SGM8711
Micro-Power, RRIO, 1.8V Small Package, Push-Pull Output Comparator with Integrated Voltage Reference

GENERAL DESCRIPTION

The SGM8711 is a low power comparator with a typical power supply current of 2.2μA. It features an uncommitted on-chip voltage reference, comparator input common mode range of 200mV beyond the supply rails, and single-supply operation from 1.8V to 5.5V. The integrated 1.2V series voltage reference offers low 42μV/℃ drift, is stable with up to 10nF capacitive load, and can source up to 2mA (TYP) of output current.

Designed to operate over a wide range of supply voltages, from 1.8V to 5.5V, with guaranteed operation at 1.8V and 5.0V, the SGM8711 is ideal for use in a variety of battery-powered applications. With rail-to-rail input common mode voltage range, the SGM8711 is well suited for single-supply operation. Its small package makes this device ideal for use in handheld electronics and mobile phone applications.

The SGM8711 has a push-pull output stage.

SGM8711 is available in a Green UTDFN-1.6×1.6-6L package. It is rated over the -40℃ to +85℃ temperature range.

FEATURES

- **Low Power Consumption:**
  2.2μA (TYP) at V_S = 1.8V
- **Wide Supply Voltage Range: 1.8V to 5.5V**
- **Push-Pull Output Current Drive:**
  18mA (TYP) at V_S = 5V
- **Rail-to-Rail Input**
- **Integrated 1.2V Voltage Reference**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in a Green UTDFN-1.6×1.6-6L Package**

APPLICATIONS

RC Timers
Window Detectors
IR Receiver
Alarm and Monitoring Circuits

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8711	UTDFN-1.6×1.6-6L	-40℃ to +85℃	SGM8711YUDN6G/TR	TFX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: X = Date Code.

YY X

Date Code - Quarter

Serial Number

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 $-V_S$ 6V
V_{IN} Differential ..... $\pm(+V_S - (-V_S))$
Voltage at Input/Output Pins ..... $(-V_S)$ - 0.3V to $(+V_S)$ + 0.3V
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 4000V
MM 400V

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

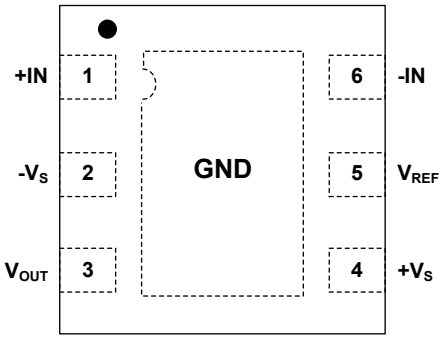
This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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 CONFIGURATION

(TOP VIEW)



UTDFN-1.6×1.6-6L

ELECTRICAL CHARACTERISTICS

(At T_A = +25℃, $+V_S$ = 1.8V, $-V_S$ = 0V, V_{CM} = $+V_S$/2, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current	I_S	I_{OUT} = 0		2.2	4.1	μA
Input Offset Voltage	V_{OS}	V_{CM} = 0V		0.5	3.3	mV
		V_{CM} = 1.8V		0.5	3.3	
Input Offset Average Drift				2		μV/℃
Common Mode Rejection Ratio	CMRR	V_{CM} = 0V to 1.8V	55	68		dB
Power Supply Rejection Ratio	PSRR	V_S = 1.8V to 5.5V, V_{CM} = 0V	74	102		dB
Power Supply Ramp-Up Rate (1)			5			V/s
Large Signal Voltage Gain	A_{VO}			100		dB
Output Swing High	V_{OH}	I_{OUT} = 500μA	1.617	1.675		V
		I_{OUT} = 500μA, -40℃ ≤ T_A ≤ +85℃	1.572			
		I_{OUT} = 1mA	1.412	1.525		
		I_{OUT} = 1mA, -40℃ ≤ T_A ≤ +85℃	1.330			
Output Swing Low	V_{OL}	I_{OUT} = -500μA		84	124	mV
		I_{OUT} = -500μA, -40℃ ≤ T_A ≤ +85℃			163	
		I_{OUT} = -1mA		173	249	
		I_{OUT} = -1mA, -40℃ ≤ T_A ≤ +85℃			347	
Output Current	I_{OUT}	Source	1.15	2		mA
		Source, -40℃ ≤ T_A ≤ +85℃	1.0			
		Sink		-3.5	-2.0	
		Sink, -40℃ ≤ T_A ≤ +85℃			-1.4	
Propagation Delay (High to Low)		Overdrive = 10mV		11.7		μs
		Overdrive = 100mV		5.6		
Propagation Delay (Low to High)		Overdrive = 10mV		24.2		μs
		Overdrive = 100mV		14.7		
Rise Time	t_{RISE}	Overdrive = 10mV, C_L = 30pF, R_L = 1MΩ		168		ns
		Overdrive = 100mV, C_L = 30pF, R_L = 1MΩ		174		
Fall Time	t_{FALL}	Overdrive = 10mV, C_L = 30pF, R_L = 1MΩ		75		ns
		Overdrive = 100mV, C_L = 30pF, R_L = 1MΩ		50		
Noise of V_{REF}		f = 0.1Hz to 10Hz		0.3		mV_{P-P}
Voltage Reference						
Reference Voltage	V_{REF}	I_{REF} = 0mA	1.182	1.200	1.218	V
Reference Voltage Drift				42		μV/℃
Reference Output Current (Source)				2		mA

