

High Isolation and Low Leakage

4:1 CMOS Analog Signal Multiplexer

General Description

The ET74HC4855 is a CMOS analog switch configured as a 4:1 multiplexer. This CMOS device can operate from 2.5V to 5.5V single supplies. Each switch can handle rail-to-rail analog signals.

The ET74HC4855 operates over an ambient temperature range of -40°C to +125°C.

Features

- Guaranteed On-Resistance 20Ω (TYP) with +5.5V Supply
- Guaranteed On-Resistance Match Between Channels
- 'T' Type Switch
- 2.5V to 5.5V Single-Supply Operation
- Low Distortion: 0.3% ($R_L = 600\Omega$, $f = 20\text{Hz}$ to 20kHz)
- High Off-Isolation: -80dB ($R_L = 50\Omega$, $f = 1\text{MHz}$)
- -40°C to +125°C Operating Temperature Range
- Part No. and Package information:

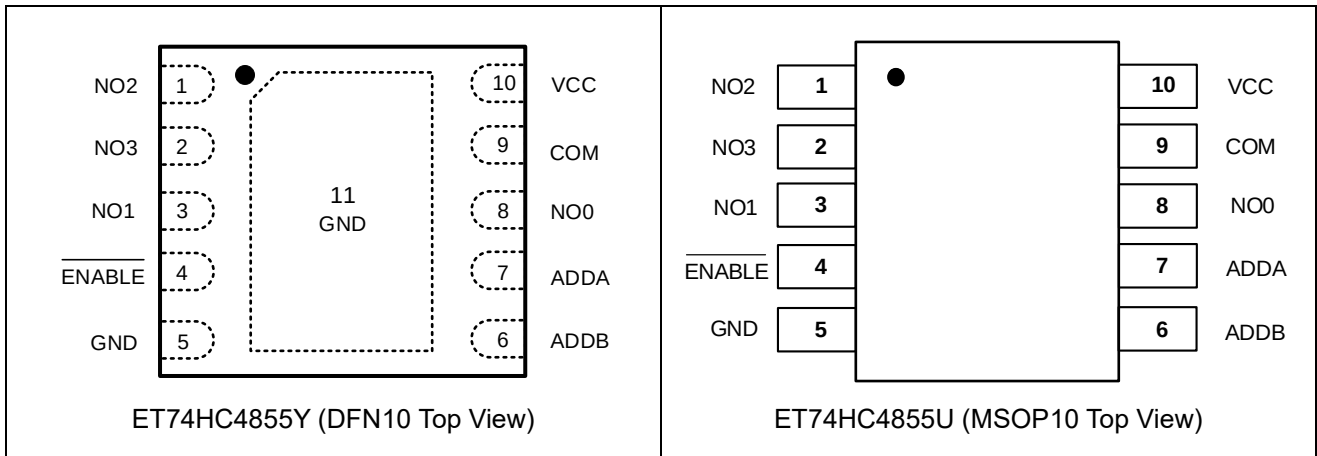
Part No.	Package	Packing Option	MSL
ET74HC4855Y	DFN10 (3mm×3mm)	Tape and Reel, 3K/Reel	Level 3
ET74HC4855U	MSOP10 (4.9mm x 3mm)	Tape and Reel, 3K/Reel	Level 3

Application

- Battery-Operated Equipment
- Audio and Video Signal Routing
- Voltage Data-Acquisition Systems
- Communications Circuits
- Automotive

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Pin Configuration



Pin Function

Pin NO.	Pin Name	Description
1	NO2	Analog Switch Normally Open Input 2
2	NO3	Analog Switch Normally Open Input 3
3	NO1	Analog Switch Normally Open Input 1
4	$\overline{\text{ENABLE}}$	Inhibit. Drive $\overline{\text{ENABLE}}$ low or connect to GND for normal operation. Drive $\overline{\text{ENABLE}}$ high or connect to VCC to turn all switches off.
5	GND	Ground
6	ADDB	Logic-Level Address Input
7	ADDA	Logic-Level Address Input
8	NO0	Analog Switch Normally Open Input 0
9	COM	Analog Switch Common
10	VCC	Positive Analog and Digital Supply Voltage
11	GND	Ground

Note. Input and output pins are identical and interchangeable. Either may be considered an input or output; signals pass equally well in either direction.

