1.Basic Features

- Low Crosstalk Between Switches
- Fast exchange and propagation speed
- Injection-Current effect control
- Injection-Current Cross Coupling <1mV/mA
- Electrostatic discharge protection(ESD)
- Green product(RoHS compliant)
- AEC-Q100 qualified

2.Description

RM40081 is an eight-channel CMOS analog multiplexer / demultiplexer, additionally, features injection-current effect control, which has excellent value in automotive applications where voltages in excess of normal supply voltages are common.

RM40081 injection-current effect control allows signals at disabled analog input channels to exceed the supply voltage without affecting the signal of the enabled analog channel. This eliminates the need for external diode/resistor networks typically used to keep the analog channel signals within the supply-voltage range.

3.Application

- Eight-channel CMOS analog multiplexer/demultiplexer for 6V
- Qualified for Automotive Applications

4.Ordering Code

Device	Package Type	Marking	Materials	Package			Package Qty
RM40081	TSSOP-16L	RM40081	Halogen free	Tape&reel	10 reels/box	40k/box	4000 /reel

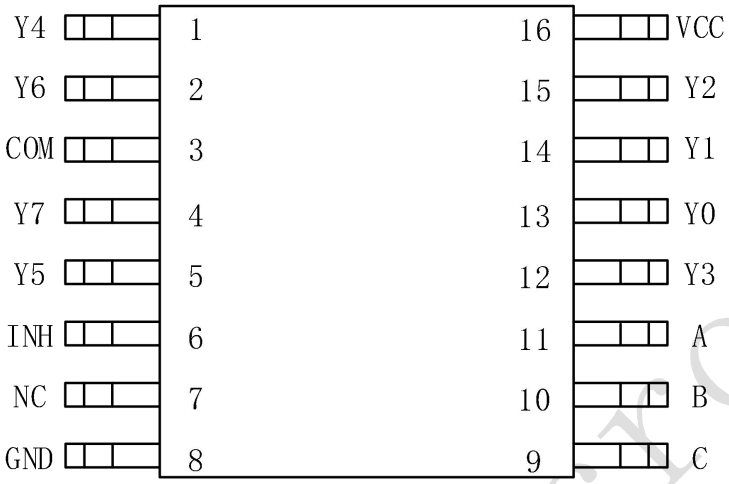
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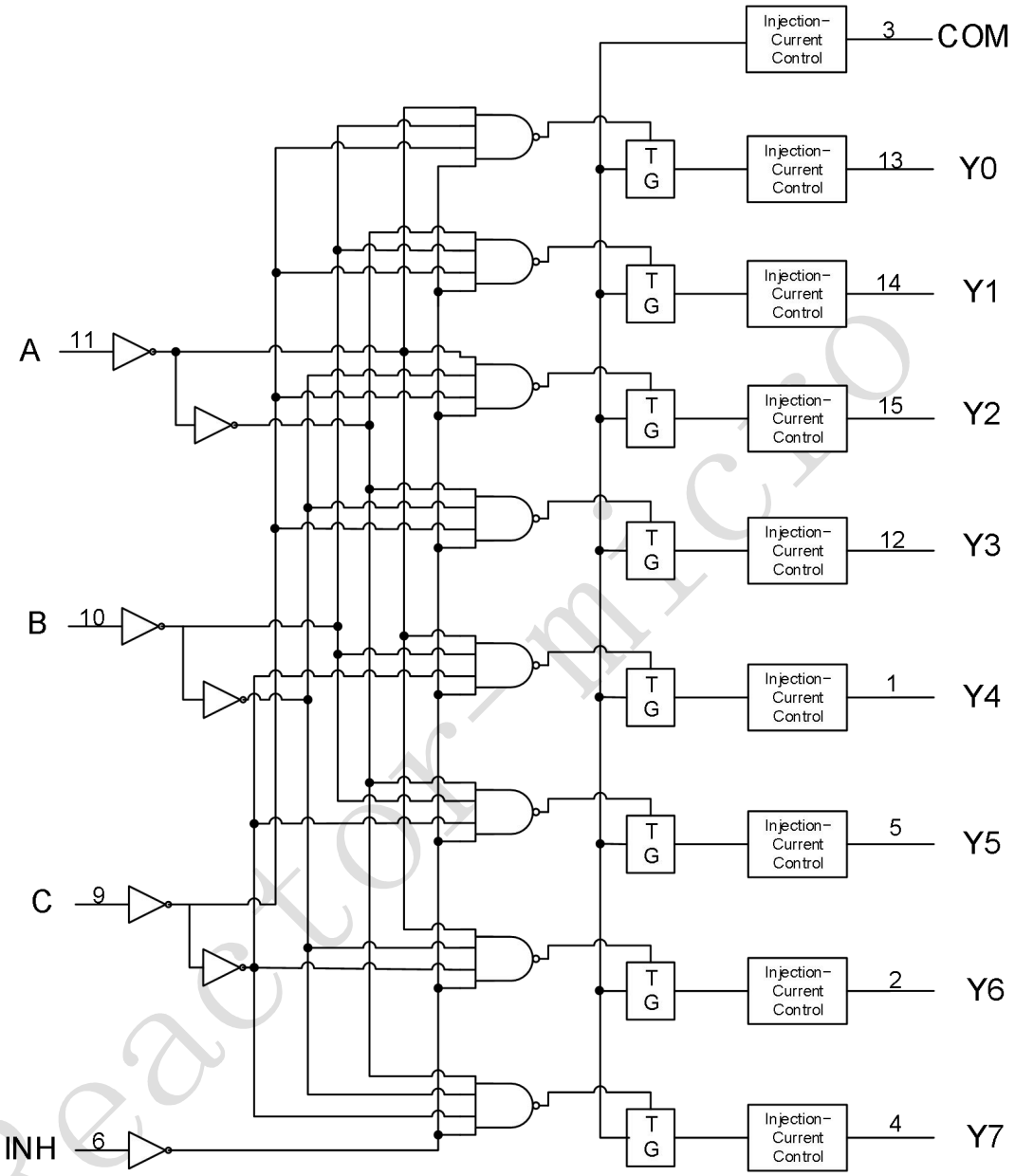
5.Pin Configuration



