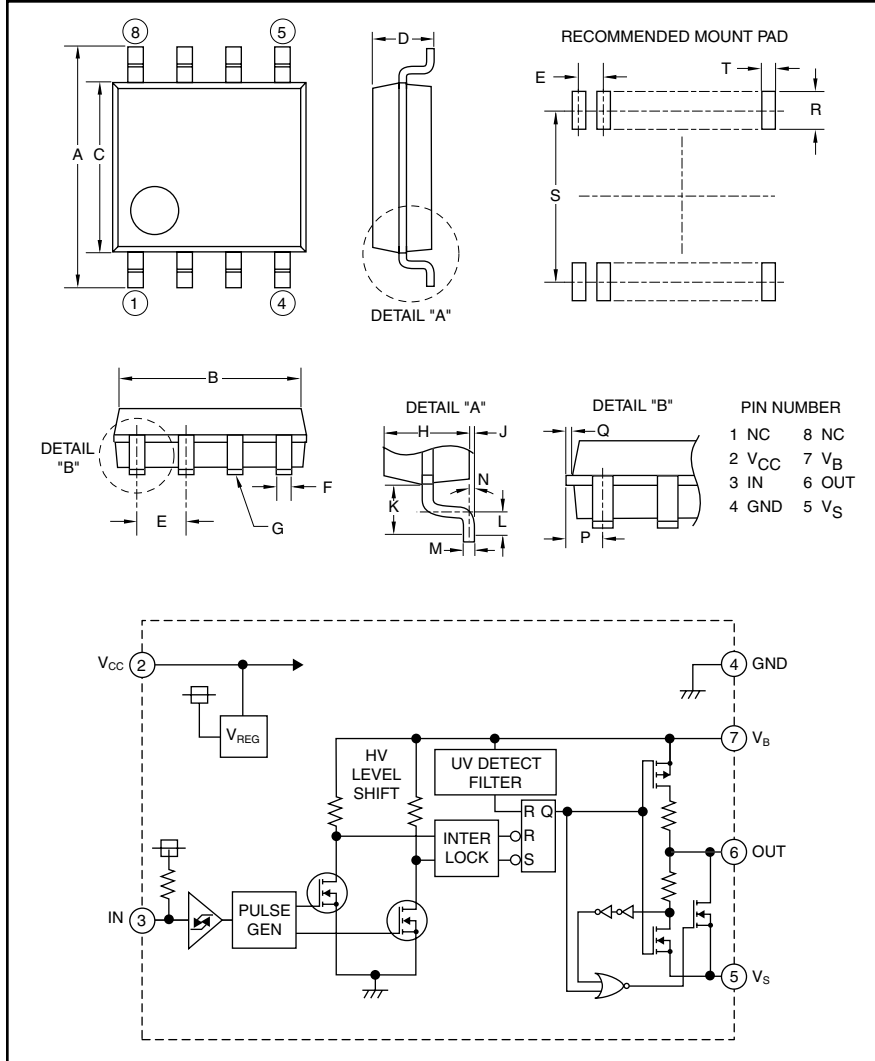


### HVIC

High Voltage Integrated Circuit  
600 Volts/+150mA/-125mA



#### Description:

M81705FP is a high voltage Power MOSFET and IGBT module driver for half-bridge applications.

#### Features:

- Floating Supply Voltage
- Output Current
- Half-Bridge Driver
- SOP-8

#### Applications:

- HID
- PDP
- MOSFET Driver
- IGBT Driver
- Inverter Module Control

#### Ordering Information:

M81705FP is a  $\pm 150/-125$ mA, 600 Volt HVIC, High Voltage Integrated Circuit

#### Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	0.25	6.5
B	0.21	5.2
C	0.18	4.6
D	0.08	1.9
E	0.05	1.27
F	0.02	0.5
G	0.004	0.1
H	0.06	1.5
J	0.002	0.05

Dimensions	Inches	Millimeters
K	0.04	0.9
L	0.03	0.6
M	0.008	0.2
N	10°	10°
P	0.023	0.595
Q	0.03	0.745
R	0.05	1.27
S	0.23	5.72
T	0.76	0.76



