

FDC6901L

Integrated Load Switch

General Description

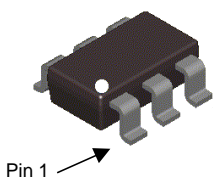
This device is particularly suited for compact power management. In portable electronic equipment where 2.5V to 6V input capability is needed. This load switch integrates a Slew Rate Control Driver that drives a P-Channel Power MOSFET in one tiny SuperSOT™-6 package. The integrated slew rate control driver is specifically designed to control the turn on of the P-Channel MOSFET in order to limit the inrush current in battery switching applications with high capacitance loads. For turn-off, the IC pulls the MOSFET gate up quickly.

Features

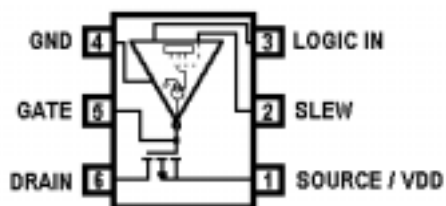
- Three programmable slew rates
- Reduces inrush current
- Minimizes EMI
- Normal turn-off speed
- Low-power CMOS operates over wide voltage range
- High performance trench technology for extremely low $R_{DS(ON)}$

Applications

- Load switch
- Power management



SuperSOT™-6



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DD}	Supply Voltage	-0.5 to 10	V
V_{IN}	DC Input Voltage (Logic Inputs)	-0.7 to 6	V
P_D	Power Dissipation		
T_{STG}	Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

Recommended Operating Range

V_{DD}	Supply Voltage	-0.5 to 10	V
T_J	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	180	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	60	$^\circ\text{C}/\text{W}$

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
.901	FDC6901L	7"	8mm	3000 units

Electrical Characteristics						
<small>T_A=25°C unless otherwise noted</small>						
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Logic Levels						
V _{IH}	Logic HIGH Input Voltage	V _{DD} = 2.7 V to 6.0 V	75%* V _{DD}			V
V _{IL}	Logic LOW Input Voltage	V _{DD} = 2.7 V to 6.0 V			25%* V _{DD}	V
OFF Characteristics – Slew Rate Control Driver						
BV _{DG}	Supply Input Breakdown Voltage	I _{DG} = 10 μA, V _{IN} = 0 V, V _{SLEW} = 0 V	9			V
BV _{SLEW}	Slew Input Breakdown Voltage	I _{SLEW} = 10 μA, V _{IN} = 0 V	9			V
BV _{IN}	Logic Input Breakdown Voltage	I _{IN} = 10 μA, V _{SLEW} = 0 V	9			V
IR _{DG}	Supply Input Leakage Current	V _{DG} = 8 V, V _{IN} = 0 V, V _{SLEW} = 0 V			100	nA
IR _{SLEW}	Slew Input Leakage Current	V _{SLEW} = 8 V, V _{IN} = 0 V			100	nA
IR _{IN}	Logic Input Leakage Current	V _{IN} = 8 V, V _{SLEW} = 0 V			100	nA
OFF Characteristics – Slew Rate Control Driver + P-Channel MOSFET						
BV _{IO}	IO Breakdown Voltage	I _D = -250 μA	9			V
IR _{IO}	IO Leakage Current	V _R = 16 V			100	nA
ON Characteristics – Slew Rate Control Driver						
I _G	Output/Gate Current	V _{IN} = 6V V _{GATE} = 2V	Slew Pin = OPEN = GROUND = V _{DD}		90 1 10	μA μA nA
ON Characteristics – P-Channel MOSFET						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250 μA	-0.6	-1.0	-1.5	V
R _{DS(ON)}	Static Drain-Source On Resistance	V _{GS} = -4.5 V, I _D = -1.5 A V _{GS} = -2.5 V, I _D = -1.2 A		120 170	145 210	mΩ mΩ
ON Characteristics – Slew Rate Control Driver + P-Channel MOSFET						
V _{DROP}	Dropout Voltage	V _{DD} = 6V, V _{IN} = 2.5V to 6V, I _L = 1.5 A V _{DD} = 6V, V _{IN} = 2.5V to 6V, I _L = 1.2 A		160 130	300 300	mV mV
R _{ON}	Load switch On Resistance	V _{DD} = 6V, V _{IN} = 2.5V to 6V, I _L = 1.5 A V _{DD} = 6V, V _{IN} = 2.5V to 6V, I _L = 1.2 A		105 110	180 210	mΩ mΩ
I _{LOAD}	Load Current	V _{GS} = 2.5 V, V _{DS} = 6 V	3			A
P-Channel MOSFET Switching Times						
V_{supply} = 5.5V, V_{DD} = 5.5V, Logic IN = 5.5V, I_{LOAD} = 1.5A						
t _{don}	Output Turn-On Delay Time	Slew Pin = OPEN = GROUND = V _{DD}		6.20 42 115		μs μs μs
t _{rise}	Output Rise Time	Slew Pin = OPEN = GROUND = V _{DD}		6.75 124 162		μs μs μs
dv/dt	Output Slew Rate	Slew Pin = OPEN = GROUND = V _{DD}		600 41 24		V/ms V/ms V/ms