Pin	Symbol	Function
1	Y4	Output; output to the load
2	Y6	Output; output to the load
3	COM	Input
4	Y7	Output; output to the load
5	Y5	Output; output to the load
6	INH	Enable Input
7	NC	Not Connected; No internal connection to the chip
8	GND	Ground; Ground connection
9	C	Input Voltage
10	B	Input Voltage
11	A	Input Voltage
12	Y3	Output; output to the load
13	Y0	Output; output to the load
14	Y1	Output; output to the load
15	Y2	Output; output to the load
16	VCC	Supply Voltage

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6.Block Diagram



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7.Absolute Maximum Ratings

T_J = 25°C; (unless otherwise specified)

Parameter	Symbol	Values	Unit
Supply voltage	V_{CC}	-0.5 to 7	V
Input voltage	V_I	-0.5 to V_{CC}+0.5	V
Input clamp current	I_{IK}	±20	mA
Ambient temperature	T_a	-40 to 125	℃
Storage temperature	T_{stg}	-55 to 150	℃

Notes:

1. Stresses above the ones listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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8.Electrical Characteristics

T_J = -40°C ~ 125°C, V_{CC}=6V; (unless otherwise specified)

Symbol	Parameter	Test Condition	Values			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		2	-	6	V
R_{ON}	On-state switch resistance	I_T≤2mA, V_I = V_{CC} to GND, V_{INH}=V_{IL}, V_{CC}=2V, T_j=25℃	-	160	250	Ω
		I_T≤2mA, V_I = V_{CC} to GND, V_{INH}=V_{IL}, V_{CC}=3V, T_j=25℃	-	90	150	Ω
		I_T≤2mA, V_I = V_{CC} to GND, V_{INH}=V_{IL}, V_{CC}=4.5V, T_j=25℃	-	70	120	Ω
		I_T≤2mA, V_I = V_{CC} to GND, V_{INH}=V_{IL}, V_{CC}=6V, T_j=25℃	-	60	100	Ω
I_I	Control input current	V_I=V_{CC} or GND, V_{CC}=6V	-	-	2.5	uA
$I_{S(off)(Yn)}$	Off-state switch leakage current	V_I=V_{CC} or GND, V_{CC}=6V, V_{INH}=V_{IH}	-	-	2	uA
$I_{S(off)(COM)}$	Off-state switch leakage current	V_I=V_{CC} or GND, V_{CC}=6V, V_{INH}=V_{IL}	-	-	2	uA
$I_{S(on)}$	On-state switch leakage current	V_I=V_{CC} or GND, V_{CC}=6V, V_{INH}=V_{IL}	-	-	2	uA
I_{CC}	Supply current	V_I=V_{CC} or GND, V_{CC}=6V	-	-	2.5	uA
VΔout	Maximum shift of output voltage of enabled analog channel	V_{CC}=3.3V, R_S≤3.9KΩ, I_I‡ ≤1mA	-	0.1	1.2	mV
