Is Now Part of

ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ON Semiconductor®

April 2017

FPF2496
IntelliMAX™ 28 V, Over-Voltage, Over-Current Protection Load Switch with Adjustable Current-Limit Control

Features

- V_{IN}: 3.5 V~5.5 V
- 28 V Absolute Ratings at V_{IN}
- Current Capability: 2.5 A
- Adjustable Current Limit: (Typ.) 0.1 A~2.5 A with 10% Accuracy
- R_{ON}: Maximum 100 mΩ at 5 V_{IN} and 1A I_{OUT}
- Input OVP: Min.=5.6 V, Typ.=5.8 V, Max.=6 V
- Output Discharge During Off State
- Open-Drain OVP on FLAGB
- Thermal Shutdown
- Under-Voltage Lockout (UVLO)
- True Reverse-Current Blocking (TRCB)
- Logic CMOS IO Meets JESD76 Standard for GPIO Interface and Related Power Supply Requirements
- ESD Protected:
  - Human Body Model: >5.0 kV
  - Charged Device Model: >2.5 kV
  - IEC 61000-4-2 Air Discharge: >15 kV
  - IEC 61000-4-2 Contact Discharge: >8 kV

Applications

- Smart Phones, Tablet PCs
- Storage, DSLR, and Portable Devices

Description

The FPF2496 advanced load-management switch targets applications requiring a highly integrated solution. It disconnects loads powered from the DC power rail (<6 V) with stringent off-state current targets and high load capacitances (<100 µF). The FPF2496 consists of a slew-rate controlled low-impedance MOSFET switch (100 mΩ maximum) and integrated analog features. The slew-rate controlled turn-on characteristic prevents inrush current and the resulting excessive voltage droop on power rails. FPF2496 has over-voltage and over-temperature protection.

The FPF2496 has a True Reverse-Current Blocking (TRCB) function that obstructs unwanted reverse current from V_{OUT} to V_{IN} during ON and OFF states. The exceptionally low off-state current drain (<2 µA maximum) facilitates compliance with standby power requirements. The input voltage range operates from 3.5 V to 5.5 V_{DC} to support a wide range of applications in consumer, optical, medical, storage, portable, and industrial-device power management systems. Switch control is managed by a logic input (active LOW) capable of interfacing directly with low-voltage control signal / General-Purpose Input / Output (GPIO) without an external pull-down resistor.

The device is packaged in advanced, fully “green” compliant, 1.21 mm x 1.21 mm, Wafer-Level Chip-Scale Package (WLCSP).

Ordering Information

Part Number	Operating Temperature Range	Package	Top Mark
FPF2496UCX	-40 to 85°C	1.21 mm x 1.21 mm, Wafer-Level Chip-Scale Package (WLCSP)	TJ

© 2014 Semiconductor Components Industries, LLC.

Application Diagram

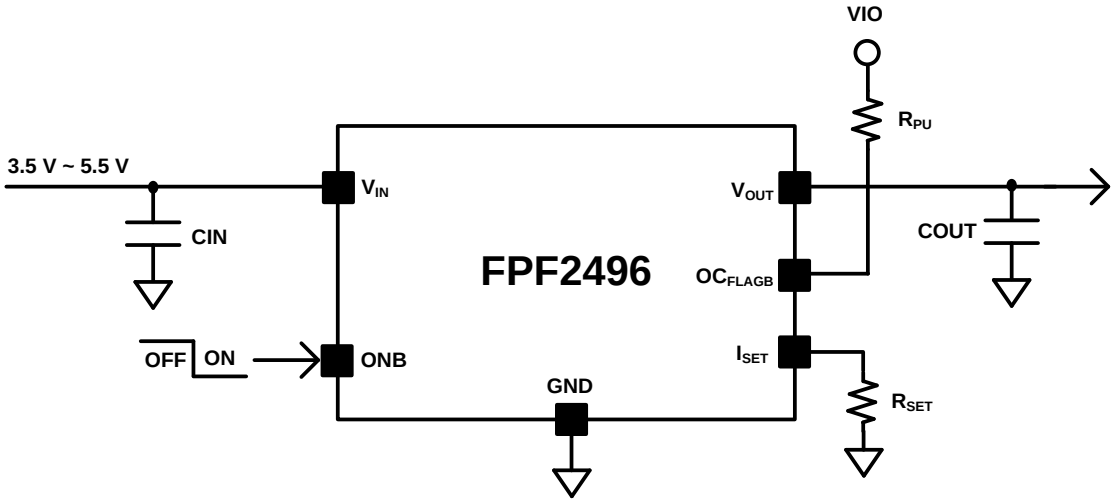


Figure 1. Typical Application

Note:

1. C_{IN} and C_{OUT} capacitors are recommended for improved device stability.

Block Diagram

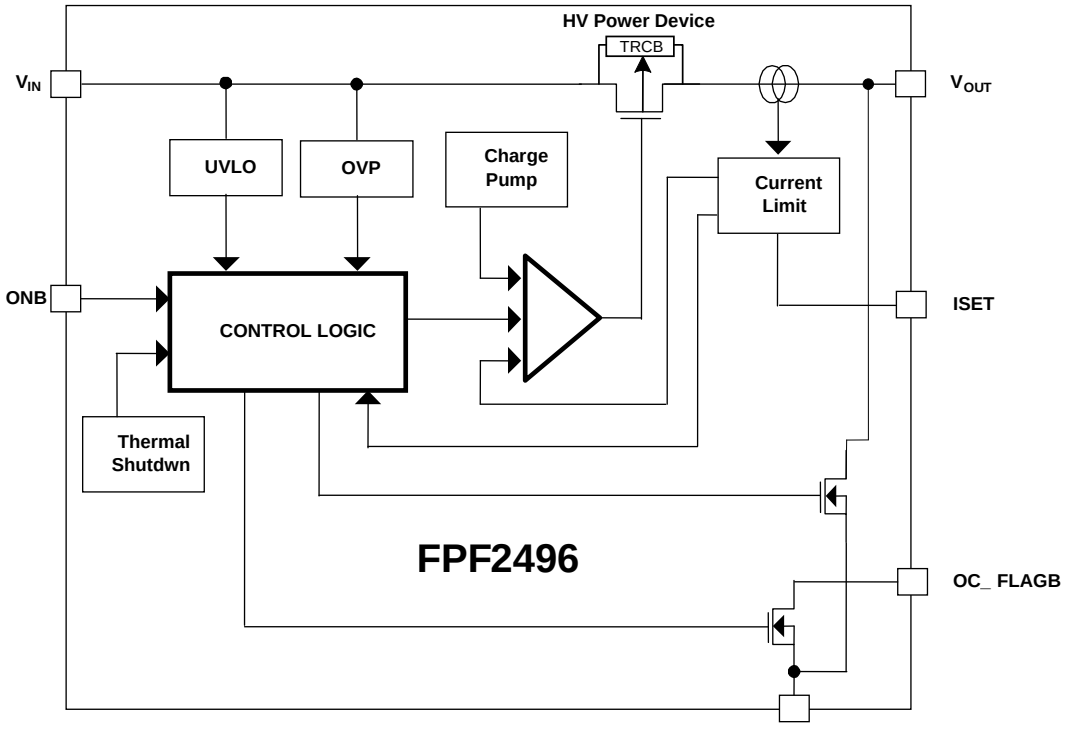


Figure 2. Functional Block Diagram

© 2014 Semiconductor Components Industries, LLC.

Pin Configurations

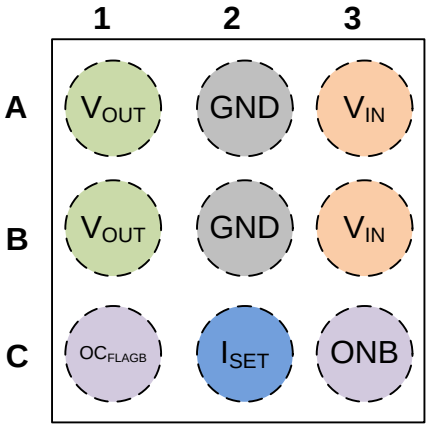


Figure 3. Pin Assignments (Top View)

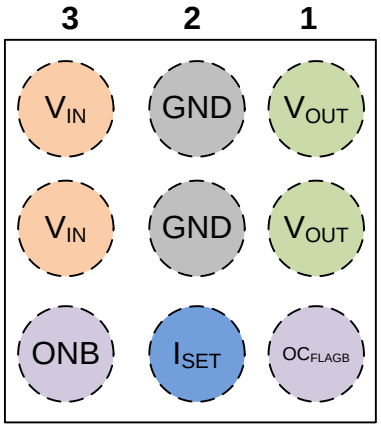


Figure 4. Pin Assignments (Bottom View)

