

Description

The PCF8574 is mainly used to expand general-purpose input and output (GPIO) ports. Port data is transmitted via the standard two-line I²C protocol.

The PCF8574 features 8-bit quasi-bidirectional GPIO ports (P0~P7), which can directly drive LEDs. Each quasi-bidirectional GPIO port can be used as an input or output without the use of a data-direction control signal.

After power on, all GPIO ports are high.

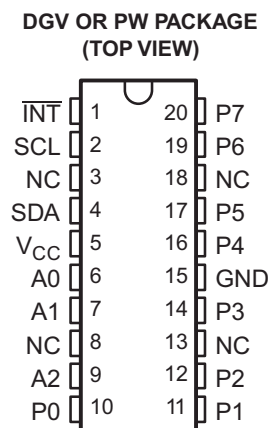
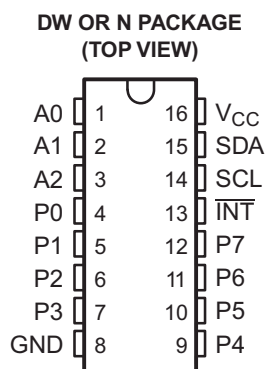
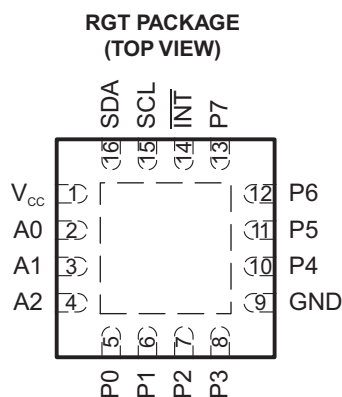
Features

- I/O interface expander controlled by I²C
- Power supply voltage: 1.4V ~ 5.5 V
- Operating temperature: - 40 °C ~ +85 °C
- Standby power consumption: <1uA
- Can drive LED directly
- Open-drain interrupt output

Applications

- Communication cabinet
- Servers
- Industrial automation
- Products with GPIO-Limited Processors

Pin Configuration and Functions



Pin Functions

NAME	PIN			DESCRIPTION
	QFN-16	SOW-16	TSSOP-20	
A[0:2]	2, 3, 4	1, 2, 3	6, 7, 9	Address selects. Connect to VCC or GND pin.
GND	9	8	15	Ground.
INT	14	13	1	Interrupt output. Open-drain output, requires a pull-up resistor.
NC	-	-	3, 8, 13, 18	Do not connect.
P[0:7]	5, 6, 7, 8 10, 11, 12, 13	4, 5, 6, 7 9, 10, 11, 12	10, 11, 12, 14 16, 17, 19, 20	Quasi-bidirectional GPIO port.
SCL	15	14	2	Serial clock pin. Open drain output, requires a pull-up resistor.
SDA	16	15	4	Serial data pin. Open drain output, requires a pull-up resistor.
VCC	1	16	5	Supply voltage pin. It is recommended to add a 10uF decoupling capacitor.

Absolute Maximum Ratings

	MIN	MAX	UNIT
Power Supply Voltage V+		6	V
Pin Voltage	- 0.5	6	V
Operating Temperature	- 55	150	°C
Junction Temperature		150	°C
Storage Temperature	- 60	150	°C

Unless otherwise noted, the specifications in the above table apply within the atmospheric temperature range.

Stresses beyond the range may cause permanent damage to the device.

Electrostatic Protection

		Value	UNIT
Electrostatic Discharge, V_{ESD}	Human Body Mode (HBM), per ANSI/ESDA/JEDEC JS-001	±5000	V
	Machine Mode (MM), per JEDEC-STD Classification	300	V

Recommended Operating Conditions

	MIN	TYP	MAX	UNIT
Supply Voltage V+	1.4	3.3	5.5	V
Operating Temperature T _A	- 40		85	°C

Unless otherwise noted, the specifications in the above table apply within the atmospheric temperature range.