		V_{CC}=5V, R_S≤3.9KΩ, I_I‡ ≤1mA	-	0.1	1.2	mV
		V_{CC}=3.3V, R_S≤3.9KΩ, I_I‡ ≤10mA	-	0.05	12	mV
		V_{CC}=5V, R_S≤3.9KΩ, I_I‡ ≤10mA	-	0.1	12	mV
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} = 2 V, C_L = 50 pF, From COM to Yn	-	30	55	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} = 2 V, C_L = 50 pF, From A, B, C to Yn	-	24	50	ns
t_{PZH}/t_{PZL}	Enable delay time	V_{CC} = 2 V, C_L = 50 pF, From INH to Yn	-	-	115	ns
t_{PZH}/t_{PLZ}	Disable delay time	V_{CC} = 2 V, C_L = 50 pF, From INH to Yn	-	-	115	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =3 V, C_L = 50 pF, From COM to Yn	-	18	30	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =3 V, C_L = 50 pF, From A, B, C to Yn	-	17	28	ns
t_{PZH}/t_{PZL}	Enable delay time	V_{CC} =3 V, C_L = 50 pF, From INH to Yn	-	-	110	ns

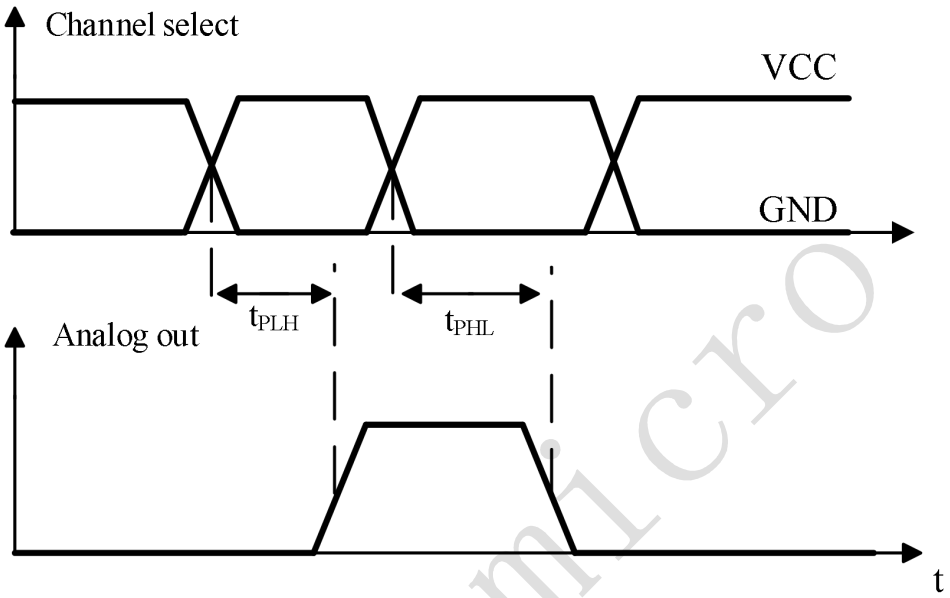
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t_{PZH}/t_{PLZ}	Disable delay time	V_{CC} =3 V, C_L = 50 pF, From INH to Yn	-	-	110	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =3.3 V, C_L = 50 pF, From COM to Yn	-	11	28	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =3.3 V, C_L = 50 pF, From A, B, C to Yn	-	11	26	ns
t_{PZH}/t_{PZL}	Enable delay time	V_{CC} =3.3 V, C_L = 50 pF, From INH to Yn	-	-	105	ns
t_{PZH}/t_{PLZ}	Disable delay time	V_{CC} =3.3 V, C_L = 50 pF, From INH to Yn	-	-	105	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =4.5 V, C_L = 50 pF, From COM to Yn	-	10	19	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} =4.5 V, C_L = 50 pF, From A, B, C to Yn	-	9	20	ns
t_{PZH}/t_{PZL}	Enable delay time	V_{CC} =4.5 V, C_L = 50 pF, From INH to Yn	-	-	100	ns
t_{PZH}/t_{PLZ}	Disable delay time	V_{CC} =4.5 V, C_L = 50 pF, From INH to Yn	-	-	100	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} = 6 V, C_L = 50 pF From COM to Yn	-	8	15	ns
t_{PLH}/t_{PHL}	Propagation delay time	V_{CC} = 6 V, C_L = 50 pF From A, B, C to Yn	-	9	19	ns
t_{PZH}/t_{PZL}	Enable delay time	V_{CC} =6 V, C_L = 50 pF From INH to Yn	-	-	80	ns
t_{PZH}/t_{PLZ}	Disable delay time	V_{CC} = 6 V, C_L = 50 pF From INH to Yn	-	-	80	ns

