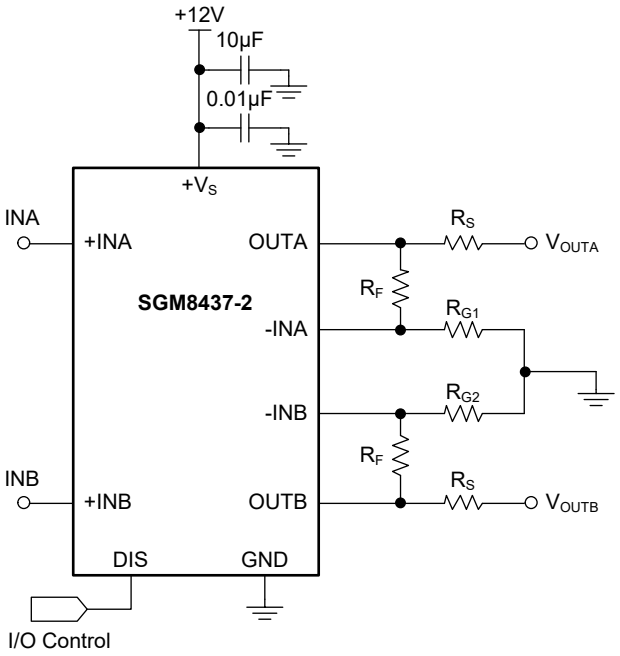


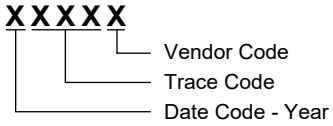
Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8437-2	TQFN-4×5-24AL	-40℃ to +85℃	SGM8437-2YTQY24G/TR	SGM84372 YTQY24 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

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



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

Supply Voltage, $+V_S$ to $-V_S$ ..... -0.3V to 32V
$+V_S$ Voltage to GND ..... -0.3V to 30V
$-V_S$ Voltage to GND ..... -30V to 0.3V
DIS Voltage to GND ..... -0.3V to 5.5V
Package Thermal Resistance
TQFN-4×5-24AL, θ_{JA} ..... 31.1℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 4000V
CDM 1000V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range ..... -40℃ to +85℃

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

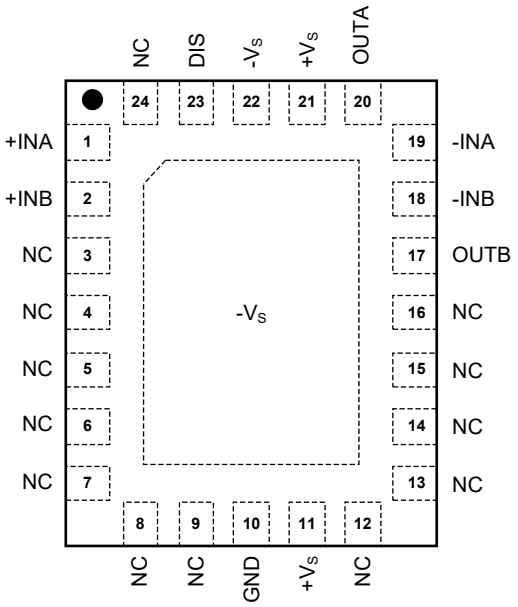
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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

(TOP VIEW)



TQFN-4×5-24AL

PIN DESCRIPTION

PIN	NAME	FUNCTION
1	+INA	Non-Inverting Input of Amplifier A.
2	+INB	Non-Inverting Input of Amplifier B.
3-9, 12-16, 24	NC	No Internal Connection.
10	GND	Ground. The GND pin must be connected with external ground.
11, 21	$+V_S$	Positive Power Supply for Amplifiers. (8V to 30V for single power supply and +4V to +15V for dual power supplies.)
17	OUTB	Output of Amplifier B.
18	-INB	Inverting Input of Amplifier B.
19	-INA	Inverting Input of Amplifier A.
20	OUTA	Output of Amplifier A.
22	$-V_S$	Negative Power Supply Voltage. For single power supply application, $-V_S$ pin must be connected to external ground. For dual power supplies application, $-V_S$ pin must be connected to external -4V to -15V negative power supply.
23	DIS	Disable Control Pin. The SGM8437-2 is in power-down (disabled) mode if the DIS pin is floating.
Exposed Pad	$-V_S$	Must be connected to $-V_S$ for optimal thermal performance. Connecting to other pins is not allowed.