Electrical Characteristics

Unless otherwise noted, the following data apply within the operating temperature range. (Typical operating conditions are + 25°C and 3.3V)

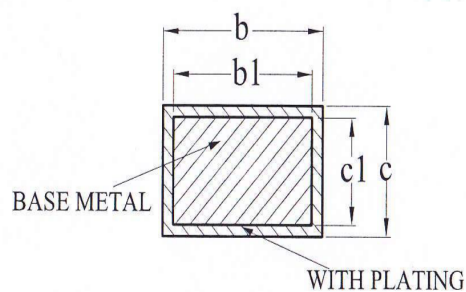
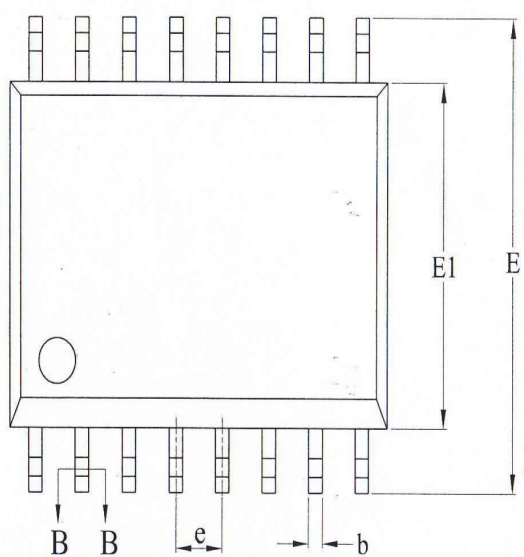
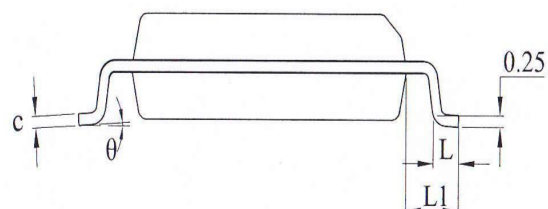
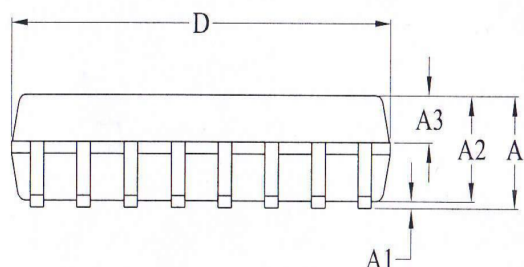
PARAMETER	SYM	TEST CONDITIONS	VCC	MIN	TYP	MAX	UNIT
I ² C communication frequency	f _{scl}	-	2.5~5.5		0.4	1	MHz
I ² C communication frequency (high speed mode)	f _{scl,hs}	-	2.5~5.5			2.4	MHz
Power-on reset voltage	V _{POR}	-	5		1	1.2	V
GPIO pull-up current	I _{OH}	V _O =GND	2.5~5.5	30	50	300	uA
GPIO pull-up current (fully driven state)	I _{OHT}	High during acknowledge, V _{OH} = GND	2.5		1		mA
GPIO sink current	I _{OL}	V _O = 1V	5	10	25		mA
SDA sink current	I _{OL,SDA}	V _O = 0.4 V	2.5~5.5	3			mA
INT sink current	I _{OL,INT}	V _O = 0.4 V	2.5~5.5	3			mA
Source current (operating mode)	I _{work}	I2C communication frequency 100kHz	5		40	100	uA
Source current (standby mode)	I _{idle}	I2C does not communicate	5		1	10	uA

Switching Sequence

Unless otherwise specified, the following data apply within the operating temperature range with the GPIO port load capacitance <100pF. (Typical operating conditions are + 25°C and 3.3V)

PARAMETER	SYMBOL	FROM	TO	MIN	TYP	MAX	UNIT
Output data valid	t _{pv}	SCL	GPIO			4	us
Input data setup time	t _{su}	GPIO	SCL		0		us
Input data hold time	t _h	GPIO	SCL		4		us
Interrupt valid time	t _{iv}	GPIO	INT			4	us
Interrupt reset delay time	t _{ir}	SCL	INT			4	us