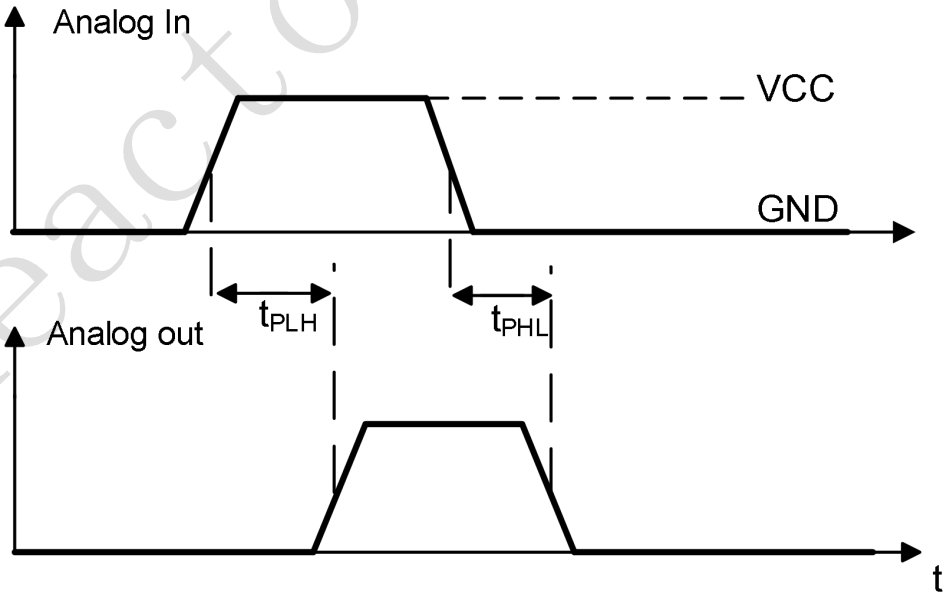
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9.Timing diagrams