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**M81705FP**

**HVIC, High Voltage Integrated Circuit**

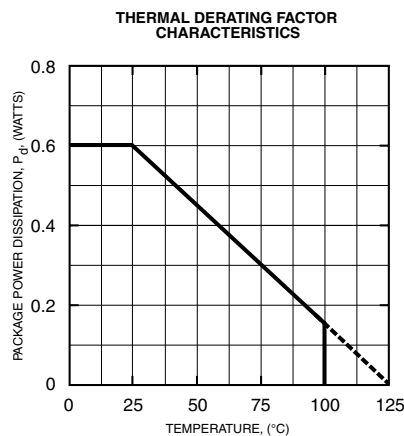
600 Volts/+150mA/-125mA

**Absolute Maximum Ratings,  $T_a = 25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	M81705FP	Units
High Side Floating Supply Absolute Voltage	$V_B$	-0.5 ~ 624	Volts
High Side Floating Supply Offset Voltage	$V_S$	$V_B - 24 \sim V_B + 0.5$	Volts
High Side Floating Supply Voltage ( $V_{BS} = V_B - V_S$ )	$V_{BS}$	-0.5 ~ 24	Volts
High Side Output Voltage	$V_{OUT}$	$V_S - 0.5 \sim V_B + 0.5$	Volts
Low Side Fixed Supply Voltage	$V_{CC}$	-0.5 ~ 24	Volts
Logic Input Voltage	$V_{IN}$	-0.5 ~ 5.5	Volts
Allowable Offset Supply Voltage Transient	$dV_S/dt$	$\pm 50$	V/ns
Package Power Dissipation ( $T_a = 25^\circ\text{C}$ , On Board)	$P_d$	0.60	Watts
Linear Derating Factor ( $T_a > 25^\circ\text{C}$ , On Board)	$K_\theta$	-6.0	mW/ $^\circ\text{C}$
Junction to Case Thermal Resistance	$R_{th(j-c)}$	50	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_j$	-20 ~ 125	$^\circ\text{C}$
Operation Temperature	$T_{opr}$	-20 ~ 100	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ 125	$^\circ\text{C}$

**Recommended Operating Conditions**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
High Side Floating Supply Absolute Voltage	$V_B$		$V_S + 13.5$	—	$V_S + 20$	Volts
High Side Floating Supply Offset Voltage	$V_S$	$V_B > 13.5\text{V}$	-5	—	500	Volts
High Side Floating Supply Voltage	$V_{BS}$	$V_B = V_B - V_S$	13.5	—	20	Volts
Low Side Fixed Supply Voltage	$V_{CC}$		13.5	—	20	Volts
Logic Input Voltage	$V_{IN}$		0	—	5	Volts



**M81705FP**

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600 Volts/+150mA/-125mA

**Electrical Characteristics**

**T<sub>a</sub> = 25°C, V<sub>CC</sub> = V<sub>BS</sub> (= V<sub>B</sub> - V<sub>S</sub>) = 15V unless otherwise specified**