ELECTRICAL CHARACTERISTICS (continued)

(At T_A = +25℃, $+V_S$ = 5V, $-V_S$ = 0V, V_{CM} = $+V_S$/2, unless otherwise noted.)

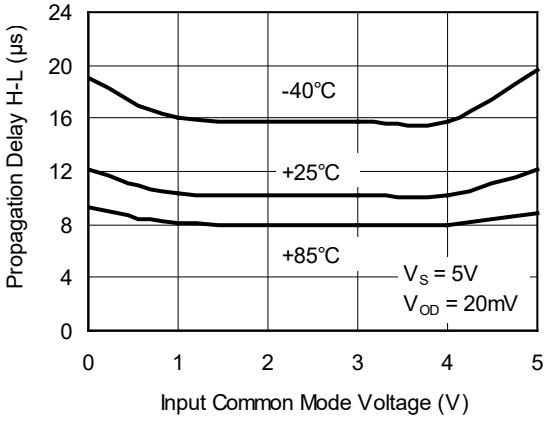
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current	I_S	I_{OUT} = 0		2.3	4.4	μA
Input Offset Voltage	V_{OS}	V_{CM} = 0V		0.5	3.3	mV
		V_{CM} = 5V		0.5	3.3	
Input Offset Average Drift				2		μV/℃
Common Mode Rejection Ratio	CMRR	V_{CM} = 0V to 5V	63	76		dB
Power Supply Rejection Ratio	PSRR	V_S = 1.8V to 5.5V, V_{CM} = 0V	74	102		dB
Power Supply Ramp-Up Rate (1)			5			V/s
Large Signal Voltage Gain	A_{VO}			110		dB
Output Swing High	V_{OH}	I_{OUT} = 500μA	4.935	4.952		V
		I_{OUT} = 500μA, -40℃ ≤ T_A ≤ +85℃	4.926			
		I_{OUT} = 1mA	4.874	4.904		
		I_{OUT} = 1mA, -40℃ ≤ T_A ≤ +85℃	4.855			
Output Swing Low	V_{OL}	I_{OUT} = -500μA		54	72	mV
		I_{OUT} = -500μA, -40℃ ≤ T_A ≤ +85℃			79	
		I_{OUT} = -1mA		106	140	
		I_{OUT} = -1mA, -40℃ ≤ T_A ≤ +85℃			154	
Output Current	I_{OUT}	Source	14.0	18		mA
		Source, -40℃ ≤ T_A ≤ +85℃	10.5			
		Sink		-18	-15.5	
		Sink, -40℃ ≤ T_A ≤ +85℃			-12.5	
Propagation Delay (High to Low)		Overdrive = 10mV		12.7		μs
		Overdrive = 100mV		5.6		
Propagation Delay (Low to High)		Overdrive = 10mV		38.1		μs
		Overdrive = 100mV		29.5		
Rise Time	t_{RISE}	Overdrive = 10mV, C_L = 30pF, R_L = 1MΩ		39		ns
		Overdrive = 100mV, C_L = 30pF, R_L = 1MΩ		40		
Fall Time	t_{FALL}	Overdrive = 10mV, C_L = 30pF, R_L = 1MΩ		33		ns
		Overdrive = 100mV, C_L = 30pF, R_L = 1MΩ		30		
Noise of V_{REF}		f = 0.1Hz to 10Hz		0.32		mV_{P-P}
Voltage Reference						
Reference Voltage	V_{REF}	I_{REF} = 0mA	1.182	1.200	1.218	V
Reference Voltage Drift				41		μV/℃
Reference Output Current (Source)				2		mA