ELECTRICAL CHARACTERISTICS

(V_S = 8V to 30V, V_{CM} = 1/2V_S, R_F = 1.2kΩ, R_L = 50Ω and A_V = 10, Full = -40℃ to +85℃, typical values are at T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Supply Characteristics							
Operating Voltage Range	V_S		Full	8		30	V
Positive Supply Current	$+I_S$ (Full-Power)	All outputs at 0V	+25℃		18	21	mA
			Full			24	
Negative Supply Current	$-I_S$ (Full-Power)	All outputs at 0V	+25℃	-21	-18		mA
			Full	-24			
Positive Supply Current	$+I_S$ (Power-Down)	All outputs at 0V, V_{DIS} = 3.3V, V_S = 28V	+25℃		35	50	μA
			Full			130	
Negative Supply Current	$-I_S$ (Power-Down)	All outputs at 0V, V_{DIS} = 3.3V, V_S = 28V	+25℃	-40	-30		μA
			Full	-120			
Power Supply Rejection Ratio	PSRR+	V_S = 8V to 30V	+25℃	90	100		dB
			Full	82			
	PSRR-	V_S = 8V to 30V	+25℃	84	94		
			Full	78			
Input Characteristics							
Input Offset Voltage	V_{OS}		+25℃		6	12	mV
			Full			18	
Input Offset Voltage Drift	$\Delta V_{OS}/\Delta T$		Full		0.1		mV/℃
Inverting Input Bias Current	$-I_B$		+25℃		18	35	μA
			Full			45	
Inverting Input Bias Current Drift	$\Delta I_B/\Delta T$		Full		0.1		μA /℃
Non-Inverting Input Bias Current	$+I_B$		+25℃		15	45	nA
			Full			320	
Non-Inverting Input Bias Current Drift	$\Delta I_{B+}/\Delta T$		Full		0.3		nA/℃
Input Common Mode Voltage Range	V_{CM}		Full	(-V_S) + 4		(+V_S) - 4	V
Common Mode Rejection Ratio	CMRR	V_S = 12V, V_{CM} = 4V to 8V	+25℃	74	82		dB
			Full	64			
		V_S = 30V, V_{CM} = 4V to 26V	+25℃	82	90		
			Full	74			
Transimpedance (1)	R_{OL}		Full		18		MΩ
Input High Voltage	V_{IH}	DIS input	Full	2			V
Input Low Voltage	V_{IL}	DIS input	Full			0.8	V
Input Pin Current	I_{IH}	DIS input, V_{DIS} = 3.3V	Full		-0.2	3	μA
	I_{IL}	DIS input, V_{DIS} = 0V	Full	-3	-2		
Output Characteristics							
Output Voltage Swing from Rail	V_{OUT}	V_S = 30V, R_L = 50Ω	+25℃		2.5	3	V
		V_S = 30V, R_L = 100Ω	+25℃		2.25		
		V_S = 30V, R_L = open	+25℃		2		
Output Current	I_{OUT}	V_S = 30V, R_L = 20Ω	+25℃		±0.5		A

NOTE: 1. Specified by design.

ELECTRICAL CHARACTERISTICS (continued)

