



AOS
SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS2227Xx

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电源管理IC



通信接口芯片



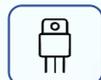
二三极管



LDO稳压器



逻辑器件



MOSFETs



运算放大器



显示驱动



MCU单片机



光电器件



High-Speed USB 2.0 (480-Mbps) 1:2 Multiplexer/Demultiplexer Switch

DESCRIPTIONS

The AOS2227 is a high-speed, low-power double pole/double-throw (DPDT) analog switch with single Enable. It is designed to operate from 1.8 V to 5.5 V.

The AOS2227 has a bus-switch enable pin, \overline{OE} , that can place the signal paths in high impedance. This allows the user to isolate the bus when it is not in use and consume less current.

The AOS2227 is a high-bandwidth switch specially designed for the switching of high-speed USB2.0 signals in handset and consumer applications, such as cell phones, digital cameras, and notebooks with hubs or controllers with limited USB I/Os.

The AOS2227 is available MSOP-10 and QFN-1.4×1.8-10L package. It operates over an ambient temperature range of -40°C to +85°C.

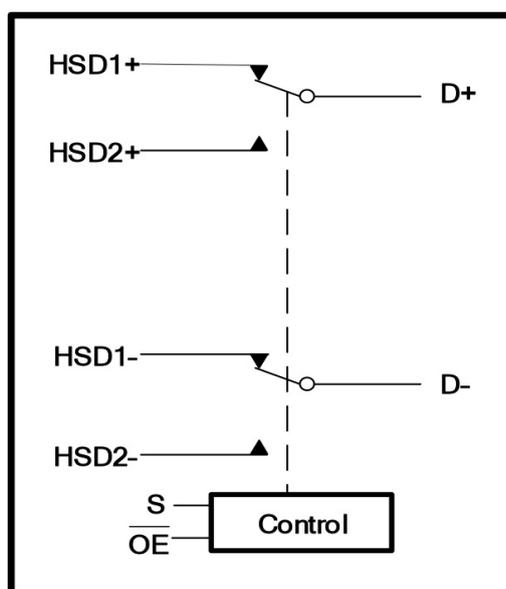
FEATURES

- 3dB Bandwidth: 550MHz
- ★ Supply Range: +1.8V to +5.5V
- ★ RON is Typically 6
- ★ Fast Switching Times:
 - tON 20ns
 - tOFF 15ns
- ★ Break-Before-Make Switching
- ★ Low Power Consumption (1μA Maximum)
- ★ Rail-to-Rail Input and Output Operation
- ★ Extended Industrial Temperature Range: -40°C to +85°C
- ★ Micro SIZE PACKAGES: MSOP-10, QFN-1.4×1.8-10L

APPLICATIONS

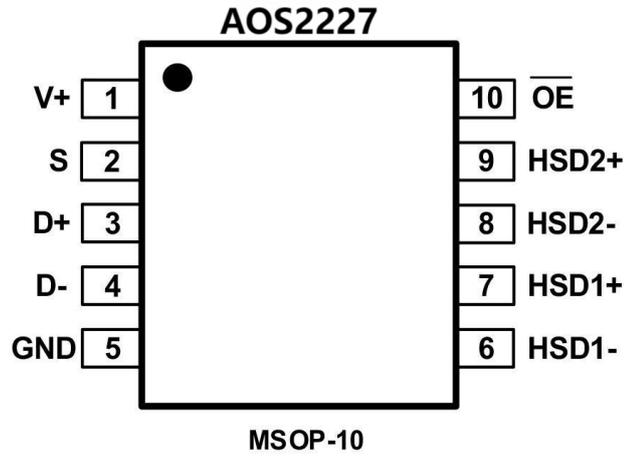
- Routes Signals for USB 1.0, 1.1, and 2.0
- MP3 and Other Personal Media Players
- ★ Portable Instrumentation
- ★ USB Switching
- ★ Digital Cameras
- ★ Set-Top Box
- ★ Cell Phones
- ★ PDAs

