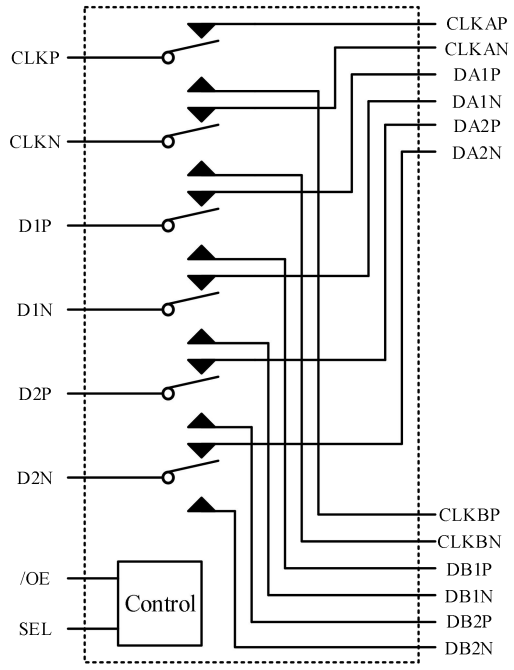
GT4642B
Low-Power，Three-Port，High-Speed MIPI Switch

1 Features	2 Application
- Signal Types: MIPI, D-PHY,C-PHY - Vcc:1.65 to 4.5V - R_{ON}：7Ω Typical LS MIPI 4Ω Typical HS MIPI - Differential -3db Bandwidth:2GHz	- Dual Camera Applications for Cell Phones - Dual LCD Applications for Cell Phones

3 Description	Circuit Diagram
The GT4642B is a bi-directional, low-power, high-speed analog switch. The pin out is designed to ease differential signal layout and is configured as a triple-pole, double-throw switch (TPDT). The GT4642B is optimized for switching between two MIPI devices, such as cameras or LCD displays and on-board Multimedia Application Processors (MAP). The GT4642B is compatible with the requirements of Mobile industry Processor Interface (MIPI). The low-capacitance design allows the GT4642B to switch signals that exceed 500MHz in frequency. Superior channel-to-channel crosstalk immunity minimizes interference allows the transmission of high-speed differential signals and single-ended signals,as described by the MIPI specification.	

4 Device Summary, Pin and Packages

Table 4-1. Device Summary (1)

Serial Name	Part Name	Package	Body Size (Nom)	Marking (2)	MSL(3)	Package Qty
GT4642B	GT4642BQQH	QFN3.4×2.5-24L	3.4mm×2.5mm×0.75mm	GT4642B XXXXX	3	3000
GT4642B	GT4642BQSH	QFN3×3-24L	3.0mm×3.0mm×0.75mm	GT4642B XXXXX	3	5000

(1) For all available packages, please contact product sales

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

(4) "XXXXX" in Marking will be appeared as the batch code.