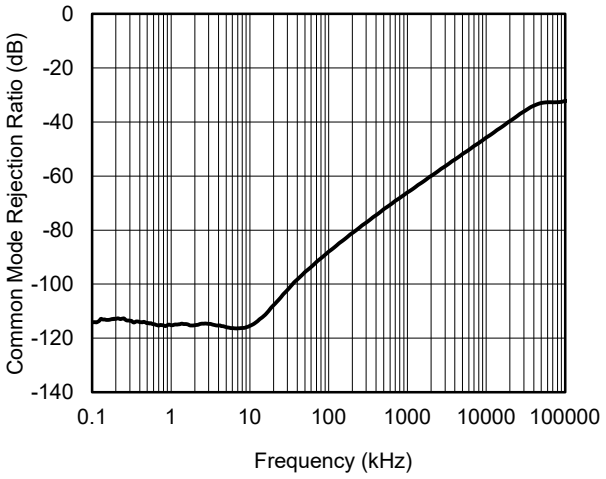
(V_S = 8V to 30V, V_{CM} = 1/2V_S, R_F = 1.2kΩ, R_L = 50Ω and A_V = 10, Full = -40℃ to +85℃, typical values are at T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Dynamic Performance							
-3dB Small-Signal Bandwidth	BW	V_S = 30V, V_{OUT} = 2V_{P-P}	+25℃		75		MHz
-3dB Large-Signal Bandwidth	BW	V_S = 30V, V_{OUT} = 10V_{P-P}	+25℃		35		MHz
2nd Harmonic Distortion	HD2	V_S = 30V, f_C = 1MHz, V_{OUT} = 10V_{P-P}	+25℃		-59		dBc
		V_S = 30V, f_C = 2MHz, V_{OUT} = 10V_{P-P}	+25℃		-60		
		V_S = 30V, f_C = 3MHz, V_{OUT} = 10V_{P-P}	+25℃		-54		
		V_S = 30V, f_C = 10MHz, V_{OUT} = 10V_{P-P}	+25℃		-35		
3rd Harmonic Distortion	HD3	V_S = 30V, f_C = 1MHz, V_{OUT} = 10V_{P-P}	+25℃		-69		dBc
		V_S = 30V, f_C = 2MHz, V_{OUT} = 10V_{P-P}	+25℃		-64		
		V_S = 30V, f_C = 3MHz, V_{OUT} = 10V_{P-P}	+25℃		-60		
		V_S = 30V, f_C = 10MHz, V_{OUT} = 10V_{P-P}	+25℃		-57		
Slew Rate (Differential Signal)	SR	V_S = 30V, V_{OUT} = 20V_{P-P}	+25℃		800		V/μs
Turn-On/Off Time	t_{EN}	From disable to enable time	+25℃		10		μs
	t_{DIS}	From enable to disable time	+25℃		160		ns
Noise							
Input Voltage Noise Density	e_n	f = 1MHz	+25℃		10		nV/$\sqrt{Hz}$
Over-Temperature Protection							
Over-Temperature Protection					150		℃
Over-Temperature Protection Hysteresis					5		℃

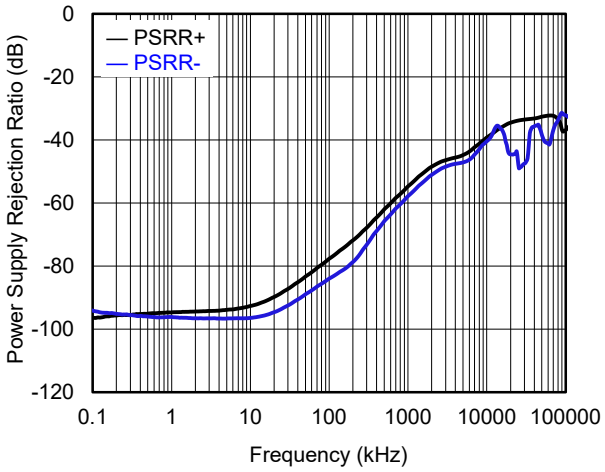
TYPICAL PERFORMANCE CHARACTERISTICS

At T_A = +25℃, V_S = ±15V, unless otherwise noted.

