



SGM41286

LNB Supply with Tone Repeater/Synthesizer and Programmable Cable Drop Compensation

GENERAL DESCRIPTION

This SGM41286 is a high-efficient boost power supply providing a wide input voltage range of 7V to 14V and two selectable 14V and 19V nominal output versions. The device integrates the high-efficient low head room architecture. It also can operate with acoustic noise free and work with low power.

The -1V/+0.4V drop compensation can be programmed, allowing the use of external surge absorbing devices at the output. This device employs the features like internal short-safe over-current protection and over-temperature protection.

The SGM41286 is available in Green TDFN-3×3-8L and SOIC-8 (Exposed Pad) packages. It operates over an ambient temperature range of -40°C to +85°C.

FEATURES

- 7V to 14V Input Voltage Range
- 500mA 14V/19V Output
- DiSEqC 1.X Compatible
- Programmable -1V/+0.4V Drop Compensation
- High-Efficient Low Head Room Architecture
- Acoustic Noise Free Low Power Operation
- Automatic Tone Repeater or Tone Synthesizer
- LDO Output and Low Out-of-Band Noise
- 200ms Current Limit Loading Surge Window
- Internal Short-Safe Over-Current Protection
- Internal Over-Temperature Protection
- Available in Green TDFN-3×3-8L and SOIC-8 (Exposed Pad) Packages
- -40°C to +85°C Operating Temperature Range

APPLICATIONS

STB Satellite Receiver
TV Satellite Receiver
PC Card Satellite Receiver

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM41286	TDFN-3×3-8L	-40°C to +85°C	SGM41286YTDB8G/TR	SGM 41286DB XXXXX	Tape and Reel, 4000
	SOIC-8 (Exposed Pad)	-40°C to +85°C	SGM41286YPS8G/TR	SGM 41286YPS8 XXXXX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XXXXX = Date Code and Vendor Code.

XXXXX

Vendor Code

Date Code - Week

Date Code - Year

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

V _{IN}	-0.3V to 22.5V
LX, VCP	-0.3V to 30V
VSW	-0.3V to 25.5V
EN, H/V, EXTM.....	-0.3V to 6V
Junction Temperature	+150°C
Storage Temperature Range.....	-65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility	
VLNB to GND, HBM	8000V
All Rest Pins to GND, HBM.....	4000V
CDM	2000V
MM.....	400V
Surge Immunity, 10µs/700µs, ±Impulse.....	40V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range	7V to 14V
Operating Temperature Range	-40°C to +85°C
Operating Junction Temperature Range	-40°C to +125°C

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.

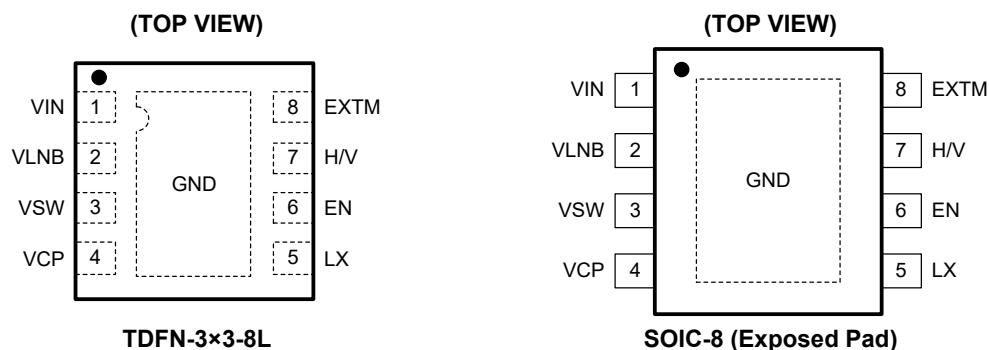
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged 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.