4 Device Summary, Pin and Packages (Continued)

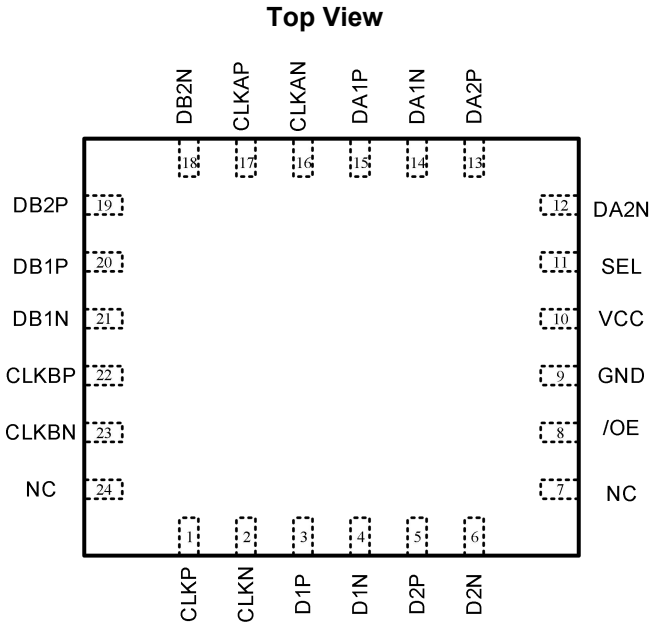


Fig.4-1. GT4642B: QQH(QFN3.4×2.5-24L) Package

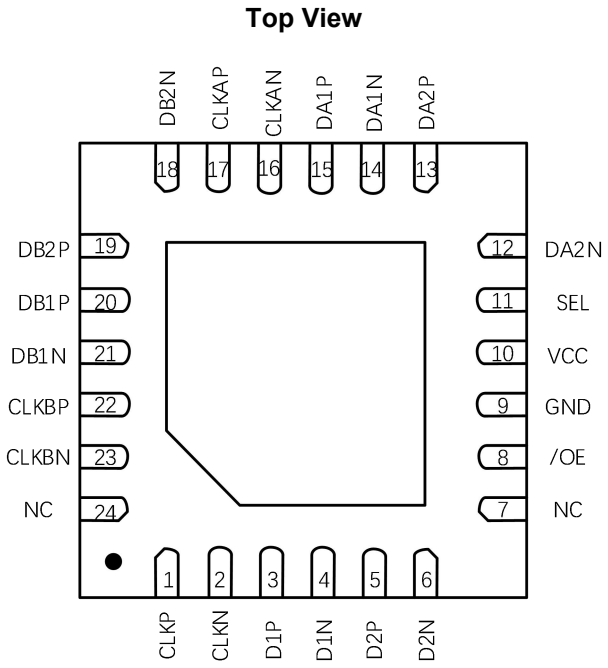


Fig.4-2. GT4642B: QSH(QFN3×3-24L) Package

4 Device Summary, Pin and Packages (Continued)

Table 4-2 Pin Definition

Name	Pin QQH/QSH	I/O	Description
CLKP, CLKN	1, 2	I/O	Clock Path (Common)
D1P, D1N	3, 4	I/O	Data Path1 (Common)
D2P, D2N	5, 6	I/O	Data Path2 (Common)
NC	7, 24	-	No Connect (Float)
/OE	8	I	Output Enable (Active Low)
GND	9	G	Ground
VCC	10	P	Power
SEL	11	I	Select (0=A, 1=B)
DA2N, DA2P	12, 13	I/O	Data Path (A2)
DA1N, DA1P	14, 15	I/O	Data Path (A1)
CLKAN, CLKAP	16, 17	I/O	Clock Path (A)
DB2N, DB2P	18, 19	I/O	Data Path (B2)
DB1P, DB1N	20, 21	I/O	Data Path (B1)
CLKBP, CLKBN	22, 23	I/O	Clock Path (B)

* It is suggested to leave the unconnected pins floating

Table 4-3 Truth Table

SEL	/OE	Function
Do not care	High	Disconnect
Low	Low	D1,D2,CLK=DA1,DA2,CLKA
High	Low	D1,D2,CLK=DB1,DB2,CLKB

5 Voltage, Temperature, ESD and Thermal Ratings

5.1 Absolute Maximum Ratings

Parameters	Min.	Max.	Unit
Supply Voltage, V_S=(V+) - (V-)		5	V
Select Input Voltage (1)(2)	(V-)-0.5	(V+)+0.5	V
Maximum Junction Temperature	-55	150	°C
Storage Temperature Range	-55	150	°C

(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.