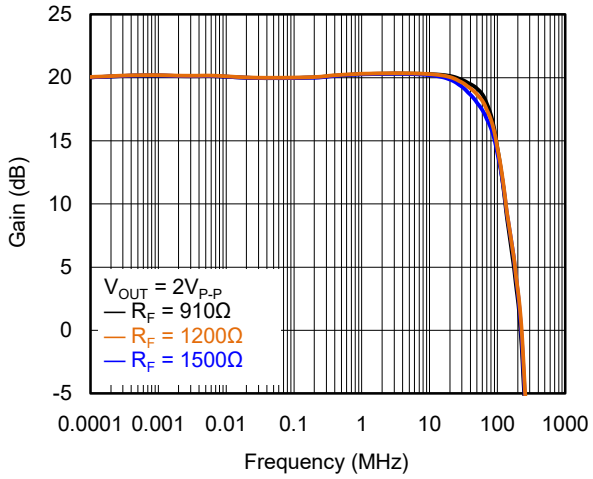
CMRR vs. Frequency



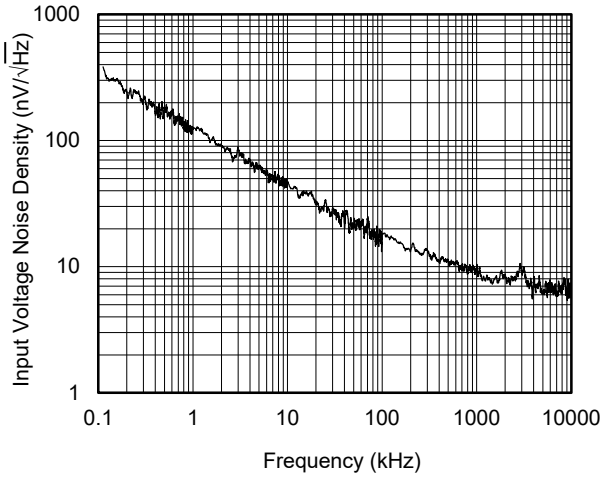
PSRR vs. Frequency



Gain vs. Frequency



Input Voltage Noise Density vs. Frequency



FUNCTIONAL BLOCK DIAGRAM

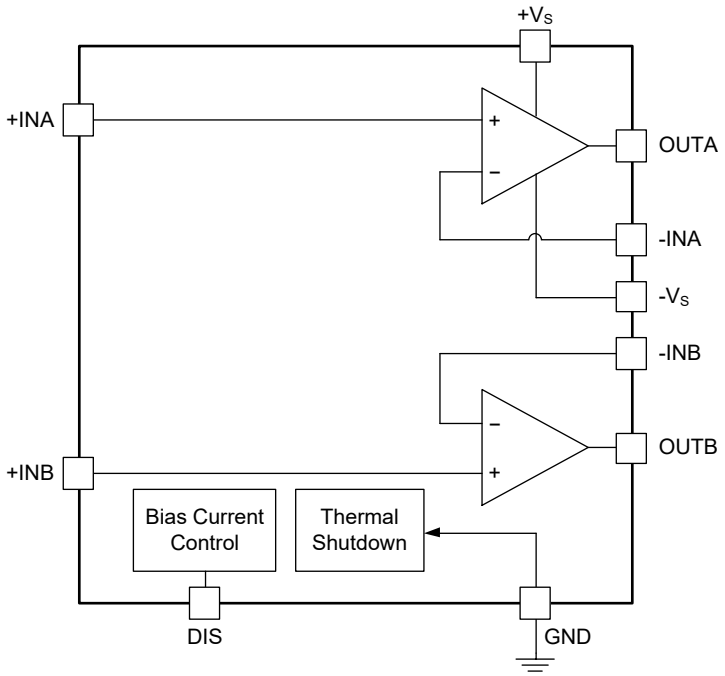


Figure 2. Block Diagram

APPLICATION INFORMATION

Figure 1 shows a typical application circuit for SGM8437-2.

Power Control Function

The SGM8437-2 supports power control operation. Its supply current is controlled by the digital inputs DIS. DIS pin is pulled high internally. The device immediately enters power-down mode when DIS pin is floating.

The truth table of the SGM8437-2 is shown in Table 1.

Table 1. Working Modes of SGM8437-2

DIS Pin	Operation
0	Full-Power Working Mode.
1	Power-Down Mode.
Floating	Power-Down Mode.

Breakdown Supply Voltage

If the amplifier is being used in an application that is part of a regulated power grid, the ability to withstand a supply voltage that is higher than the recommended voltage is important to ensure robustness.

In order to estimate the margin beyond the maximum supply voltage, several randomly selected samples are tested to show the robustness of SGM8437-2.

Figure 3 shows the configuration of this test. The SGM8437-2 is tested by manually increasing the supply voltage in 1V steps while simultaneously recording the supply current. This operation is performed from 28V until internal device is breakdown. Five samples are subjected to this test, and the results are shown in Figure 4.

