

GENERAL DESCRIPTION

The SGM2042 is a dual low noise, high PSRR, low quiescent current and low dropout voltage linear regulator. It is capable of supplying 100mA per channel output current with typical dropout voltage of only 220mV. The operating input voltage range is from 1.6V to 5.5V.

The SGM2042 is suitable for applications which need low noise and fast line and load transient responses, such as smartphone and many other portable equipment.

The SGM2042 is available in a Green UTDFN-1×1-4AL package, and allows for small footprint and dense PCB layout. It operates over an ambient temperature range of -40°C to +85°C.

FEATURES

- **Operating Input Voltage Range: 1.6V to 5.5V**
- **Output Voltage Accuracy: ±1% at +25°C**
- **Output Current: 100mA per Channel**
- **High PSRR: 65dB (TYP) at 1kHz**
- **Low Output Noise: 145µV_{RMS} (TYP)**
- **Low Quiescent Current: 40µA (TYP) per Channel**
- **Current Limiting Protection**
- **Fast Line and Load Transient Responses**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green UTDFN-1×1-4AL Package**

APPLICATIONS

- Smartphone
- PAD
- USB Interface
- Fingerprint Modular
- Radio Frequency Supplies
- Portable Electronic Devices

TYPICAL APPLICATION

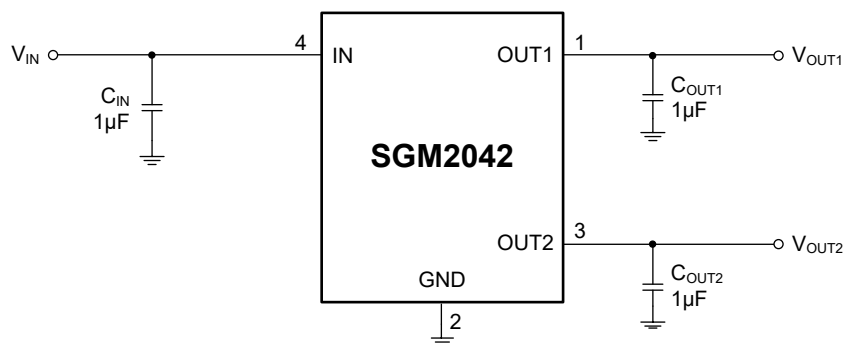


Figure 1. Typical Application Circuit

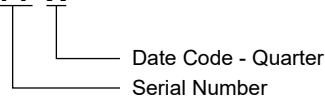
PACKAGE/ORDERING INFORMATION

ORDERING NUMBER	V _{OUT1}	V _{OUT2}	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	PACKAGE MARKING	PACKING OPTION
SGM2042-EHYUDH4G/TR	1.8V	0.80V	UTDFN-1×1-4AL	-40°C to +85°C	L9X	Tape and Reel, 10000
SGM2042-EIYUDH4G/TR	1.8V	0.75V	UTDFN-1×1-4AL	-40°C to +85°C	EBX	Tape and Reel, 10000
SGM2042-EJYUDH4G/TR	1.8V	0.72V	UTDFN-1×1-4AL	-40°C to +85°C	EAX	Tape and Reel, 10000
SGM2042-EKYUDH4G/TR	1.8V	0.70V	UTDFN-1×1-4AL	-40°C to +85°C	E9X	Tape and Reel, 10000
SGM2042-ELYUDH4G/TR	1.8V	0.68V	UTDFN-1×1-4AL	-40°C to +85°C	E8X	Tape and Reel, 10000
SGM2042-EMYUDH4G/TR	1.8V	0.65V	UTDFN-1×1-4AL	-40°C to +85°C	E7X	Tape and Reel, 10000
SGM2042-ENYUDH4G/TR	1.8V	0.60V	UTDFN-1×1-4AL	-40°C to +85°C	LAX	Tape and Reel, 10000
SGM2042-EOYUDH4G/TR	1.8V	0.55V	UTDFN-1×1-4AL	-40°C to +85°C	LBX	Tape and Reel, 10000
SGM2042-EPYUDH4G/TR	1.8V	0.50V	UTDFN-1×1-4AL	-40°C to +85°C	LCX	Tape and Reel, 10000

MARKING INFORMATION

NOTE: X = Date Code.

YY X



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

- Input Voltage.....6V
- Output Voltage.....-0.3V to V_{IN} + 0.3V
- Junction Temperature.....+150°C
- Storage Temperature Range.....-65°C to +150°C
- Lead Temperature (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM.....8000V
- MM.....400V
- CDM.....1000V

RECOMMENDED OPERATING CONDITIONS

- Input Voltage Range.....1.6V to 5.5V
- Output Current Range.....0mA to 100mA
- Operating Temperature Range.....-40°C to +85°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.