Pin Description

Pin #	Name	Description		
A1, B1	V_{OUT}	**Switch Output**		
A3, B3	V_{IN}	**Supply Input**: Input to the power switch		
A2	GND	**Ground** (Device Ground)		
B2				
C3	ONB	**ON/OFF Control Input**: Active LOW; GPIO compatible	**Logic HIGH**	Switch Disable
			Logic LOW	Switch Enable
C1	OC_{FLAGB}	**Fault Output**: Active LOW, open-drain output that indicates an input over current. External pull-up resistor to V_{CC} is required.		
C2	I_{SET}	**Current Limit Set Input**: A resistor from ISET to ground sets the current limit for the switch.		

© 2014 Semiconductor Components Industries, LLC.

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters		Min.	Max.	Unit
V_{PIN}	V_{IN} to GND, V_{IN} to V_{OUT}		-0.3	28.0	V
	ONB, V_{OUT}, FLAGB, I_{SET} to GND		-0.3	6.0	
I_{SW}	Maximum Continuous Switch Current			2.75	A
t_{PD}	Total Power Dissipation at T_A=25°C			1.0	W
T_J	Operating Junction Temperature		-40	+150	°C
T_{STG}	Storage Junction Temperature		-65	+150	°C
Θ_{JA}	Thermal Resistance, Junction-to-Ambient (1-inch Square Pad of 2 oz. Copper)			95(2)	°C/W
				110(3)	
ESD	Electrostatic Discharge Capability	Human Body Model, ANSI/ESDA/JEDEC JS-001-2012	5.0		kV
		Charged Device Model, JESD22-C101	2.5		
	IEC61000-4-2 System Level	Air Discharge (V_{IN}, V_{ON}, V_{OUT} to GND)	15		
		Contact Discharge (V_{IN}, V_{ON}, V_{OUT} to GND)	8		

Notes:

2. Measured using 2S2P JEDEC std. PCB.
3. Measured using 2S2P JEDEC PCB cold plate method.

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. ON Semiconductor does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameters	Min.	Max.	Unit
V_{IN}	Supply Voltage	3.5	5.5	V
T_A	Ambient Operating Temperature	-40	85	°C

© 2014 Semiconductor Components Industries, LLC.

Electrical Characteristics

Unless otherwise noted; V_{IN}=3.5 to 5.5 V, T_A=-40 to +85°C; typical values are at V_{IN}=5 V and T_A=25°C.

