

## Microprocessor Reset Circuits With Adjustable Delay Time

### Description

The FP6801 asserts a reset signal whenever the  $V_{DD}$  supply voltage declines below a preset threshold. The reset threshold voltage is fixed internally with an accuracy of  $\pm 2.0\%$ . A time delayed reset can be accomplished with the addition of an external capacitor.

The output reset signal is set to be active low. That means when the power supply voltage is lower than reset threshold, the OUT pin will turn low.

FP6801 has two different output forms, CMOS output and N-channel open-drain output. It is available in space-saving SC-82 and SOT-23-5 packages.

### Features

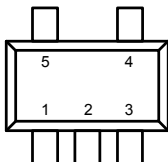
- Precision Monitoring of 2.5V, 3.0V, 3.3V, and 5.0V Power Supply Voltages
- Ultra-Low Supply Current at 2.5 $\mu$ A Typ.
- Operating Voltage Range from 1V to 5.5V
- $\pm 2.0\%$  Reset Threshold Accuracy
- Reset Threshold Hysteresis : 5% Typ.
- Active Low Output
- Adjustable Delay Time
- Small Package :SC-82 and SOT-23-5
- RoHS Compliant

### Applications

- TFT-LCD Panels
- Battery Powered Equipments
- Microprocessor Power Supply Monitoring
- Embedded Systems
- Automotive

### Pin Assignments

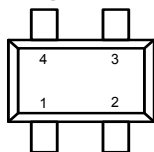
#### S5 Package (SOT-23-5)



TOP VIEW

1. OUT
2. VDD
3. GND
4. NC
5. CD

#### C8 Package (SC-82)



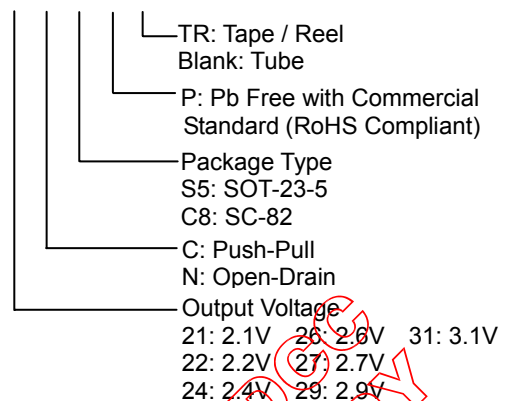
TOP VIEW

1. GND
2. VDD
3. CD
4. OUT

Figure 1. Pin Assignment of FP6801

### Ordering Information

FP6801-



#### SOT-23-5 Marking

Part Number	Product Code	Part Number	Product Code
FP6801-21CS5P	Gf	FP6801-21NS5P	Gh
FP6801-22CS5P	Ga	FP6801-22NS5P	Gk
FP6801-24CS5P	GZ	FP6801-24NS5P	G1
FP6801-26CS5P	Gb	FP6801-26NS5P	Gm
FP6801-27CS5P	G0	FP6801-27NS5P	G2
FP6801-29CS5P	Gd	FP6801-29NS5P	Gn
FP6801-31CS5P	Ge	FP6801-31NS5P	Gr

#### SC-82 Marking

Part Number	Product Code	Part Number	Product Code
FP6801-21CC8P	Gi	FP6801-21NC8P	Gs
FP6801-22CC8P	Gv	FP6801-22NC8P	GD
FP6801-24CC8P	G3	FP6801-24NC8P	G5
FP6801-26CC8P	Gw	FP6801-26NC8P	GE
FP6801-27CC8P	G4	FP6801-27NC8P	G6
FP6801-29CC8P	Gx	FP6801-29NC8P	GF
FP6801-31CC8P	Gz	FP6801-31NC8P	GG

