Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	−0.5 to 7	V
	$V_{CC} - V_{EE}$	−0.5 to 13	
Control input voltage	V_{IN}	−0.5 to V_{CC} + 0.5	V
Switch I/O voltage	$V_{I/O}$	V_{EE} −0.5 to V_{CC} + 0.5	V
Control input diode current	I_{CK}	±20	mA
I/O diode current	I_{IOK}	±20	mA
Switch through current	I_T	±25	mA
DC V_{CC}/GND current	I_{CC}	±25	mA
Power dissipation	P_D	300 (SM8)	mW
		200 (US8)	
Storage temperature range	T_{stg}	−65 to 150	°C
Lead temperature (10 s)	T_L	260	°C

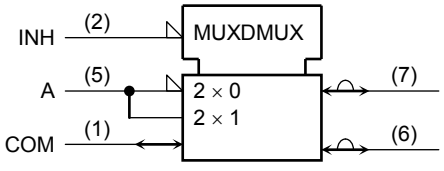
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Truth Table

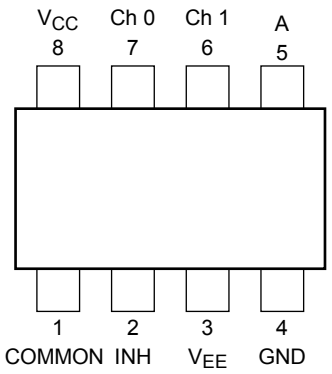
Control Input		On Channel
INH	A	
L	L	Ch 0
L	H	Ch 1
H	X	None

X: Don’t care

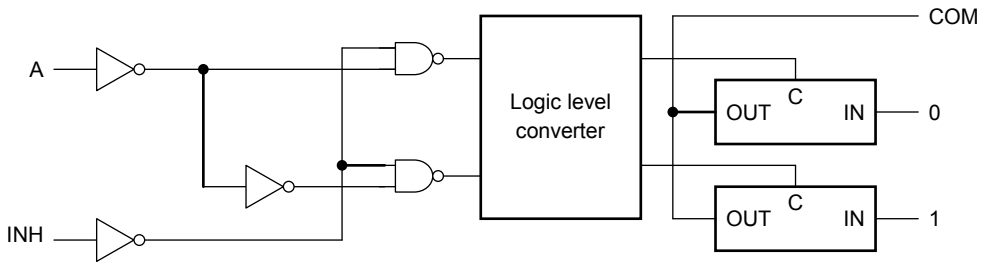
Logic Symbol



Pin Assignment (top view)



Logic Diagram



Operating Ranges

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2 to 6	V
	V_{EE}	−6 to 0	
	$V_{CC} - V_{EE}$	2 to 12	
Control input voltage	V_{IN}	0 to V_{CC}	V
Switch I/O voltage	$V_{I/O}$	V_{EE} to V_{CC}	V
Operating temperature range	T_{opr}	−40 to 85	°C
Input rise and fall time	t_r, t_f	0 to 1000 (V_{CC} = 2.0 V)	ns
		0 to 500 (V_{CC} = 4.5 V)	
		0 to 400 (V_{CC} = 6.0 V)	