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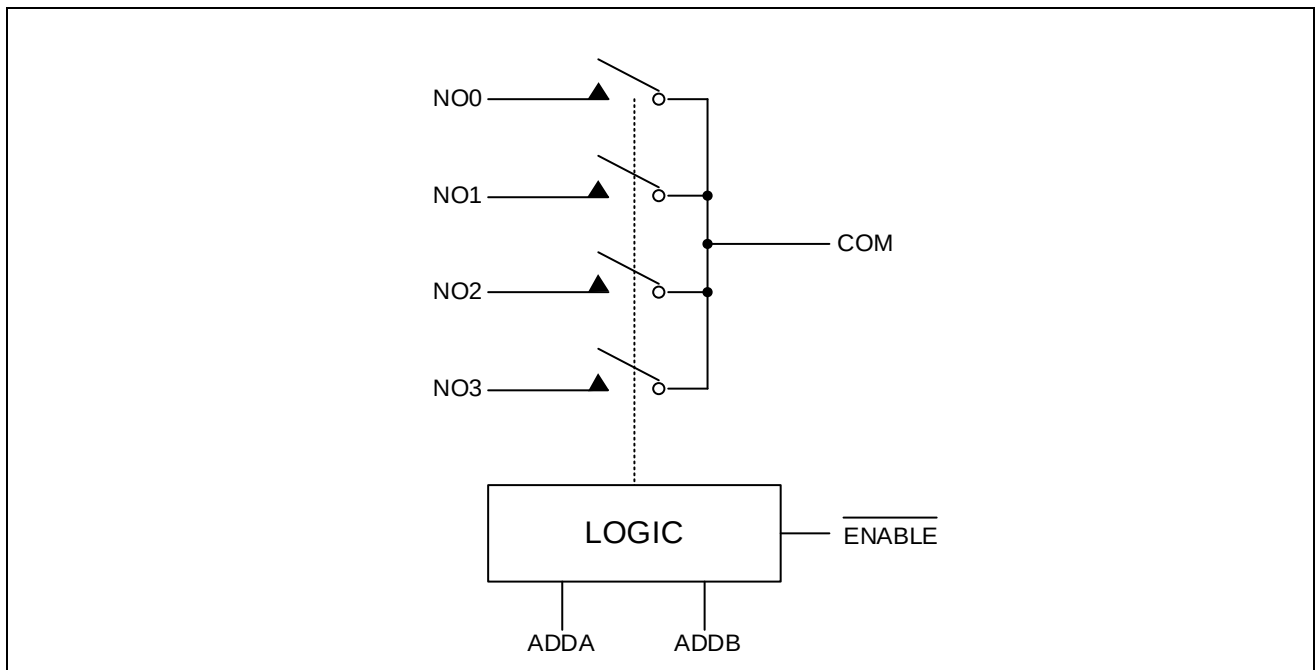
Truth Table

ENABLE	SELECT INPUTS		ON SWITCHES
	ADDDB	ADDA	
1	X	X	NONE
0	0	0	COM-NO0
0	0	1	COM-NO1
0	1	0	COM-NO2
0	1	1	COM-NO3

X=Don't care

Note. Input and output pins are identical and interchangeable. Either may be considered an input or output; signals pass equally well in either direction.

Analog Symbol



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Absolute Maximum Ratings

Characteristic		Symbol	Value	Unit
Supply Voltage		V_{CC}	-0.3 ~ +6.0	V
Voltage into Any Terminal		V_{IS}	-0.3 ~ $V_{CC}+0.3$	V
Continuous Current into Any Terminal		I_{ANL1}	±20	mA
Peak Current(Pulsed at 1ms, 10% duty cycle)		$I_{ANL-PK1}$	±40	mA
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-65 to +150	°C
Lead Temperature (Soldering, 10s)		T_L	260	°C
ESD Classification	Human Body Model ⁽¹⁾	V_{ESD}	±4000	V
	Charged Device Model ⁽²⁾		±2000	
Max Latch Up Current Above V_{CC} and GND at 85°C ⁽³⁾		I_{LU}	±200	mA

Exceeding the maximum ratings listed under Absolute Maximum Ratings when designing is likely to damage the device permanently. Do not design to the maximum limits because long-time exposure to them might impact the device's reliability. The ratings are obtained over an operating free-air temperature range unless otherwise specified.

Note1: HBM tested per JEDEC JS-001;

Note2: CDM tested per JEDEC JS-002;

Note3: Latch up Current Maximum Rating tested per JEDEC JESD78F.

Recommended Operating Conditions

Characteristic	Symbol	Min	Max	Unit
DC Supply Voltage	V_{CC}	2.5	5.5	V
Operating Temperature Range	T_A	-40	+125	°C

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Electrical Characteristics

$V_{CC} = 5.5V$, $T_A = -40^{\circ}C$ to $+125^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.