NOTE:

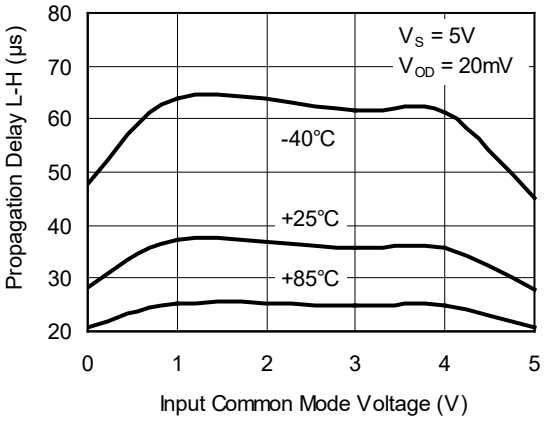
1. If the power supply ramp-up rate is lower than 5V/s, the reference voltage output is not guaranteed to start up.

TYPICAL PERFORMANCE CHARACTERISTICS

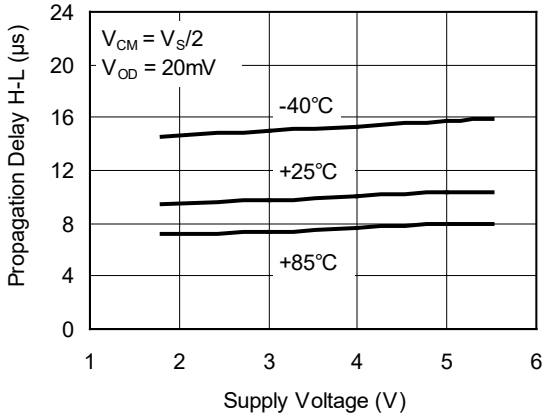
Propagation Delay vs. Input Common Mode Voltage



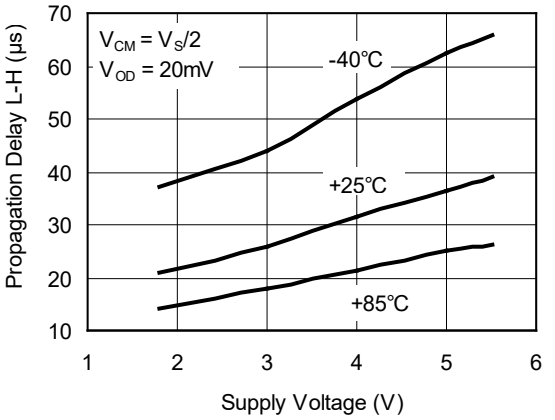
Propagation Delay vs. Input Common Mode Voltage