DISCLAIMER

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

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	TYPE ⁽¹⁾	FUNCTION
1	VIN	P	Power Input for Internal Circuit.
2	VLNB	O	Output for LNB Powering. Put a 100nF decoupling capacitor to this pin.
3	VSW	O	Input for Powering Output Stage.
4	VCP	O	Charge Pump Storage Output for Internal Use. Put a 10nF storage capacitor to this pin.
5	LX	O	Switch Node. Connect with one end of a power inductor.
6	EN	I	Enable Input. Pull up to 1.1V ~ 6V logic high to enable the device.
7	H/V	I	VLNB Output Voltage Selection Input. 19V nominal output is got when pulls this pin up to 1.1V to 6V logic high. 14V nominal output is got when pulls it down or leaves it open.
8	EXTM	I	External Tone Input and Internal Tone Synthesizer Enable Input.
Exposed Pad	GND	G	Ground.

NOTE : 1. P: power, I: input, O: output, G: ground.

SGM41286

LNB Supply with Tone Repeater/Synthesizer and Programmable Cable Drop Compensation

ELECTRICAL CHARACTERISTICS

($V_{IN} = 12V$, $V_{EN} = 3V$, $C_{IN} = 10\mu F$, $C_{VSW} = 22\mu F \times 2$, $L = 10\mu H$ and Full = $-40^\circ C$ to $+85^\circ C$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
OPERATION CHARACTERISTIC							
Supply Voltage	V _{OPM}		Full	7	12	14	V
Under-Voltage Lockout Release Voltage	UVLO _r	V _{IN} rising	+25°C		4.5	4.8	V
Shutdown Supply Current	I _Q	EN = 0	+25°C		60	80	μA
Operation Supply Current	I _{OP}	EN = 1, H/V = 0, I _{OUT} = 0mA	+25°C		4	5.5	mA
Boost Switching Frequency	f _{swm}	No load	+25°C		22		kHz
Boost Switching Frequency	f _{sw1}		+25°C	1.27	1.41	1.55	MHz
VLNB Output Voltage	V14	H/V = 0, I _{OUT} = 500mA	+25°C	13.65	14	14.35	V
	V19	H/V = 1, I _{OUT} = 500mA	+25°C	18.5	19	19.5	
Power Supply Rejection Ratio	14PSRR1k	1kHz, H/V = 0, V _{PP} = 200mV	+25°C		-58		dB
	19PSRR1k	1kHz, H/V = 1, V _{PP} = 200mV	+25°C		-50		
Line Regulation	14V _{LINEREG}	V _{IN} = 11V to12V, I _{OUT} = 500mA, H/V = 0	+25°C		0.01		% /V
	19V _{LINEREG}	V _{IN} = 11V to12V, I _{OUT} = 500mA, H/V = 1	+25°C		0.01		
Linear Regulator Dropout Voltage	V _{RRM}		+25°C		600		mV
Short Circuit Current Limit	I _{SHRT}		+25°C		3		A
Over-Current Limit	I _{OC}		+25°C		750		mA
Output Current	I _{OUT}		+25°C		500		mA
Over-Current Blanking Time	t _{OCBLK}		+25°C		186		ms
Over-Current Retry Time	t _{RETRY}		+25°C		744		ms
Count of Over-Current Retry Times	C _{RETRY}		+25°C		8		–
Line Drop Compensation Voltage	DCV	3 EN pulses	+25°C		-1		V
		4 EN pulses	+25°C		0.4		V
Efficiency (No Tone)	η	H/V = 0, I _{OUT} = 500mA	+25°C		89.5		%
		H/V = 1, I _{OUT} = 500mA	+25°C		89		
Efficiency (Tone)	η _T	H/V = 0, I _{OUT} = 500mA	+25°C		87.7		%
		H/V = 1, I _{OUT} = 500mA	+25°C		87.5		
OVER-TEMPERATURE PROTECTION							
Over-Temperature Shutdown	T _{OT}				160		°C
Over-Temperature Protection Hysteresis	T _{OTHYS}				30		°C
LOGIC SIGNALS							
Logic High Threshold Level	V _{TL}	EN, H/V, EXTM	Full			0.4	V
	V _{TH}		Full	1.1			
Logic Input Current	I _{EN}		+25°C		0.1	1	μA
H/V Internal Pull-Down Resistance	R _{H/V}		+25°C		750		kΩ
EXTM Internal Pull-Down Resistance	R _{EXTM}		+25°C		250		kΩ
TIMING							
Power Blanking Time	t _{PONBLK}		+25°C		93		ms
Delay Time for Tone Starting after Enable	t _{ENDLY}		+25°C		2.9		ms
Delay Time for Output Starting after Enable	t _{ONDLY}		+25°C		23.3		ms
Delay Time for Line Drop Out Compensation after End of EN Pulses	t _{PROGDLY}		+25°C		2.9		ms
Delay Time for Output Stopping after Disable	t _{OFFDLY}		+25°C		23.3		ms