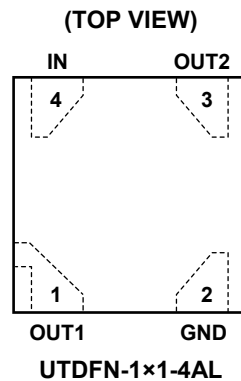
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged 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



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	OUT1	Channel 1 Regulator Output Pin. It is recommended to use a minimum 1 μ F ceramic capacitor to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to OUT1 pin.
2	GND	Ground.
3	OUT2	Channel 2 Regulator Output Pin. It is recommended to use a minimum 1 μ F ceramic capacitor to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to OUT2 pin.
4	IN	Input Supply Voltage Pin.

ELECTRICAL CHARACTERISTICS

($V_{IN} = V_{OUT(NOM)} + 1.0V$ ($V_{OUT(NOM)} > 1.5V$) or $V_{IN} = 2.5V$ ($V_{OUT(NOM)} \leq 1.5V$), $I_{OUT} = 1mA$, $C_{IN} = C_{OUT1} = C_{OUT2} = 1\mu F$, Full = $-40^{\circ}C$ to $+85^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.)

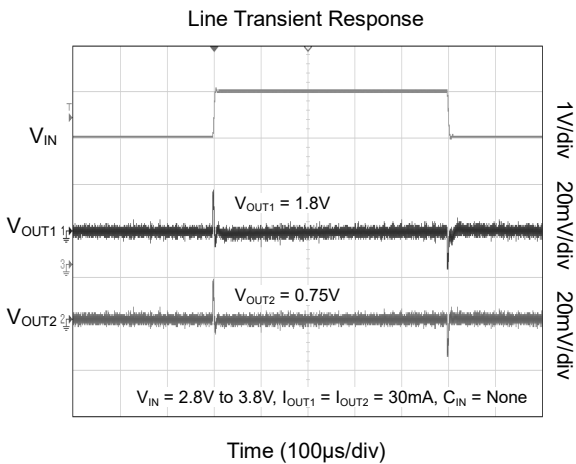
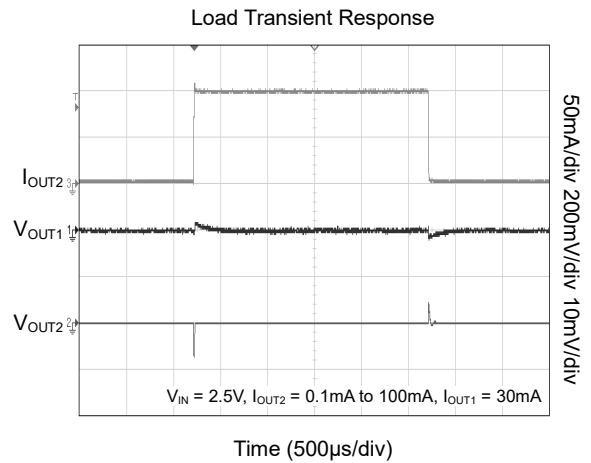
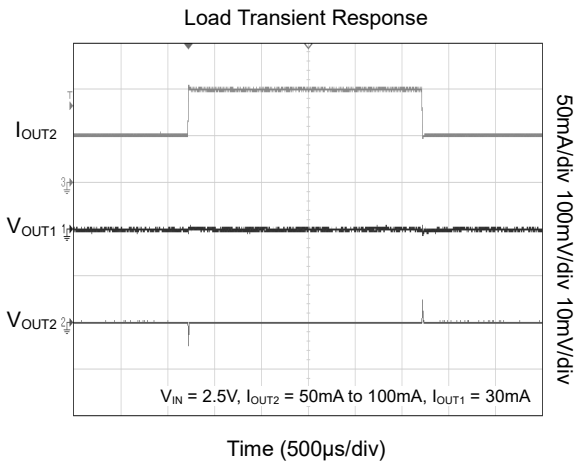
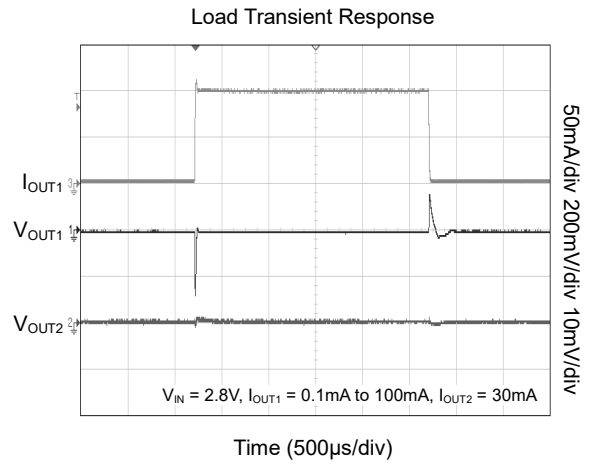
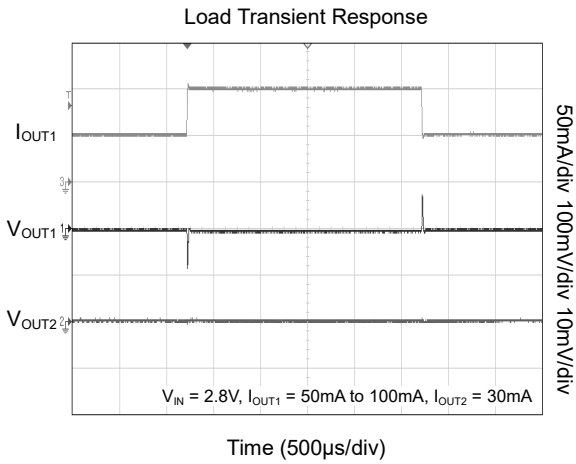
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS	