Symbol	Parameters	Condition	Min.	Typ.	Max.	Unit
Basic Operation						
V_{IN}	Input Voltage		3.5		5.5	V
$I_{Q(OFF)}$	Off Supply Current	V_{ONB}=HIGH, V_{OUT}=Open		1	2	µA
$I_{SD(OFF)}$	Shutdown Current	V_{IN}=5.5 V, V_{OUT}=0 V, V_{ONB}=HIGH		0.1	4.0	µA
I_Q	Quiescent Current	I_{OUT}=0 mA		65	100	µA
R_{ON}	On Resistance	V_{IN}=5.0 V, I_{OUT}=1 A		70	100	mΩ
		V_{IN}=3.7 V, I_{OUT}=1 A		75	105	
V_{IH}	ONB Input Logic HIGH Voltage	V_{IN}=3.5 V to 5.5 V	1.15			V
V_{IL}	ONB Input Logic LOW Voltage	V_{IN}=3.5 V to 5.5 V			0.65	V
V_{IL_FLAG}	FLAGB Output Logic LOW Voltage	V_{IN}=5 V, I_{SINK}=10 mA		0.1	0.2	V
		V_{IN}=3.5 V, I_{SINK}=10 mA		0.15	0.30	
I_{FLAGB_LK}	FLAGB Output HIGH Leakage Current	V_{IN}=5 V, Switch On			1	µA
I_{ON}	ONB Input Leakage	0 V to V_{IN}			1.0	µA
R_{ON_PD}	Pull-Down Resistance at ONB Pin	V_{IN}=3.5~5.5 V, V_{ON}=HIGH, T_A=-40 to 85°C		14		MΩ
RPD	Output Discharge R_{PULL_DOWN}	V_{IN}=3.5 V, V_{ONB}=HIGH, I_{FORCE}=20 mA, T_A=-40 to 85°C		100		Ω
Over-Voltage Protection						
V_{OVP_TRIP}	Input OVP Lockout	V_{IN} Rising Threshold	5.60	5.80	6.00	V
		V_{IN} Falling Threshold		5.50		
V_{OVP_HYS}	Input OVP Hysteresis			0.3		V
t_{OVP}	Response Time	I_{OUT}=0.5 A, C_L=1 µF, T_A=25°C, V_{IN}=5.5 V to 6.0 V	1			µs
Over-Current Protection						
I_{LIM}	Current Limit	V_{IN}=5 V, R_{SET} = 2100 Ω, V_{OUT} >1.68V with with 10% Accuracy	450	500	550	mA
		V_{IN}=5 V, R_{SET} = 1070 Ω, V_{OUT} >1.68 V with 10% Accuracy	900	1000	1100	
V_{UVLO}	Under-Voltage Lockout	V_{IN} Increasing		3.2		V
		V_{IN} Decreasing		3.0		
V_{UVLO_HYS}	UVLO Hysteresis			200		mV
V_{T_RCB}	RCB Protection Trip Point	V_{OUT} - V_{IN}		50		mV
V_{R_RCB}	RCB Protection Release Trip Point	V_{IN} - V_{OUT}		50		mV

Continued on the following page…

© 2014 Semiconductor Components Industries, LLC.

Electrical Characteristics (Continued)

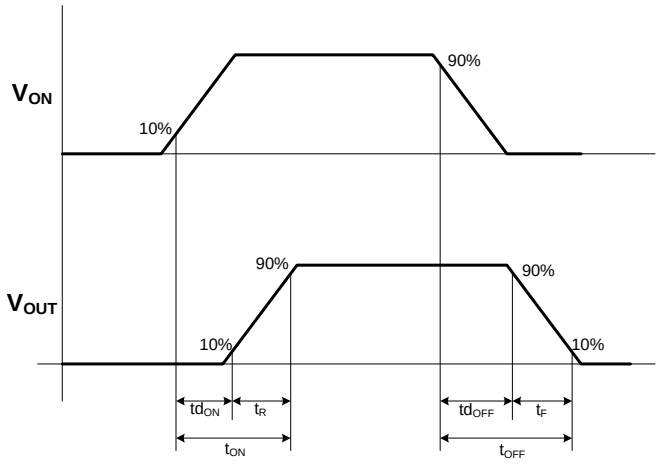
Unless otherwise noted; V_{IN}=3.5 to 5.5 V, T_A=-40 to +85°C; typical values are at V_{IN}=5 V and T_A=25°C.

Symbol	Parameters	Conditions	Min.	Typ.	Max.	Unit
V_{RCB_HYS}	RCB Hysteresis			100		mV
t_{RCB}	Default RCB Response Time	V_{IN}=5 V, V_{ONB}=HIGH/LOW		2		µs
I_{RCB}	RCB Current	V_{ONB}=HIGH, V_{OUT}=5.5 V		14		µA
t_{HOCP}	Hard Over-Current Response Time	Moderate Over-Current Condition, $I_{OUT} \geq I_{LIM}$, $V_{OUT} \leq 0$ V		6		µs
t_{OCP}	Over-Current Response Time	Moderate Over-Current Condition, $I_{OUT} \geq I_{LIM}$ $V_{OUT} \leq V_{IN}$		7		µs
t_{OC_FLAG}	Over-Current Flag Response Time	When Over-Current Occurs to Flag Pulling LOW		8		ms
TSD	Thermal Shutdown	Shutdown Threshold		150		°C
		Return from Shutdown		130		
		Hysteresis		20		
Dynamic Characteristics						
t_{DON}	Turn-On Delay[4,5]	V_{IN}=5 V, R_L=100 Ω, C_L=1 µF, T_A=25°C		4.39		ms
t_R	V_{OUT} Rise Time[4,5]			7.26		ms
t_{ON}	Turn-On Time[4,7]			11.65		ms
t_{DOFF}	Turn-Off Delay[5]			1.85		ms
t_F	V_{OUT} Fall Time[5]			37.60		ms
t_{OFF}	Turn-Off Time[7]			39.45		ms

Notes:

4. This parameter is guaranteed by design and characterization; not production tested.
5. t_{DON}/t_{DOFF}/t_R/t_F are defined in Figure 5 below.
6. t_{ON}=t_R + t_{DON}.
7. t_{OFF}=t_F + t_{DOFF}.