Functional Block Diagram





PIN CONFIGURATIONS



PIN DESCRIPTION

NAME	PIN	FUNCTION
V+	1	Power Supply
GND	5	Ground
S	2	Select Input
$\bar{O}E$	10	Output Enable
HSD1+, HSD2+	7, 9	Data Port
HSD1-, HSD2-	6, 8	
D+, D-	3, 4	

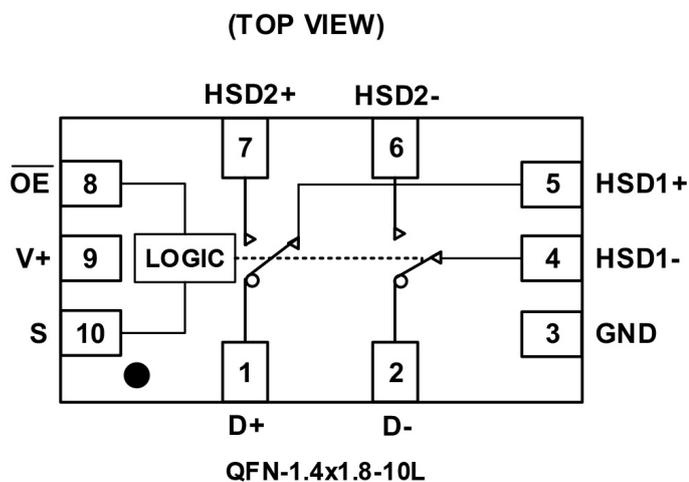
FUNCTION TABLE

$\bar{O}E$	S	HSD1+, HSD1-	HSD2+, HSD2-
0	0	ON	OFF
0	1	OFF	ON
1	X	OFF	OFF

X=Don't care



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ABSOLUTE MAXIMUM RATINGS⁽¹⁾

V+ to GND.....	0V to 6V
Analog, Digital Voltage Range ⁽²⁾	-0.3 to (V+) + 0.3V
Continuous Current HSDn or Dn.....	±100mA
Peak Current HSDn or Dn.....	±150mA
Storage Temperature	-65°C to +150°C
Operating Temperature	-40°C to +85°C
Junction Temperature.....	+150°C
Package Thermal Resistance @ TA = +25°C	
MSOP-10.....	204°C/W
QFN-1.4 x1.8-10L.....	120°C/W
Lead Temperature (Soldering, 10s)	260°C
ESD Susceptibility	
HBM	3000V
MM	200V



ESD SENSITIVITY CAUTION

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.

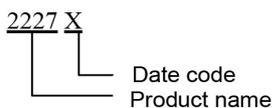
- (1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.
- (2) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGE OPTION
AOS2227	AOS2227XN	-40 ~+85	MSOP-10	AOS2227	Tape and Reel , 3000
	AOS2227XUTQK10	-40 ~+85	QFN-1.4 x 1.8-10L	2227X	Tape and Reel , 4000

