



SGM3132

4-Channel 1-Wire Dimming LED Driver with Ultra Low Dropout Current Source

GENERAL DESCRIPTION

The SGM3132 is a 4-channel ultra low dropout constant source parallel LED driver. The SGM3132 uses an internal resistor to set the bias current for four LEDs.

The SGM3132 incorporates a single wire interface to program the output current at 16 continuous steps. It has an internal deglitch circuit for filtering the noise of the EN input.

The SGM3132 requires only a 35mV dropout voltage at a 20mA load. The feature makes SGM3132 ideal for battery-operated systems, such as personal digital assistants.

The SGM3132 is available in Green TQFN-3x3-16L, TDFN-2x2-8L and MSOP-8 packages and is specified over an ambient temperature range of -40°C to +85°C.

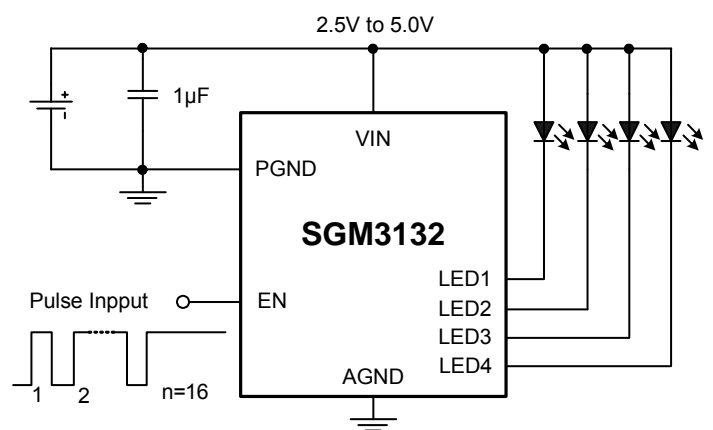
APPLICATIONS

- Wireless Handsets
- MP3, MP4, and PMP
- Cellular Phones
- Portable Communication Devices
- Digital Cameras, Camcorders
- PDAs, Palmtops, and Handy Terminals
- Battery-Powered Equipment

FEATURES

- Ultra Low Dropout: 35mV/20mA
- Support up to 4 LEDs
- LED Sink Current 20mA
- ±3% LED Current Matching
- Deglitch Circuit
- Thermal Shutdown Protection
- 16-Step Brightness Control
- No EMI and Switch Noise
- Operating Temperature Range: -40°C to +85°C
- Available in Green TQFN-3x3-16L, TDFN-2x2-8L and MSOP-8 Packages

TYPICAL APPLICATION



PACKAGE/ORDERING INFORMATION

MODEL	ORDER NUMBER	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	MARKING INFORMATION	PACKAGE OPTION
SGM3132	SGM3132YTQ16G/TR	TQFN-3x3-16L	-40°C to +85°C	3132TQ	Tape and Reel, 3000
	SGM3132YDE8G/TR	TDFN-2x2-8L	-40°C to +85°C	3132	Tape and Reel, 3000
	SGM3132YMS8G/TR	MSOP-8	-40°C to +85°C	SGM3132YMS8	Tape and Reel, 3000

ABSOLUTE MAXIMUM RATINGS

V _{IN} to GND.....	-0.3V to 6V
The Other Pins to GND.....	-0.3V to 6V
Power Dissipation ⁽¹⁾ , P _D @ T _A = 25°C	
TQFN-3x3-16L.....	1.47W
TDFN-2x2-8L.....	0.61W
MSOP-8.....	0.57W
Storage Temperature Range.....	-40°C to +150°C
Junction Temperature.....	125°C
Operating Temperature Range.....	-40°C to +85°C
Lead Temperature (Soldering 10 sec)	
.....	260°C
ESD Susceptibility	
HBM.....	4000V
MM.....	400V

NOTES:

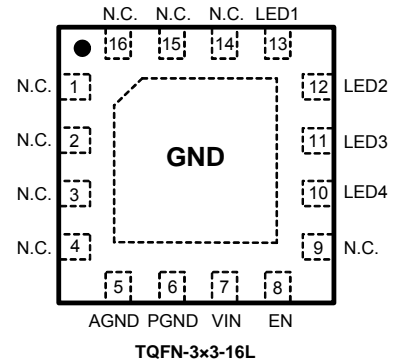
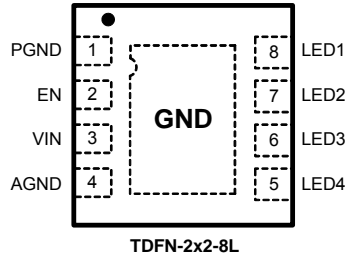
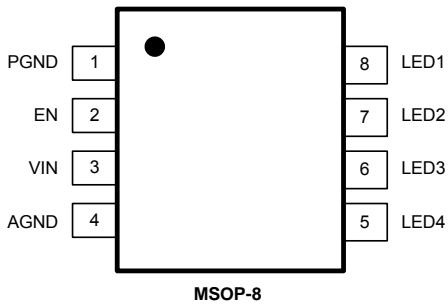
1. The thermal resistance figures are for general reference only. Actual thermal characteristics may vary with the PCB layout, size of metal trace, the thermal conduction path between metal layers and the environment of the system.
2. Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its published specifications.

SGMICRO reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SGMICRO sales office to get the latest datasheet.

PIN CONFIGURATIONS (TOP VIEW)



