AOS SEMICONDUCTOR

产品规格说明书

Product Data Sheet

AOS2255XN

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CMOS 4-Channel Analog Multiplexer/Demultiplexer

DESCRIPTIONS

The AOS2255 is a CMOS analog IC configured as 4-channel multiplexers. This CMOS device can operate from 2.5 V to 5.5 V.

The AOS2255 device are digitally-controlled analog switches. It has low on-resistance (24 ΩTYP) and very low off-leakage current (1nA TYP).

The AOS2255 is available in Green MSOP-10packages. It operates over an ambient temperature range of -40℃ to +125℃.

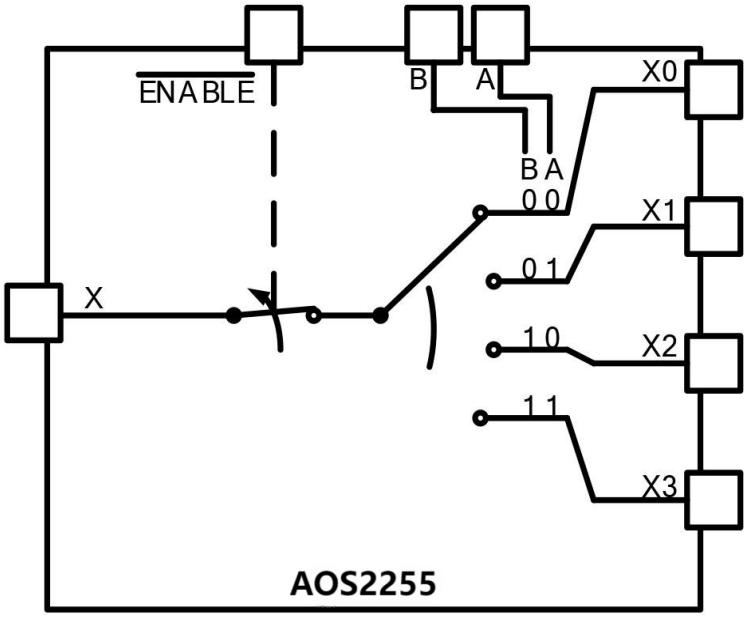
FEATURES

- ★ -3dB Bandwidth: 180MHz
- ★ Single Supply Operation +2.5V to +5.5V
- ★ Low ON Resistance, 24Ω(TYP) With 5V Supply
- ★ High Off-Isolation: -83dB (RL = 50Ω, f = 1MHz)
- ★ Break-Before-Make Switching
- ★ Binary Address Decoding on Chip
- ★ Operating Temperature Range:-40℃ to +125℃
- ★ PACKAGES: MSOP-10

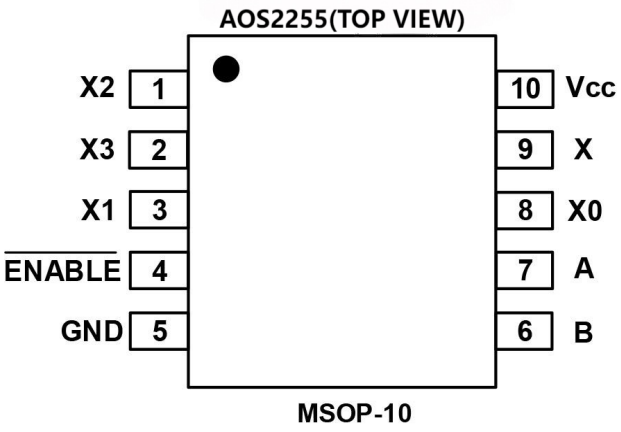
APPLICATIONS

- ★ Sensors
- ★ Analog and Digital Multiplexing and Demultiplexing
- ★ A/D and D/A Conversion
- ★ Signal Gating
- ★ Battery-Operated Equipment
- ★ Factory Automation
- ★ Appliances
- ★ Communications Circuits

Functional Diagrams of AOS2255



PIN CONFIGURATIONS



PIN DESCRIPTION

NAME	PIN	FUNCTION
X2	1	Analog SwitchNormally OpenInputs 2.
X3	2	Analog SwitchNormally OpenInputs 3.
X1	3	Analog SwitchNormally OpenInputs 1.
¬ ENABLE	4	Inhibit. Drive ENABLElow or connectto GND for normal operation. Drive ENABLEhigh or connect to VCC to turn all switches off.
GND	5	Ground.
B	6	Digital Address “B” Input.
A	7	Digital Address “A” Input.
X0	8	Analog SwitchNormally OpenInputs 0.
X	9	Analog SwitchCommon.
VCC	10	Positive Analog and Digital Supply Voltage.