NOTE: X = Date Code

MARKING INFORMATION





ELECTRICAL CHARACTERISTICS

($V_+ = +1.8V$ to $+5.5V$, $GND = 0V$, $V_{IH} = +1.5V$, $V_{IL} = +0.5V$, $T_A = -40^\circ C$ to $85^\circ C$. Typical values are at $V_+ = +3.3V$, $T_A = +25^\circ C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	T_A	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog I/O Voltage (HSD1+, HSD1-, HSD2+, HSD2-)	V_{IS}		-40 to +85	0		V_+	V
On-Resistance	R_{ON}	$V_+ = 3.0V, V_{IS} = 0V$ to $0.4V$, $I_D = 8mA$, Test Circuit 1	+25		6	10	
			-40 to +85				10.5
On-Resistance Match Between Channels	R_{ON}	$V_+ = 3.0V, V_{IS} = 0V$ to $0.4V$, $I_D = 8mA$, Test Circuit 1	+25		0.15	0.6	
			-40 to +85				1.6
On-Resistance Flatness	$R_{FLAT(ON)}$	$V_+ = 3.0V, V_{IS} = 0V$ to $1.0V$, $I_D = 8mA$, Test Circuit 1	+25		5	7	
			-40 to +85				8
Power Off Leakage Current (D+, D-)	I_{OFF}	$V_+ = 0V$, $V_D = 0V$ to $3.6V, V_S$, $V_{-OE} = 0V$ or $3.6V$	-40 to +85			1	μA
Increase in I_+ per Control Voltage	I_{CCT}	$V_+ = 4.3V$, V_S or $V_{-OE} = 2.6V$	-40 to +85			40	μA
Source Off Leakage Current	$I_{HSD2(OFF)}$ $I_{HSD1(OFF)}$	$V_+ = 3.6V, V_{IS} = 3.3V/0.3V$, $V_D = 0.3V/3.3V$	-40 to +85			1	μA
Channel On Leakage Current	$I_{HSD2(ON)}$ $I_{HSD1(ON)}$	$V_+ = 3.6V$, $V_{IS} = 3.3V/0.3, V_D = 0.3V/3.3V$ or floating	-40 to +85			1	μA
DIGITAL CONTROL INPUTS⁽¹⁾							
Input High Voltage	V_{IH}		-40 to +85	1.6			V
Input Low Voltage	V_{IL}		-40 to +85			0.5	V
Input Leakage Current	I_{IN}	$V_+ = 3.0V, V_S$, $V_{-OE} = 0V$ or V_+	-40 to +85			1	μA



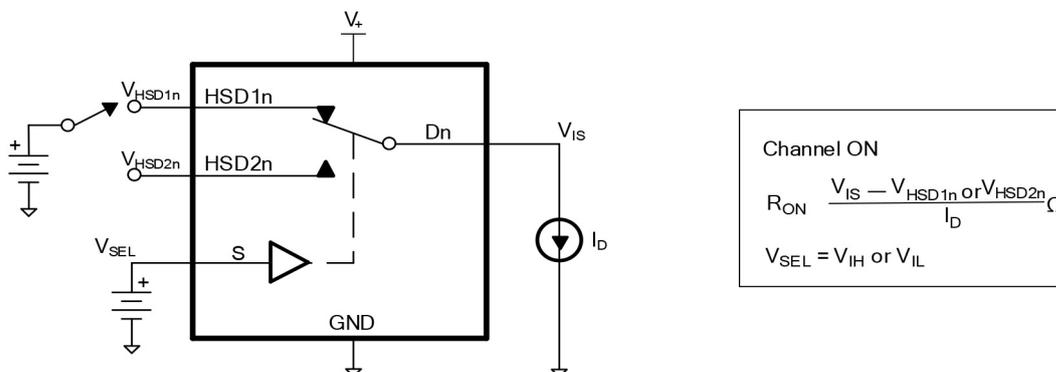
ELECTRICAL CHARACTERISTICS

(V+ = +1.8V to +5.5V, GND = 0V, V_{IH} = +1.5V, V_{IL} = +0.5V, T_A = -40°C to 85°C. Typical values are at V+ = +3.3V, T_A = +25°C, unless otherwise noted.)