### Typical Application Circuit

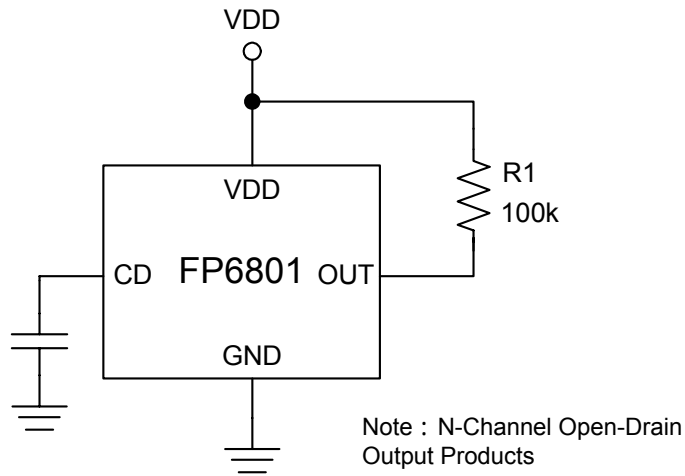


Figure 2. Typical Application Circuit of FP6801

### Functional Pin Description

Pin Name	Pin Function
<b>GND</b>	Ground
<b>CD</b>	Connect capacitor to adjust delay time.
<b>OUT</b>	When the power supply voltage is lower than the reset threshold, the OUT is low.
<b>VDD</b>	Supply Voltage

### Block Diagram

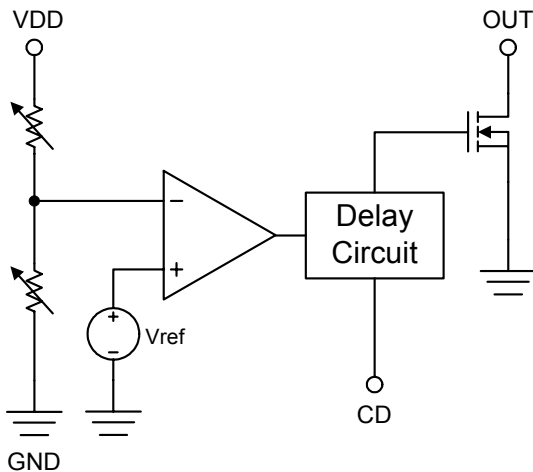


Figure 3. N-Channel Open-Drain Output Products

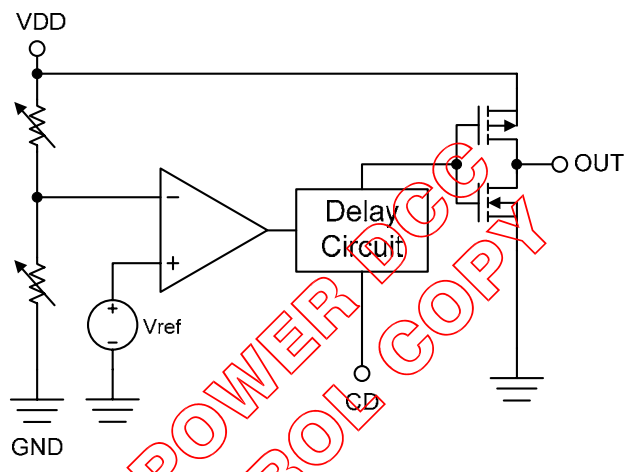


Figure 4. CMOS Output Products

## Absolute Maximum Ratings

- Supply Voltage ( $V_{DD}$  to GND) ----- - 0.3V to + 6V
- OUT voltage (Push-Pull)----- - 0.3 to ( $V_{DD}$  + 0.3V)
- OUT Voltage (Open Drain)----- - 0.3 to ( $V_{DD}$  + 0.3V)
- Output Current ----- + 20mA
- Power Dissipation,  $P_D$  @  $T_A=70^\circ\text{C}$ , SOT-23-5 ----- + 220mW
- Power Dissipation,  $P_D$  @  $T_A=70^\circ\text{C}$ , SC-82 ----- + 110mW
- Package Thermal Resistance, ( $\theta_{JA}$ ) (SOT-23-5) ----- + 250°C/W
- Package Thermal Resistance, ( $\theta_{JA}$ ) (SC-82) ----- + 500°C/W
- Maximum Junction Temperature ----- + 150°C
- Storage Temperature Range ( $T_S$ )----- - 65°C to + 150°C
- Lead Temperature (Soldering, 10sec.)----- + 260°C

Note : Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device.