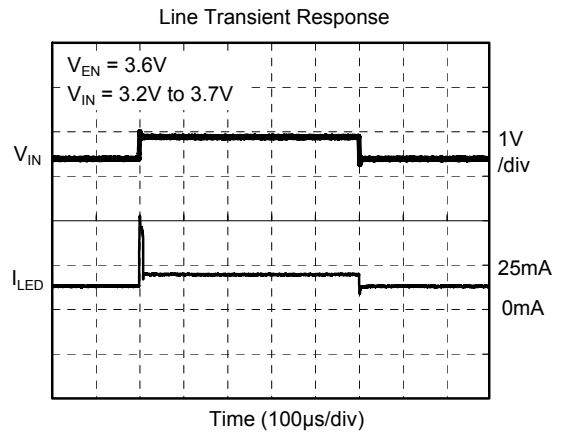
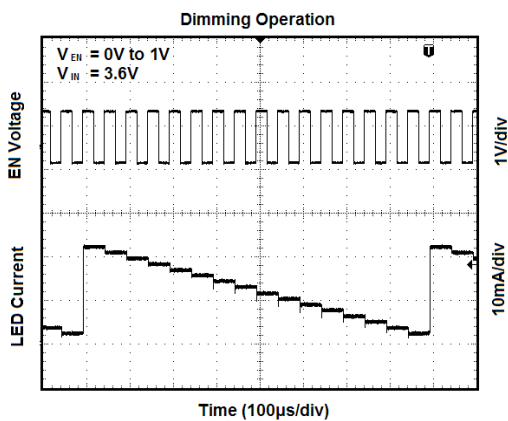
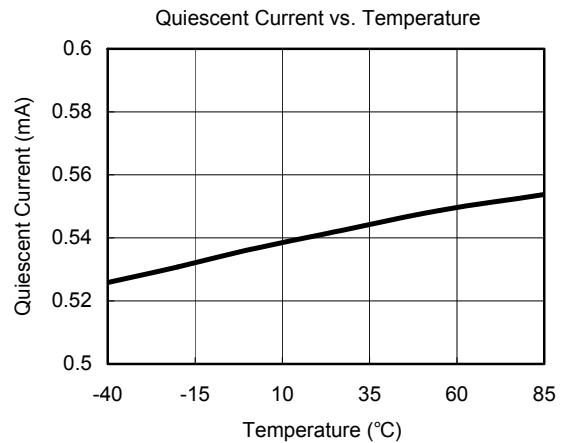
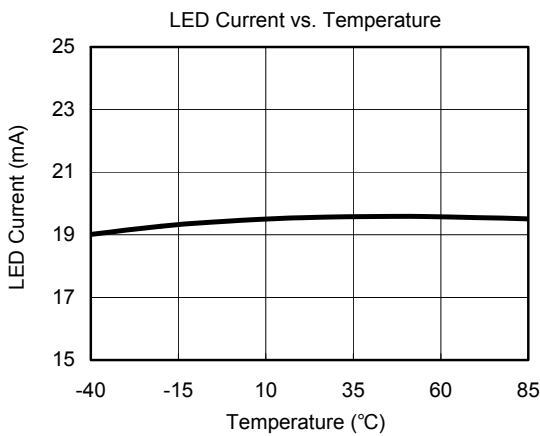
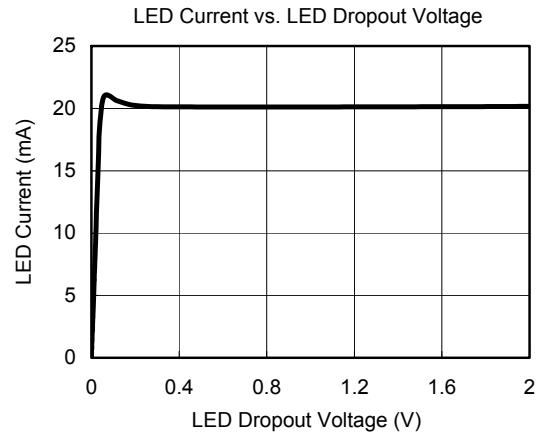
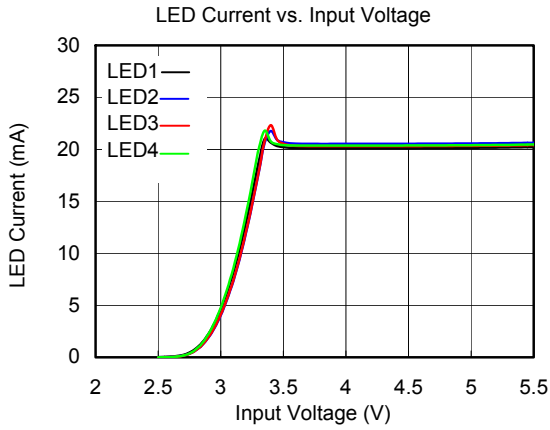
PIN DESCRIPTION

PIN NUMBER			PIN NAME	PIN FUNCTION
TQFN-3x3-16L	TDFN-2x2-8L	MSOP-8		
5	4	4	AGND	Analog Ground.
6	1	1	PGND	Power Ground.
7	3	3	VIN	Power Input Voltage.
8	2	2	EN	Enable Input. Active high and connect to GPIO pin of MCU.
10	5	5	LED4	Current Sink for LED4. Connect to cathode of external White LED.
11	6	6	LED3	Current Sink for LED3. Connect to cathode of external White LED.
12	7	7	LED2	Current Sink for LED2. Connect to cathode of external White LED.
13	8	8	LED1	Current Sink for LED1. Connect to cathode of external White LED.
1,2,3,4, 9,14,15,16	—	—	N.C.	No Internal Connection.
Exposed Pad	Exposed Pad	—	GND	Exposed pad should be soldered to PCB board and connected to GND.