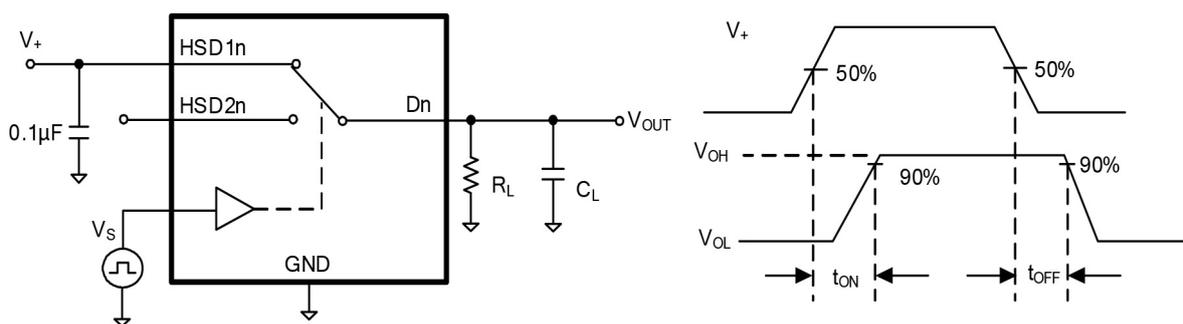
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Turn-On Time	t _{ON}	V _{IS} = 0.8V, R _L = 50 , C _L = 10pF,Test Circuit 2	+25		20		ns
Turn-Off Time	t _{OFF}		+25		15		ns
Break-Before-Make Time Delay	t _D	V _{IS} = 0.8V, R _L = 50 , C _L = 10pF,Test Circuit 3	+25		4		ns
Propagation Delay	t _{PD}	R _L = 50 , C _L = 10pF	+25		0.35		ns
Off Isolation	O _{ISO}	Signal = 0dBm, R _L = 50 , f = 250MHz,Test Circuit 4	+25		-35		dB
Channel-to-Channel Crosstalk	X _{TALK}	Signal = 0dBm, R _L = 50 , f = 250MHz,Test Circuit 5	+25		-40		dB
-3dB Bandwidth	BW	Signal = 0dBm, R _L = 50 , C _L = 5pF,Test Circuit 6	+25		550		MHz
Channel-to-Channel Skew	t _{SKEW}	R _L = 50 , C _L = 10pF	+25		0.05		ns
Charge Injection Select Input to Common I/O	Q	V _G = GND, C _L = 1.0nF, R _G = 0 , Q = C _L x V _{OUT} , Test Circuit 7	+25		11		pC
HSD+, HSD-, D+, D-ON Capacitance	C _{ON}		+25		7		pF
POWER REQUIREMENTS							
Power Supply Range	V+		-40 to +85	1.8		5.5	V
Power Supply Current	I+	V+ = 3.0V, V _S , V _{- OE} = 0V or V+	-40 to +85			1	μA



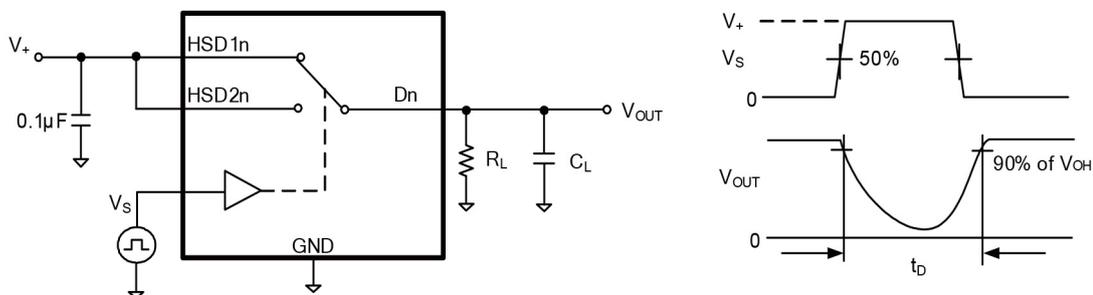
Parameter Measurement Information



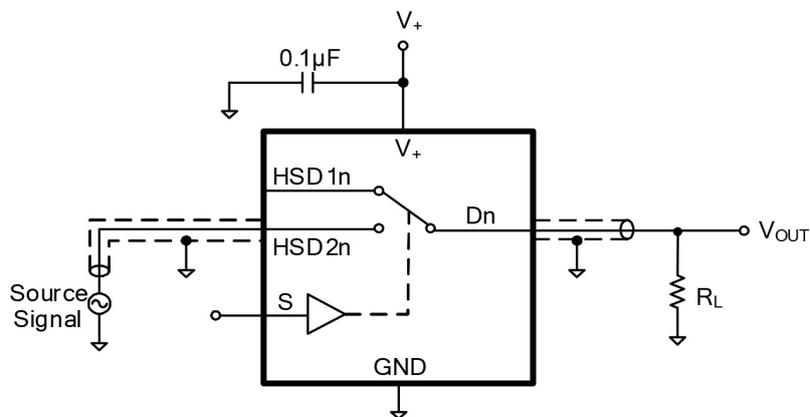
Test Circuit 1. ON-State Resistance (R_{ON})