9.1 Propagation Delays, Channel Select to Analog Out

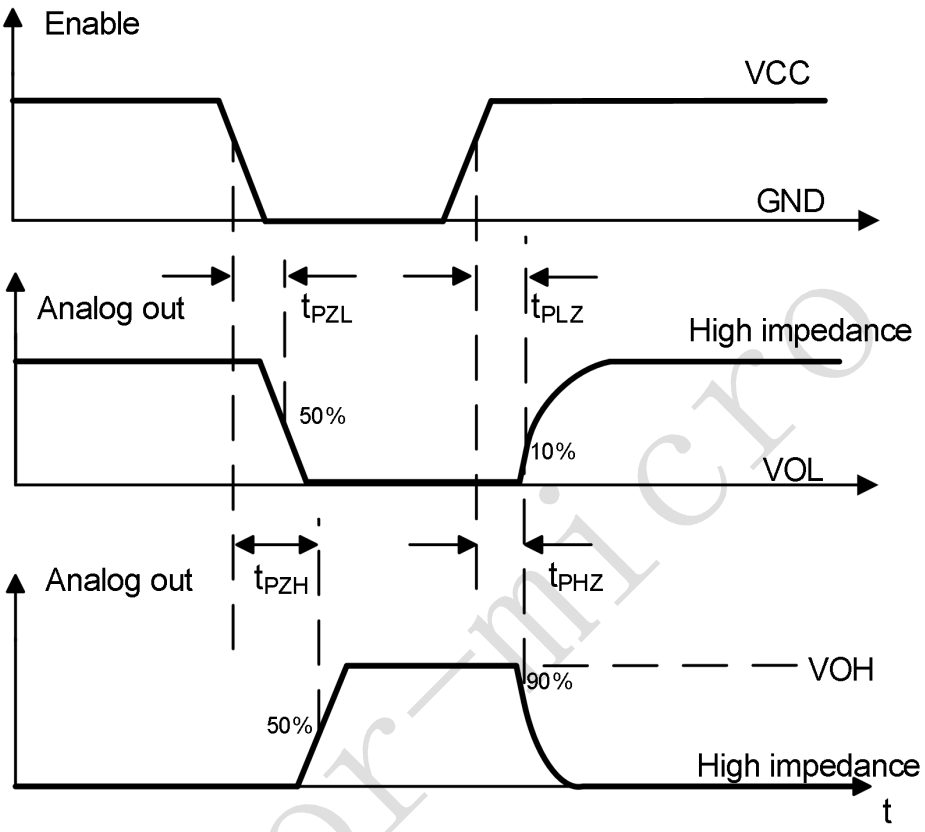


9.2 Propagation Delays, Analog In to Analog Out



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9.3 Propagation Delays, Enable to Analog Out



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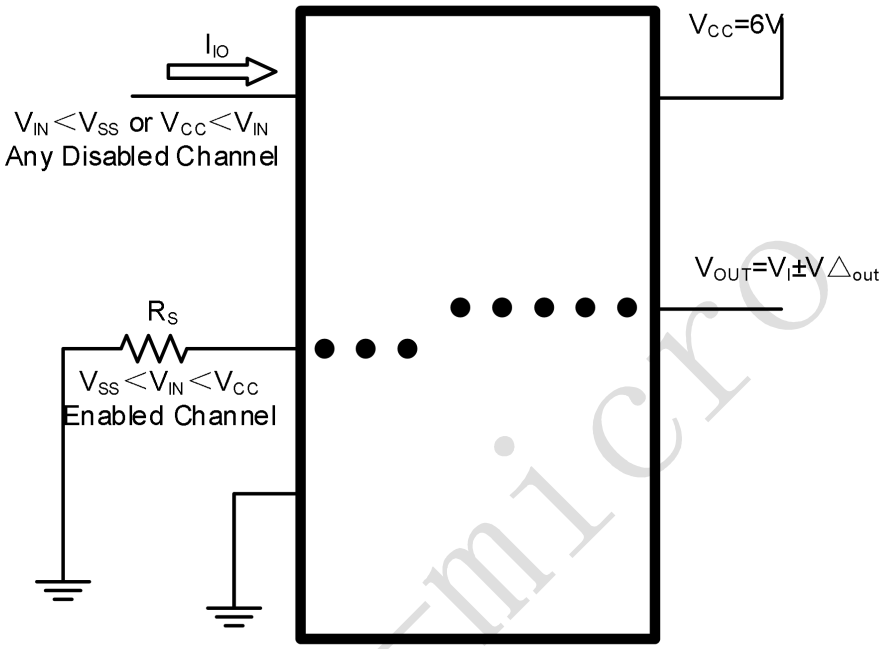
10.Truth Table

INPUTS				ON CHANNEL
INH	C	B	A	
L	L	L	L	Y0
L	L	L	H	Y1
L	L	H	L	Y2
L	L	H	H	Y3
L	H	L	L	Y4
L	H	L	H	Y5
L	H	H	L	Y6
L	H	H	H	Y7
H	X	X	X	None