## Recommended Operating Conditions

- Supply Voltage ( $V_{DD}$  to GND) ----- + 1.0V to + 5.5V
- Operation Temperature Range----- - 40°C to + 85°C

## Electrical Characteristics

( $V_{DD}=5V$ ,  $T_A=25^\circ\text{C}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
$V_{DD}$ Range	$V_{DD}$		1.0		5.5	V
Supply Current	$I_{DD}$	$-V_{TH} < 3.3V$ , $V_{DD} = 3.6V$		2.5	5	$\mu\text{A}$
		$3.3V < -V_{TH} < 4.7V$ , $V_{DD} = 5V$		2.5	5	
Reset Threshold	$-V_{TH}$		$0.98 \times (-V_{TH})$	$-V_{TH}$	$1.02 \times (-V_{TH})$	V
Hysteresis Width	$V_{HYS}$		3%	5%	7%	
Reset Threshold Temperature Coefficient				50		ppm/°C
Delay Time	$T_D$	$C_D = 4.7\text{nF}$ , $-V_{TH} < 3.3V$ , $V_{DD} = 3.6V$	20	27	34	ms
		$C_D = 4.7\text{nF}$ , $3.3V < -V_{TH} < 4.7V$ , $V_{DD} = 5V$				
Output Current	$I_{OUT}$	NCH, $V_{DD} = 2.2V$ , $V_{DS} = 0.5V$	5	10		mA
		PCH, $V_{DD} = 4.8V$ , $V_{DS} = 0.5V$	3	6		

**Typical Performance Curves**

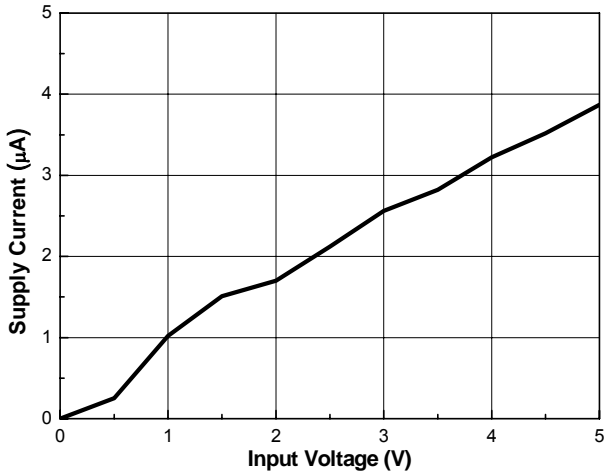


Figure 5. Supply Current Consumption ( $I_{DD}$ ) vs. Input Voltage ( $V_{DD}$ ) for  $-V_{TH}=2.4V$

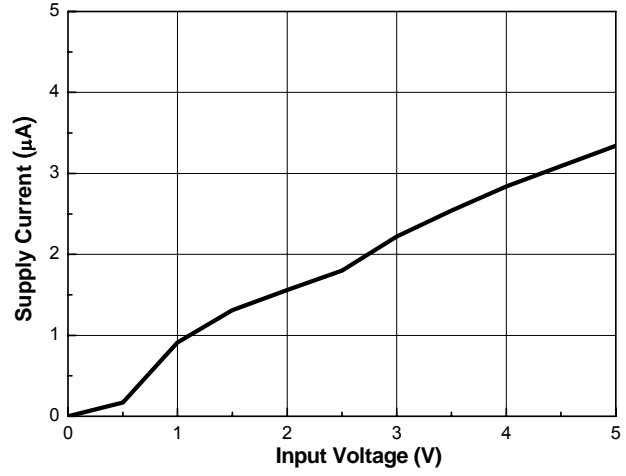


Figure 6. Supply Current Consumption ( $I_{DD}$ ) vs. Input Voltage ( $V_{DD}$ ) for  $-V_{TH}=2.7V$

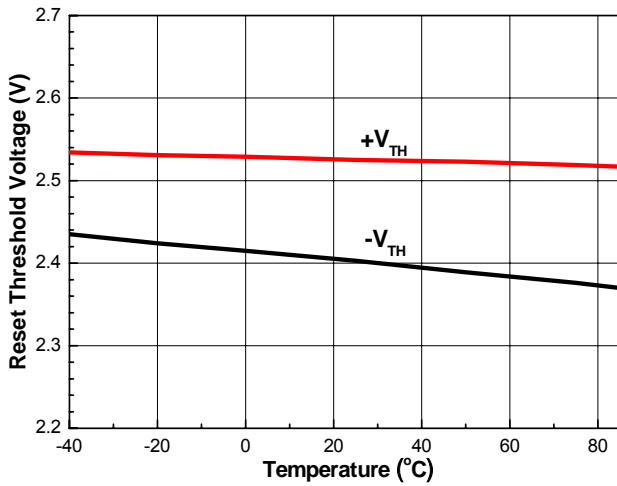


Figure 7. Reset Threshold Voltage ( $\pm V_{TH}$ ) vs. Temperature ( $T_a$ ) for  $-V_{TH}=2.4V$