Electrical Characteristics

DC Electrical Characteristics

Characteristics		Symbol	Test Condition	V_{EE} (V)	V_{CC} (V)	Ta = 25°C Min	Ta = 25°C Typ.	Ta = 25°C Max	Ta = –40 to 85°C Min	Ta = –40 to 85°C Max	Unit
Control input voltage	High level	V_{IHC}	—	—	2.0	1.5	—	—	1.5	—	V
				—	4.5	3.15	—	—	3.15	—	
				—	6.0	4.2	—	—	4.2	—	
	Low level	V_{ILC}	—	—	2.0	—	—	0.5	—	0.5	
				—	4.5	—	—	1.35	—	1.35	
				—	6.0	—	—	1.8	—	1.8	
ON resistance		R_{ON}	V_{IN} = V_{ILC} or V_{IHC} $V_{I/O}$ = V_{CC} to V_{EE} $I_{I/O} \leq 2$ mA	GND	4.5	—	85	180	—	225	Ω
				–4.5	4.5	—	55	120	—	150	
				–6.0	6.0	—	50	100	—	125	
			V_{IN} = V_{ILC} or V_{IHC} $V_{I/O}$ = V_{CC} or V_{EE} $I_{I/O} \leq 2$ mA	GND	2.0	—	150	—	—	—	
				GND	4.5	—	70	150	—	190	
				–4.5	4.5	—	50	100	—	125	
				–6.0	6.0	—	45	80	—	100	
Difference of ON resistance between switches		ΔR_{ON}	V_{IN} = V_{ILC} or V_{IHC} $V_{I/O}$ = V_{CC} to V_{EE} $I_{I/O} \leq 2$ mA	GND	4.5	—	10	30	—	35	Ω
				–4.5	4.5	—	5	12	—	15	
				–6.0	6.0	—	5	10	—	12	
Input/output leakage current (switch off)		I_{OFF}	V_{OS} = V_{CC} or GND V_{IS} = GND to V_{CC} V_{IN} = V_{ILC} or V_{IHC}	GND	6.0	—	—	±60	—	±600	nA
				–6.0	6.0	—	—	±100	—	±1000	
Switch input leakage current (switch on output open)		I_{IZ}	V_{OS} = V_{CC} or GND V_{IN} = V_{ILC} or V_{IHC}	GND	6.0	—	—	±60	—	±600	nA
				–6.0	6.0	—	—	±100	—	±1000	
Control input current		I_{IN}	V_{IN} = V_{CC} or GND	GND	6.0	—	—	±0.1	—	±1.0	μA
Quiescent supply current		I_{CC}	V_{IN} = V_{CC} or GND	GND	6.0	—	—	4	—	40	μA
				–6.0	6.0	—	—	8	—	80	

AC Electrical Characteristics (C_L = 50 pF, input $t_r = t_f$ = 6 ns, GND = 0 V)

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = −40 to 85°C		Unit
			V_{EE} (V)	V_{CC} (V)	Min	Typ.	Max	Min	Max	
Phase difference between input and output	ϕI/O	—	GND	2.0	—	25	60	—	75	ns
			GND	4.5	—	6	12	—	15	
			GND	6.0	—	5	10	—	13	
			−4.5	4.5	—	4	—	—	—	
Output enable time	t_{pZL} t_{pZH}	R_L = 1 kΩ	GND	2.0	—	50	225	—	280	ns
			GND	4.5	—	14	45	—	56	
			GND	6.0	—	12	38	—	48	
			−4.5	4.5	—	14	—	—	—	
Output disable time	t_{pLZ} t_{pHZ}	R_L = 1 kΩ	GND	2.0	—	95	225	—	280	ns
			GND	4.5	—	30	45	—	56	
			GND	6.0	—	26	38	—	48	
			−4.5	4.5	—	26	—	—	—	
Control input capacitance	C_{IN}	—	—	—	—	5	10	—	10	pF
Common terminal capacitance	C_{IS}	—	−5.0	5.0	—	11	20	—	20	pF
Switch terminal capacitance	C_{OS}	—	−5.0	5.0	—	7	15	—	15	pF
Feed through capacitance	C_{IOS}	—	−5.0	5.0	—	0.75	2	—	2	pF
Power dissipation capacitance	C_{PD}	(Note)	GND	5.0	—	67	—	—	—	pF

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current can be obtained by the equation: $I_{CC\ (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/2$

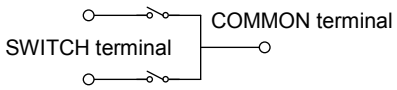
Analog Switch Characteristics (GND = 0 V, Ta = 25°C)