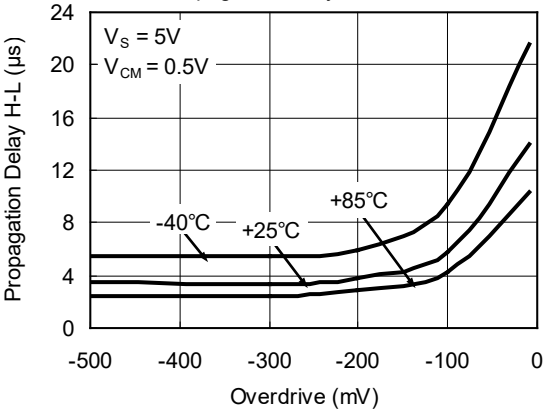
Propagation Delay vs. Supply Voltage



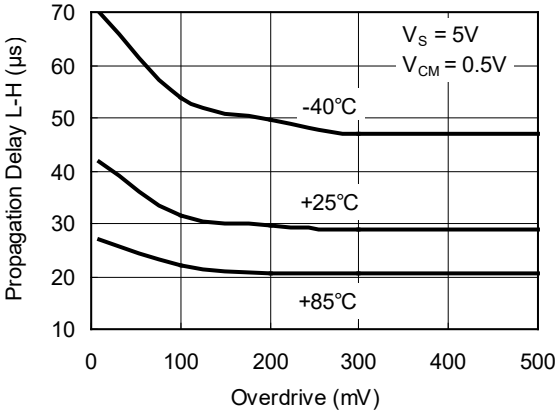
Propagation Delay vs. Supply Voltage



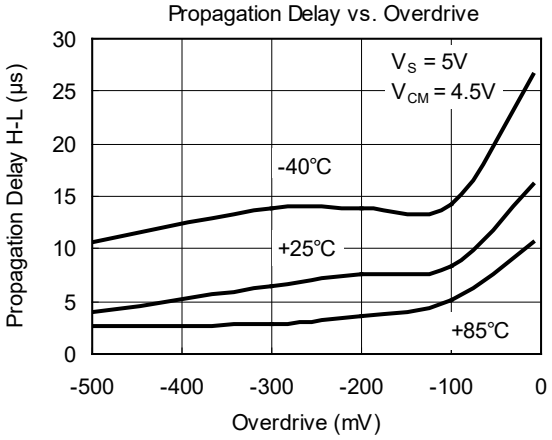
Propagation Delay vs. Overdrive

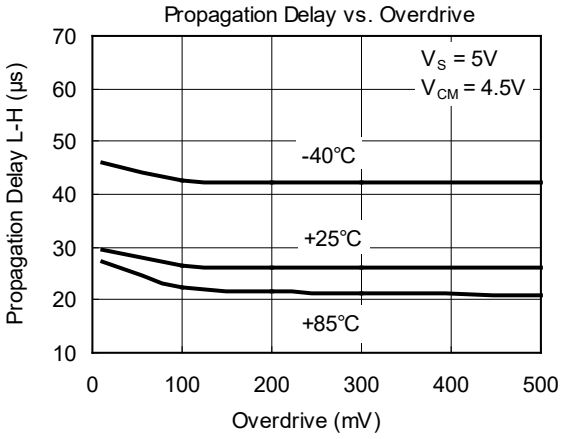


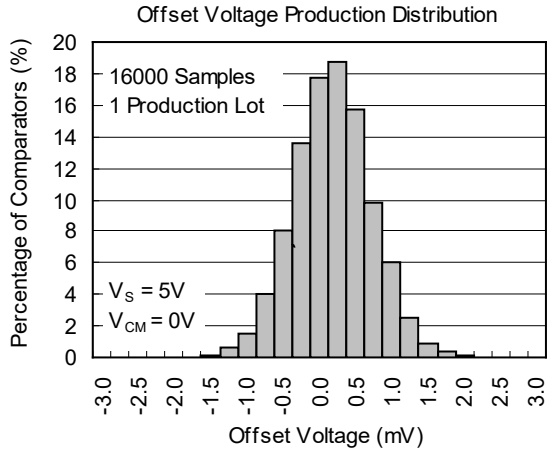
Propagation Delay vs. Overdrive

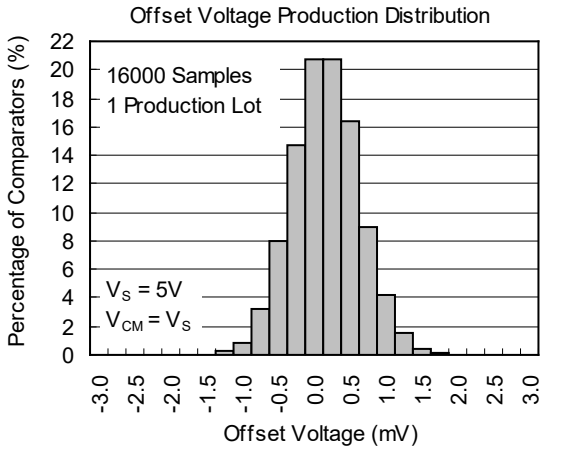


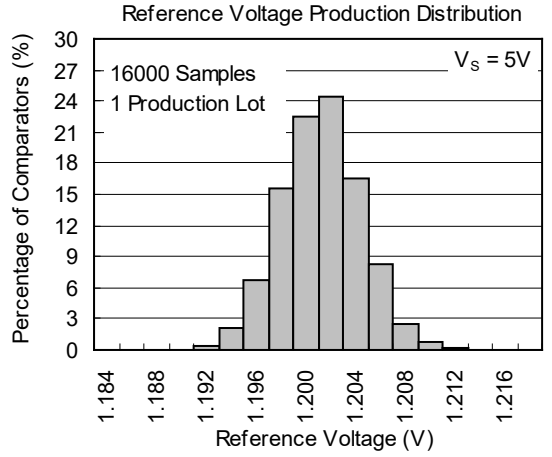
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