Symbol	Parameters	Conditions	Temp	Min	Typ	Max	Unit
Analog Switch							
$V_{NO_}, V_{COM}$	Analog Signal Range		Full	GND		V_{CC}	V
R_{ON}	On-Resistance	$I_{COM}=1mA$	$+25^{\circ}C$		20	30	Ω
			Full			35	Ω
ΔR_{ON}	On-Resistance Match between Channels	$I_{COM}=1mA$	$+25^{\circ}C$		0.5	2.5	Ω
			Full			3	Ω
$R_{FLAT(ON)}$	On-Resistance Flatness	$I_{COM}=1mA$	$+25^{\circ}C$		5	10	Ω
			Full			15	Ω
$I_{NO_ (OFF)}$	Channel Off Leakage Current	$V_{NO_} = 4.5V$ or $0V$, $V_{COM} = 4.5V$ or $0V$	$+25^{\circ}C$		10	1000	nA
$I_{COM(OFF)}$		$V_{NO_} = 4.5V$ or $0V$, $V_{COM} = 4.5V$ or $0V$	$+25^{\circ}C$		10	1000	nA
$I_{NO_ (ON)},$ $I_{COM(ON)}$	Channel On Leakage Current	$V_{NO_} = 4.5V$ or $0V$, $V_{COM} = 4.5V$ or $0V$	$+25^{\circ}C$		10	1000	nA
Digital Inputs							
V_{IH}	Input High Voltage		$+25^{\circ}C$	1.7			V
V_{IL}	Input Low Voltage		$+25^{\circ}C$			0.5	V
I_{IH}	Input-Current High	$V_{ADDA}, V_{ADDB},$ $V_{ENABLE} = V_{CC}$	$+25^{\circ}C$		10		nA
I_{IL}	Input-Current Low	$V_{ADDA}, V_{ADDB},$ $V_{ENABLE} = V_{CC}$	$+25^{\circ}C$		10		nA
Dynamic Characteristics							
t_{TRANS}	Address Transition Time	$V_{NO_} = 3/0V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		65		ns
t_{ON}	Turn-On Time	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		35		ns
t_{OFF}	Turn-Off Time	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		60		ns
t_D	Break-Before-Make Time Delay	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		35		ns

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Electrical Characteristics (Continued)

$V_{CC} = 5.5V$, $T_A = -40^{\circ}C$ to $+125^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.

Symbol	Parameter	Conditions	Temp	Min	Typ	Max	Unit
Dynamic Characteristics							
Q	Charge Injection	$R_S = 0\Omega$, $C_L = 1nF$, $V_S = 0V$			15		pC
O _{ISO}	Off Isolation	$f=1MHz$, $R_L=50\Omega$	$+25^{\circ}C$		-80		dB
BW	-3dB Bandwidth	$R_L=50\Omega$	$+25^{\circ}C$		250		MHz
THD	Total Harmonic Distortion	$5V_{P-P}$, $R_L=600\Omega$, $f=20Hz$ to $20kHz$	$+25^{\circ}C$		0.3		%
C _{NO(OFF)}	Input Off-Capacitance	$V_{NO_} = 0V$, $f = 1MHz$	$+25^{\circ}C$		5		pF
C _{COM(OFF)}	Output Off-Capacitance	$V_{NO_} = 0V$, $f = 1MHz$	$+25^{\circ}C$		10		pF
C _{COM(ON)}	Output On-Capacitance	$V_{NO_} = 0V$, $f = 1MHz$	$+25^{\circ}C$		15		pF
Power Requirements							
V _{CC}	Power Supply Range		Full	2.5		5.5	V
I _{CC}	Power Supply Current	V_{ADDA} , V_{ADDB} , $V_{ENABLE} = V_{CC}$ or $0V$	$+25^{\circ}C$		0.01	6	uA

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Electrical Characteristics (Continued)

$V_{CC} = 3.3V$, $T_A = -40^{\circ}C$ to $+125^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.

Symbol	Parameter	Conditions	Temp	Min	Typ	Max	Unit
Analog Switch							
$V_{NO_}, V_{COM}$	Analog Signal Range		Full	GND		V_{CC}	V
R_{ON}	On-Resistance	$I_{COM}=1mA$	$+25^{\circ}C$		40	60	Ω
			Full			65	Ω
ΔR_{ON}	On-Resistance Match between Channels	$I_{COM}=1mA$	$+25^{\circ}C$		1	5	Ω
			Full			6	Ω
$I_{NO_}(OFF), I_{COM_}(OFF)$	Channel Off Leakage Current	$V_{NO_} = 1V$ or $3V$, $V_{COM} = 3V$ or $1V$	$+25^{\circ}C$		10	1000	nA
$I_{NO_}(ON), I_{COM}(ON)$	Channel On Leakage Current	$V_{NO_} = 1V$ or $3V$, $V_{COM} = 3V$ or $1V$	$+25^{\circ}C$		10	1000	nA
Digital Inputs							
V_{IH}	Input High Voltage		$+25^{\circ}C$	1.7			V
V_{IL}	Input Low Voltage		$+25^{\circ}C$			0.5	V
I_{IH}	Input-Current High	$V_{ADDA}, V_{ADDB},$ $V_{ENABLE} = V_{CC}$	$+25^{\circ}C$		10		nA
I_{IL}	Input-Current Low	$V_{ADDA}, V_{ADDB},$ $V_{ENABLE} = V_{CC}$	$+25^{\circ}C$		10		nA
Dynamic Characteristics							
t_{TRANS}	Address Transition Time	$V_{NO_} = 3V/0V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		140		ns
t_{ON}	Turn-On Time	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		100		ns
t_{OFF}	Turn-Off Time	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		110		ns
t_D	Break-Before-Make Time Delay	$V_{NO_} = 3V, R_L = 300\Omega,$ $C_L = 35pF$	$+25^{\circ}C$		80		ns
Q	Charge Injection	$R_S = 0\Omega, C_L = 1nF,$ $V_S = 0V$	$+25^{\circ}C$		10		pC
BW	-3dB Bandwidth	$R_L=50\Omega$	$+25^{\circ}C$		200		MHz
Power Requirements							
I_{CC}	Power Supply Current	$V_{ADDA}, V_{ADDB},$ $V_{ENABLE} = V_{CC}$ or $0V$	$+25^{\circ}C$		0.01	3	μA