Input Voltage Range	V_{IN}		Full	1.6		5.5	V	
Output Voltage Accuracy	V_{OUT}	$V_{IN} = (V_{OUT(NOM)} + 1.0V)$ to 5.5V, $I_{OUT} = 1mA$ to 100mA	+25°C	-1		1	%	
			Full	-2		2		
Maximum Output Current			Full	100			mA	
Ground Pin Current	I_Q	No Load	+25°C		40	62	μA	
			Full			66		
Power Supply Rejection Ratio	PSRR	$V_{IN} = (V_{OUT(NOM)} + 1.0V)_{DC} + 0.2V_{P-PAC}$, $V_{OUT(NOM)} = 1.8V$, $I_{OUT} = 30mA$, $f = 1kHz$	+25°C		65		dB	
Output Voltage Noise	e_n	BW = 10Hz to 100kHz, $V_{OUT(NOM)} = 1.8V$, $I_{OUT} = 30mA$	+25°C		145		μV_{RMS}	
Dropout Voltage ⁽¹⁾	V_{DROP}	$I_{OUT} = 100mA$	$V_{OUT(NOM)} = 0.7V$	+25°C		0.87	1.1	V
				Full			1.15	
			$V_{OUT(NOM)} = 1.8V$	+25°C		0.22	0.3	
				Full			0.34	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{OUT} \times \Delta V_{OUT}}$	$V_{IN} = (V_{OUT(NOM)} + 1.0V)$ to 5.5V, $I_{OUT} = 1mA$	+25°C		0.01	0.05	%V	
			Full			0.07		
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT(NOM)} + 1.0V$, $I_{OUT} = 1mA$ to 100mA	+25°C		4	6	mV	
			Full			8		
Output Voltage Temperature Coefficient		$I_{OUT} = 50mA$	Full		80		ppm/°C	
Over-Current Protection	OCP		+25°C	115	190		mA	
			Full	100				

