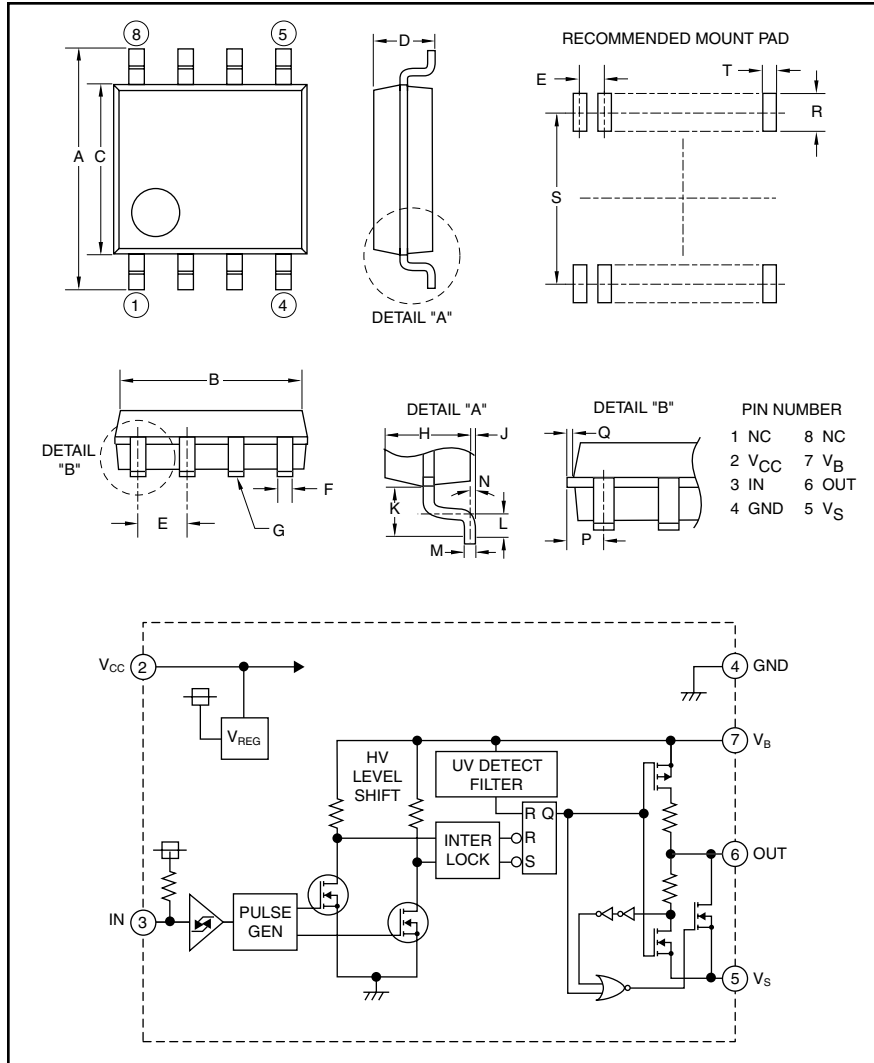


HVIC

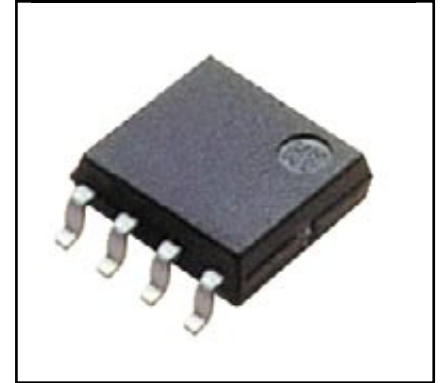
High Voltage Integrated Circuit
600 Volts/+150mA/-125mA