FUNCTION TABLE

ENABLE INPUT	INPUT STATES		ON CHANNEL(S)
	B	A	
1	X	X	NONE
0	0	0	X0
0	0	1	X1
0	1	0	X2
0	1	1	X3

X=Don't care

NOTE:Input and output pins are identical and inter-changeable. Either may be considered an input or output; signals pass equally well in either direction.

SPECIFICATIONS

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

SYMBOL	PARAMETER		MIN	MAX	UNIT
V_{CC}	Supply Voltage		-0.3	6	V
V_{IN}	Input Voltage (All inputs)		-0.3	V_{CC}+0.3	
I_{IN}	Switch InputCurrent	Any one input	-20	+20	mA
I_{PEAK}	Peak Switch Current	Pulsed at 1ms Duration, <10% Duty Cycle	-40	+40	
T_J	Junction Temperature			150	℃
T_{stg}	Storage temperature		-65	+150	

(1) Stresses above these ratings may cause permanentdamage. 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.

ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM)	±4500	V
		Charged device model(CDM)	±1500	V

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNIT
V_{CC}	Supply Voltage	2.5	5.5	V
T_A	Operating temperature	-40	+125	℃

Thermal Information

THERMAL METRIC		AOS2255	UNIT
		10 PINS	
		MSOP-10	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	180.7	℃/W
$R_{JC(top)}$	Junction-to-case(top) thermal resistance	66.2	℃/W
R_{JB}	Junction-to-board thermal resistance	103.2	℃/W
ψ_{JT}	Junction-to-top characterization parameter	11.2	℃/W
ψ_{JB}	Junction-to-board characterization parameter	101.3	℃/W
$R_{JC(bot)}$	Junction-to-case(bottom) thermal resistance	N/A	℃/W

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGE OPTION
AOS2255	AOS2255XN	-40°C~+125°C	MSOP-10	AOS2255	Tape and Reel,3000

ELECTRICAL CHARACTERISTICS

V_{CC}= 5.0V or 3.3V, FULL= -40℃ to +125℃,Typical values are at T_A= +25℃.(unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V_{DD}	T_A	MIN	TYP	MAX	UNITS
ANALOG SWITCH								
Analog Signal Range	$V_{X\_}$, V_X			FULL	0		V_{CC}	V
On-Resistance	R_{ON}	V_{CC}=5V, I_X=1mA	5V	+25°C		24	30	Ω
				FULL			35	Ω
		V_{CC}=3.3V, I_X=1mA	3.3V	+25°C		50	60	Ω
				FULL			65	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_{CC}=5V, I_X=1mA Switch ON	5V	+25°C		1	4	Ω
				FULL			5.3	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	V_{CC}=5V, I_X=1mA Switch ON	5V	+25°C		8	11	Ω
				FULL			14	Ω
X_Off,X Off,X On, Leakage Current	$I_{X\_(OFF)}$, $I_{X(OFF)}$, $I_{X(ON)}$	V_{CC}=5V, $V_{X\_}$=1V,4.5V V_X=4.5V,1V	5V	+25°C		1	100	nA
		V_{CC}=3.3V, $V_{X\_}$=1V,3V V_X=3V,1V	3.3V	+25°C		1	100	nA
DIGITALCONTROL INPUTS(1)								
Logic Input Logic Threshold High	V_{AH}, V_{BH}, $V_{\neg ENABLE}$		5V	+25°C	1.7			V
			3.3V	+25°C	1.7			V
Logic Input Logic Threshold Low	V_{AL}, V_{BL}, $V_{\neg ENABLE}$		5V	+25°C			0.5	V
			3.3V	+25°C			0.5	V
Input-Current High	I_{AH}, I_{BH}, $I_{\neg ENABLE}$	V_A, V_B, $V_{\neg ENABLE}$= V_{CC}	3.3V to 5V	+25°C		1	100	nA
Input-Current Low	I_{AL}, I_{BL}, $I_{\neg ENABLE}$	V_A, V_B, $V_{\neg ENABLE}$= 0V	3.3V to 5V	+25°C		1	100	nA