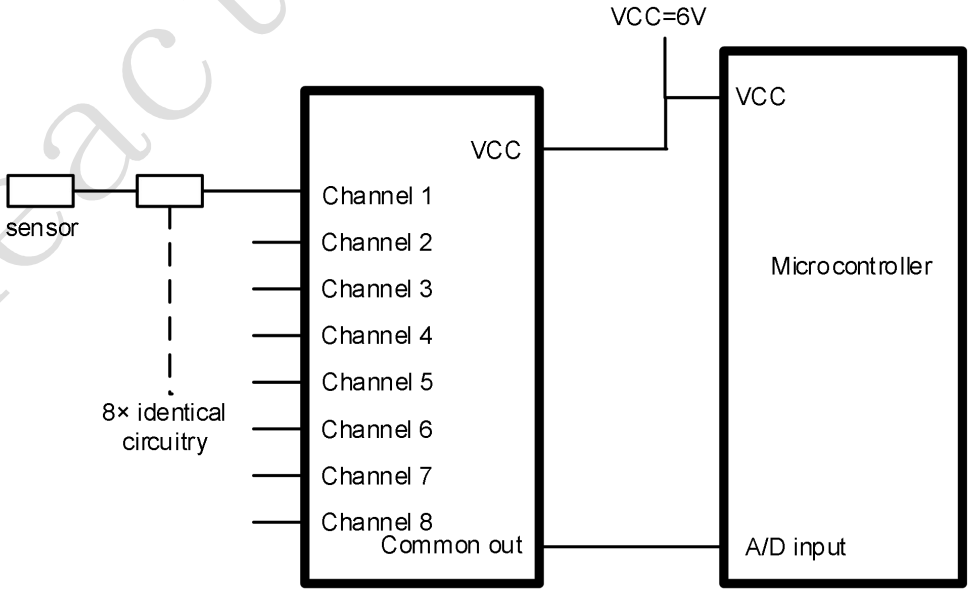
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11.Functions