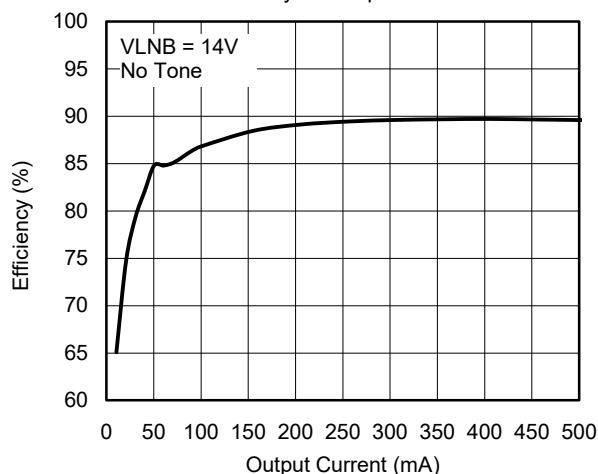
ELECTRICAL CHARACTERISTICS (continued)(V_{IN} = 12V, V_{EN} = 3V, C_{IN} = 10μF, C_{VSW} = 22μF × 2, L = 10μH and Full = -40°C to +85°C, T_A = +25°C, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Detection Time for Internal Synthesized Tone Signal	t _{SYNDLY}		+25°C		46		μs
SYNTHESIZED TONE							
Frequency of Internal Synthesized Tone Signal	f _{22k}		+25°C		22		kHz
Tone Amplitude	V _{PPTONE}		+25°C		600		mV
Tone Duty Cycle	D		+25°C		50		%
Tone Rise Time	t _R		+25°C		5		μs
Tone Fall Time	t _F		+25°C		5		μs
EN PULSES							
Minimum On Time between Two EN Pulses	t _{SH}		+25°C		30		μs
Minimum Off Time of EN Pulse	t _{SL}		+25°C		30		μs
Delay Time for Sending EN Pulses after Enable	t _{E2S}		+25°C		2.9		ms
Detection Time for End of EN Pulses	t _{EOS}		+25°C		2.9		ms

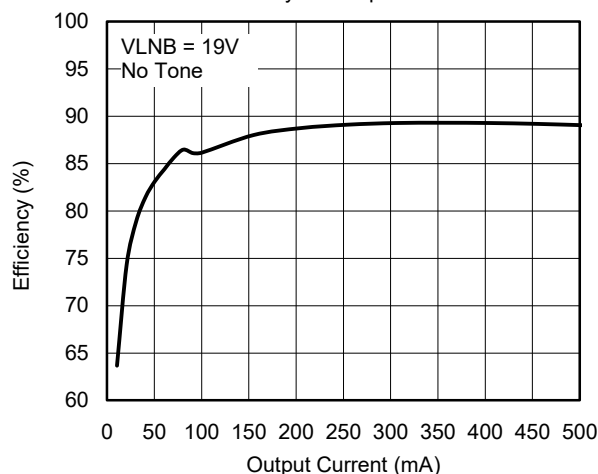
TYPICAL PERFORMANCE CHARACTERISTICS

$V_{IN} = 12V$, $C_{IN} = 10\mu F$, $C_{VSW} = 22\mu F \times 2$, $L = 10\mu H$ and $T_A = +25^\circ C$, unless otherwise noted.