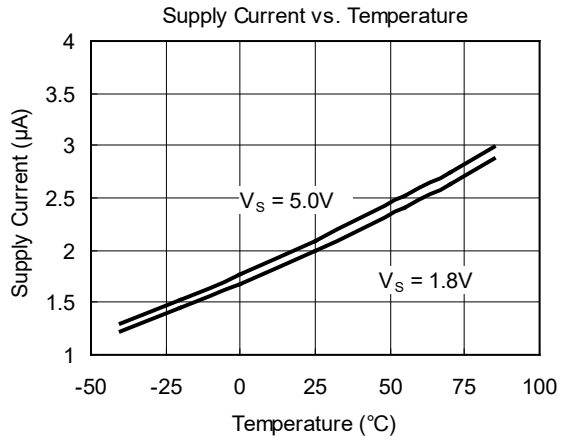






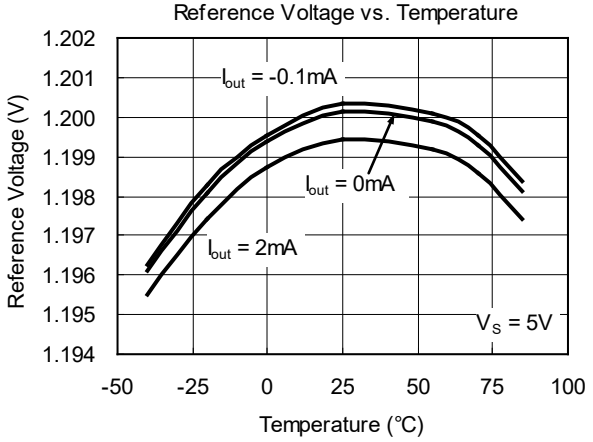




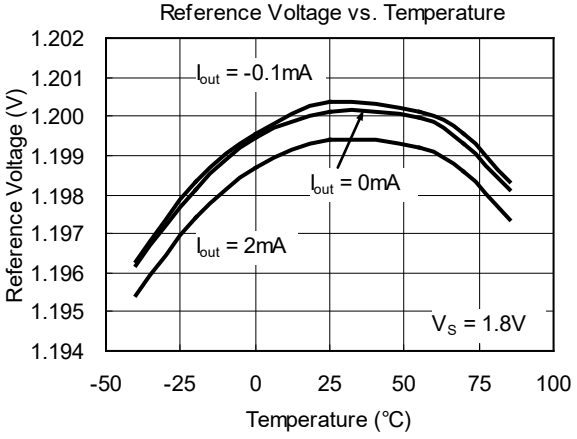


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

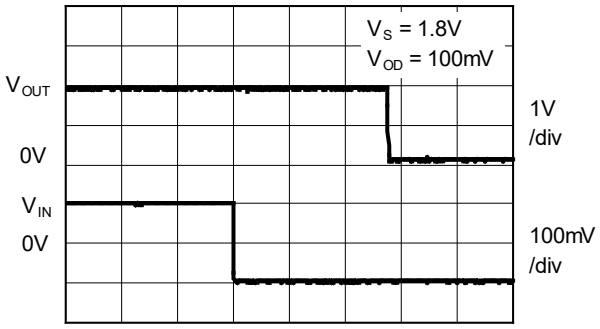
Reference Voltage vs. Temperature



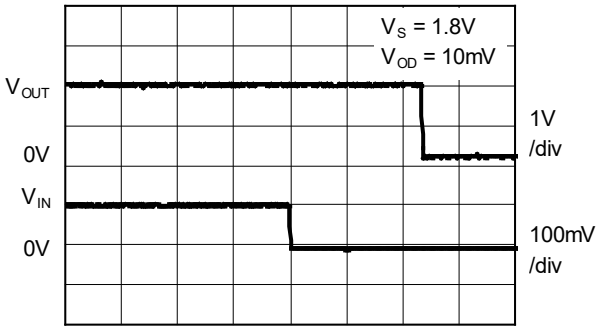
Reference Voltage vs. Temperature