Typical Characteristics

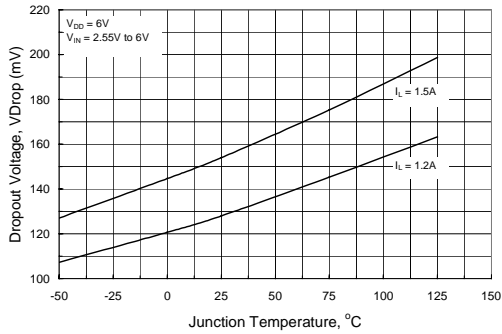


Figure 1. Dropout Voltage vs. Temperature. SLEW = OPEN

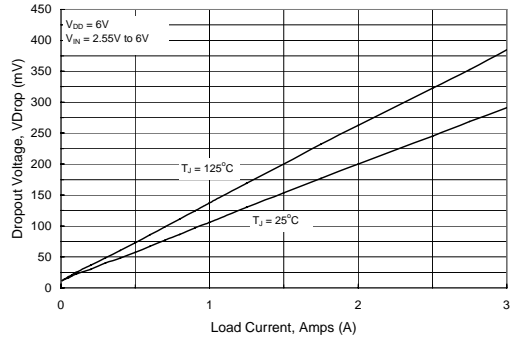


Figure 2. Dropout Voltage vs. Load Current. SLEW = OPEN

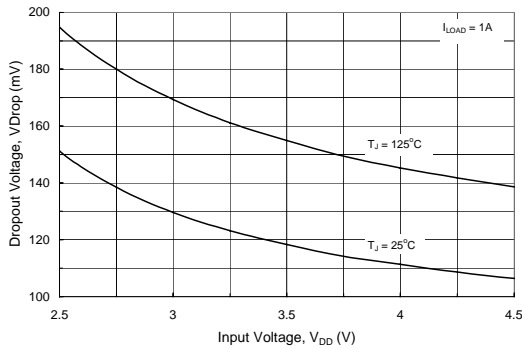


Figure 3. Dropout Voltage vs. Input Voltage. SLEW = OPEN

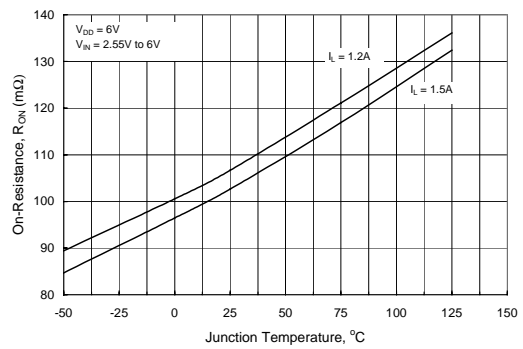


Figure 4. On-Resistance vs. Temperature. SLEW = OPEN

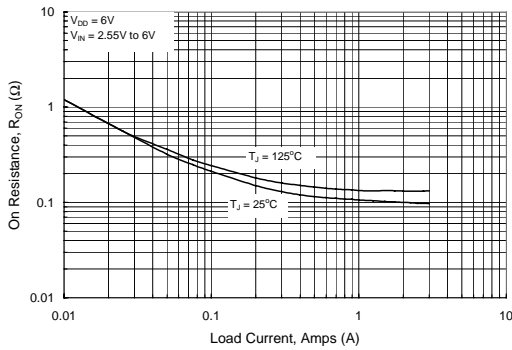


Figure 5. On-Resistance vs. Load Current. SLEW = OPEN

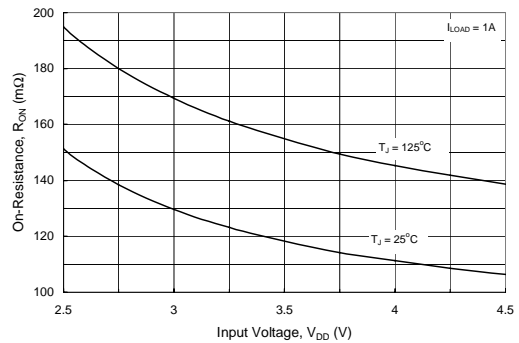


Figure 6. On-Resistance vs. Input Voltage. SLEW = OPEN

Typical Characteristics