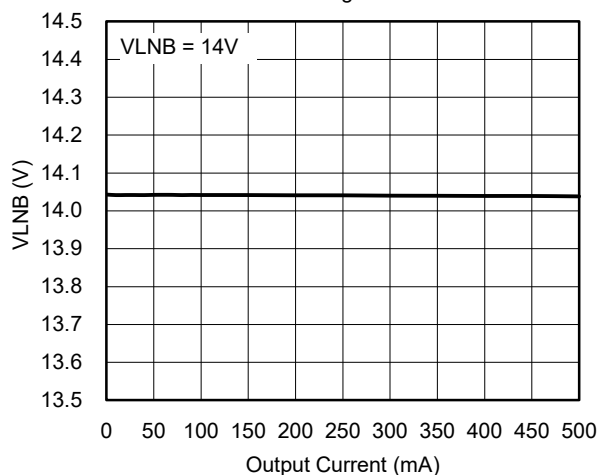
Efficiency vs. Output Current



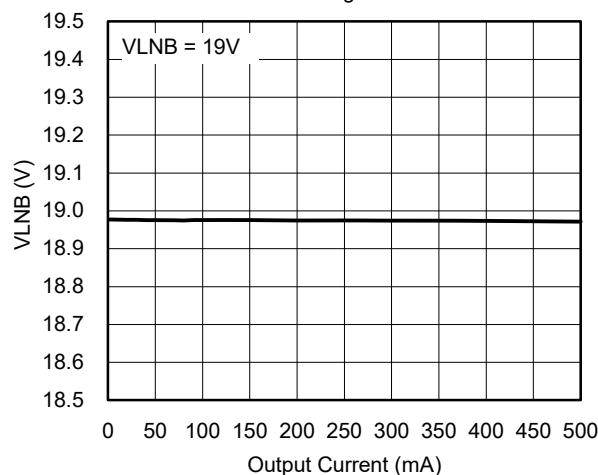
Efficiency vs. Output Current



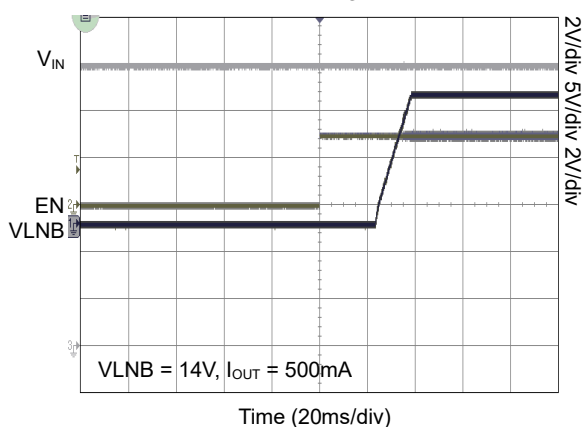
Load Regulation



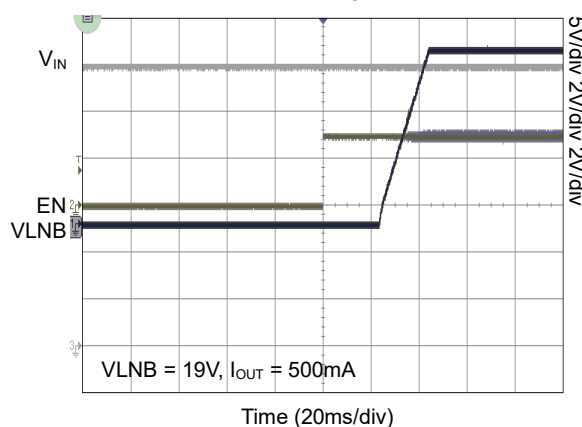
Load Regulation