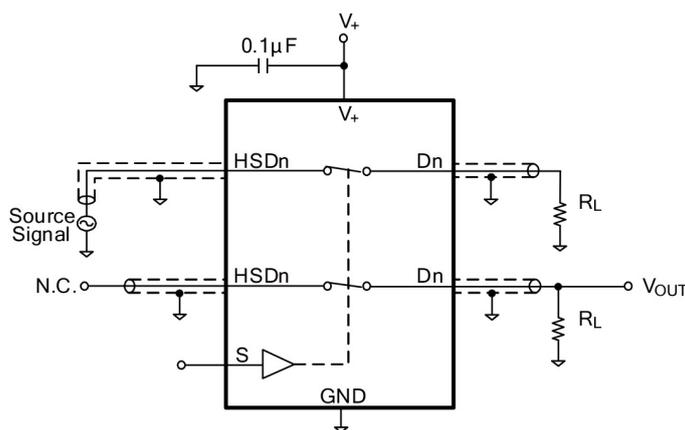
Test Circuit 2. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})



Test Circuit 3. Break-Before-Make Time (t_D)

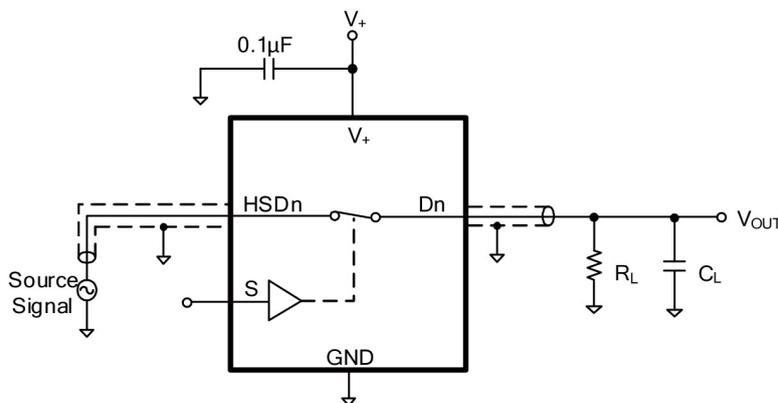


Test Circuit 4.OFF Isolation (O_{Iso})

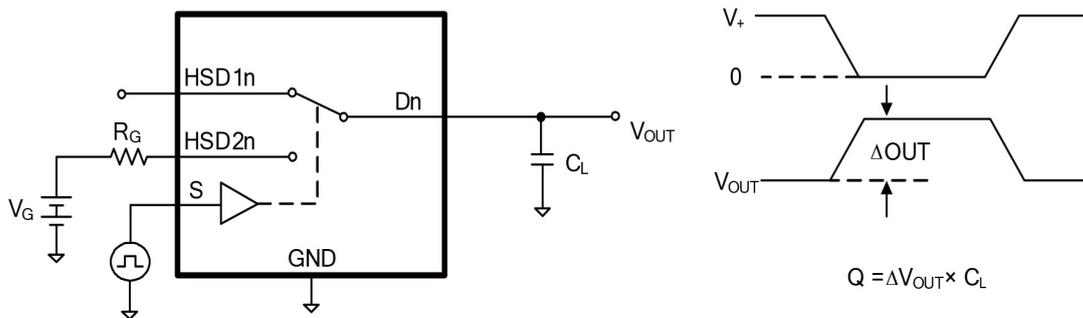


$$\text{Channel To Channel Crosstalk} = -20 \times \log \frac{V_{HSDn}}{V_{OUT}}$$