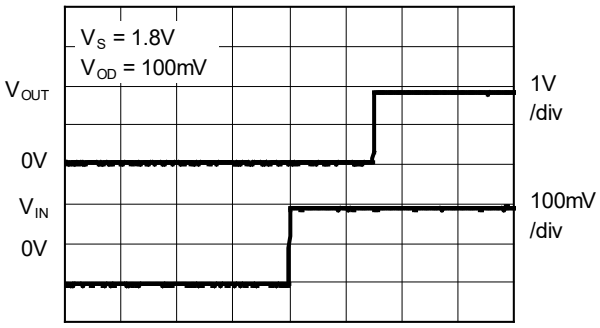
Propagation Delay (t_{PHL})



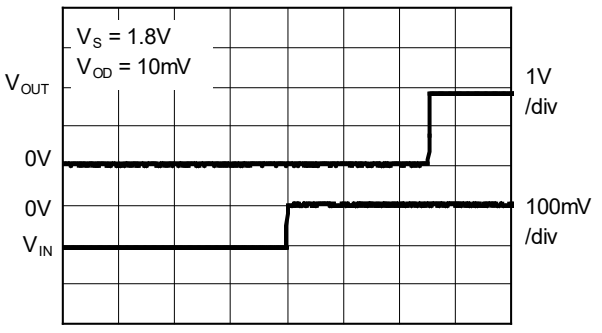
Propagation Delay (t_{PHL})



Propagation Delay (t_{PLH})

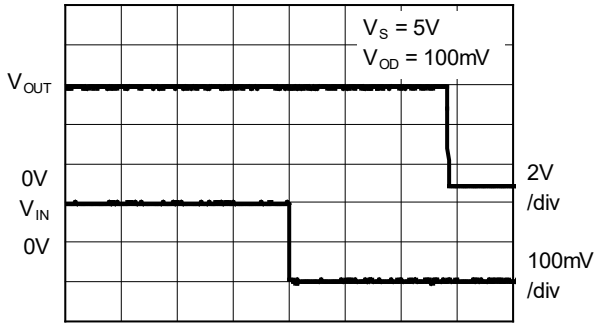


Propagation Delay (t_{PLH})



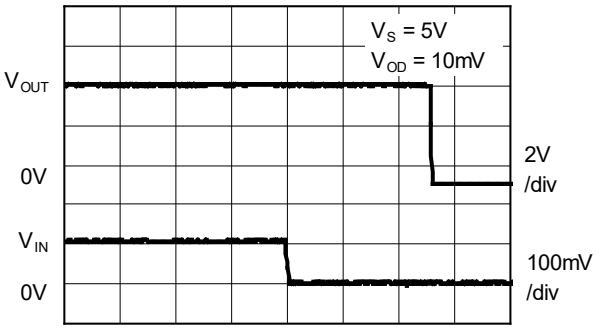
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Propagation Delay (t_{PHL})