Power On

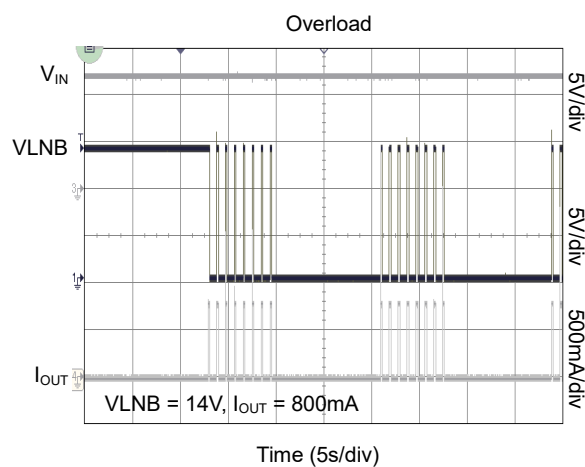
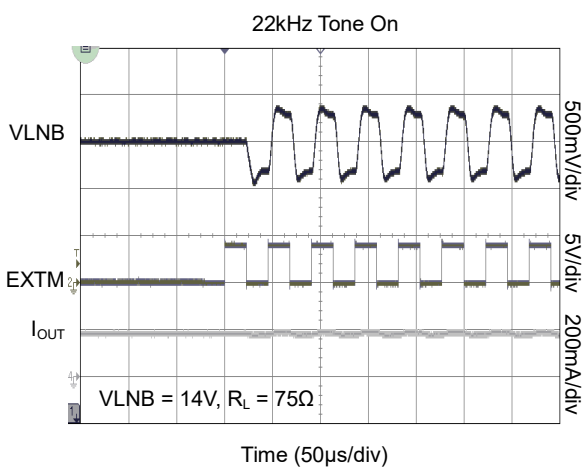
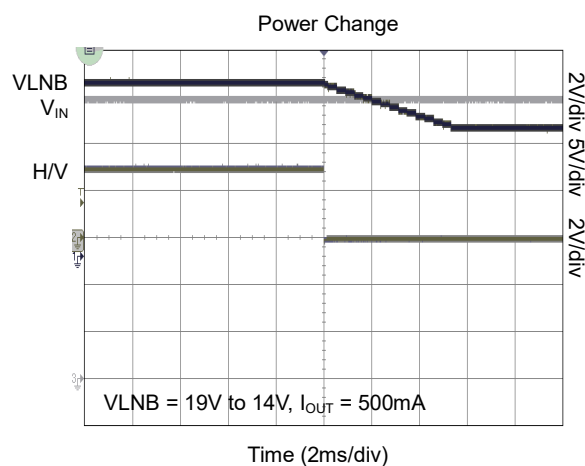
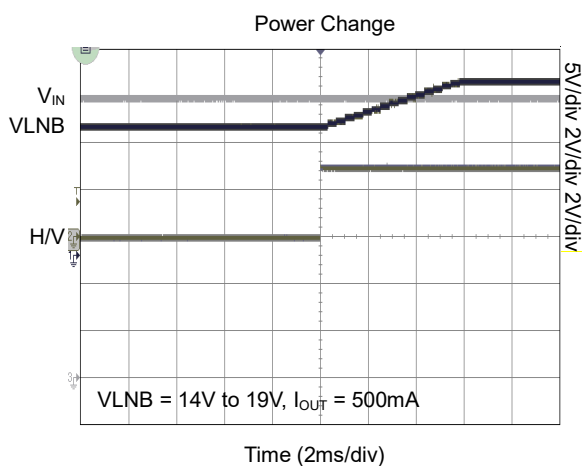
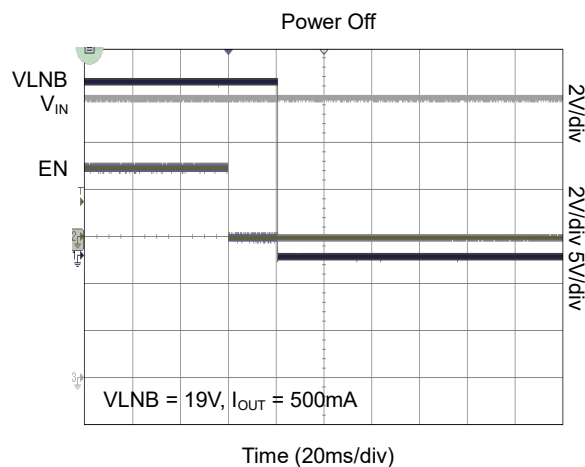
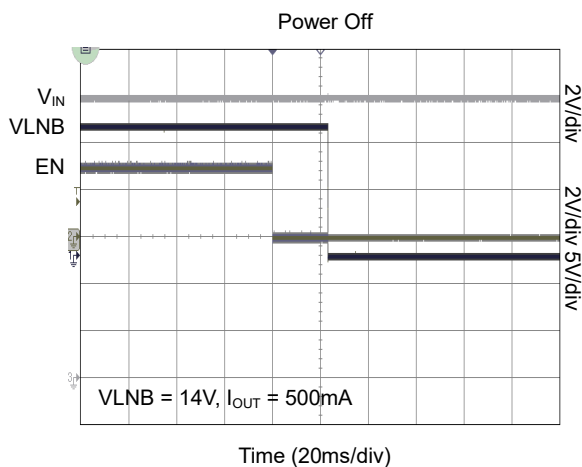