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Test Circuit

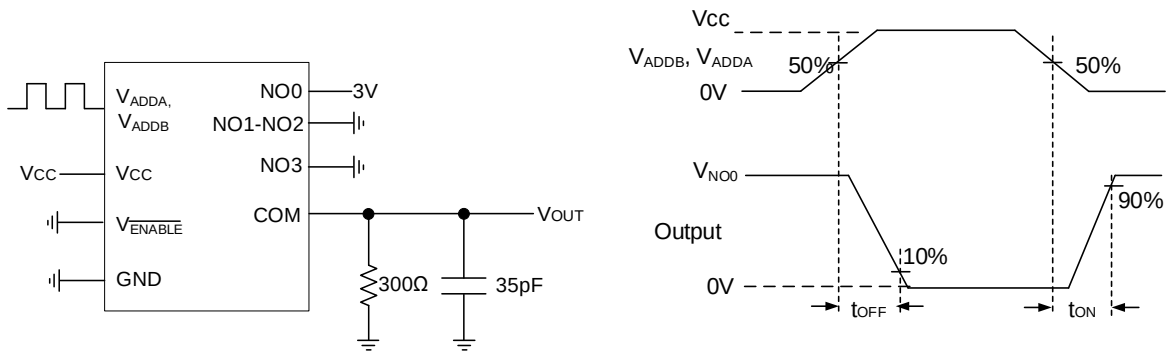


Figure 1. t_{TRANS}

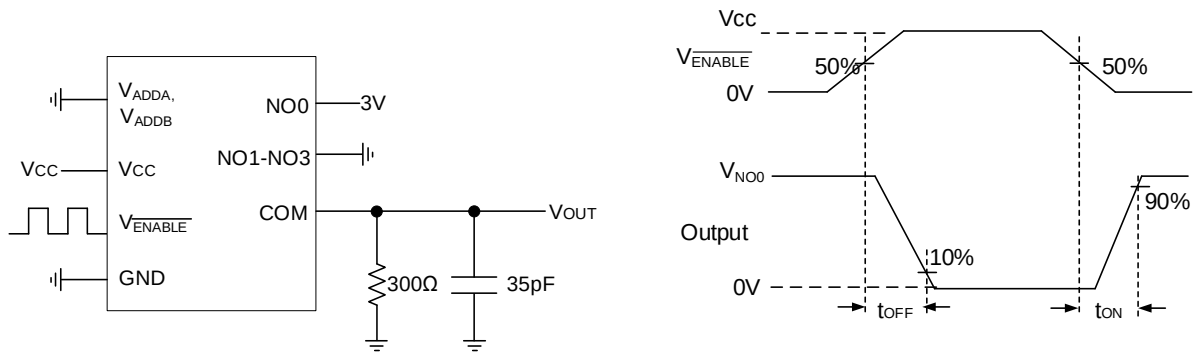


Figure 2. $t_{\text{ON}} / t_{\text{OFF}}$

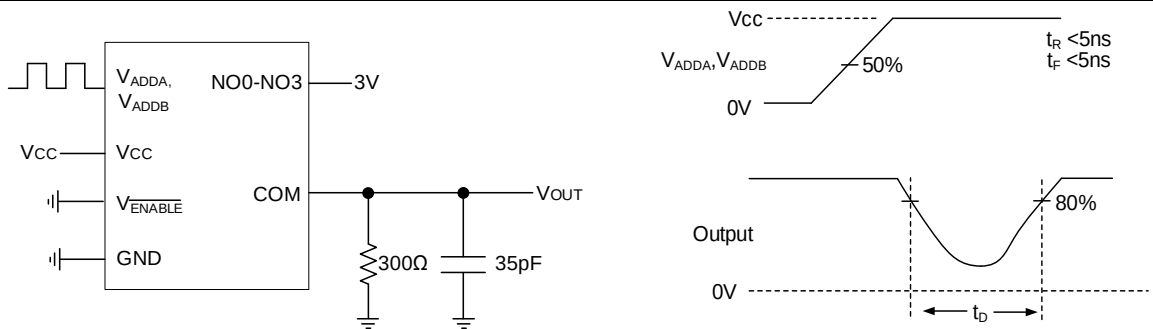


Figure 3. Break-Before-Make Time Delay (t_{D})