NOTE:

1. The dropout voltage is defined as the difference between V_{IN} and V_{OUT} when V_{OUT} falls to $98\% \times V_{OUT(NOM)}$.

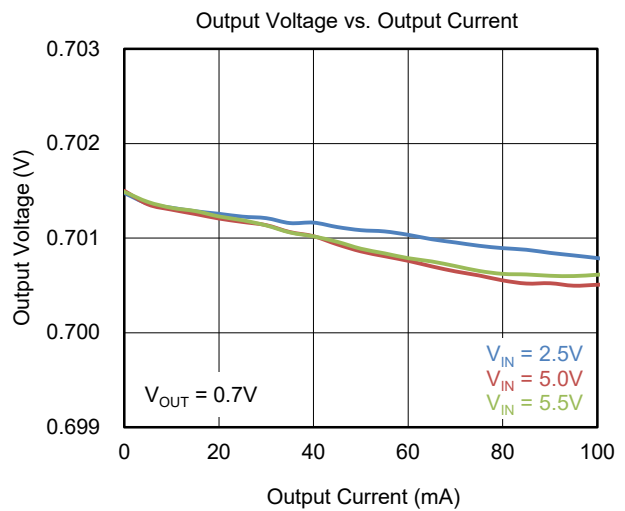
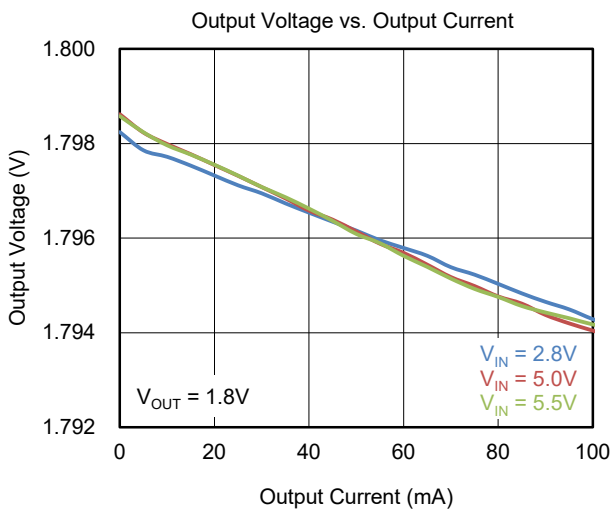
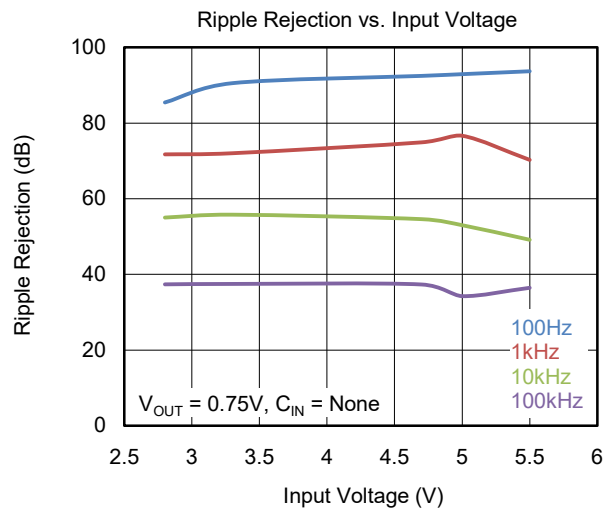
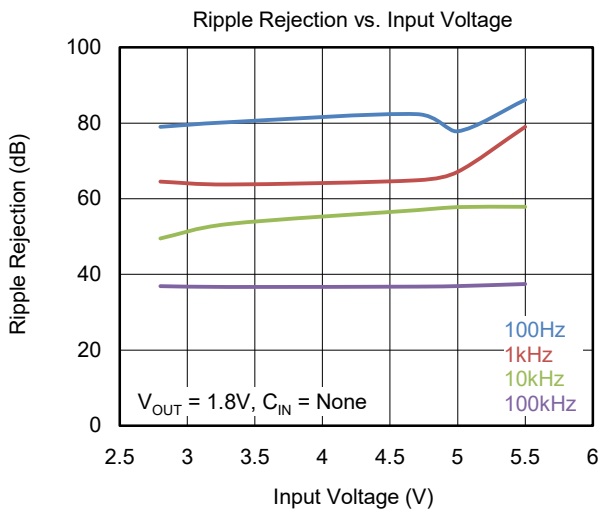
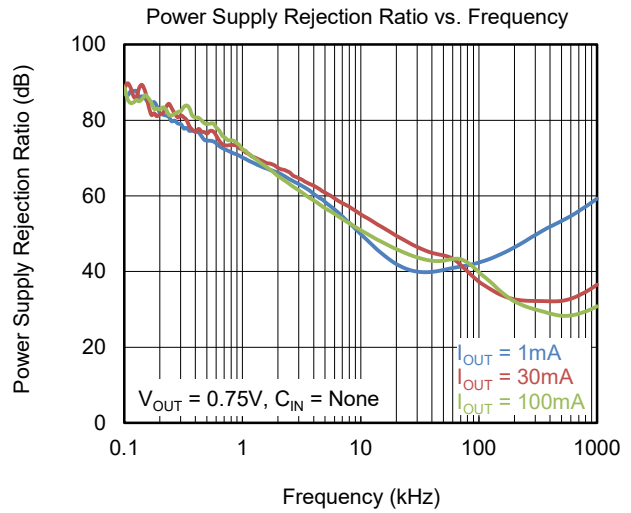
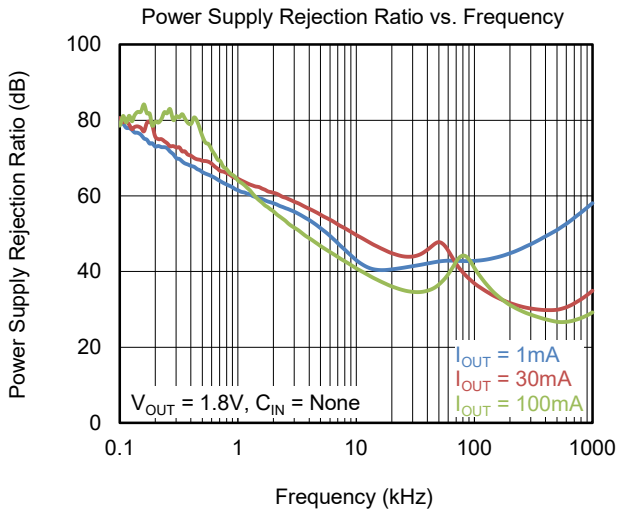
TYPICAL PERFORMANCE CHARACTERISTICS

$T_A = +25^\circ\text{C}$, $V_{IN} = V_{OUT(NOM)} + 1.0\text{V}$, $C_{IN} = C_{OUT1} = C_{OUT2} = 1\mu\text{F}$, unless otherwise noted.