Timing Diagram



where:

t_{DON} = Delay On Time
t_R = V_{OUT} Rise Time
t_{ON} = Turn-On Time
t_{DOFF} = Delay Off Time
t_F = V_{OUT} Fall Time
t_{OFF} = Turn Off Time

Figure 5. Timing Diagram

© 2014 Semiconductor Components Industries, LLC.

Operation and Application Description

Input Capacitor

To limit the voltage drop on the input supply caused by transient inrush current when the switch turns on into discharge load capacitor; a capacitor must be placed in between the V_{IN} and GND pins. A high-value C_{IN} capacitor can be used to reduce the voltage drop in high-current applications.

Output Capacitor

An output capacitor should be placed between the V_{OUT} and GND pins. This capacitor prevents parasitic board inductance from forcing V_{OUT} below GND when the switch is on. This capacitor also prevents reverse inrush current from creating a voltage spike that could damage the device in the case of a V_{OUT} short.

Fault Reporting

Upon the detection of an over-current, OC_FLAGB signals the fault by activating LOW.

Current Limiting

The current limit ensures that the current through the switch does not exceed the maximum set value, while not limiting the minimum value. The current limit is adjustable through the selection of an external resistor connected to ISET. Information for selecting the resistor is found in the sections below. The device acts as a constant-current source when the load draws more than the maximum value set by the device until thermal shutdown occurs. The device recovers if the die temperature drops below the threshold temperature.

Under-Voltage Lockout (UVLO)

The under-voltage lockout turns the switch off if the input voltage drops below the lockout threshold. With the ONB pin active, the input voltage rising above the UVLO threshold releases the lockout and enables the switch.

True Reverse-Current Blocking

The true reverse-current blocking feature protects the input source against current flow from output to input, whether the load switch is on or off.

Thermal Shutdown

The thermal shutdown protects the die from internally or externally generated excessive temperature. During an over-temperature condition, the switch is turned off. The switch automatically turns on again if the temperature of the die drops below the threshold temperature.

Setting Current Limit

The current limit is set with an external resistor connected between the I_{SET} and GND pins. The resistor is selected using Table 1. Resistor tolerance of 1% or less is recommended

Table 1. Current Limit Settings by RSET(8)

$R_{SET}\Omega$	Min. Current Limit (mA)	Typ. Current Limit (mA)	Max. Current Limit (mA)
420	2250	2500	2750
469	2020	2250	2407
528	1800	2000	2200
604	1570	1750	1920
680	1350	1500	1650
866	1125	1250	1375
1070	900	1000	1100
1200	810	900	990
1330	720	800	880
1500	630	700	770
1740	540	600	660
2100	450	500	550
2320	405	450	495
2550	360	400	440
2940	315	350	385
3400	370	300	330
4020	225	250	275
4990	180	200	220
6490	135	150	165
9530	90	100	110

Note:

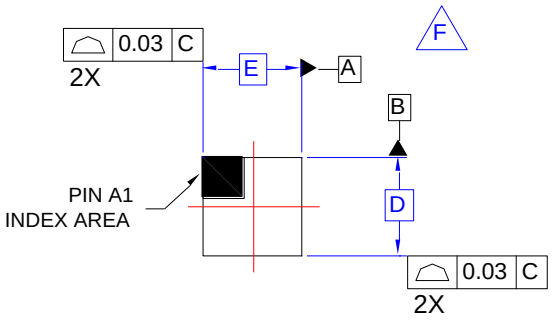
8. Table values based on 1% tolerance resistor.