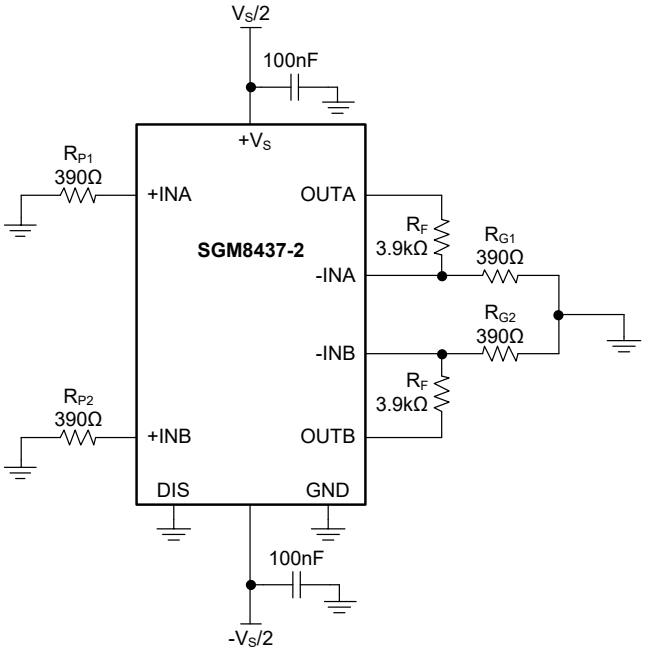


Figure 3. Breakdown Supply Voltage Test Configuration

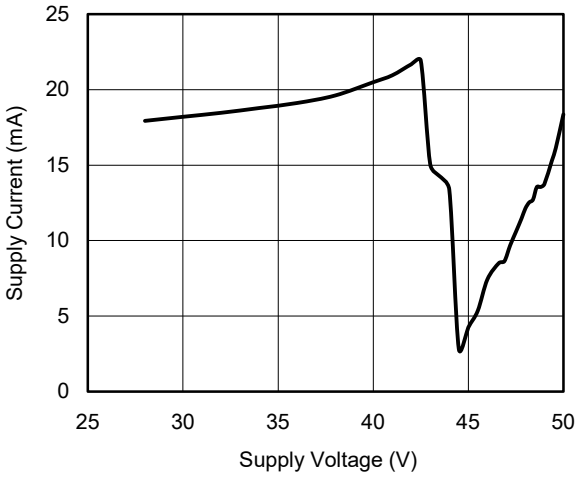


Figure 4. Supply Current vs. Supply Voltage

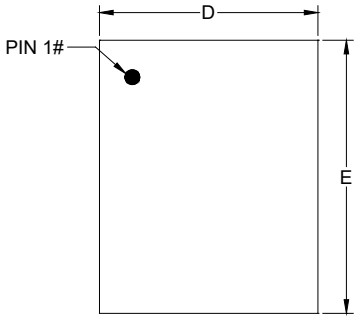
REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

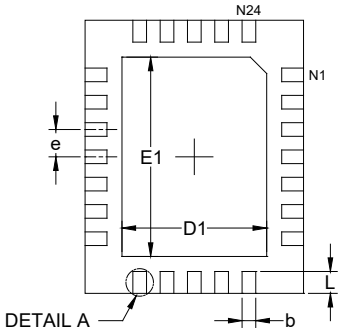
Changes from Original (JUNE 2024) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