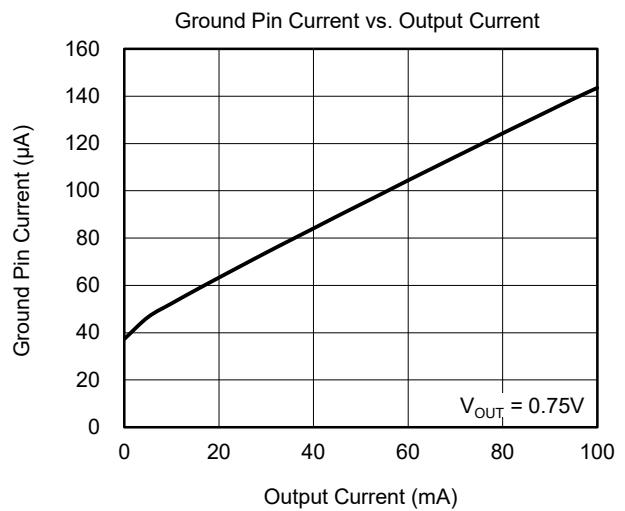
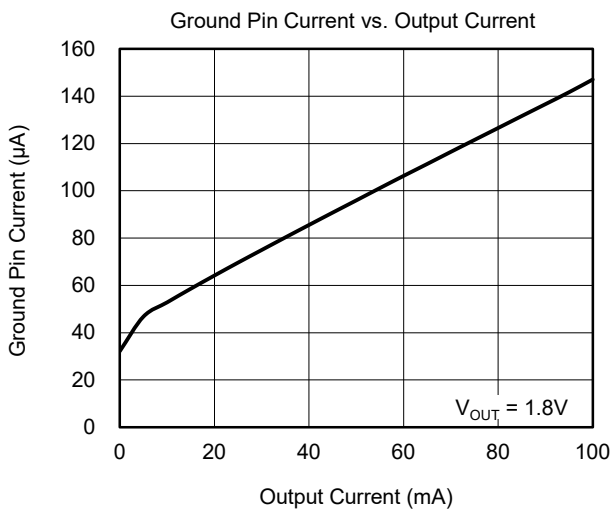
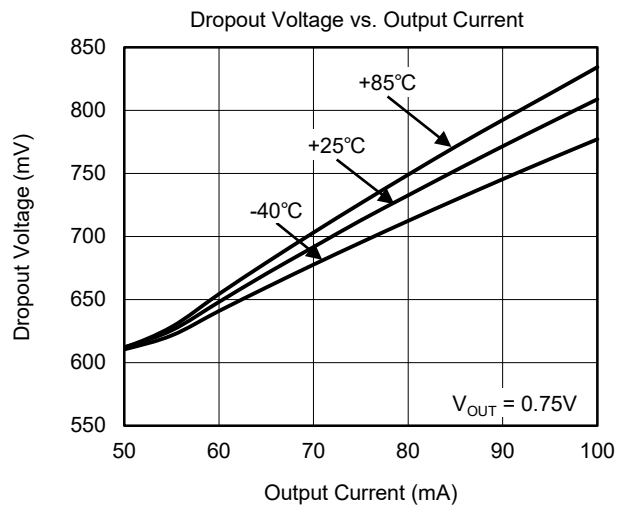
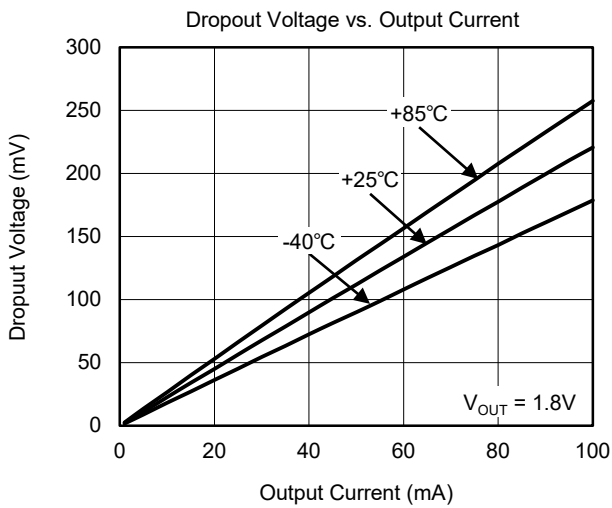
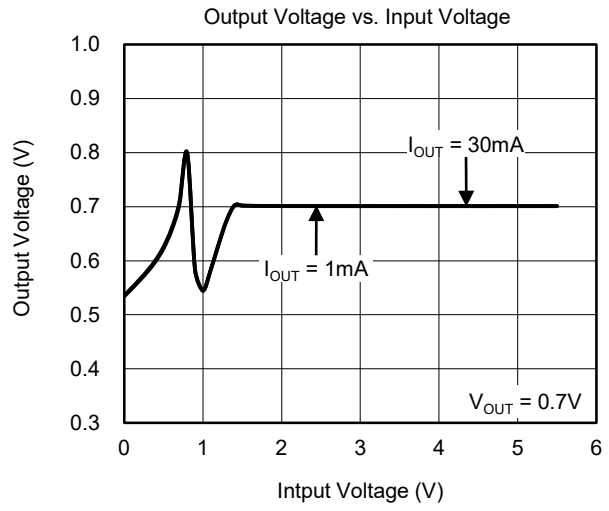
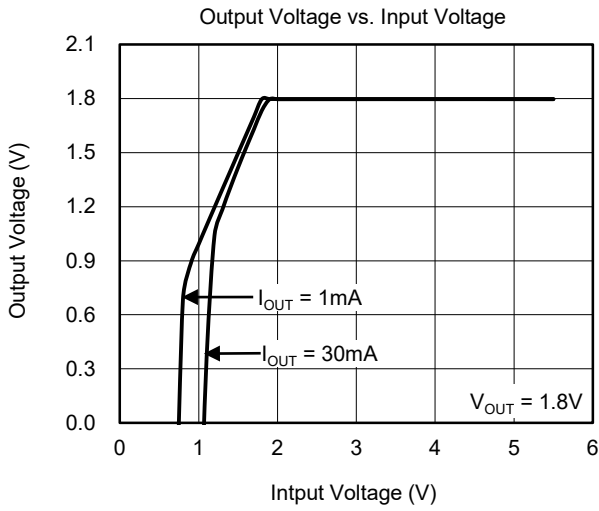
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$T_A = +25^\circ\text{C}$, $V_{IN} = V_{OUT(NOM)} + 1.0\text{V}$, $C_{IN} = C_{OUT1} = C_{OUT2} = 1\mu\text{F}$, unless otherwise noted.