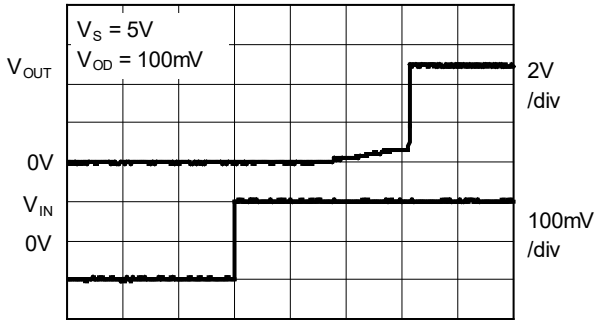
Time (2μs/div)

Propagation Delay (t_{PHL})



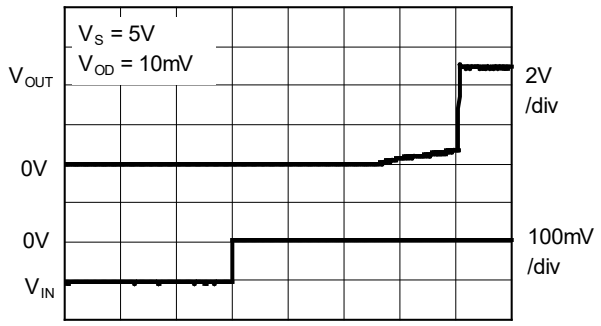
Time (5μs/div)

Propagation Delay (t_{PLH})



Time (10μs/div)

Propagation Delay (t_{PLH})



Time (10μs/div)

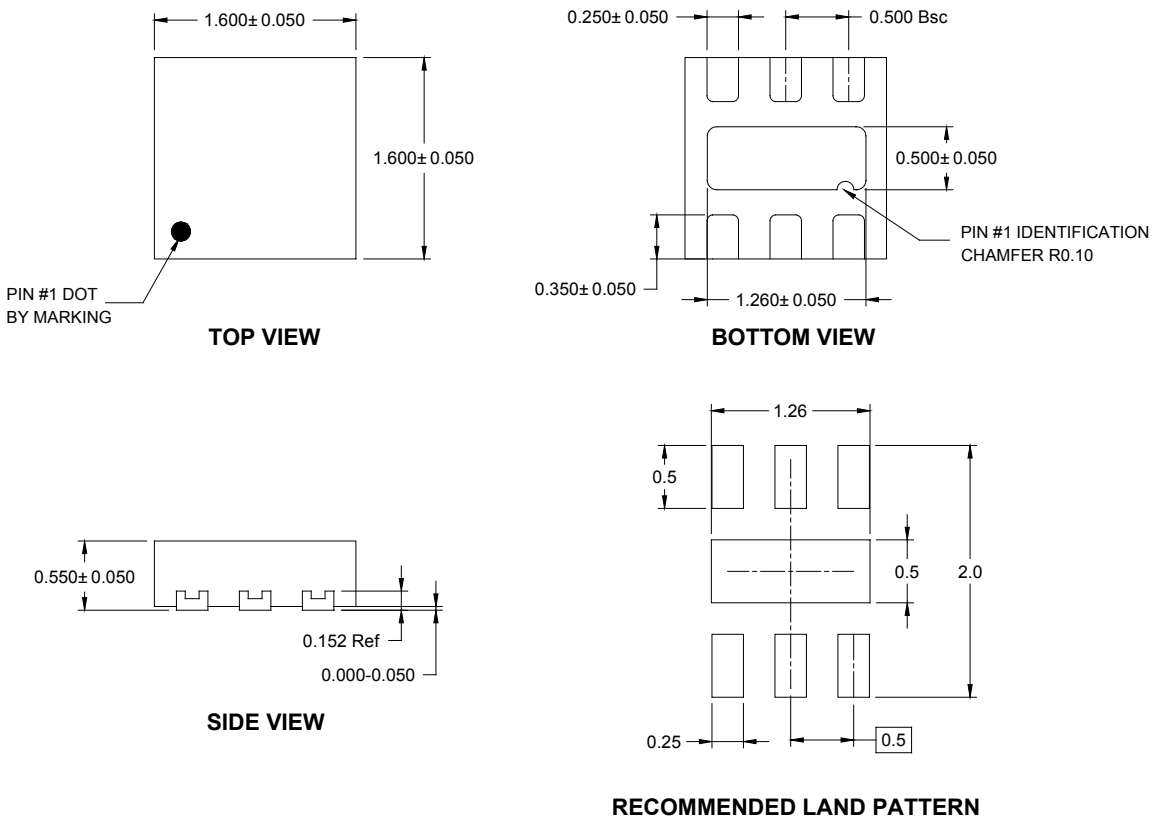
REVISION HISTORY

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

Changes from Original (AUGUST 2014) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