Power On



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

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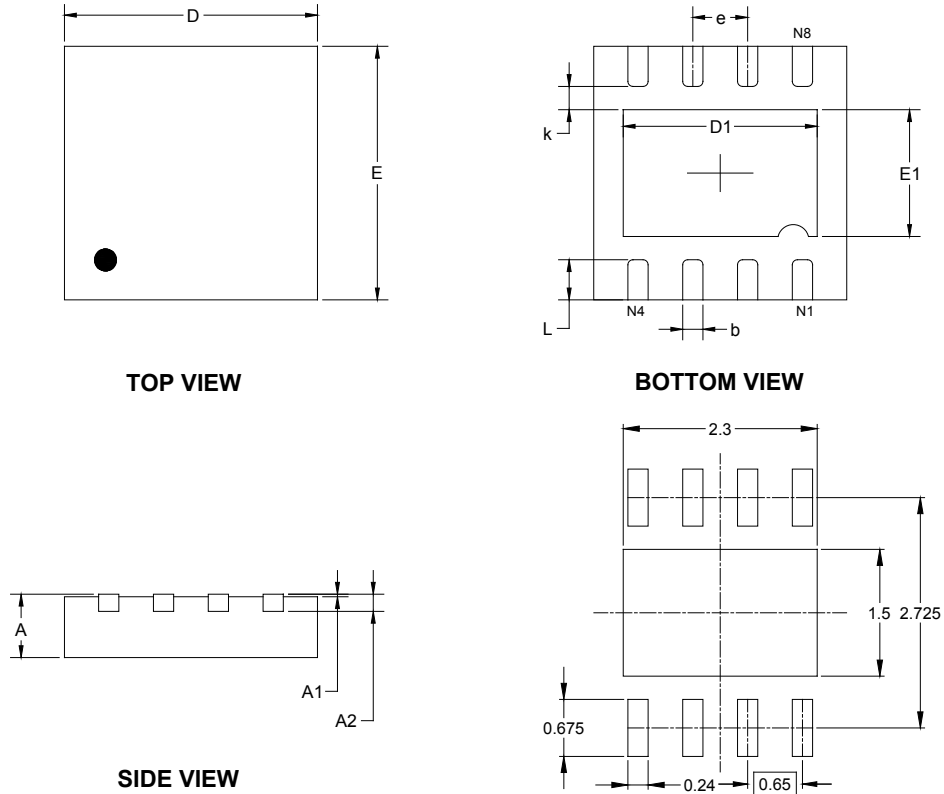
REVISION HISTORY