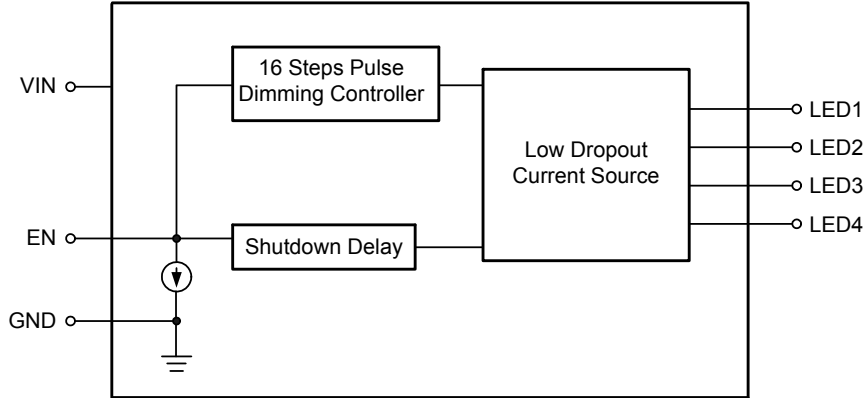
ELECTRICAL CHARACTERISTICS(V_{IN} = 3.6V, C_{IN} = 1μF, T_A = +25°C, unless otherwise noted.)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operation Voltage Range		V _{IN}		2.5		5.0	V
EN Pull Low Current			V _{EN} = 1.8V		0.01		μA
Quiescent Power Supply Current		I _Q	V _{IN} = 5.0V, LED OFF		0.55		mA
Shutdown Current		I _{SHDN}	V _{EN} = 0V, V _{IN} = 5.0V		0.1	5	μA
I _{LEDx} Accuracy		I _{LED-ERR}		-10		+10	%
LED Current Deviation Matching		D _{LED}		-3		+3	%
LED Dropout Voltage		V _{LED}	I _{LEDx} = 20mA, V _{LED} @ I _{LEDx} = 90% × I _{LED}		35		mV
EN Low Time for Shutdown		T _{SHDN}			1.6		ms
EN Low Time for Dimming		T _{LO}		0.5		500	μs
EN High Time for Dimming		T _{HI}		0.5			μs
EN Threshold	Logic-High Voltage	V _{IH}	V _{EN} > V _{IH} for Enable IH	1.2			V
	Logic-Low Voltage	V _{IL}	V _{EN} < V _{IL} for Disable IL			0.5	V
Thermal Shutdown Temperature					150		°C
Hysteresis Temperature					10		°C

TYPICAL PERFORMANCE CHARACTERISTICS



FUNCTION BLOCK DIAGRAM



APPLICATION INFORMATION

LED Connection

The SGM3132 supports up to 4 white LEDs. The four LEDs are connected from VIN to TQFN-3x3-16L package's pin 10, 11, 12 and 13 respectively. For TDFN-2x2-8L and MSOP-8 packages, Cathode of white LEDs are connected to pin 5, 6, 7 and 8 respectively.

Brightness Control

The SGM3132 implements a pulse dimming method to control the brightness of white LEDs. Users can easily configure the LED current from 1.25mA to 20mA by a serial pulse. The dimming of white LEDs' current can be achieved by applying a pulse signal to the EN pin. There are totally 16 steps of current that could be set by users. The detail operation of brightness dimming is showed in the Figure 1.

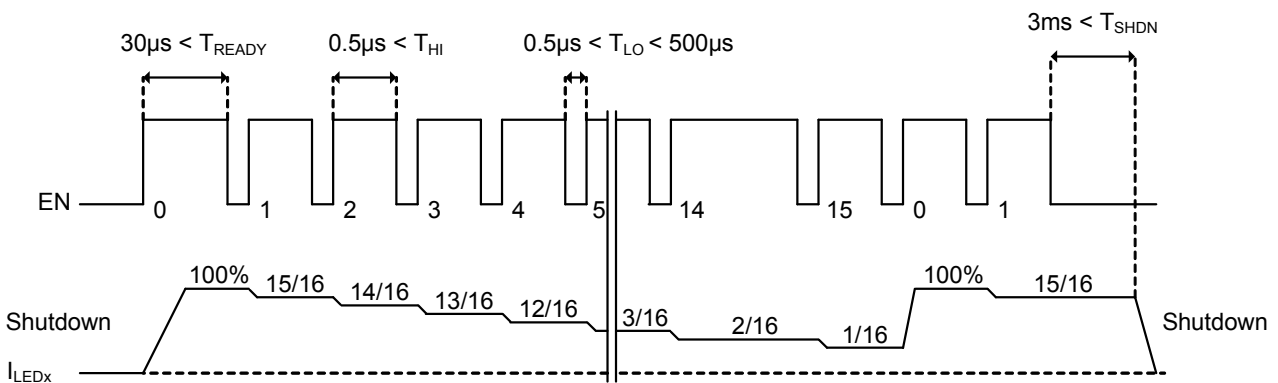
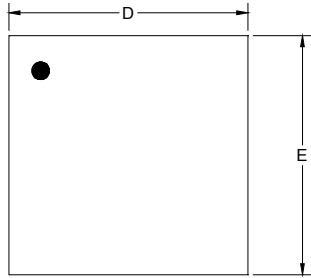