5.2 ESD Ratings

ESD			Value	Unit
V(ESD)(1)(2)	Electrostatic Discharge	Human-Body Model (HBM)	5.5 K	V
		Charged-Device Model (CDM)	2 K	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

5.3 Recommended Operating Conditions

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

Symbol	Parameters	Min	Max	Unit
V_{CC}	Single-Supply, V_S=(V+) - (V-)	1.65	4.5	V
V_{CTRL}	Control Input Voltage (SEL/OE)	0	V_{CC}	V
V_{SW}	Switch I/O Voltage	-0.5	V_{CC}	V
T_A	Operating Temperature	-40	85	°C

6 Electrical Specifications

All typical values are T_A=25°C unless othewise specified

DC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC} (V)	Min.	Typ.	Max.	Unit
V_{IK}	Clamp Diode Voltage	I_{IN}=-18mA	1.65~4.5			-1.2	V
I_{IN}	Control Input Leakage	Vsw=0 to 4.3V	4.5	-1		1	μA
V_{IH}	Input Voltage High	V_{IN}=0 to Vcc	4.5		1.3		V
V_{IL}	Input Voltage Low	V_{IN}=0 to Vcc	4.5		0.7		V
I_{OZ}	Off-State Leakage	A,B=+0.3V to Vcc-0.3	4.5	-2		2	μA
I_{CC}	Quiescent Supply Current	V_{CNTRL}=0 or V_{CC} I_{OUT}=0	4.5		10		μA

DC Electrical Characteristics, Low-Speed Mode

Symbol	Parameter	Conditions	Vcc (V)	Min.	Typ.	Max.	Units
R_{ON}	LS Switch On Resistance	Vsw=1.2V,I_{ON}=-10mA	1.65~4.5		7	10	Ω
ΔR_{ON}	LS Delta R_{ON}	Vsw=1.2,I_{ON}=-10mA	1.65~4.5		0.65		Ω

DC Electrical Characteristics, High-Speed Mode

Symbol	Parameter	Conditions	Vcc (V)	Min.	Typ.	Max.	Units
R_{ON}	HS Switch On Resistance	Vsw=0.4V,I_{ON}=-10mA	1.65~4.5		4	5	Ω
ΔR_{ON}	HS Delta R_{ON}	Vsw=0.4V,I_{ON}=-10mA	1.65~4.5		0.65		Ω

6 Electrical Specifications(Continued)

AC Electrical Characteristics

Symbol	Parameter	Conditions	Vcc (V)	Min.	Typ.	Max.	Units
Q_{IRR}	Off Isolation	f=100MHz, R_T =50Ω	1.65~4.5		-42		dB
Xtalk	Non-Adjacent Channel Crosstalk	f=100MHZ, R_T=50Ω	1.65~4.5		-50		dB
BW	-3 db Bandwidth	C_L=0pF, R_T =50Ω	1.65~4.5		2		GHz
t_{ON}	Turn-On Time	C_L=5pF, Vsw=1.2V	2.775		20	37	ns
t_{OFF}	Turn-Off Time	C_L=5pF, Vsw=1.2V	2.775		15	27	ns
t_{PD}	Propagation Delay	C_L=5pF	2.775		0.25		ns
t_{BBM}	Break-Before-Make Time	C_L=5pF Vsw=1.2V	2.775	3	5	8	ns

AC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC}(V)	Min.	Typ.	Max.	Units
t_{SK} (Part_Part)	Channel-to-Channel Skew Across Multiple Parts	Vsw=0.2V $diff_{PP}$, C_L=5pF	2.775		40	80	ps
t_{SK} (Chl-Chl)	Channel-to-Channel Skew Within a Single Part	Vsw=0.2V $diff_{PP}$, C_L=5pF	2.775		15	30	ps
t_{SK} (Pulse)	Skew of Opposite Transitions in the Same Differential Channel	Vsw=0.2V $diff_{PP}$, C_L=5pF	2.775		10	20	ps

Capacitance

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
C_{IN}	Control Pin input Capacitance	Vcc=0V		1.5		pF
C_{ON}	Dn/CLK-On Capacitance	/OE=0V, f=1MHz		7		pF
C_{OFF}	Dn/CLK-Off Capacitance	/OE=2.775V,f=1MHz		2.5		pF