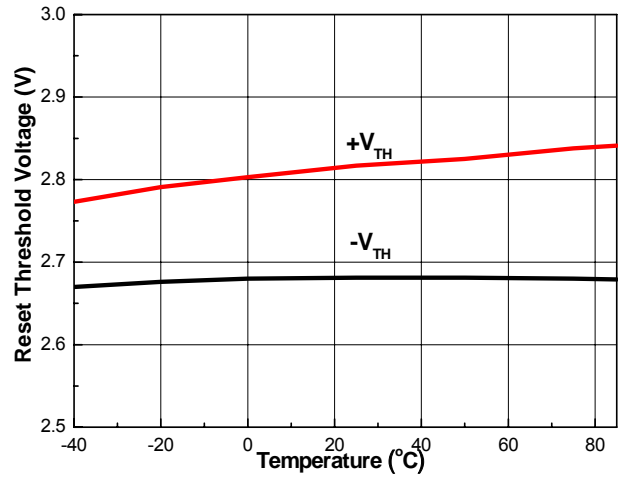


Figure 8. Reset Threshold Voltage ( $\pm V_{TH}$ ) vs. Temperature ( $T_a$ ) for  $-V_{TH}=2.7V$

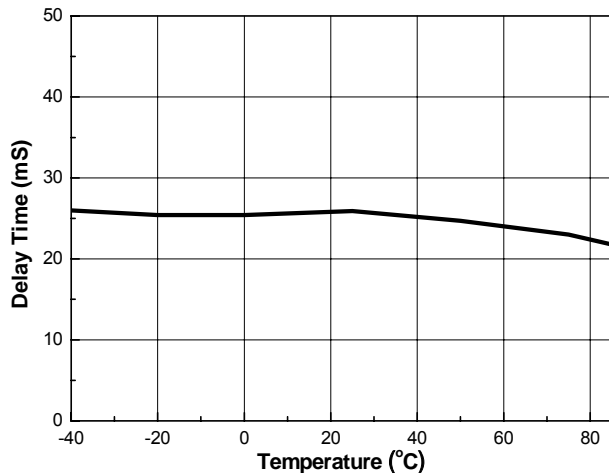


Figure 9. Delay Time ( $T_D$ ) vs. Temperature for  $-V_{TH}=2.2V$

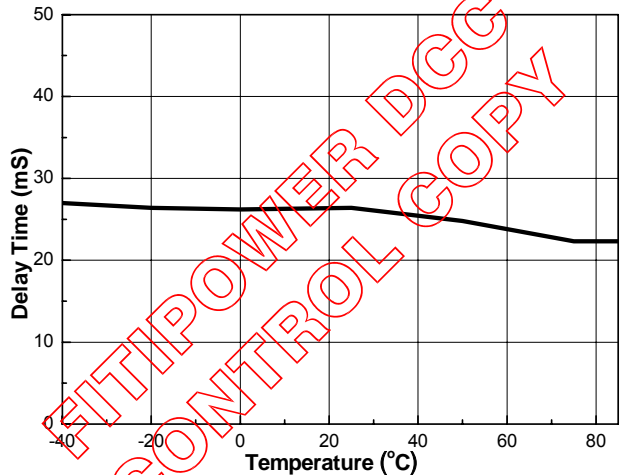


Figure 10. Delay Time ( $T_D$ ) vs. Temperature for  $-V_{TH}=2.7V$

**Typical Performance Curves (Continued)**

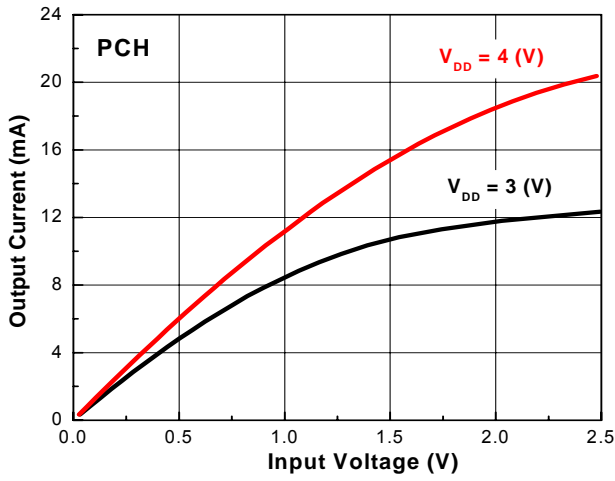


Figure 11. PCH Output Current ( $I_b$ ) Capability for  $-V_{TH}=2.7V$

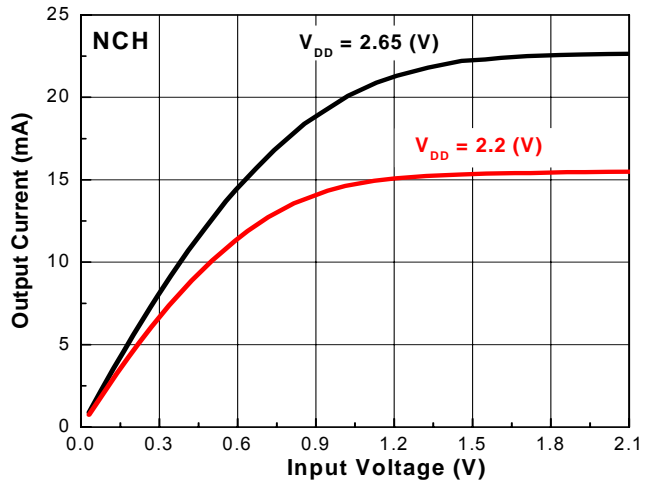


Figure 12. NCH Output Current ( $I_b$ ) Capability for  $-V_{TH}=2.7V$

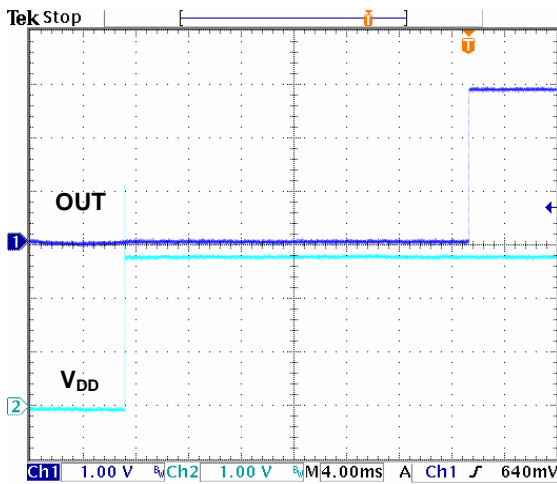


Figure 13. Power-Up OUT Timeout Waveforms for  $-V_{TH}=2.7V$

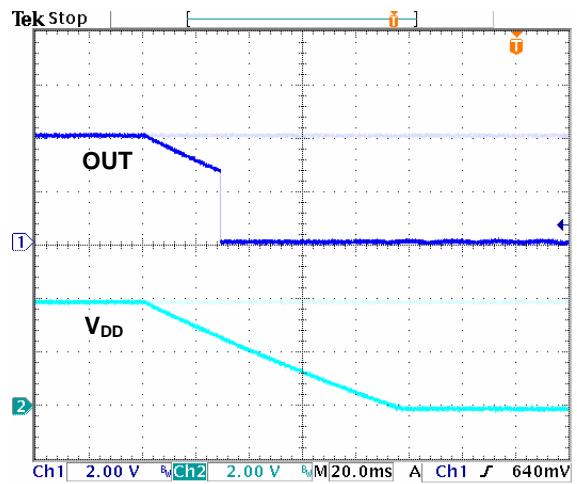