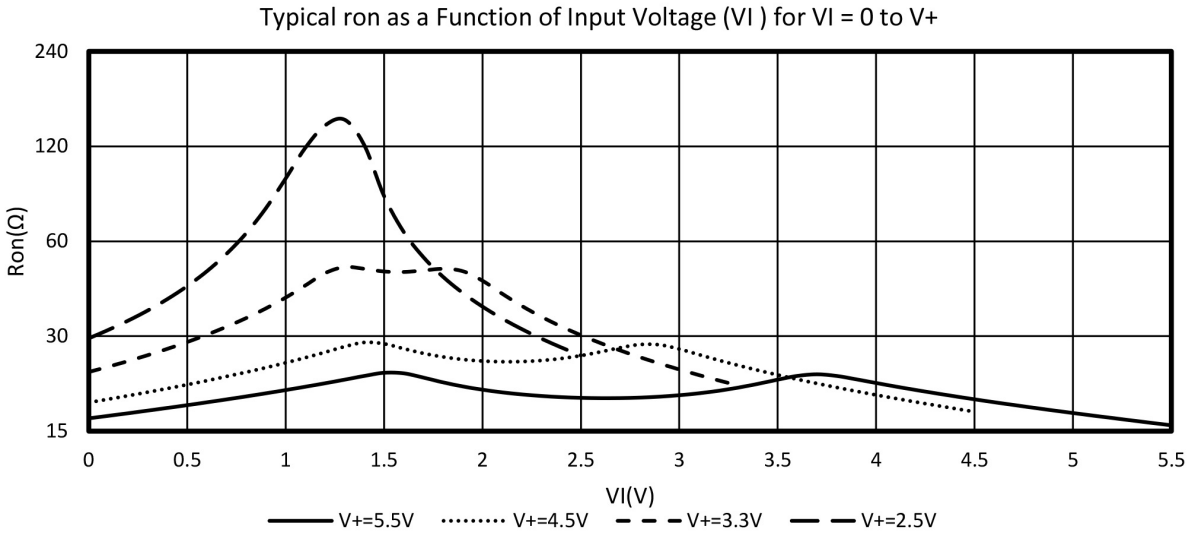
(1) All unused digital inputs of the device must be held at V_{IO} or GND to ensure proper device operation.

ELECTRICAL CHARACTERISTICS(continued)