Test Circuit 5. Channel-to-Channel Crosstalk



Test Circuit 6. -3dB Bandwidth



Test Circuit 7. Charge Injection(Q)



APPLICATION NOTES

There are many USB applications in which the USB hubs or controllers have a limited number of USB I/Os. The AOS2227 solution can effectively expand the limited USB I/Os by switching between multiple USB buses in order to interface them to a single USB hub or controller. AOS2227 can also be used to connect a single controller to two USB connectors or controllers.

Design requirements of the USB 1.0, 1.1, and 2.0 standards should be followed. It is recommended that the digital control pins S and \overline{OE} be pulled up to V+ or down to GND to avoid undesired switch positions that could result from the floating pin.

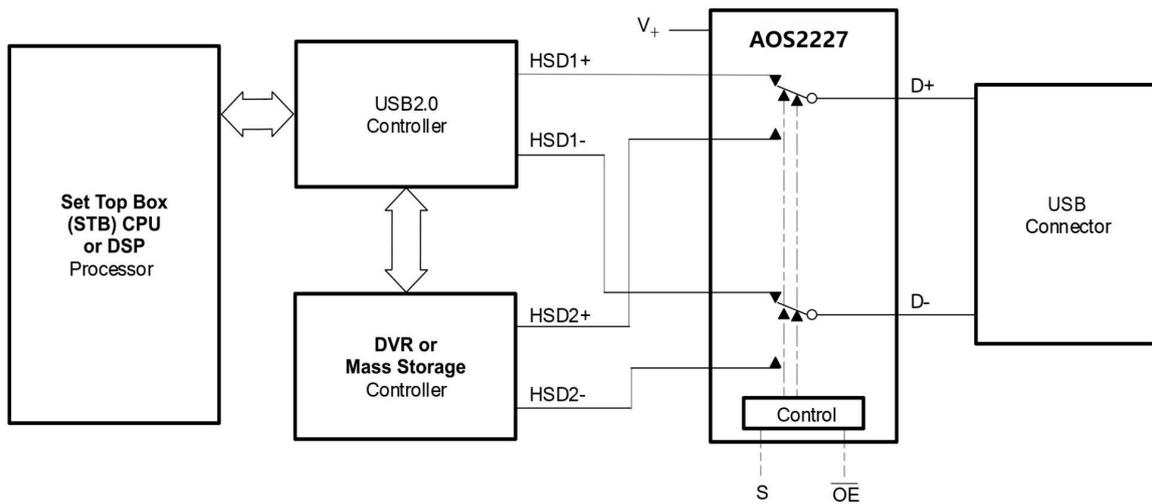
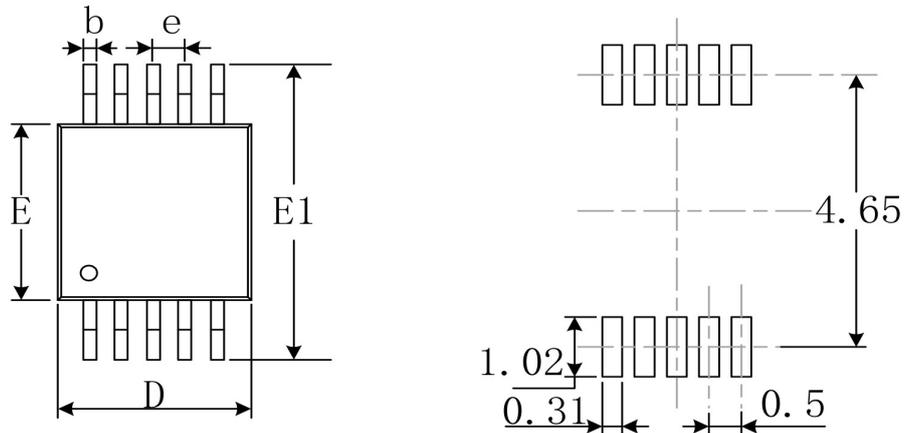