Characteristics	Symbol	Test Condition		V_{EE} (V)	V_{CC} (V)	Typ.	Unit
Sine wave distortion (T.H.D)	—	R_L = 10 kΩ, C_L = 50 pF, f_{IN} = 1 kHz	V_{IN} = 4.0 Vp-p	−2.25	−2.25	0.025	%
			V_{IN} = 8.0 Vp-p	−4.5	4.5	0.02	
			V_{IN} = 11 Vp-p	−6.0	6.0	0.018	
Frequency response (switch ON)	t_{MAX}	Adjust V_{IN} voltage to obtain 0dBm at V_{OS}, Increase F_{IN} until dB Meter reads −3dB, R_L = 50 Ω, C_L = 10 pF, f_{IN} = 1 MHz, sine wave	(Note1)	−2.25	−2.5	120	MHz
			(Note2)			95	
			(Note1)	−4.5	4.5	190	
			(Note2)			150	
			(Note1)	−6.0	6.0	200	
			(Note2)			190	
Feed Through attenuation (switch OFF)	—	V_{IN} is centered at (V_{CC}–V_{EE})/2. Adjust input for 0dBm, R_L = 600 Ω, C_L = 50 pF, f_{IN} = 1 MHz, sine wave		−2.25	2.25	−50	dB
				−4.5	−4.5	−50	
				−6.0	6.0	−50	
Crosstalk (control input to signal output)	—	R_L = 600 Ω, C_L = 50 pF, f_{IN} = 1 MHz, square wave (t_r = t_f = 6 ns)		−2.25	2.25	60	mV
				−4.5	−4.5	140	
				−6.0	6.0	200	
Crosstalk (between any switches)	—	Adjust V_{IN} to obtain 0dBm at input, R_L = 600 Ω, C_L = 50 pF, f_{IN} = 1 MHz, sine wave		2.25	2.25	−50	dB
				−4.5	−4.5	−50	
				6.0	6.0	−50	

Note: These characteristics are determined by design of device.

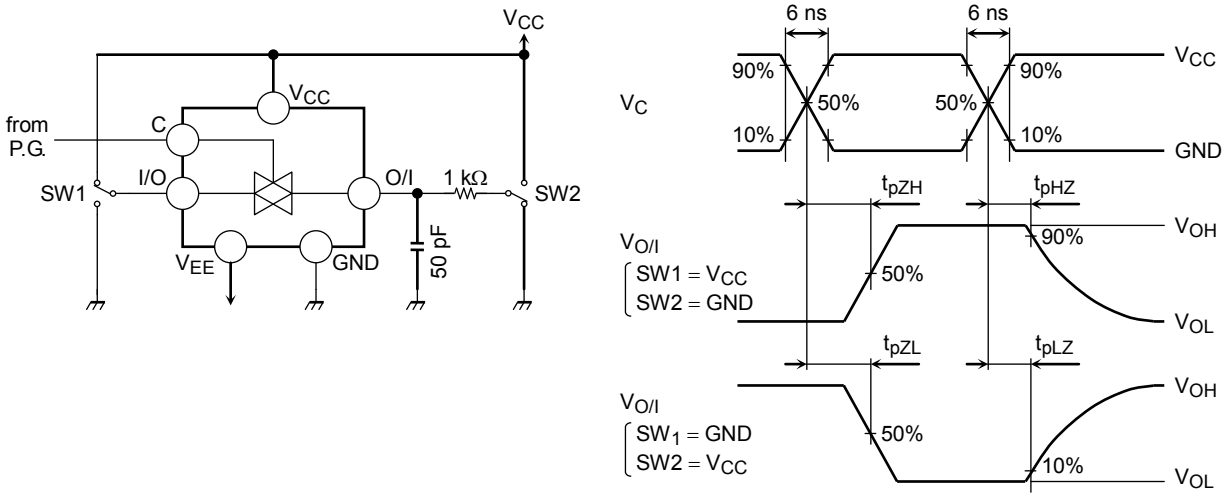
Note 1: Input COMMON terminal, and measure at SWITCH terminal.

Note 2: Input SWITCH terminal, and measure at COMMON terminal.