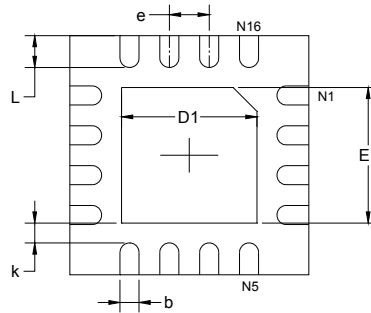
Figure 1. Brightness Control by Pulse Dimming

PACKAGE OUTLINE DIMENSIONS

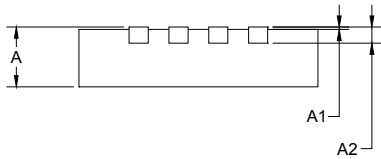
TQFN-3x3-16L



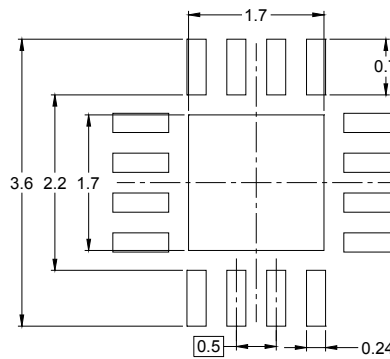
TOP VIEW



BOTTOM VIEW



SIDE VIEW

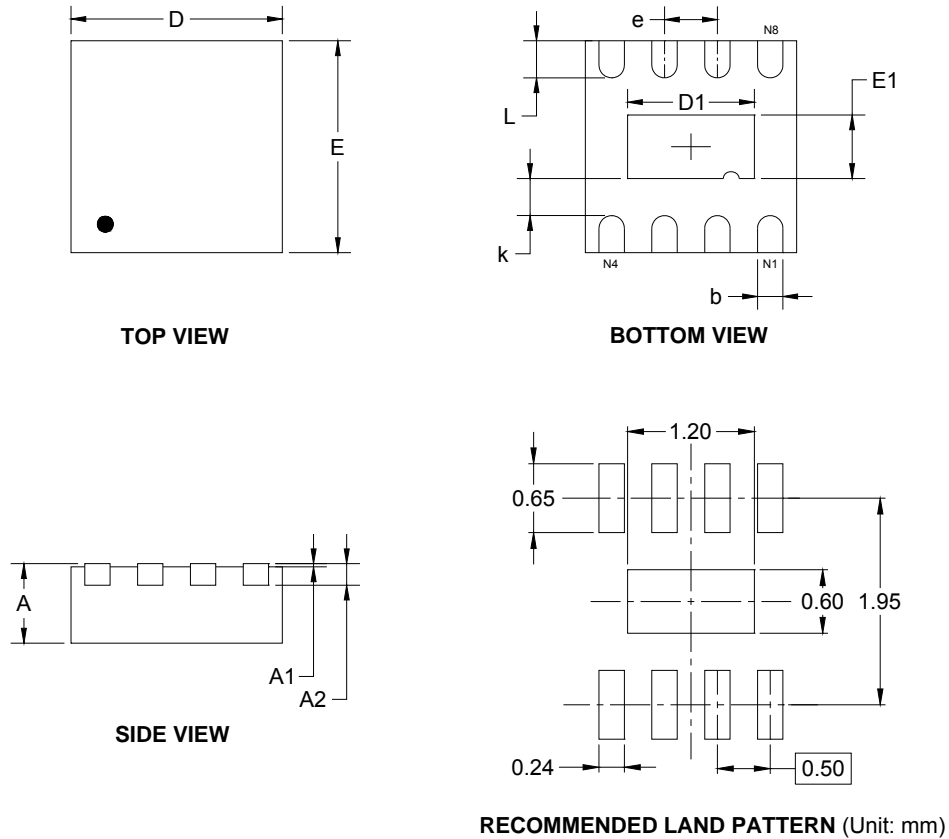


RECOMMENDED LAND PATTERN (Unit: mm)

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	2.900	3.100	0.114	0.122