Test Circuit (Continued)

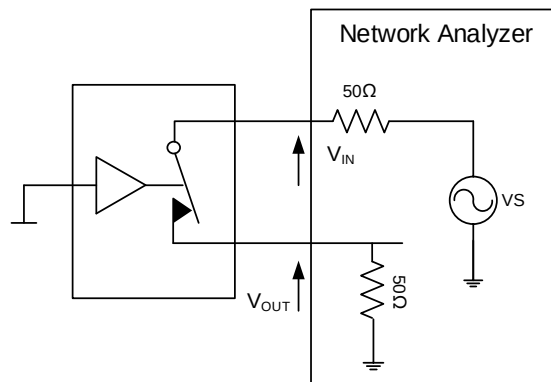
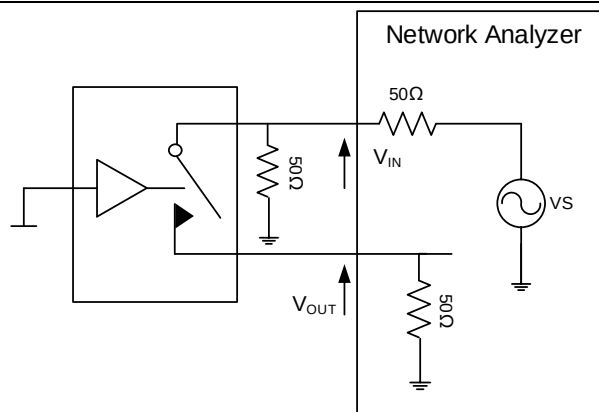


Figure 4. Bandwidth



$$\text{Off-Isolation} = 20 \log(V_{\text{OUT}}/V_{\text{IN}})$$

Figure 5. Channel Off Isolation

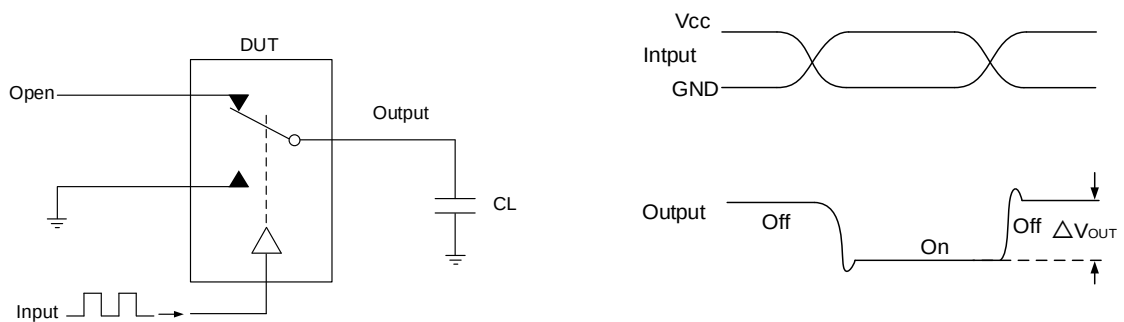


Figure 6. Charge Injection (Q)

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Test Circuit (Continued)