Board Layout

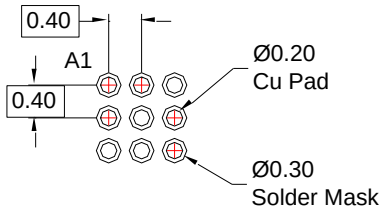
For best performance, all traces should be as short as possible. The input and output capacitors should be placed close to the device to minimize the effect that parasitic trace inductance may have on normal and short-circuit operation. Using wide traces for V_{IN}, V_{OUT}, GND helps minimize parasitic electrical effects along with minimizing the case-to-ambient thermal impedance.

© 2014 Semiconductor Components Industries, LLC.

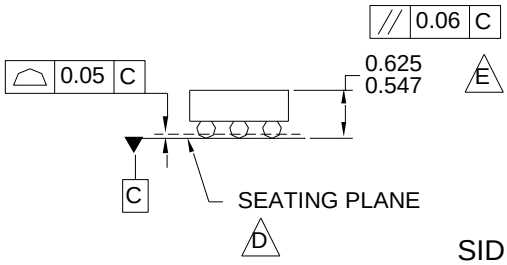
Physical Dimensions

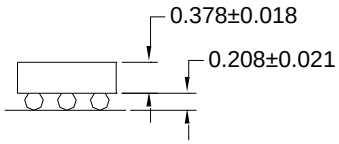


TOP VIEW

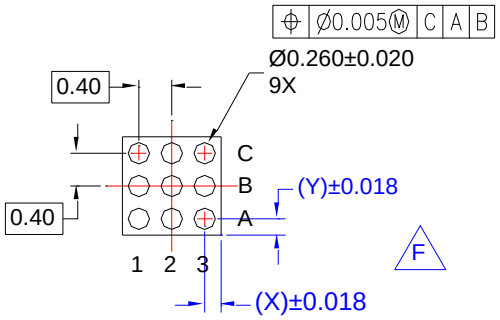


LAND PATTERN RECOMMENDATION
(NSMD PAD TYPE)





SIDE VIEWS



BOTTOM VIEW

NOTES:

A. NO JEDEC REGISTRATION APPLIES.

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCE PER ASMEY14.5M, 1994.

D. DATUM C IS DEFINED BY THE SPHERICAL CROWNS OF THE BALLS.

E. PACKAGE NOMINAL HEIGHT IS 586 MICRONS ±39 MICRONS (547-625 MICRONS).

F. FOR DIMENSIONS D, E, X, AND Y SEE PRODUCT DATASHEET.

G. DRAWING FILNAME: MKT-UC009ABrev2

Product-Specific Dimensions

Product	D	E	X	Y
FPF2496	1210 µm ±30 µm	1210 µm ±30 µm	205 µm	205 µm

© 2012 Semiconductor Components Industries, LLC.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada.
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.o

Order Literature: http://www.onsemi.c

For additional information, please cont
Sales Representative

ON Semiconductor and ON are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5817−1050

ON Semiconductor Website: **www.onsemi.com**

Order Literature: http://www.onsemi.com/orderlit

For additional information, please contact your local Sales Representative

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Switch ICs - Power Distribution ***category:***

Click to view products by ON Semiconductor ***manufacturer:***

Other Similar products are found below :

TCK111G,LF(S FPF1018 DS1222 TCK2065G,LF SZNCP3712ASNT3G MIC2033-05BYMT-T5 MIC2033-12AYMT-T5 MIC2033-05BYM6-T5 SLG5NT1437VTR SZNCP3712ASNT1G DML1008LDS-7 KTS1670EDA-TR KTS1640QGDV-TR KTS1641QGDV-TR NCV459MNWTBG FPF2260ATMX U6513A MIC2012YM-TR NCP45780IMN24RTWG MAX14919ATP+ MC33882PEP TPS2104DBVR MIC2098-1YMT-TR MIC94062YMT TR MP6231DN-LF MIC2015-1.2YM6 TR MIC2075-2YM MIC94068YML-TR SIP32461DB-T2-GE1 NCP335FCT2G TCK105G,LF(S AP2411S-13 AP2151DSG-13 MIC94094YC6-TR MIC94093YC6-TR MIC94064YC6-TR MIC94061YMT-TR MIC2505-1YM MIC94305YMT-TR MIC94085YFT-TR MIC94081YFT-TR MIC94042YFL-TR MIC94041YFL-TR MIC2005-1.2YM6-TR TPS2032QDRQ1 NCP333FCT2G BTS3050TFATMA1 NCP331SNT1G TPS2092DR TPS2063DR