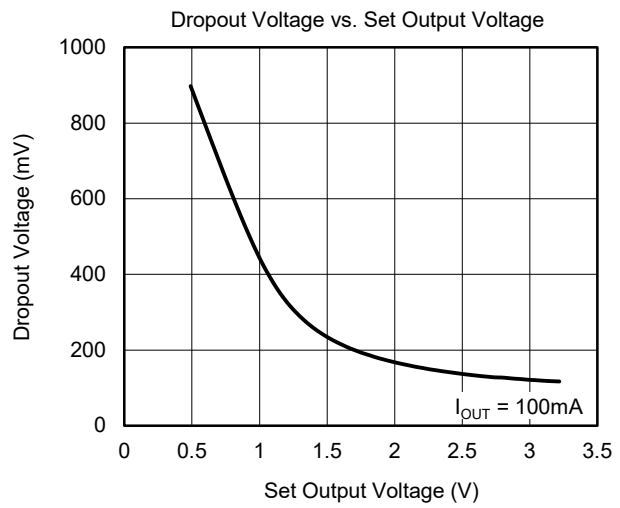
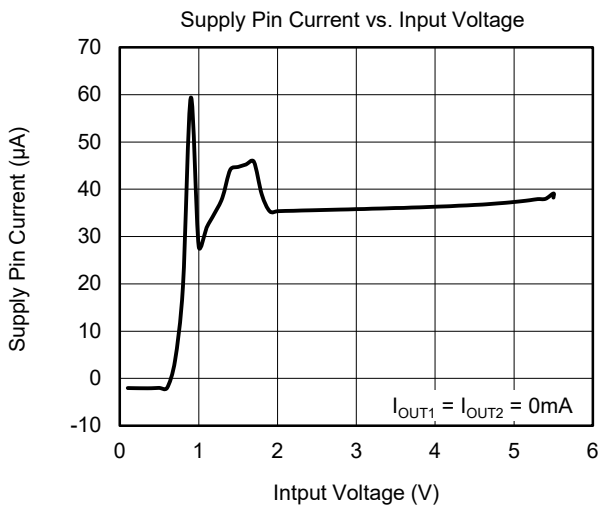
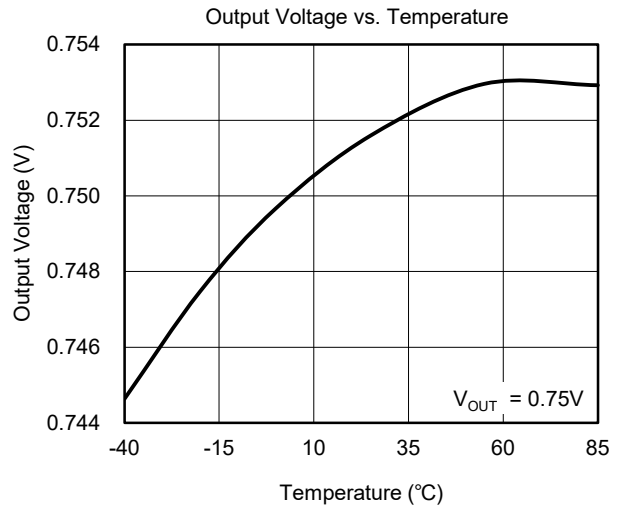
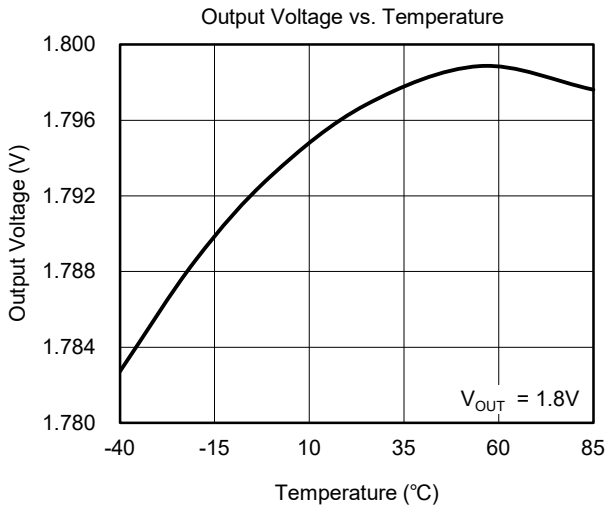
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$T_A = +25^\circ\text{C}$, $V_{IN} = V_{OUT(NOM)} + 1.0\text{V}$, $C_{IN} = C_{OUT1} = C_{OUT2} = 1\mu\text{F}$, unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$T_A = +25^\circ\text{C}$, $V_{IN} = V_{OUT(NOM)} + 1.0\text{V}$, $C_{IN} = C_{OUT1} = C_{OUT2} = 1\mu\text{F}$, unless otherwise noted.