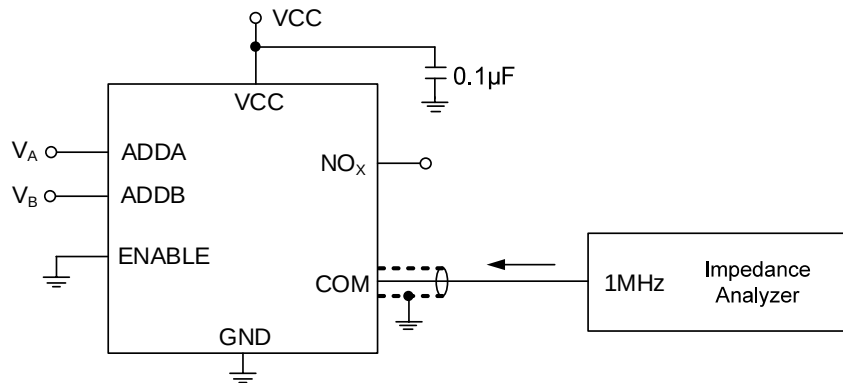


Figure 7. Test Capacitance Circuit

Typical Characteristics

$T_A=25^{\circ}\text{C}$, unless otherwise stated

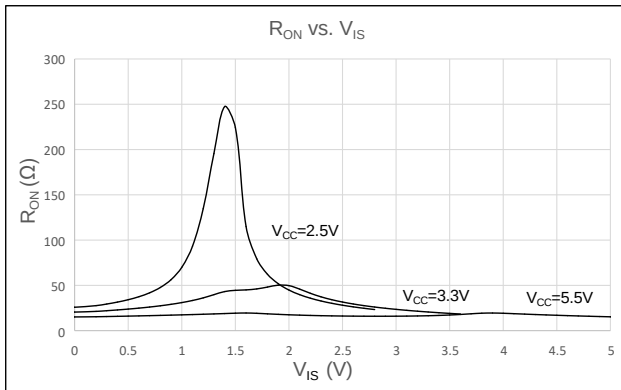


Figure 8. R_{ON} vs. V_{IS} vs. V_{CC}

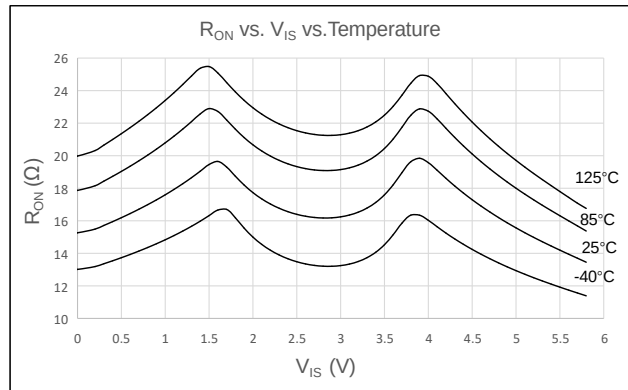


Figure 9. R_{ON} vs. V_{IS} vs. Temperature @ $V_{CC}=5.5\text{V}$

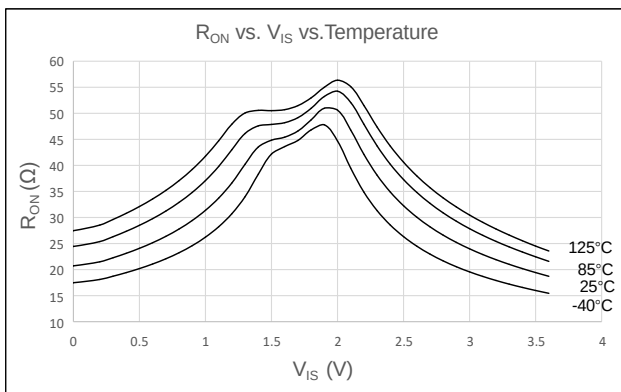


Figure 10. R_{ON} vs. V_{IS} vs. Temperature @ $V_{CC}=3.3\text{V}$