Figure 14. Power-Down OUT Timeout Waveforms for  $-V_{TH}=2.7V$

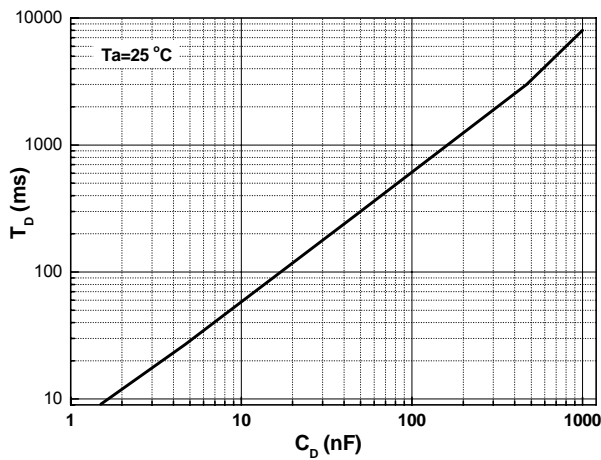
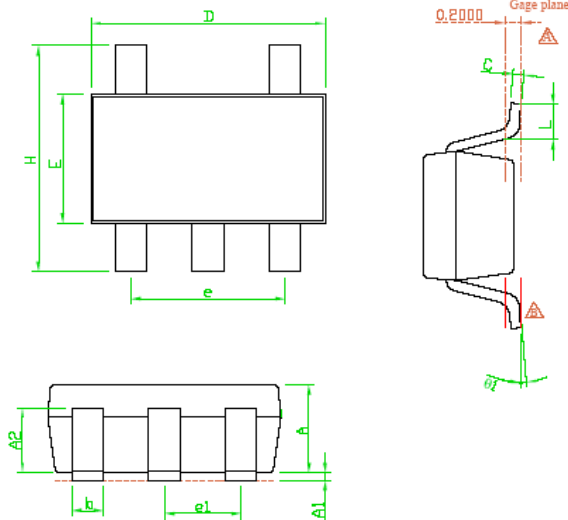


Figure 15. Delay Time( $T_D$ ) vs. Capacitance ( $C_D$ ) for  $-V_{TH}=2.7V$

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## Outline Information

### SOT-23-5 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	---	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.50	1.60	1.80
e	---	1.90(TYP)	---
H	2.60	2.80	3.00
L	0.37	---	---
θ1	1°	5°	9°
e1	---	0.95(TYP)	---

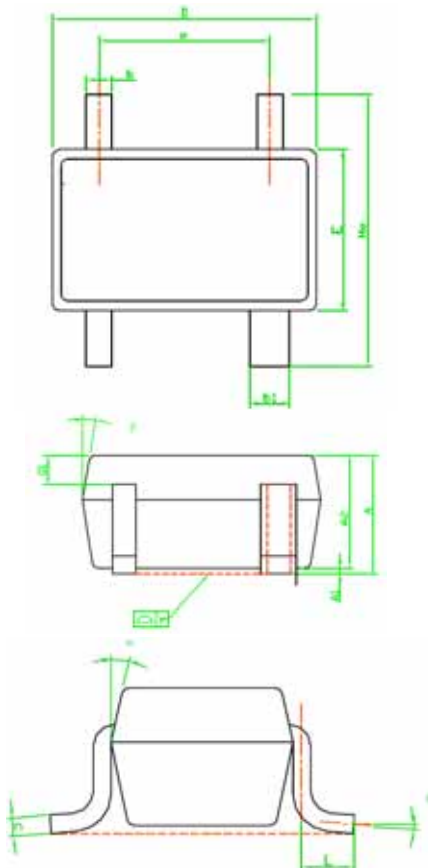
Note 1 : Package Body Sizes Exclude Mold Flash Protrusions or Gate Burrs.

Note 2 : Tolerance  $\pm 0.1000$  mm(4mil) Unless Otherwise Specified.

Note 3 : Coplanarity : 0.1000 mm

Note 4 : Dimension L Is Measured in Gage plane.

### SC-82 Package (Unit: mm)



SYMBOLS UNIT	DIMENSION IN MILLIMETER		
	MIN	NOM	MAX
A	0.80	---	1.10
A1	0.00	---	0.10
A2	0.80	---	1.00
b	0.15	0.20	0.30
b1	0.25	0.30	0.40
C	0.10	---	0.20
D	1.80	2.00	2.20
E	1.15	1.25	1.35
e	---	1.30	---
He	1.80	2.10	2.40
L	0.10	---	0.45
Q1	0.10	---	0.40
y	---	---	0.10
α	---	---	17°
β	---	---	12°
θ	- 15°	0	15°

Note 1 : Package Body Sizes Exclude Mold Flash and Gate Burrs.

Note 2 : Tolerance  $\pm 0.10$  mm(4 mil) Unless Otherwise Specified.

Note 3 : Controlling Dimension Is Millimeter. Converted Inch Dimension Are Not Necessarily Exact.

Note 4 : Followed from EIAJ ED-7500-2.

Note 5 : Dimension L Is measured Form 0.1 mm above Seated Plane.

#### Life Support Policy

Fitipower's products are not authorized for use as critical components in life support devices or other medical systems.