FUNCTIONAL BLOCK DIAGRAM

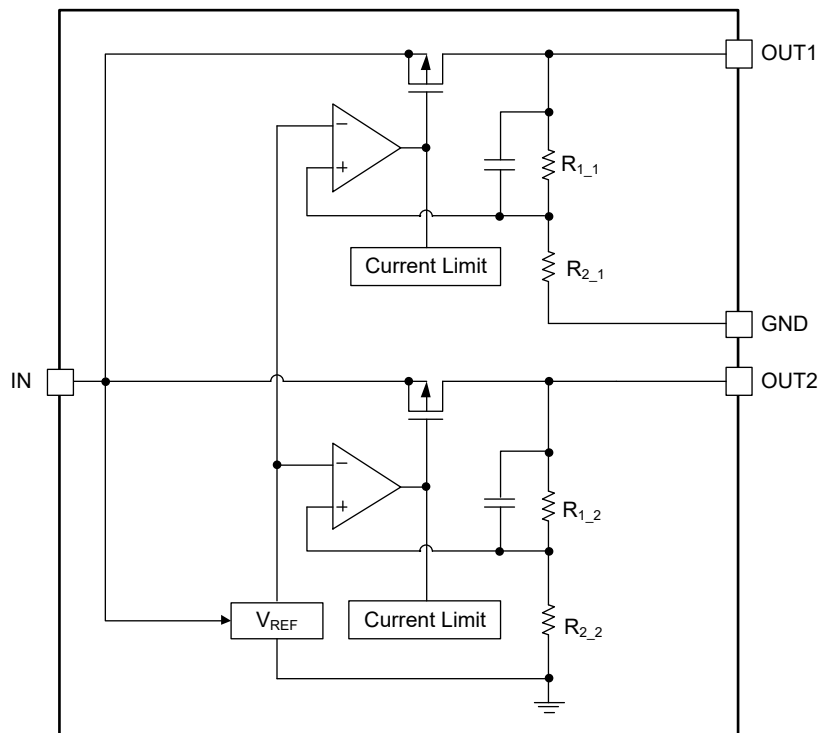


Figure 2. Block Diagram

APPLICATION INFORMATION

Input Capacitor Selection (C_{IN})

The input decoupling capacitor should be placed as close as possible to the IN pin for ensuring the device stability. 1 μ F or larger X7R or X5R ceramic capacitor is selected to get good dynamic performance.

When V_{IN} is required to provide large current instantaneously, a large effective input capacitor is required. Multiple input capacitors can limit the input tracking inductance. Adding more input capacitors is available to restrict the ringing and to keep it below the device absolute maximum ratings.

Output Capacitor Selection (C_{OUT1} , C_{OUT2})

The output decoupling capacitors should be placed as close as possible to the OUTx pins. 1 μ F or larger X7R or X5R ceramic capacitors are selected to get good dynamic performance. For ceramic capacitors, temperature, DC bias and package size will change the

effective capacitance, so enough margins of C_{OUT1} and C_{OUT2} must be considered in design. Additionally, C_{OUT1} and C_{OUT2} with larger capacitance and lower ESR will help increase the high frequency PSRR and improve the load transient response.

Output Current Limit Protection

When overload events happen, the output current is internally limited to 190mA (TYP).