7 Measurement Information

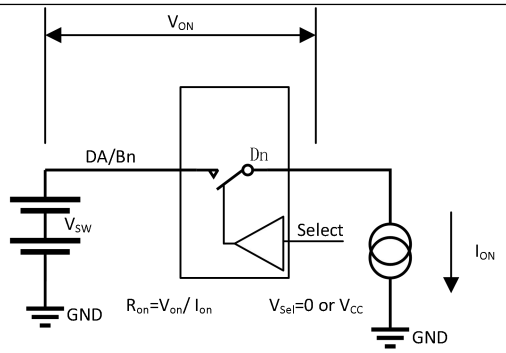


Fig. 7-1.On Resistance

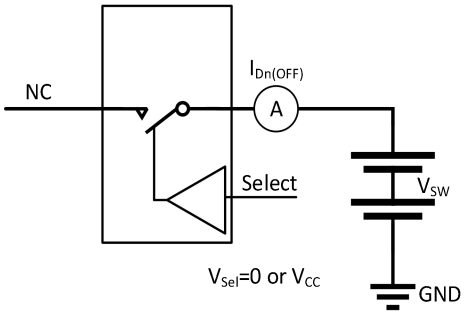


Fig. 7-2. Off Leakage

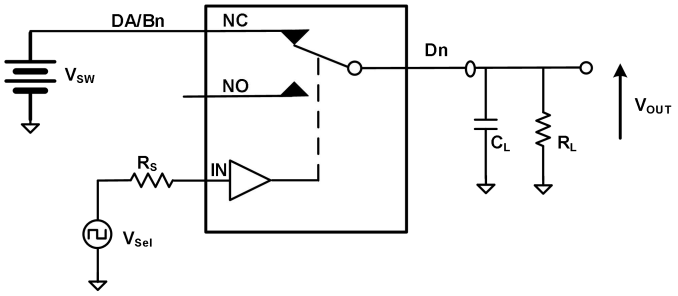


Fig. 7-3. AC Test Circuit Board

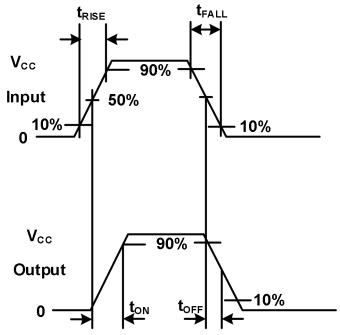


Fig. 7-4.Turn-On/Turn-Off waveform

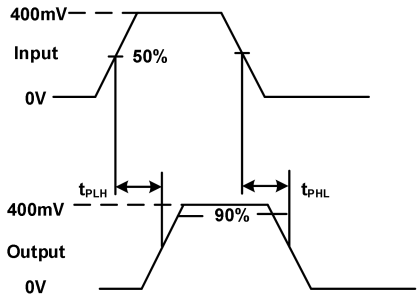


Fig. 7-5.Propagation Delay(trtr-500ps)