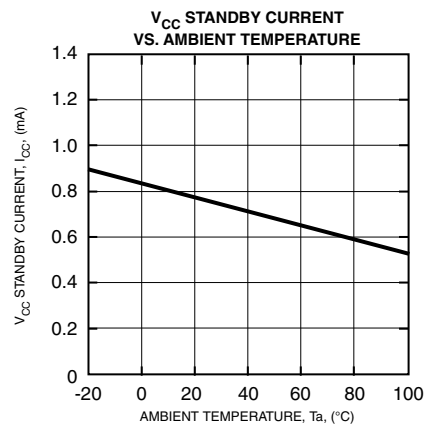
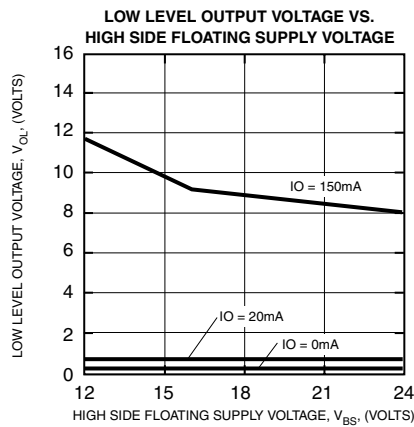
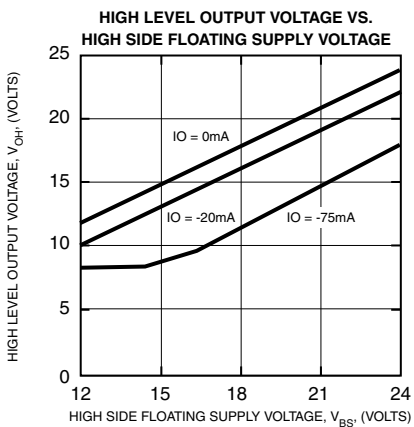
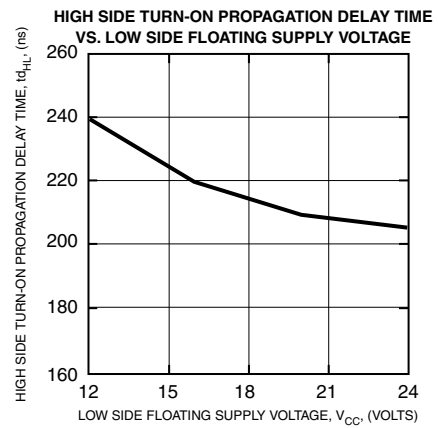
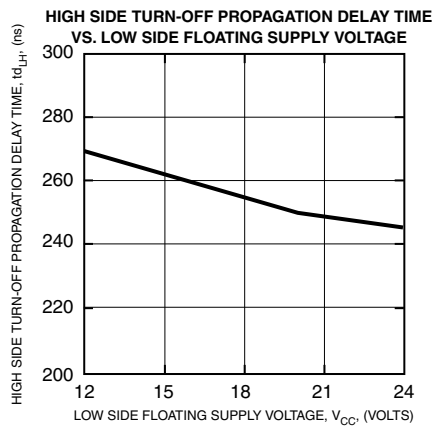
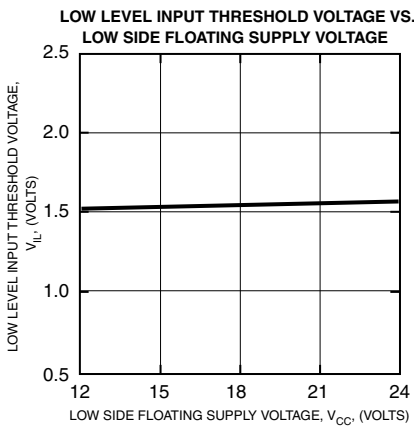
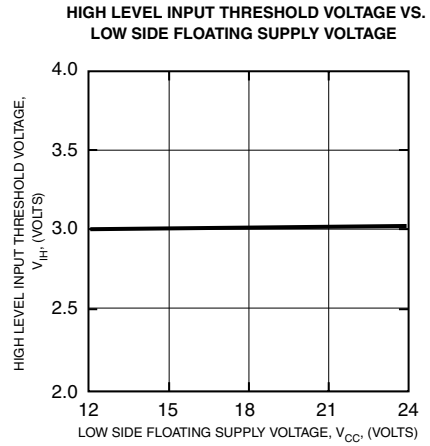
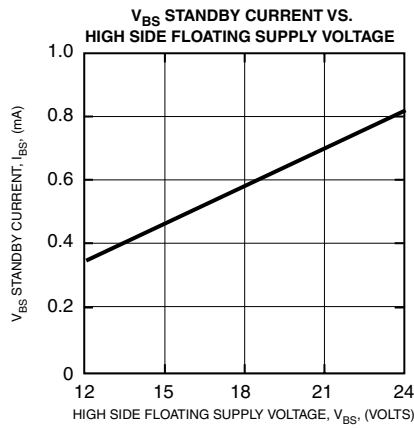
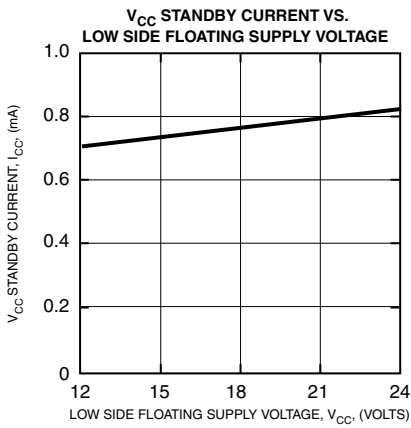
Characteristics	Symbol	Test Conditions	Min.	Typ. *	Max.	Units
Floating Supply Leakage Current	I <sub>FS</sub>	V <sub>B</sub> = V <sub>S</sub> = 600V	—	—	1.0	μA
V <sub>BS</sub> Standby Current	I <sub>BS</sub>		0.25	0.50	0.75	mA
V <sub>CC</sub> Standby Current	I <sub>CC</sub>		0.50	0.75	1.00	mA
High Level Output Voltage	V <sub>OH</sub>	I <sub>O</sub> = 0A	14.9	—	—	Volts
Low Level Output Voltage	V <sub>OL</sub>	I <sub>O</sub> = 0A	—	—	0.1	Volts
High Level Input Threshold Voltage	V <sub>IH</sub>		2.5	3.0	4.0	Volts
Low Level Input Threshold Voltage	V <sub>IL</sub>		0.8	1.5	2.0	Volts
High Level Input Bias Current	I <sub>IH</sub>	V <sub>IN</sub> = 5V	-50	-20	—	μA
Low Level Input Bias Current	I <sub>IL</sub>	V <sub>IN</sub> = 0V	-200	-100	—	μA
V <sub>BS</sub> Supply UV Reset Voltage	V <sub>BSuvr</sub>		10.5	11.5	12.5	Volts
V <sub>BS</sub> Supply UV Hysteresis Voltage	V <sub>BSuvh</sub>		0.2	0.5	0.8	Volts
V <sub>BS</sub> Supply UV Filter Time	t <sub>VBSuv</sub>		—	5	—	μs