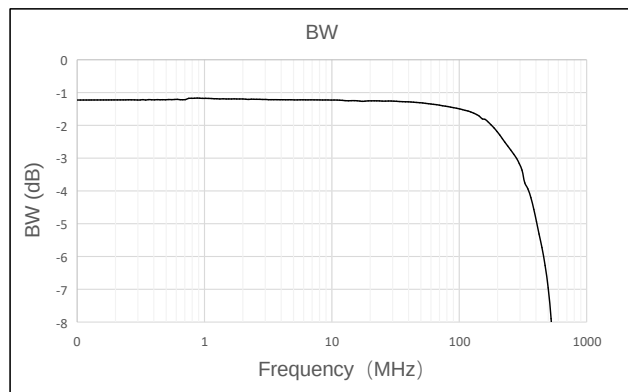


Figure 11. Bandwidth vs. Frequency @ $V_{CC}=5.5\text{V}$

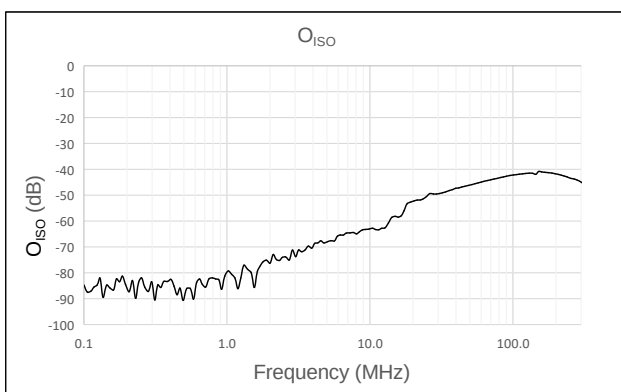


Figure 12. O_{ISO} vs. Frequency @ $V_{CC}=5.5\text{V}$

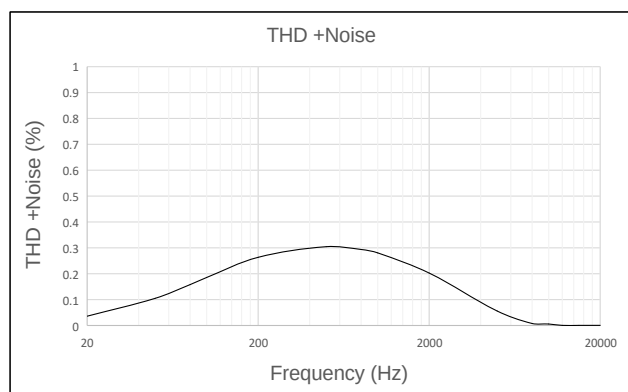
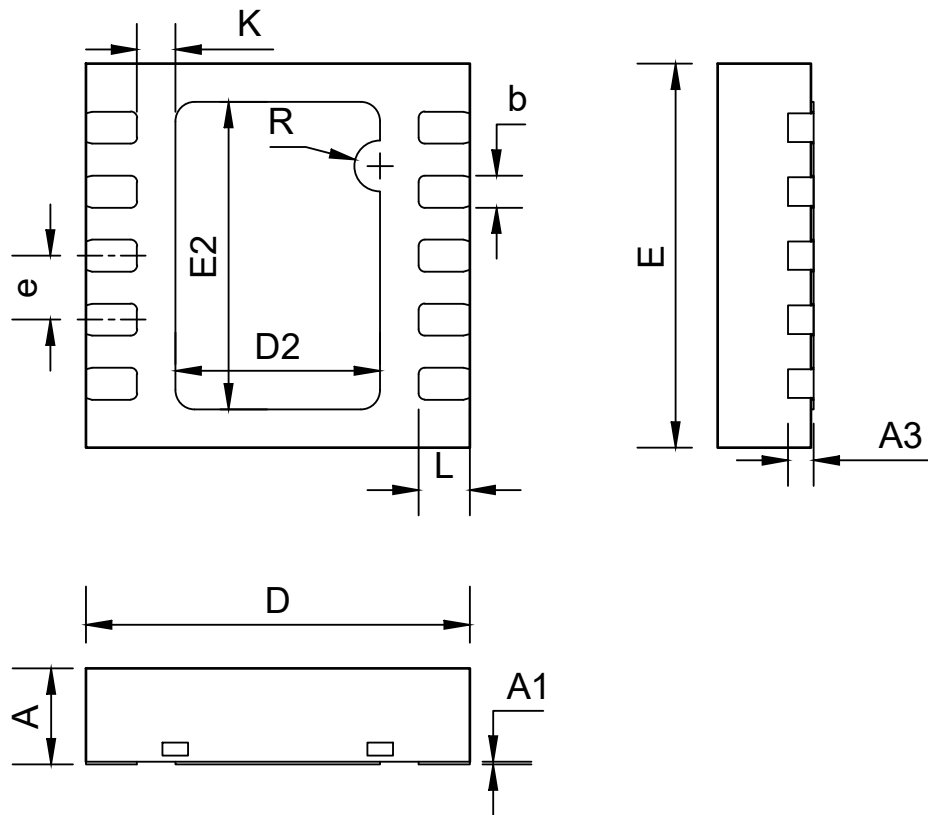


Figure 13. THD+N vs. Frequency @ $V_{CC}=5.5\text{V}$

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Package Dimension

DFN10 (3mm x 3mm)