Layout Guidelines

To get good PSRR, low output noise and high transient response performance, the input and output bypass capacitors must be placed as close as possible to the IN pin and OUTx pins separately. V_{IN} and V_{OUT} had better use separate ground planes and these ground planes are single point connected to the GND pin.

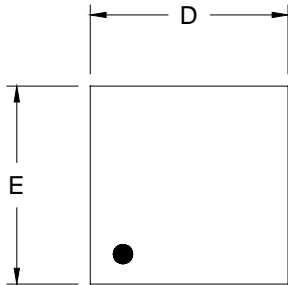
REVISION HISTORY

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

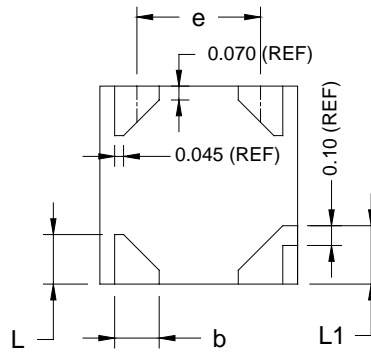
AUGUST 2020 – REV.A to REV.A.1	Page
Updated Package/Ordering Information section.....	2
Changes from Original (DECEMBER 2018) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

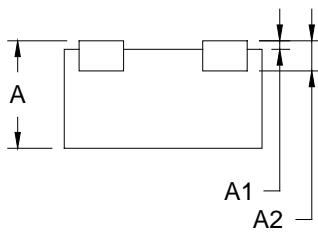
UTDFN-1x1-4AL



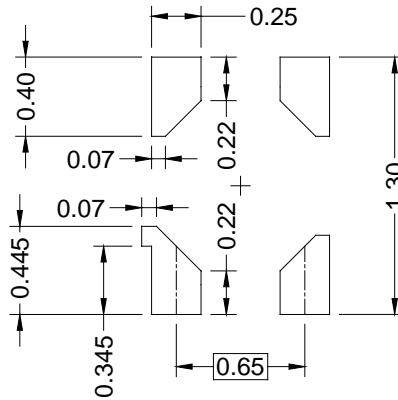
TOP VIEW



BOTTOM VIEW



SIDE VIEW



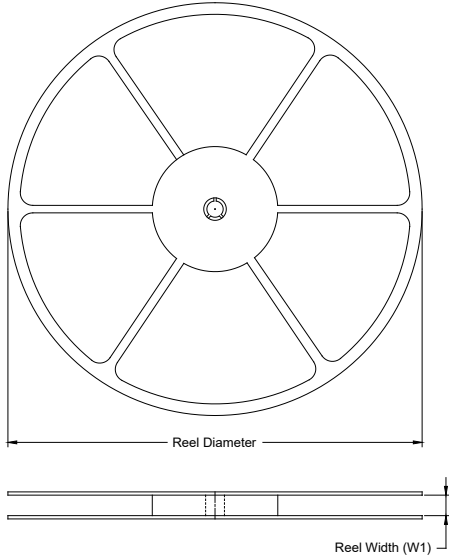
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.500	0.550	0.600
A1	0.000		0.050
A2	0.152 REF		
e	0.625 BSC		
D	0.950	1.000	1.050
E	0.950	1.000	1.050
b	0.175	0.225	0.275
L	0.200	0.250	0.300
L1	0.245	0.295	0.345

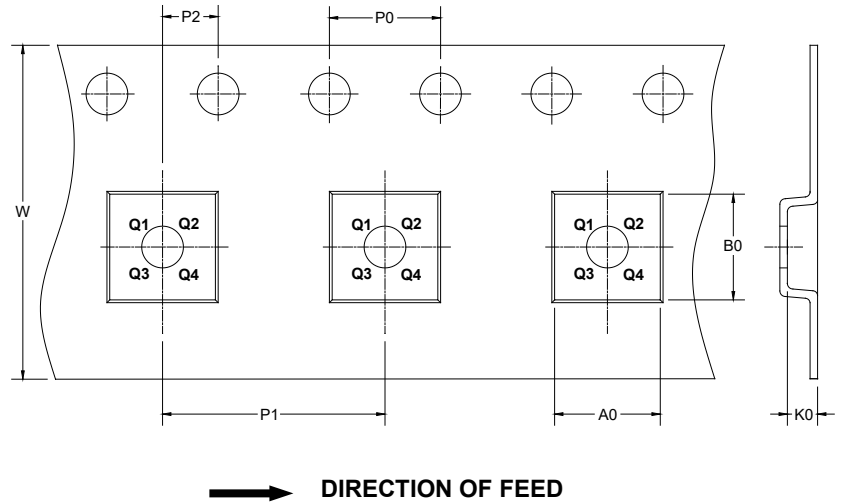
PACKAGE INFORMATION

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
UTDFN-1×1-4AL	7"	9.0	1.18	1.18	0.68	4.0	2.0	2.0	8.0	Q1

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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
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002