Output High Level Short Circuit Pulsed Current	I <sub>OH</sub>	V <sub>O</sub> = 0V, V <sub>IN</sub> = 0V, P <sub>W</sub> < 10μs	—	-125	—	mA
Output Low Level Short Circuit Pulsed Current	I <sub>OL1</sub>	V <sub>O</sub> = 1V, V <sub>IN</sub> = 5V, P <sub>W</sub> < 10μs	—	40	—	mA
Output Low Level Short Circuit Pulsed Current	I <sub>OL2</sub>	V <sub>O</sub> = 15V, V <sub>IN</sub> = 5V, P <sub>W</sub> < 10μs	—	150	—	mA
Output High Level ON Resistance	R <sub>OH</sub>	I <sub>O</sub> = -100mA, R <sub>OH</sub> = (V <sub>OH</sub> - V <sub>O</sub> )/I <sub>O</sub>	—	120	160	Ω
Output Low Level ON Resistance1	R <sub>OL1</sub>	V <sub>O</sub> = 1V, R <sub>OL1</sub> = V <sub>O</sub> /I <sub>O</sub>	—	50	60	Ω
Output Low Level ON Resistance2	R <sub>OL2</sub>	V <sub>O</sub> = 5V, R <sub>OL2</sub> = V <sub>O</sub> /I <sub>O</sub>	—	100	130	Ω
High Side Turn-On Propagation Delay	t <sub>dLH</sub>	C <sub>L</sub> = 1000pF between OUT - V <sub>S</sub>	100	—	500	ns
High Side Turn-Off Propagation Delay	t <sub>dHL</sub>	C <sub>L</sub> = 1000pF between OUT - V <sub>S</sub>	100	—	500	ns
High Side Turn-On Rise Time	t <sub>r</sub>	C <sub>L</sub> = 1000pF between OUT - V <sub>S</sub>	—	220	—	ns
High Side Turn-Off Fall Time	t <sub>f</sub>	C <sub>L</sub> = 1000pF between OUT - V <sub>S</sub>	—	110	—	ns
R <sub>OL1</sub> /R <sub>OL2</sub> Switching Output Voltage	V <sub>Oth</sub>		1.5	2.5	4.0	Volts