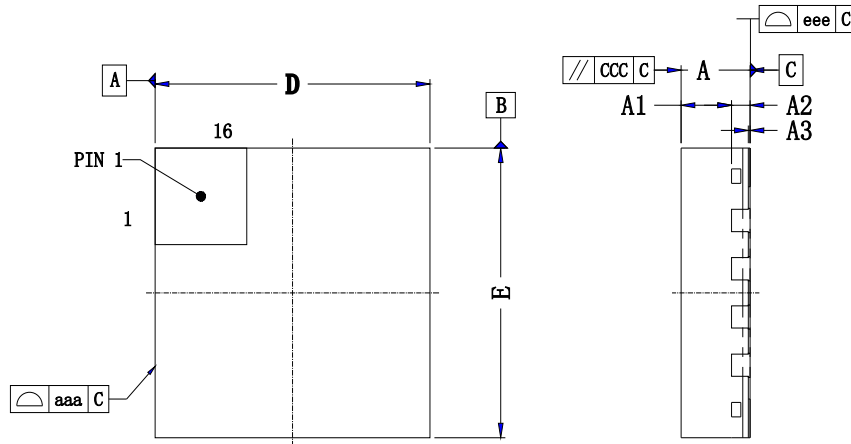
SOIC-16-300mil



SECTION B-B

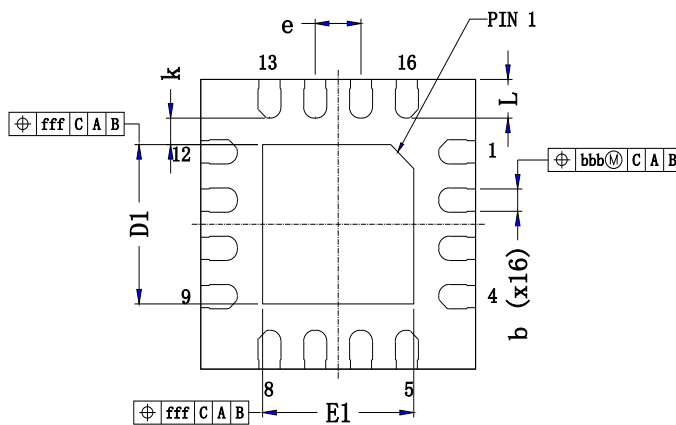
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	2.65
A1	0.10	—	0.30
A2	2.25	2.30	2.35
A3	0.97	1.02	1.07
b	0.35	—	0.43
b1	0.34	0.37	0.40
c	0.25	—	0.29
c1	0.24	0.25	0.26
D	10.20	10.30	10.40
E	10.10	10.30	10.50
E1	7.40	7.50	7.60
e	1.27BSC		
L	0.55	—	0.85
L1	1.40REF		
θ	0	—	8°

WQFN-16-EP(3x3)