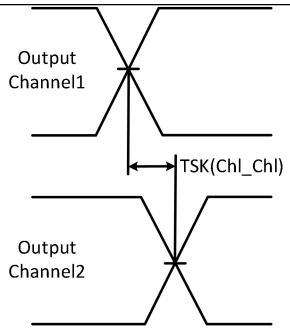


Fig. 7-6. Channel to Channel Skew

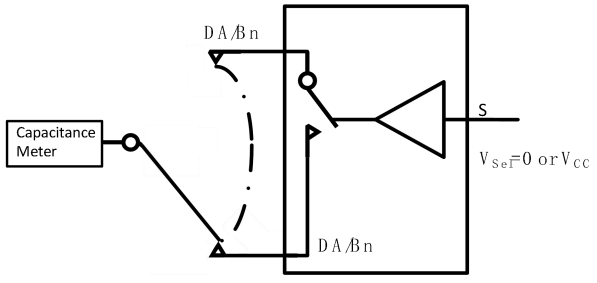


Fig. 7-7.Channel Off Capacitance

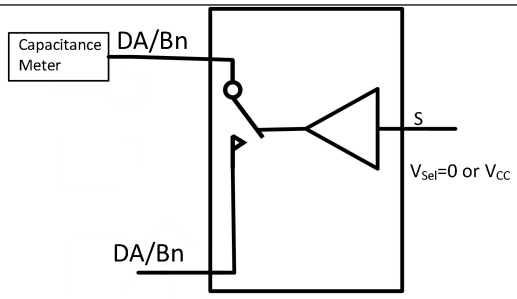


Fig. 7-8.Channel On Capacitance

7 Measurement Information(Continued)

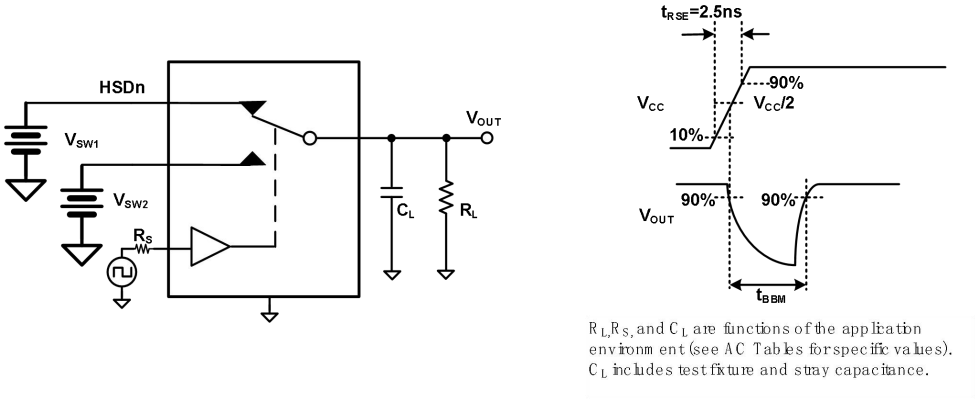


Fig. 7-9.Break-Before-Make Interval Timing