\*Typical is not specified.



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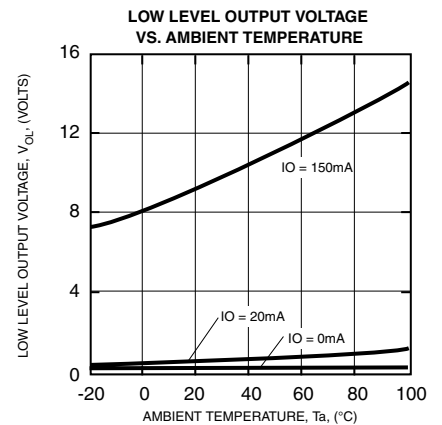
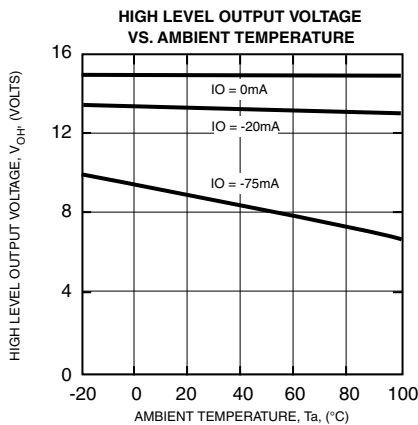
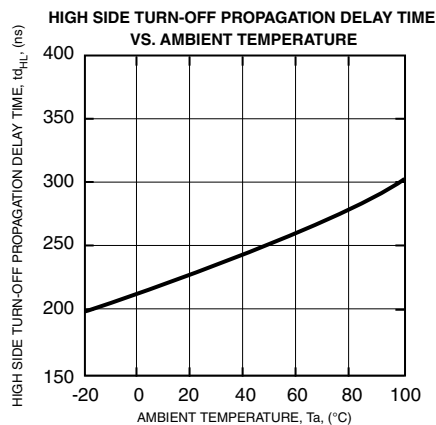
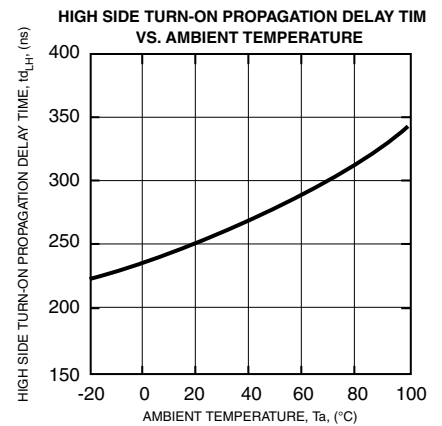
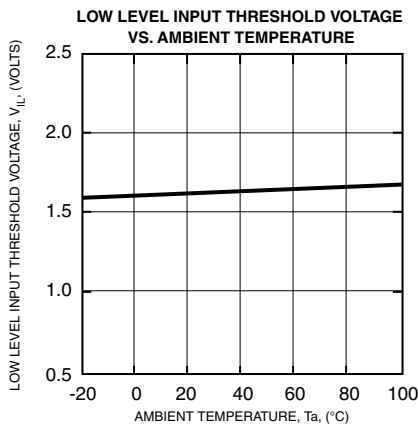
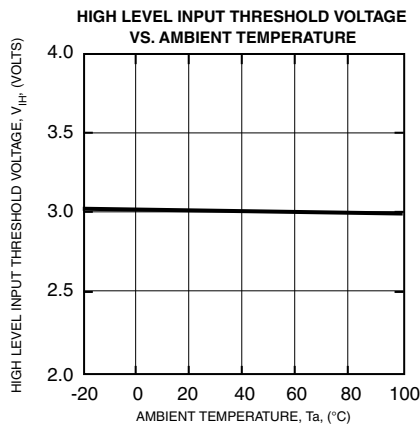
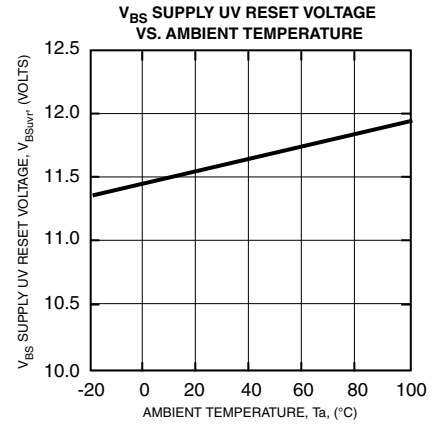
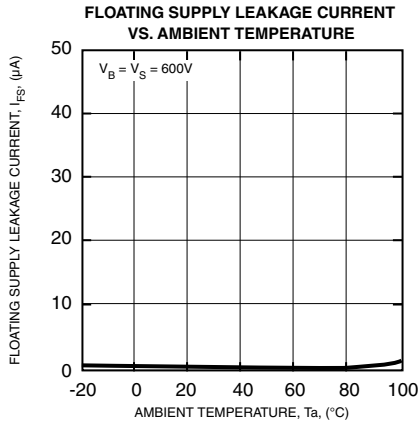
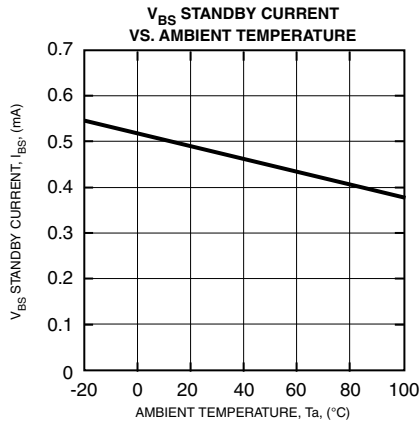