11.1 Injection-Current Coupling Specification

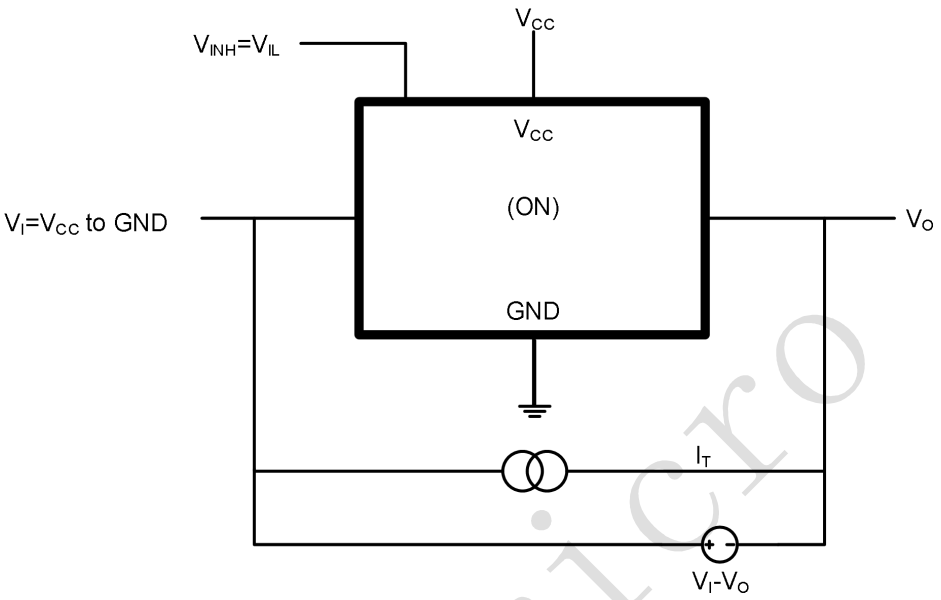


11.2 Solution by Applying the Multiplexer



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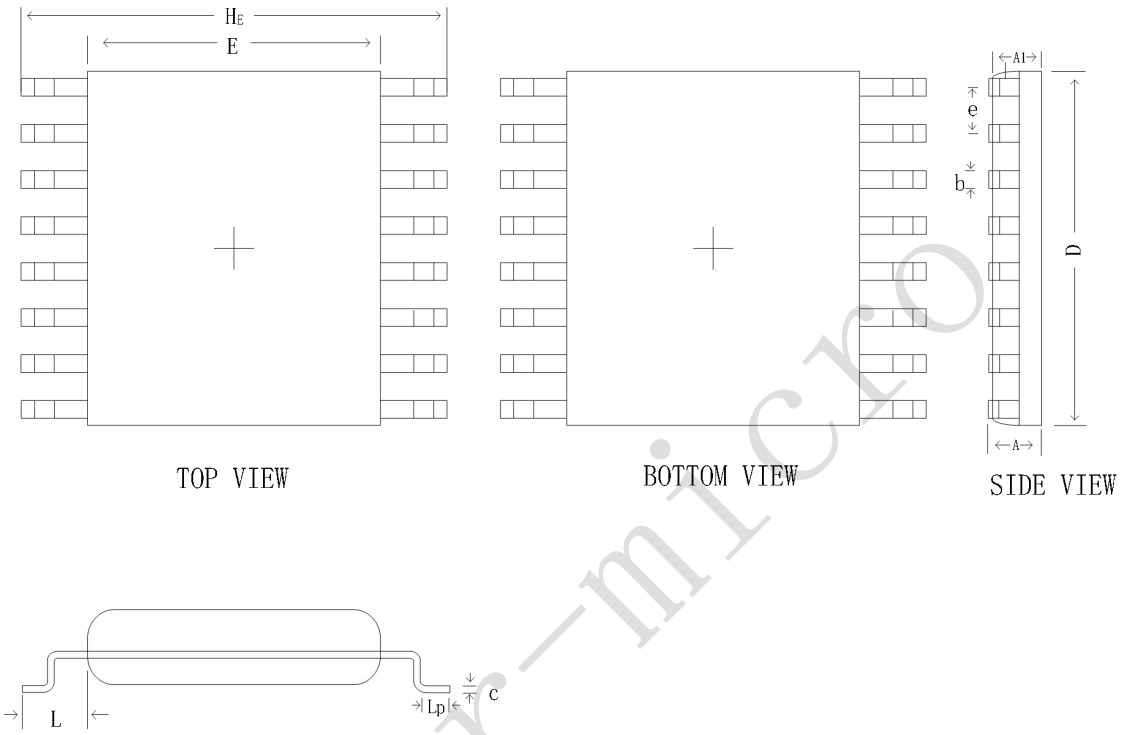
11.3 On-State-Resistance Test Circuit



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12.Package

TSSOP-16L

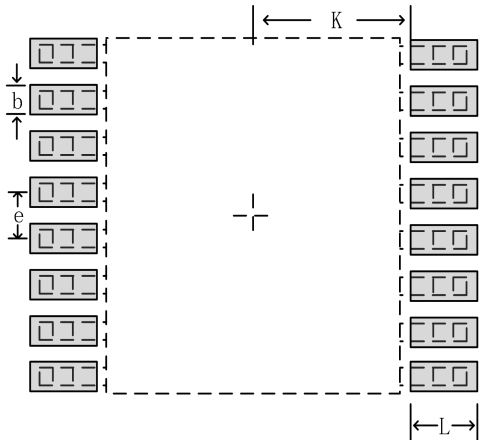


Unit :mm

Symbol	MIN	NOM	MAX
H_E	6.25	-	6.55
E	4.30	4.40	4.50
D	4.9		5.1
A1	0.8	-	1.05
A	-	-	1.2
e	-	0.65	-
b	0.19	-	0.3
L	-	-	1
Lp	0.45	-	0.75
c	0.09	-	0.20

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13.Recommended Soldering Footprint



Unit : mm

Symbol	NOM	Symbol	NOM
K	2.3	b	0.4
L	1.2	e	0.65

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14.Revision History

Version	Change Description	Date
1.0	Initial Version	2024/08/16

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