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

MAY 2019 – REV.A.1 to REV.A.2	Page
Updated Absolute Maximum Ratings	2
APRIL 2019 – REV.A to REV.A.1	Page
Updated Absolute Maximum Ratings	2
Changes from Original (JULY 2017) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

TDFN-3×3-8L

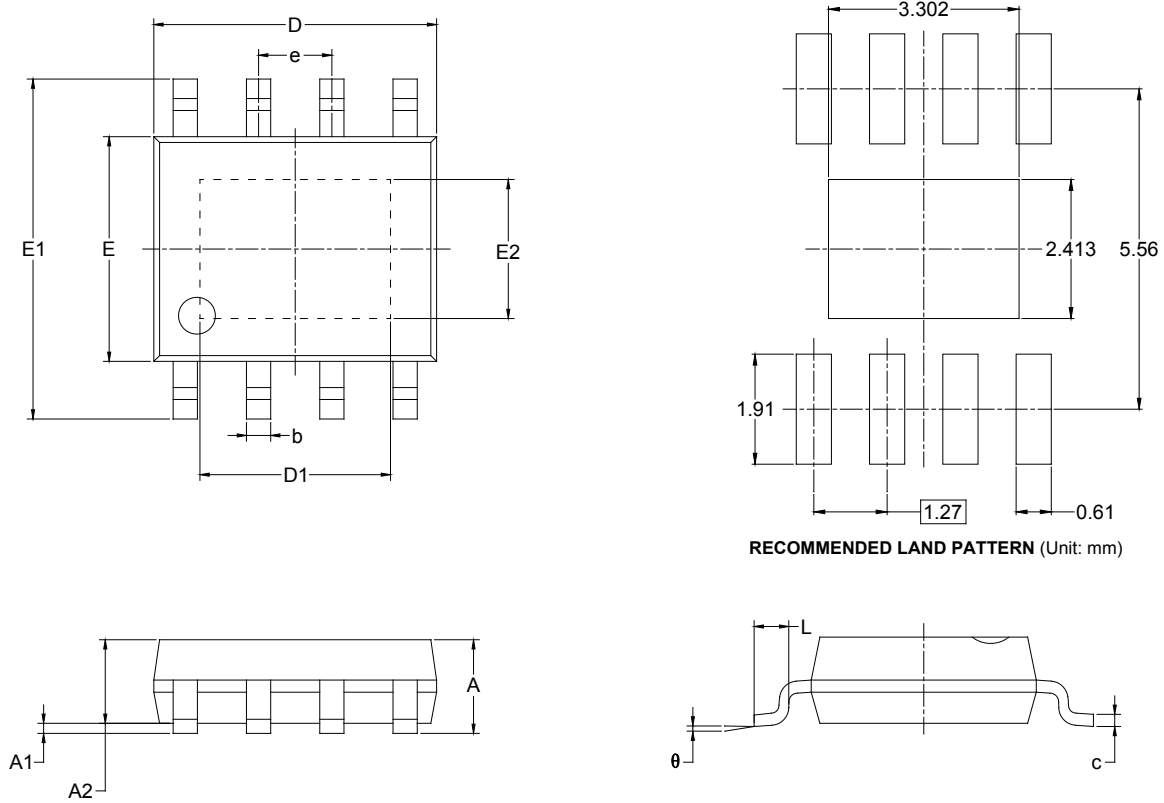


RECOMMENDED LAND PATTERN (Unit: mm)