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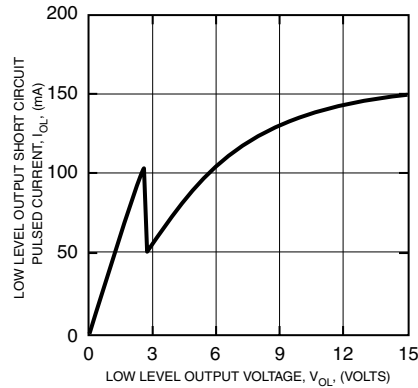


**M81705FP**

**HVIC, High Voltage Integrated Circuit**

600 Volts/+150mA/-125mA

LOW LEVEL OUTPUT SHORT CIRCUIT PULSED CURRENT VS. LOW LEVEL OUTPUT VOLTAGE (R<sub>OL1</sub>/R<sub>OL2</sub> SWITCHING OUTPUT VOLTAGE)



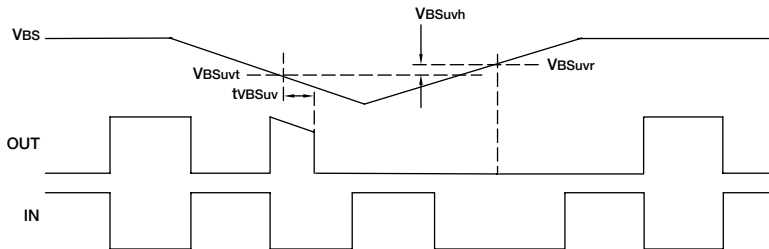
**TIMING DIAGRAM**

**1. Input/Output Timing Diagram**

When input signal "L", then output signal is "H".

**2. V<sub>BS</sub> Supply Under Voltage Lockout Timing Diagram**

When V<sub>BS</sub> supply voltage keeps lower UV trip voltage (V<sub>BSuvt</sub> = V<sub>BSuvr</sub> - V<sub>BSuvh</sub>) for V<sub>BS</sub> supply UV filter time, output signal becomes "L". And then, V<sub>BS</sub> supply voltage is higher UV reset voltage, output signal keeps "L" until next input signal is "L".

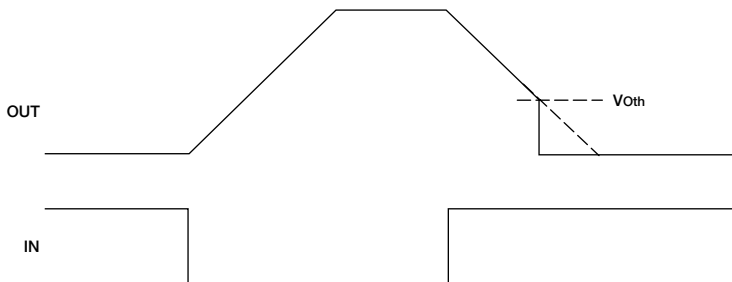


**3. Allowable Supply Voltage Transient**

Firstly, supply V<sub>CC</sub> with voltage. Secondly, supply V<sub>BS</sub> with voltage. In the case of shutting off supply voltage, shut off V<sub>BS</sub> Supply Voltage firstly. Secondly, shut off V<sub>CC</sub> Supply Voltage.

In case V<sub>BS</sub> or V<sub>CC</sub> is started too fast, output signal may be "H".

**4. ROL1 / ROL2 Switching Output Voltage V<sub>Oth</sub>**



As shown by the solid line of the timing chart, the output on-resistance drops at "V<sub>Oth</sub>" level when the output is in the "L" state (output level falls). Below the "V<sub>Oth</sub>" level, the output level falls more steeply.