Figure 1. Application Diagram



PACKAGE OUTLINE DIMENSIONS
MSOP10



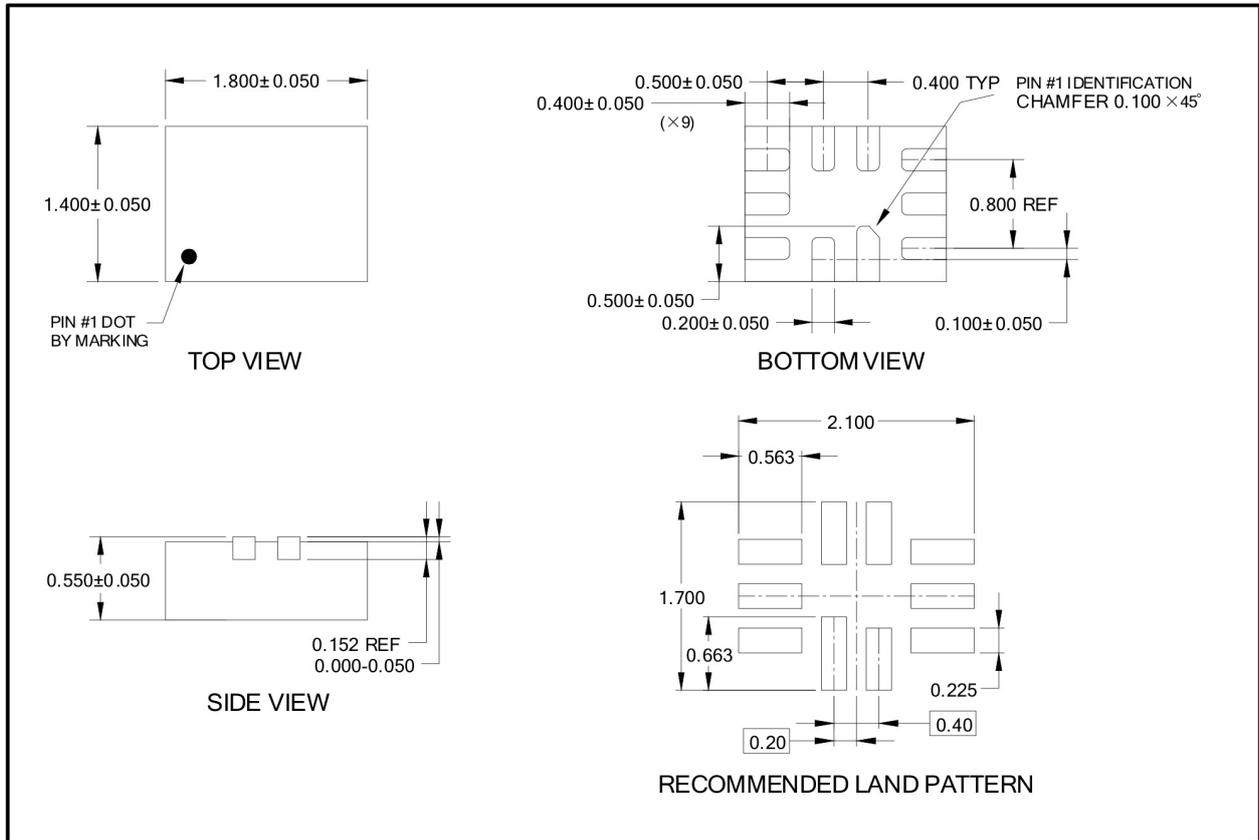
RECOMMENDED LAND PATTERN (Unit: mm)



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	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
	0°	6°	0°	6°



PACKAGE OUTLINE DIMENSIONS
QFN-1.4×1.8-10L



NOTE: All linear dimensions are in millimeters.