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	2.200	2.400	0.087	0.094
E	2.900	3.100	0.114	0.122
E1	1.400	1.600	0.055	0.063
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.650 TYP		0.026 TYP	
L	0.375	0.575	0.015	0.023

PACKAGE OUTLINE DIMENSIONS

SOIC-8 (Exposed Pad)

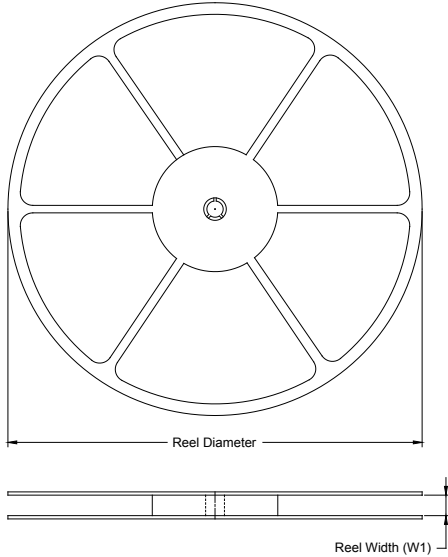


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.700		0.067
A1	0.000	0.100	0.000	0.004
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.700	5.100	0.185	0.201
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

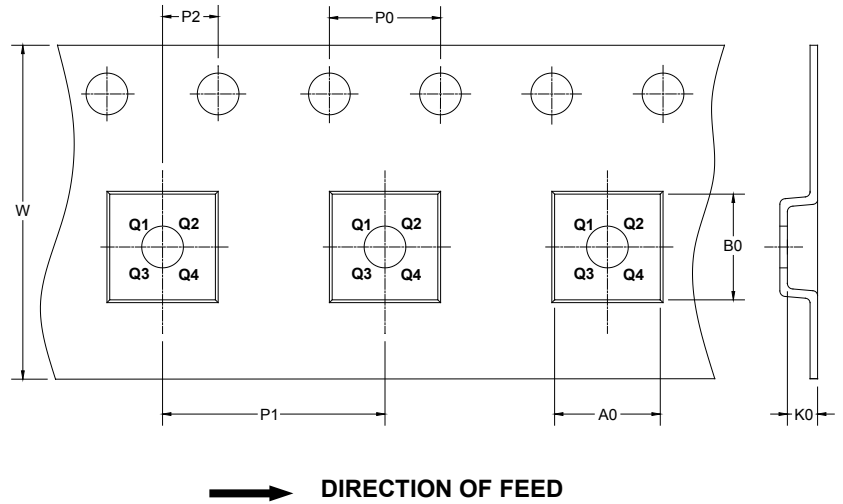
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

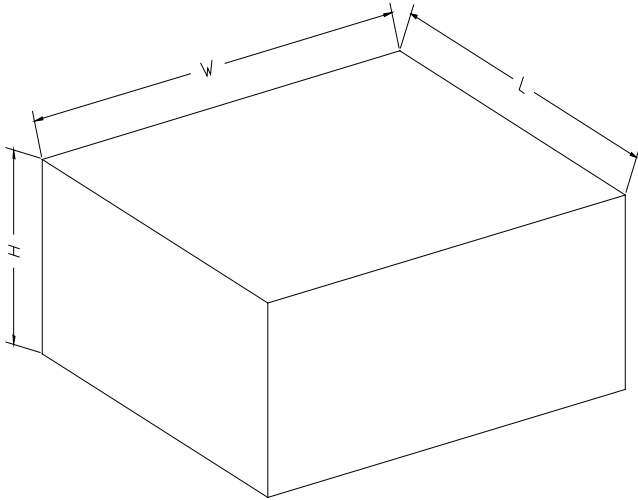
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TDFN-3×3-8L	13"	12.4	3.35	3.35	1.13	4.0	8.0	2.0	12.0	Q1
SOIC-8 (Exposed Pad)	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1

DD0001

PACKAGE INFORMATION

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