D1	1.600	1.800	0.063	0.071
E	2.900	3.100	0.114	0.122
E1	1.600	1.800	0.063	0.071
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.300	0.500	0.012	0.020

PACKAGE OUTLINE DIMENSIONS

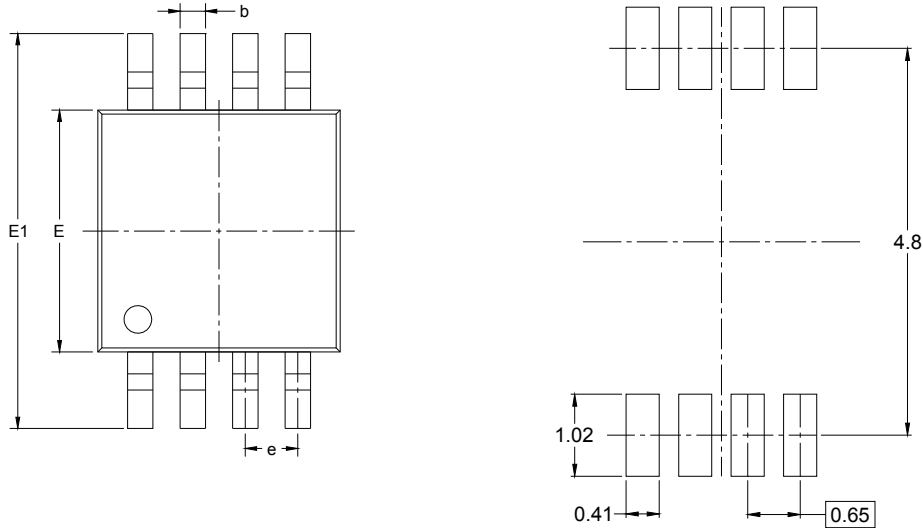
TDFN-2x2-8L



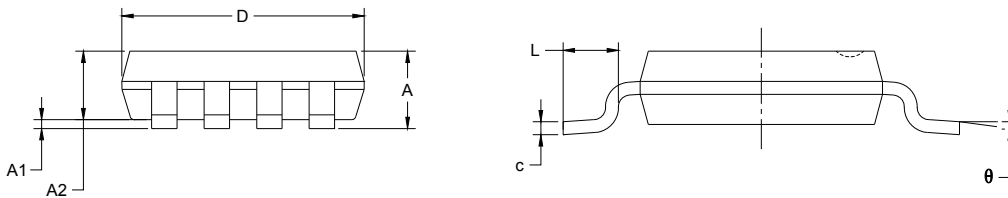
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.500	0.700	0.020	0.028
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.250	0.450	0.010	0.018