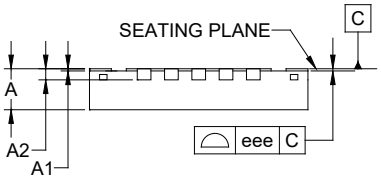
TQFN-4×5-24AL



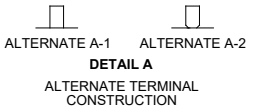
TOP VIEW



BOTTOM VIEW

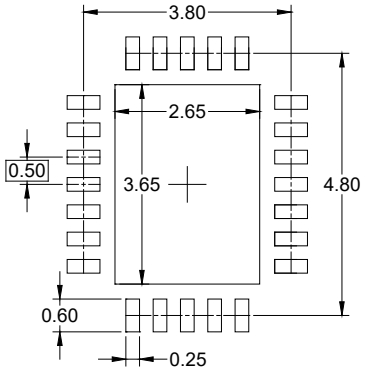


SIDE VIEW



DETAIL A

ALTERNATE TERMINAL CONSTRUCTION



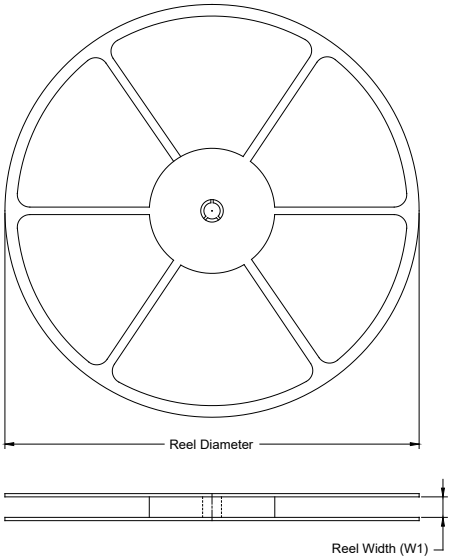
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.200	-	0.300
D	3.900	-	4.100
E	4.900	-	5.100
D1	2.550	-	2.750
E1	3.550	-	3.750
e	0.500 BSC		
L	0.300	-	0.500
eee	0.080		

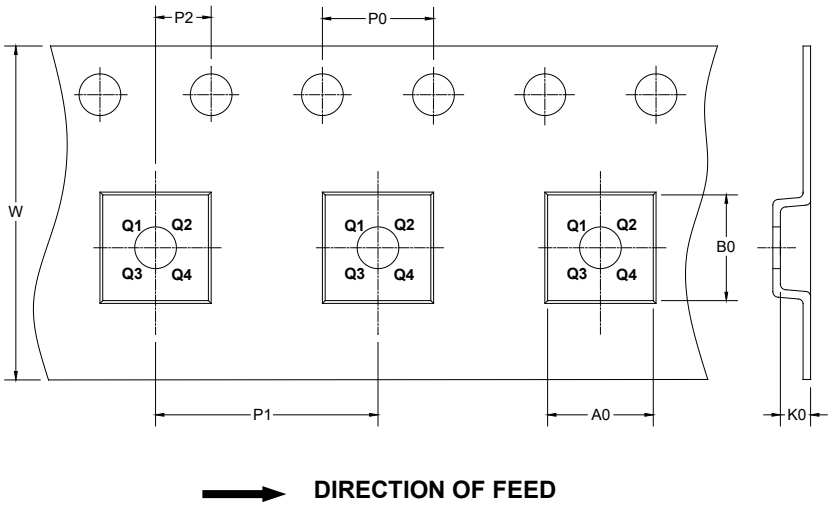
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



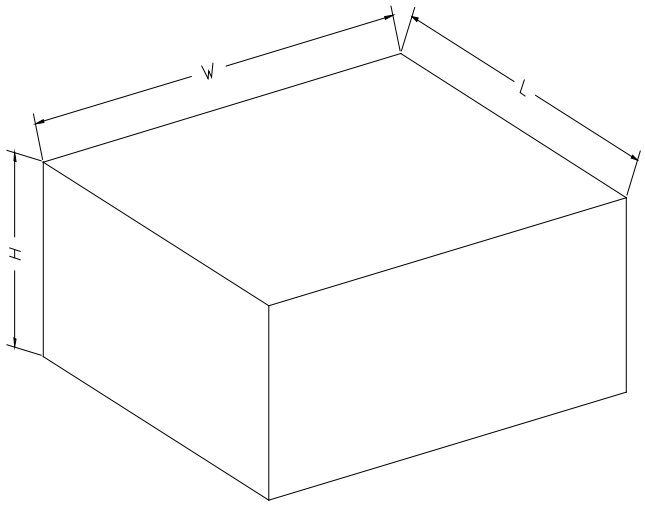
NOTE: The picture is only for reference. Please make the object as the standard.

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
TQFN-4×5-24AL	13″	12.4	4.30	5.30	1.10	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
13″	386	280	370	5

DD0002