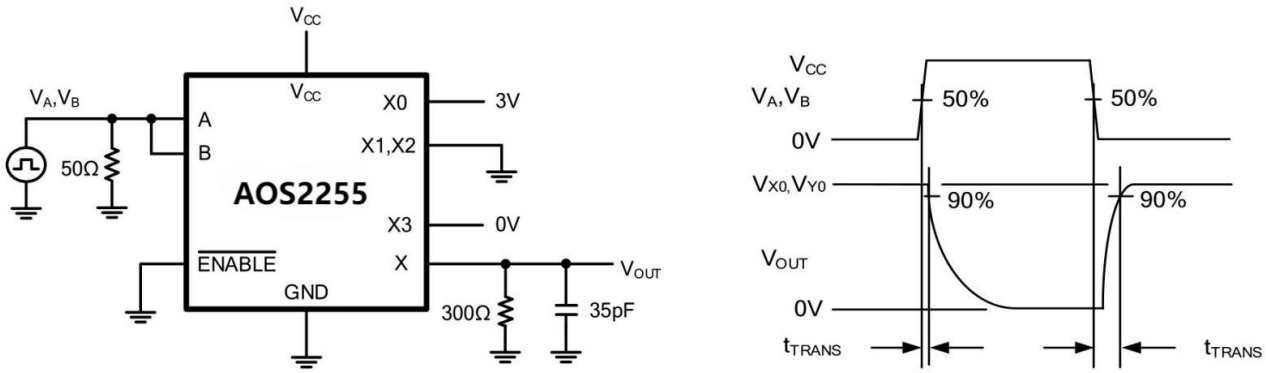
V_{CC}= 5.0V or 3.3V, FULL= −40℃ to +125℃,Typical values are at T_A= +25℃.(unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	Vcc	TEMP	MIN	TYP	MAX	UNITS
DYNAMIC CHARACTERISTICS								
Address Transition Time	t_{TRANS}	$V_{X\_}$= 3V/0V, R_L= 300Ω, C_L= 35pF, Test Circuit 1	5V	+25°C		160		ns
		$V_{X\_}$= 3V/0V, R_L= 300Ω, C_L= 35pF,Test Circuit 1	3.3V	+25°C		240		ns
ENABLE Turn-On Time	t_{ON}	$V_{X\_}$= 3V, R_L= 300Ω, C_L= 35pF,Test Circuit 2	5V	+25°C		90		ns
			3.3V	+25°C		140		
ENABLE Turn-Off Time	t_{OFF}	$V_{X\_}$= 3V, R_L= 300Ω, C_L= 35pF,Test Circuit 2	5V	+25°C		70		ns
			3.3V	+25°C		100		
Internal A, B, C Rise Time	t_R		5V	+25°C		50		ns
			3.3V	+25°C		80		
Internal A, B, C Fall Time	t_F		5V	+25°C		60		ns
			3.3V			85		ns
Break-Before-Make Time Delay	t_D	$V_{X\_}$= 3V, R_L= 300Ω, C_L= 35pF,Test Circuit 3	5V	+25°C		50		ns
			3.3V			80		ns
Charge Injection	Q	R_S = 0Ω, C_L= 1nF, Test Circuit 4	5V	+25°C		6		pC
		R_S = 0Ω, C_L = 1nF, Test Circuit 4	3.3V			4		pC
Crosstalk	X_{TALK}	f = 1MHz, Test Circuit 5	5V	+25°C		-110		dB
Off Isolation	O_{ISO}	R_L= 50Ω, f = 1MHz, Test Circuit 5	5V	+25°C		-83		dB
-3dB Bandwidth	BW	R_L = 50Ω	5V	+25°C		180		MHz
			3.3V			180		MHz
Input Off-Capacitance	$C_{X\_(OFF)}$	f = 1MHz, Test Circuit 6	5V	+25°C		4.7		pF
Output Off-Capacitance	$C_{X(OFF)}$	f = 1MHz, Test Circuit 6	5V	+25°C		12.7		pF
Output On-Capacitance	$C_{X(ON)}$	f = 1MHz, Test Circuit 6	5V	+25°C		16		pF
Total Harmonic Distortion	THD	R_L= 600Ω,5V_{P-P}, f = 20Hz to 20kHz	5V	+25°C		0.7		%
POWER REQUIREMENTS								
Power Supply Range	V_{CC}			FULL	2.5		5.5	V
Power Supply Current	I_{CC}	V_{CC}= 5.0V, V_A, V_B, $V_{\neg ENABLE}$= V_{CC} or 0	5V	+25°C		0.001	2	μA
		V_{CC}= 3.3V, V_A, V_B, $V_{\neg ENABLE}$= V_{CC} or 0	3.3V	+25°C		0.001	1	μA