PACKAGE OUTLINE DIMENSIONS

MSOP-8



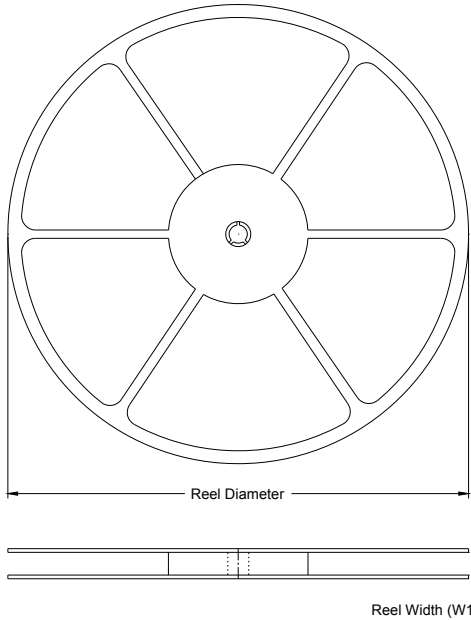
RECOMMENDED LAND PATTERN (Unit: mm)



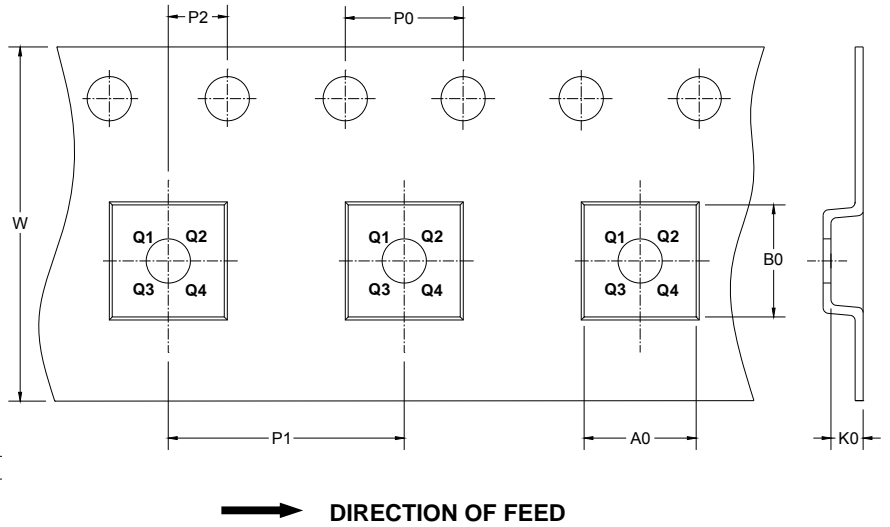
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

TAPE AND REEL INFORMATION

REEL DIMENSIONS



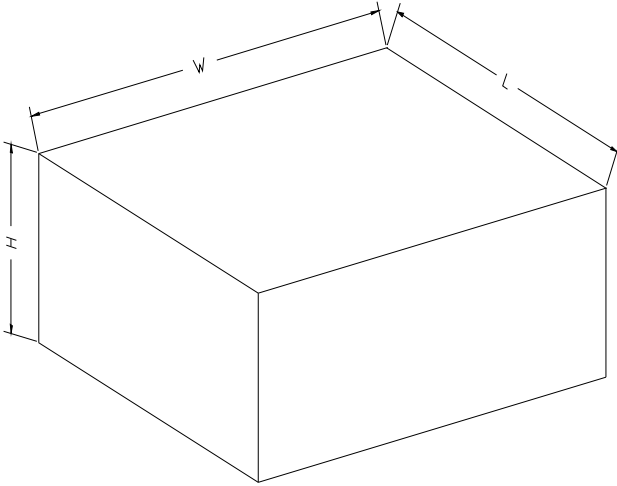
TAPE DIMENSIONS



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-3×3-16L	13"	12.40	3.35	3.35	1.13	4.00	4.00	2.00	12.00	Q1
TDFN-2×2-8L	7"	9.5	2.30	2.30	1.10	4.00	4.00	2.00	8.00	Q1
MSOP-8	13"	12.4	5.2	3.3	1.5	4.0	8.0	2.0	12.0	Q1

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