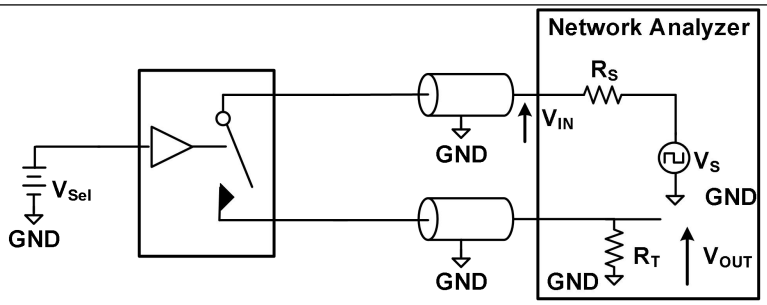


Fig. 7-10.Bandwidth

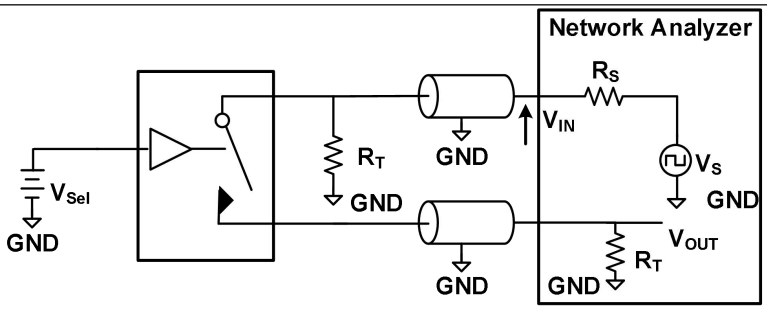


Fig. 7-11. Channel Off isolation

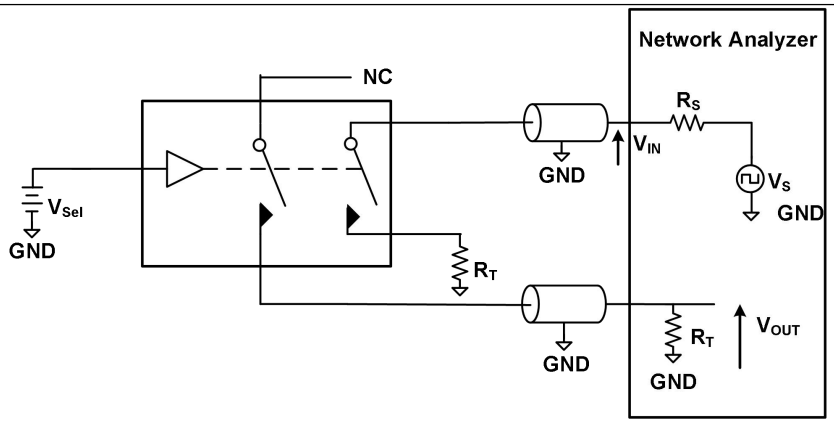
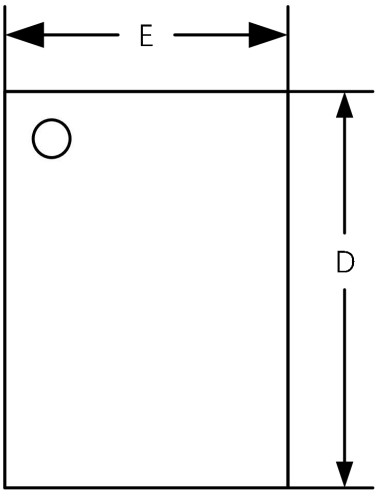


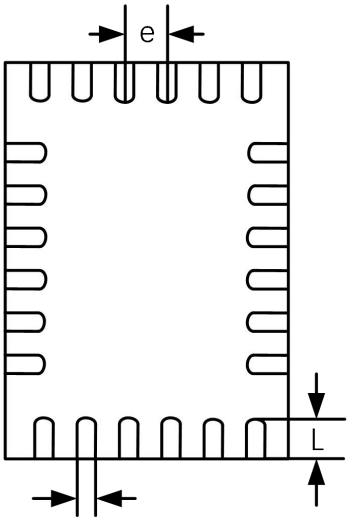
Fig. 7-12.Non-Adjacent Channel-to-Channel Crosstalk