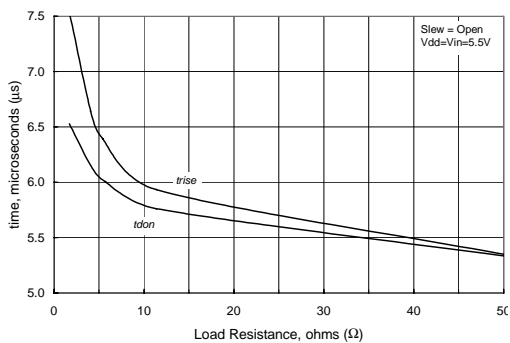


Figure 7. Switching Time vs. Load Resistance. SLEW = OPEN

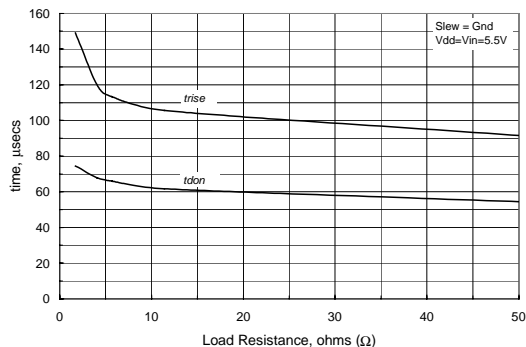


Figure 8. Switching Time vs. Load Resistance. SLEW = GROUND

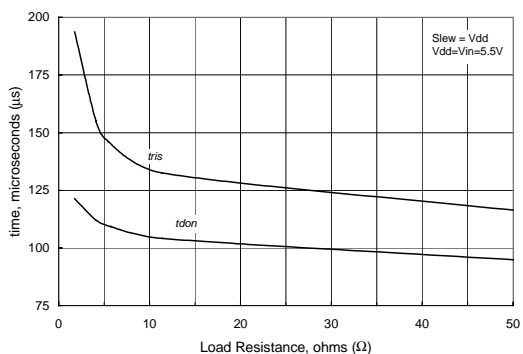


Figure 9. Switching Time vs. Load Resistance. SLEW = V_{DD}

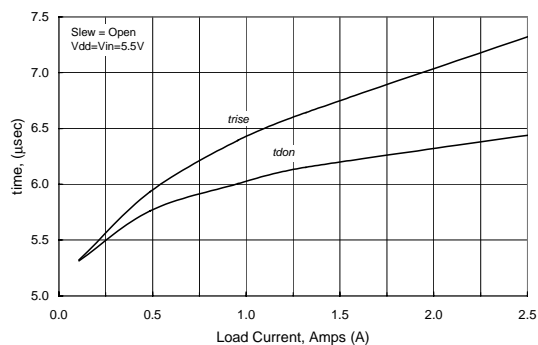


Figure 10. Switching time vs. Load Current. SLEW = OPEN

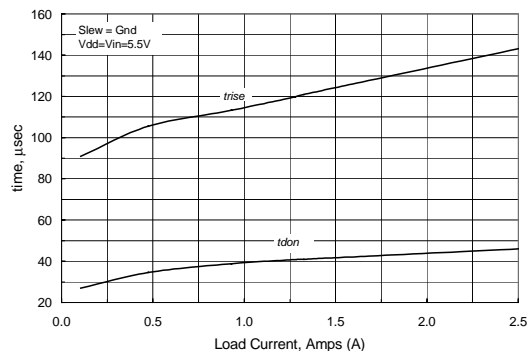


Figure 11. Switching time vs. Load Current. SLEW = GROUND

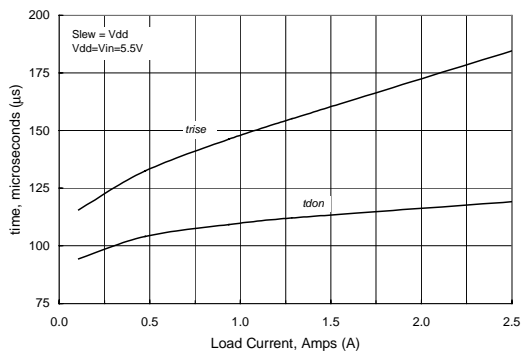


Figure 12. Switching time vs. Load Current. SLEW = V_{DD}

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