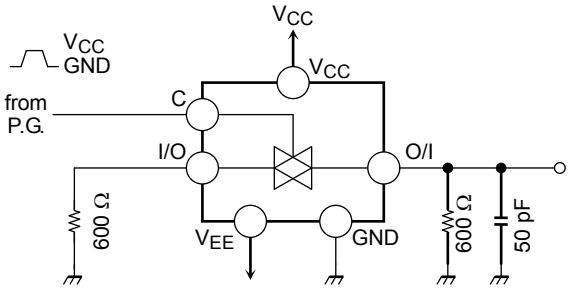
Switching Characteristics Test Circuits

1. t_{pLZ}, t_{pHZ}, t_{pZL} and t_{pZH}

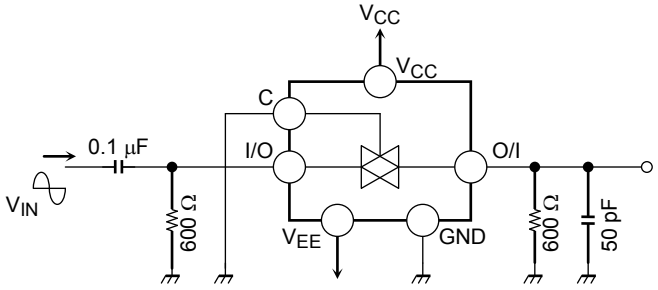


2. Cross Talk (control input-switch output)

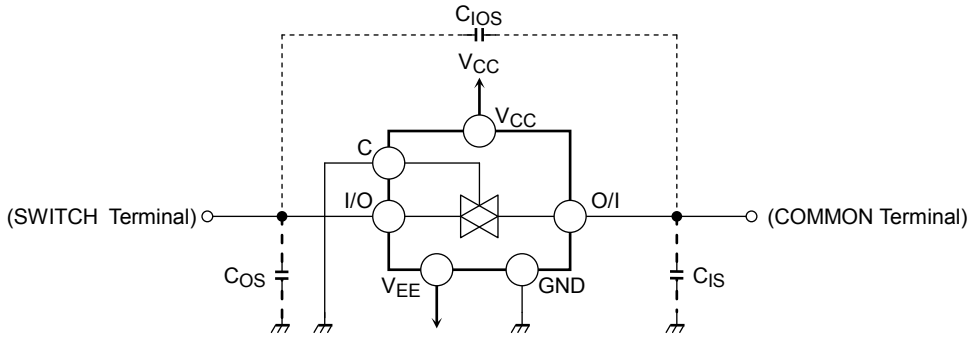
f_{IN} = 1 MHz, duty = 50% and $t_r = t_f$ = 6 ns