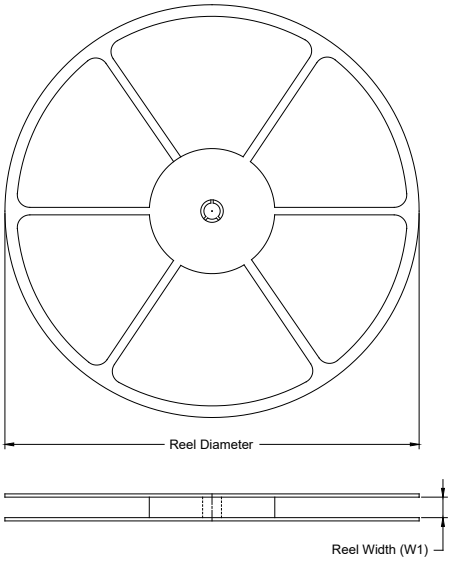
UTDFN-1.6×1.6-6L



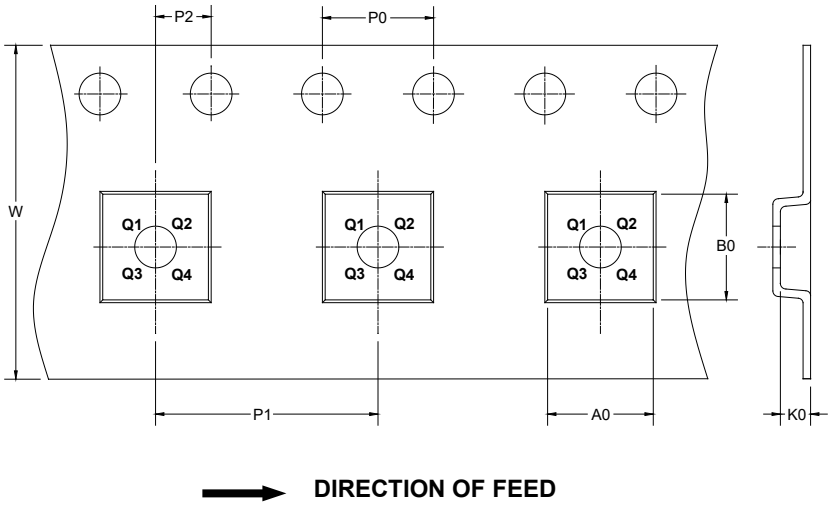
NOTE: All linear dimensions are in millimeters.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



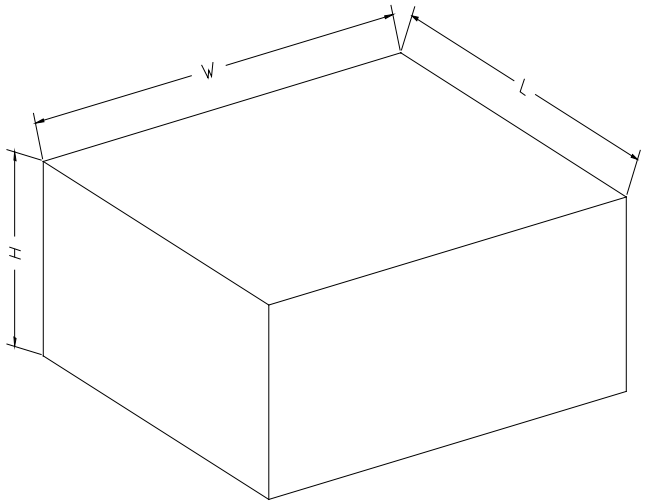
NOTE: The picture is only for reference. Please make the object as the standard.

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-1.6×1.6-6L	7″	9.0	1.78	1.78	0.69	4.0	4.0	2.0	8.0	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

DD0002