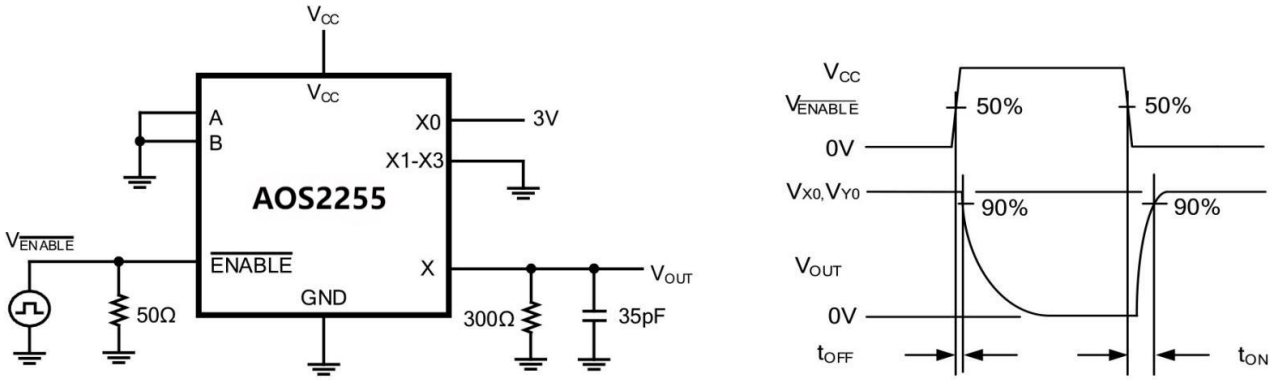
TYPICAL CHARACTERISTICS



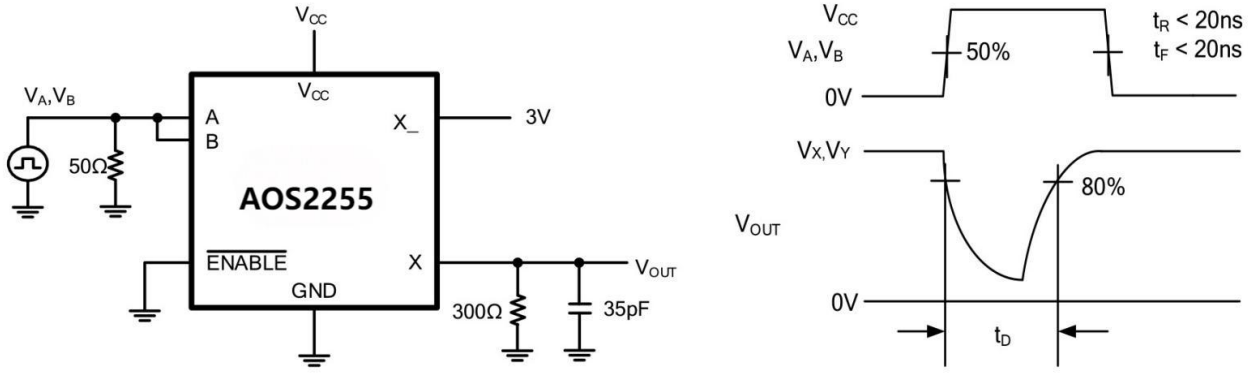
Parameter Measurement Information



Test Circuit 1. Address Transition Times (t_{TRANS})

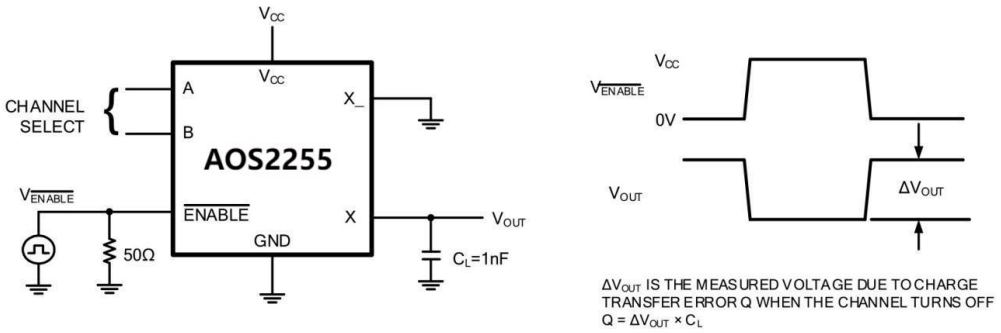


Test Circuit 2. Switching Times (t_{ON}, t_{OFF})