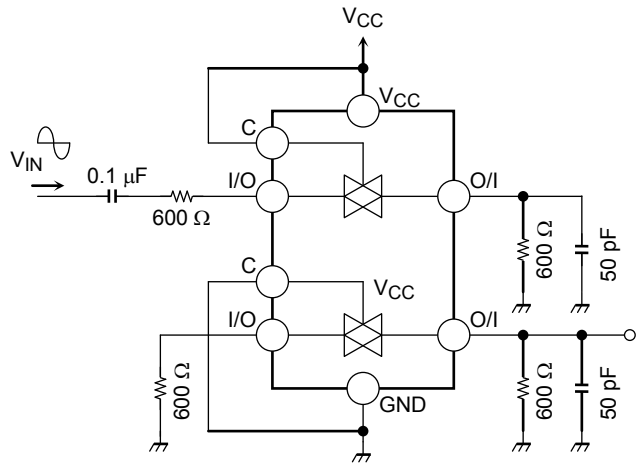
3. Feed Through Attenuation



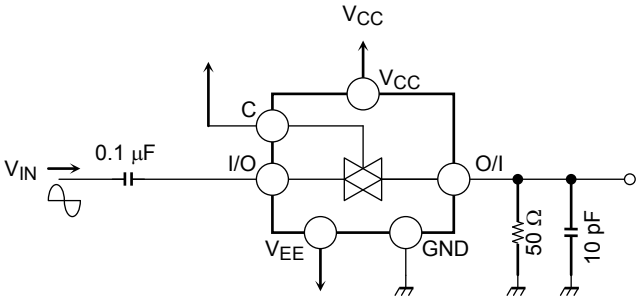
4. C_{IOS}, C_{IS}, C_{OS}



5. Cross Talk (between any two switches)

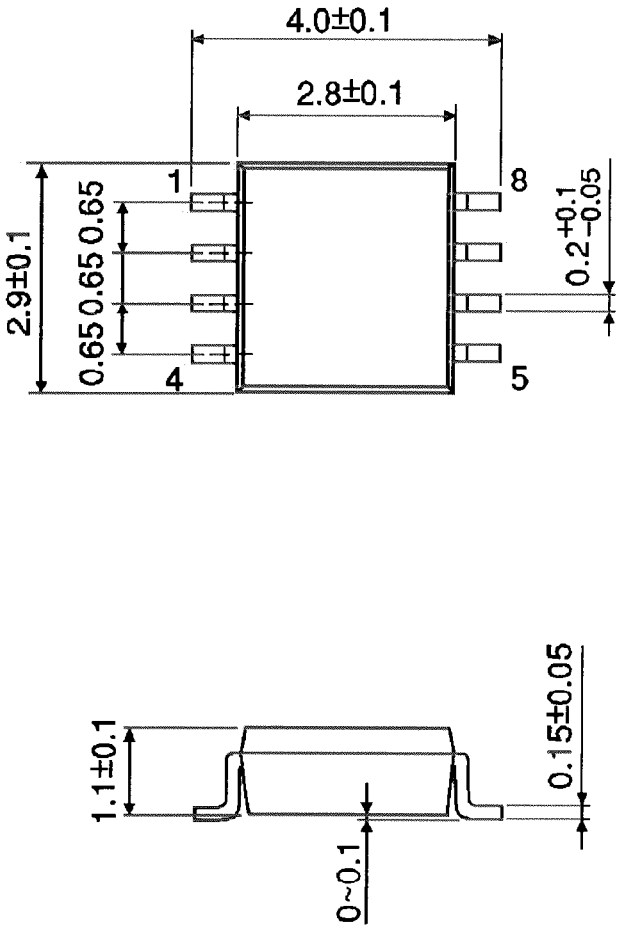


6. Frequency Response (switch ON)



Package Dimensions

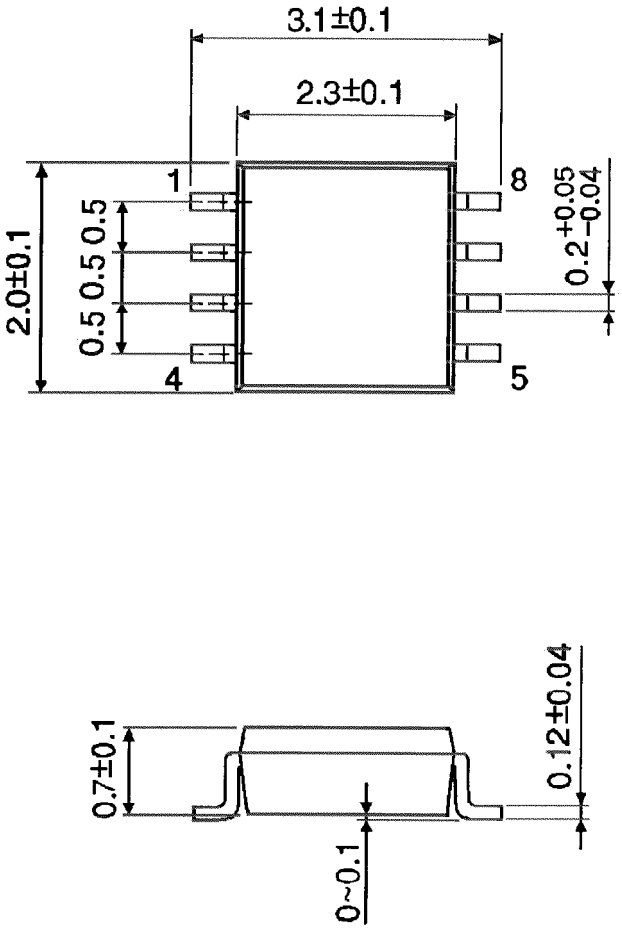
SSOP8-P-0.65 Unit : mm



Weight: 0.02 g (typ.)

Package Dimensions

SSOP8-P-0.50A Unit : mm



Weight: 0.01 g (typ.)

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