TOP VIEW

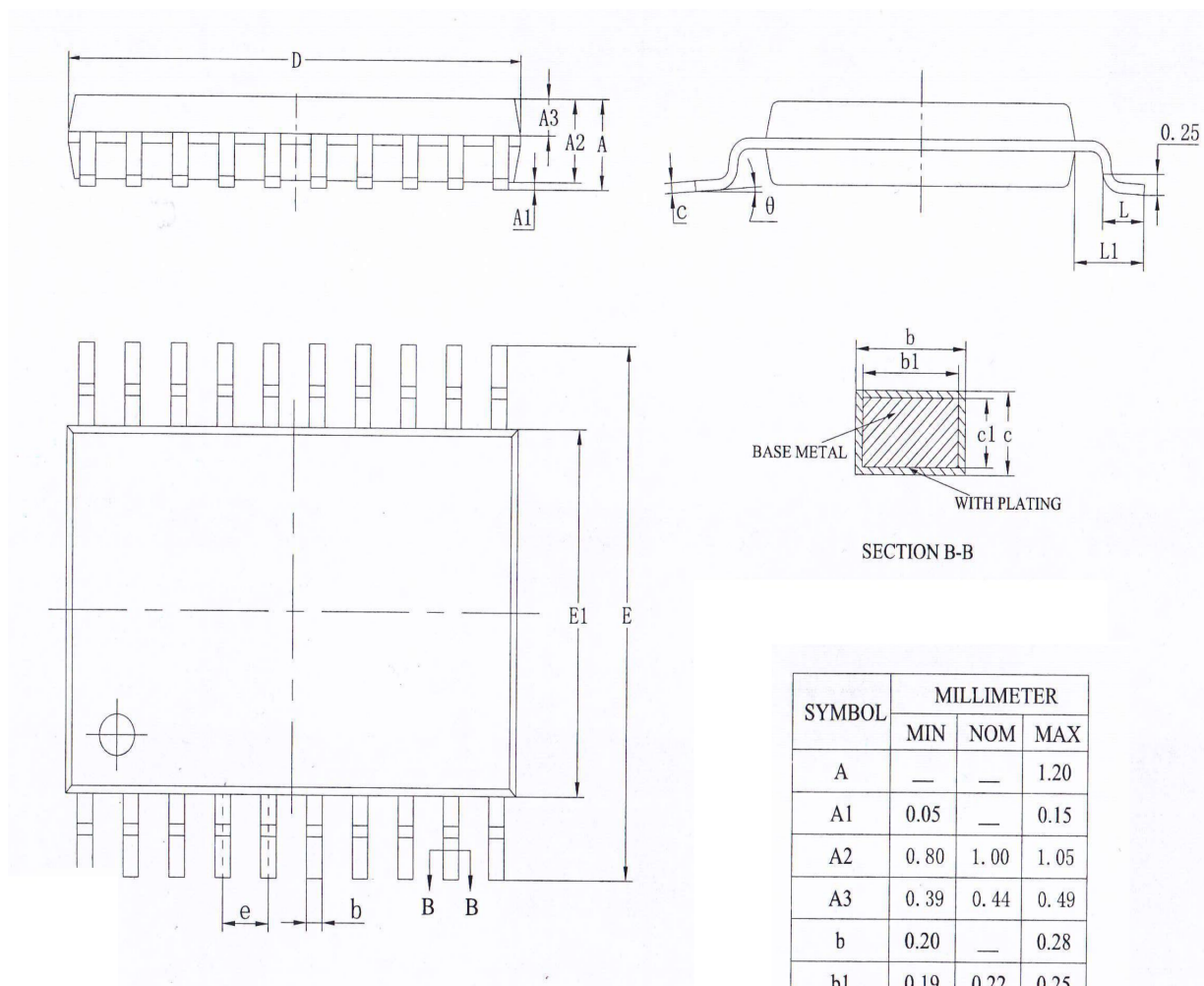
SIDE VIEW



BOTTOM VIEW

Item	Symbol	Minimum	Normal	Maximum
Body Size	X D		3.0 BSC	
	Y E		3.0 BSC	
Exposed Pad Size	X D1	1.55	1.65	1.75
	Y E1	1.55	1.65	1.75
Total Thickness	A	0.7	0.75	0.8
Molding Thickness	A1		0.55	
LF Thickness	A2		0.203 REF	
Stand Off	A3	0	0.02	0.05
Lead Width	b	0.20	0.25	0.30
Lead Length	L	0.3	0.4	0.5
Lead Pitch	e		0.5 BSC	
The space from terminals of lead to exposed pad	k		0.2 MIN	
Package Edge Tolerance	aaa		0.1	
Lead Offset	bbb		0.07	
Molding Flatness	ccc		0.1	
Coplanarity	eee		0.08	
Exposed Pad Offset	fff		0.1	

TSSOP-20



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.80	1.00	1.05
A3	0.39	0.44	0.49
b	0.20	—	0.28
b1	0.19	0.22	0.25
c	0.13	—	0.17
c1	0.12	0.13	0.14
D	6.40	6.50	6.60
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00REF		
θ	0	—	8°

Ordering information

Order code	Package	Baseqty	Deliverymode	Marking
UMW PCF8574DWR	SOIC-16-300mil	2000	Tape and reel	PCF8574
UMW PCF8574RGTR	WQFN-16-EP(3x3)	3000	Tape and reel	8574Q U
UMW PCF8574PW	TSSOP-20	3000	Tape and reel	PCF8574