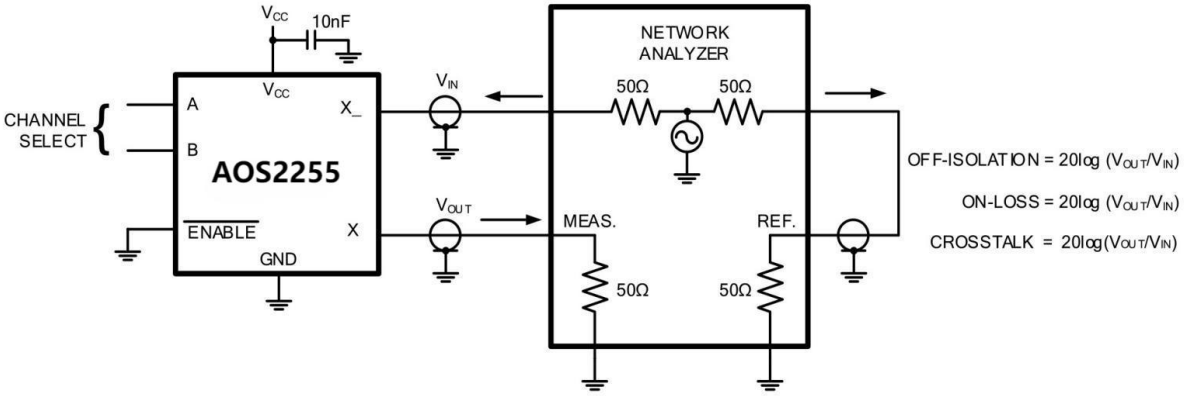


Test Circuit 3. Break-Before-Make Time Delay (t_D)

Parameter Measurement Information (continued)

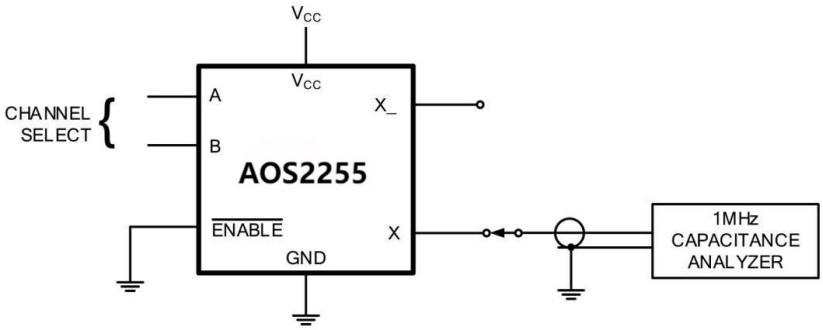


Test Circuit 4. Charge Injection (Q)



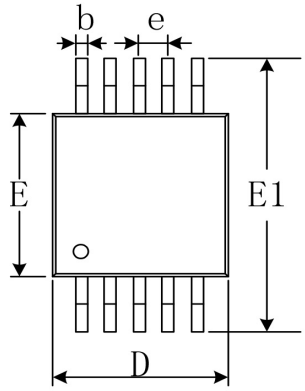
MEASUREMENTS ARE STANDARDIZED AGAINST SHORT AT SOCKET TERMINALS.
OFF-ISOLATION IS MEASURED BETWEEN COM AND "OFF" NO TERMINAL ON EACH SWITCH.
ON-LOSS IS MEASURED BETWEEN COM AND "ON" NO TERMINAL ON EACH SWITCH.
SIGNAL DIRECTION THROUGH SWITCH IS REVERSED; WORST VALUES ARE RECORDED.

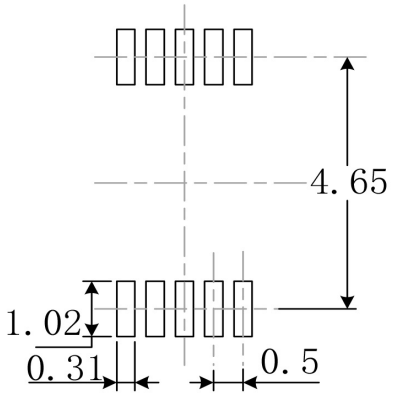
Test Circuit 5. Off Isolation, On Loss



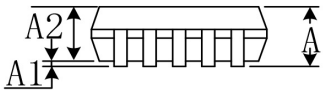
Test Circuit 6. Capacitance

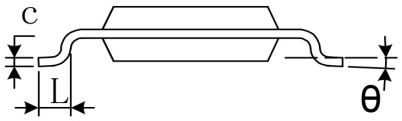
PACKAGE OUTLINE DIMENSIONS
MSOP-10





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
θ	0 °	6 °	0 °	6 °