8 Package Outline Dimension

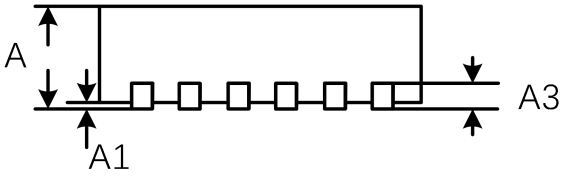
QFN 3.4×2.5-24L



Top View



Bottom View

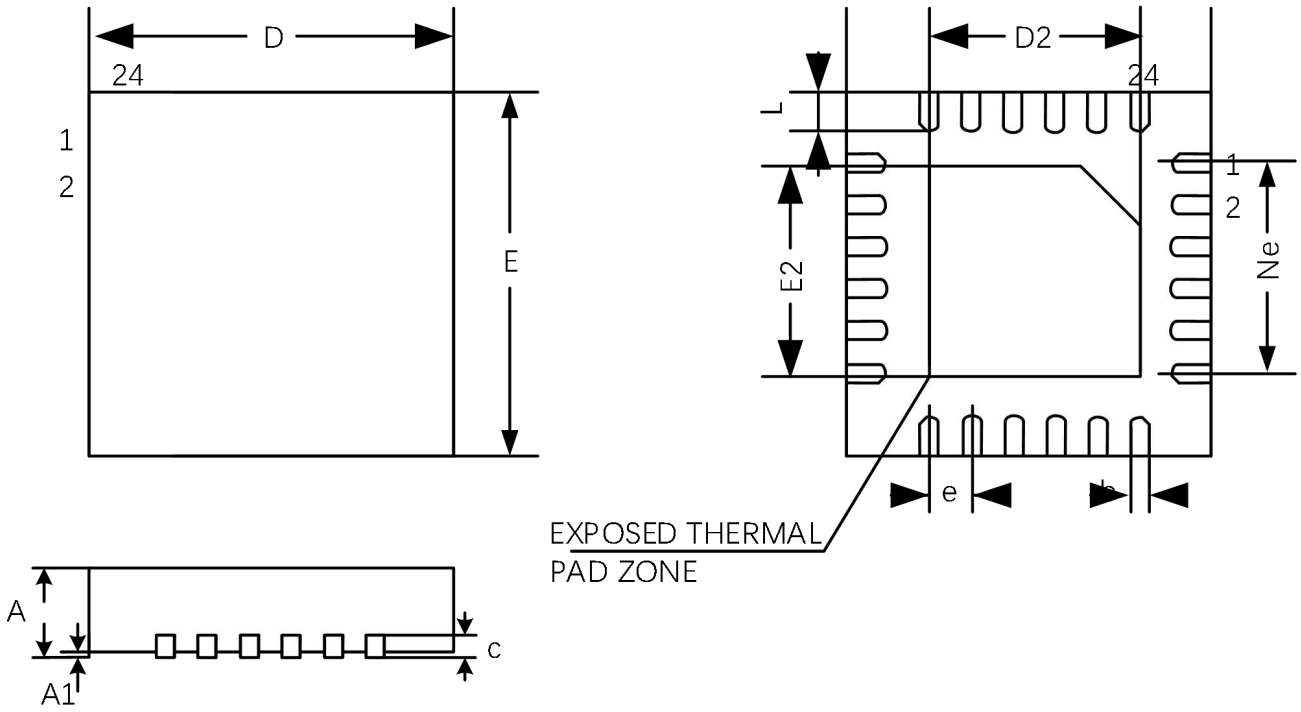


Side View

Common Dimensions(mm)				Common Dimensions (Inch)			
Ref.	Min.	Ref.	Min.	Ref.	Min.	Nom.	Max.
A	0.70	0.75	0.80	A	0.028	0.030	0.031
A1	0.00	-	0.05	A1	0.00	-	0.002
A3	-	0.2 Ref.	-	A3	-	0.008 Ref.	-
D	3.35	3.40	3.45	D	0.132	0.134	0.136
E	2.45	2.50	2.55	E	0.096	0.098	0.100
b	0.15	0.20	0.25	b	0.006	0.008	0.010
L	0.30	0.40	0.50	L	0.012	0.016	0.020
e	0.40 Bsc			e	0.016 Bsc		

8 Package Outline Dimension(Continued)

QFN 3×3-24L



Common Dimensions(mm)				Common Dimensions (Inch)			
Ref.	Min.	Ref.	Min.	Ref.	Min.	Nom.	Max.
A	0.70	0.75	0.80	A	0.027	0.029	0.031
A1	---	0.02	0.05	A1	---	0.001	0.002
b	0.13	0.18	0.23	b	0.005	0.007	0.009
c	0.18	0.20	0.25	c	0.007	0.008	0.009
D	2.90	3.00	3.10	D	0.114	0.118	0.122
D2	1.60	1.70	1.80	D2	0.063	0.067	0.071
e	-	0.35BSC	-	e		0.014	
Ne		1.75BSC		Ne		0.069	
E	2.90	3.00	3.10	E	0.114	0.118	0.122
E2	1.60	1.70	1.80	E2	0.063	0.067	0.071
L	0.25	0.30	0.35	L	0.010	0.011	0.012
h	0.25	0.30	0.35	h	0.010	0.011	0.012