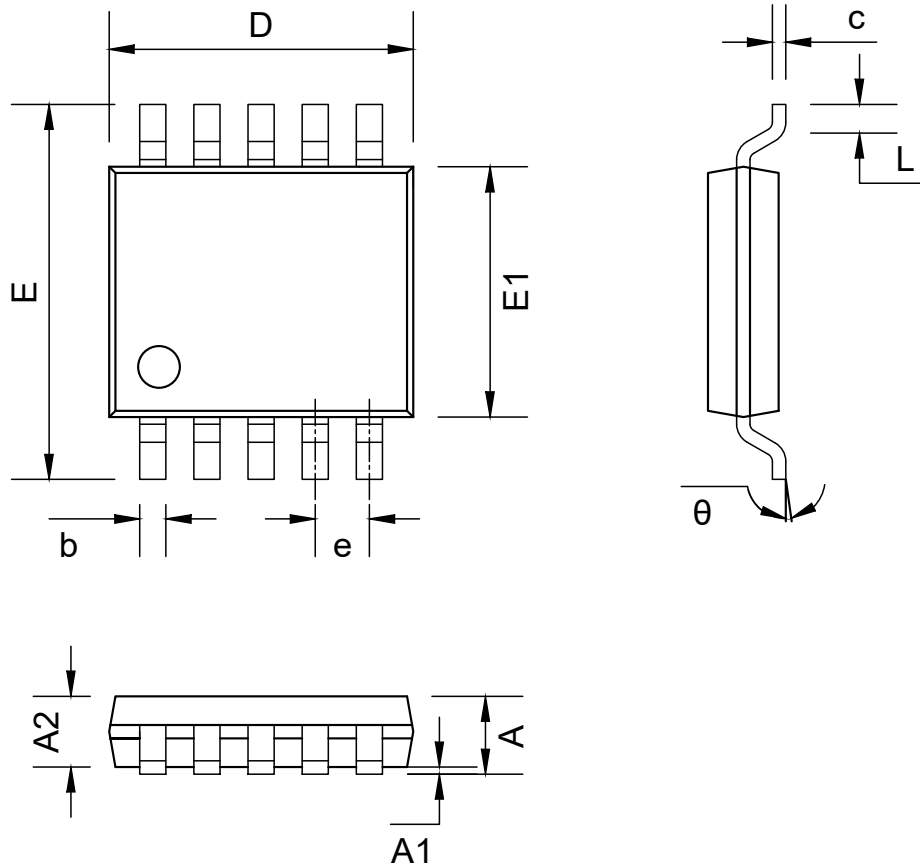
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3	0.203REF		
b	0.20	0.25	0.30
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D2	1.60	1.65	1.80
E2	2.30	2.40	2.50
e	0.45	0.50	0.55
K	0.175	0.275	0.375
L	0.30	0.40	0.50
R	0.15REF		

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Package Dimension

MSOP10 (4.9mm x 3mm)



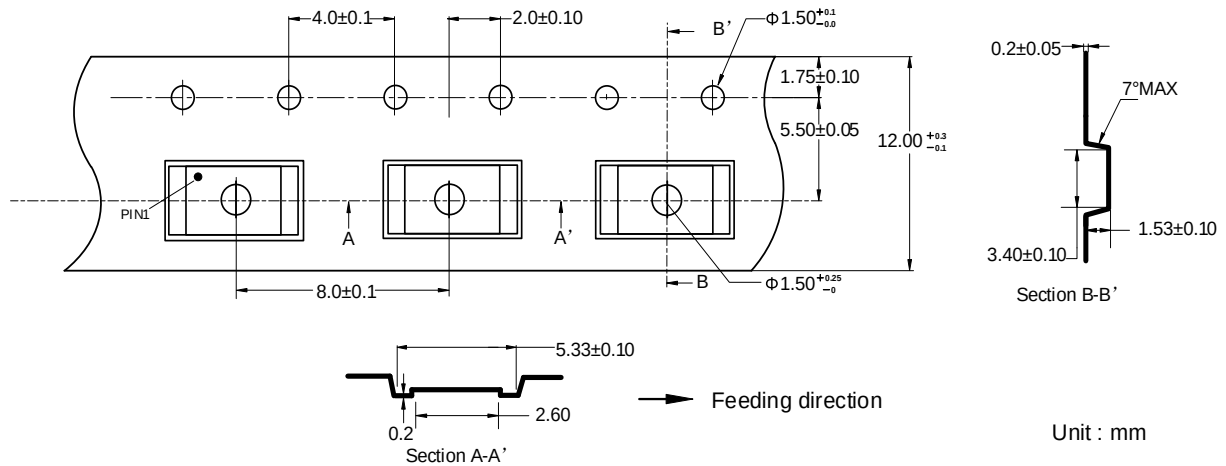
COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.82	0.96	1.10
A1	0.02	0.085	0.15
A2	0.75	0.85	0.95
b	0.18	0.23	0.28
c	0.09	0.16	0.23
D	2.90	3.00	3.10
E	4.75	4.90	5.05
E1	2.90	3.00	3.10
e	0.5 BSC		
L	0.40	0.60	0.80
θ	0°	3°	6°

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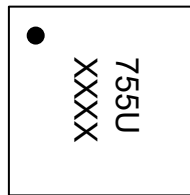
Tape Information

MSOP10 (4.9mm x 3mm)



Marking Information

ET74HC4855U



755U - Part Number

XXXXXX - Tracking Number

Note: X (Tracking Number) is variable, according to the wafer lot number.

ET74HC4855

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2022-11-24	Preliminary Version	Huyt	Zhangzw	Liujiy
1.1	2023-05-17	Original Version	Qinpl	Zhangzw	Liujiy
1.2	2025-08-22	Update Package and Test Circuit	Wanghao	Zhangzw	Liujiy
1.3	2025-09-04	Update Electrical Characteristics	Wanghao	Zhangzw	Liujiy
1.4	2026-01-20	Update Tape Information and Marking Information	Zhangjinqi	Zhangzw	Liujiy