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



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



Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

M81705FP

HVIC, High Voltage Integrated Circuit

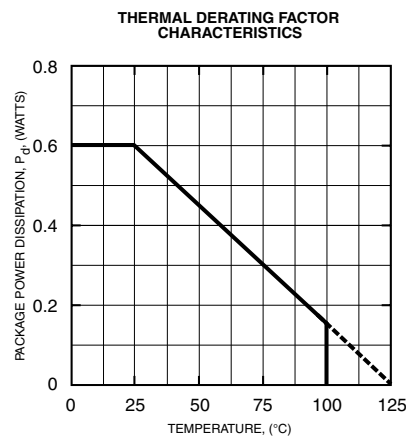
600 Volts/+150mA/-125mA

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	± 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_θ	-6.0	mW/ $^\circ\text{C}$
Junction to Case Thermal Resistance	$R_{th(j-c)}$	50	$^\circ\text{C/W}$
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

HVIC, High Voltage Integrated Circuit

600 Volts/+150mA/-125mA

Electrical Characteristics

$T_a = 25^\circ\text{C}$, $V_{CC} = V_{BS} (= V_B - V_S) = 15\text{V}$ unless otherwise specified

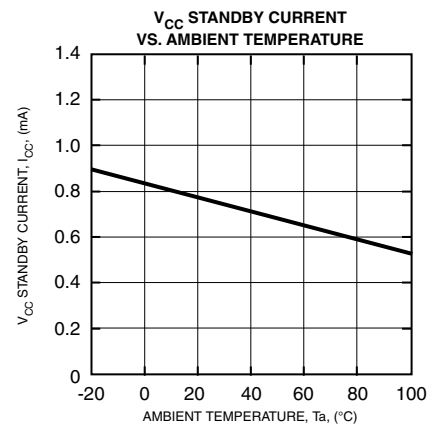
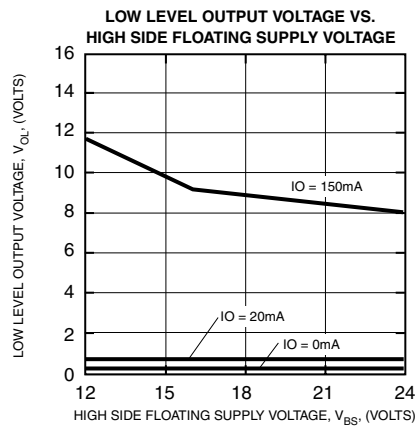
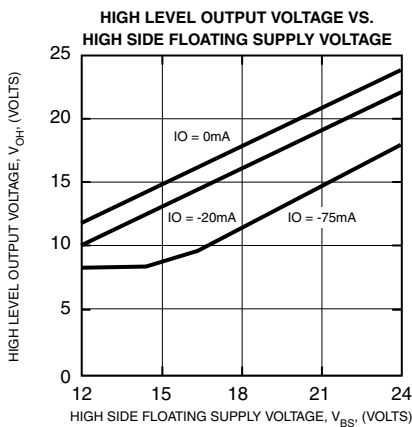
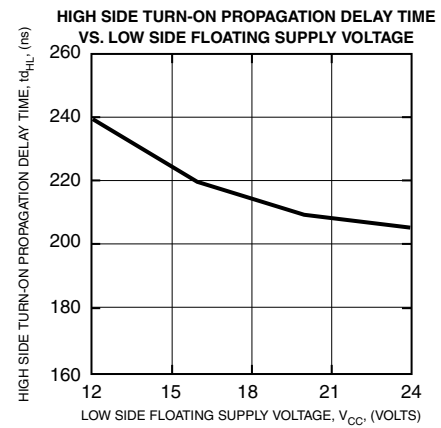
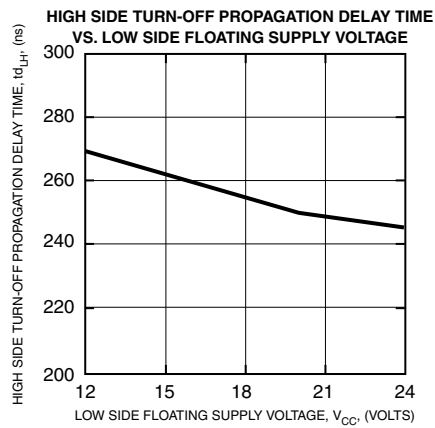
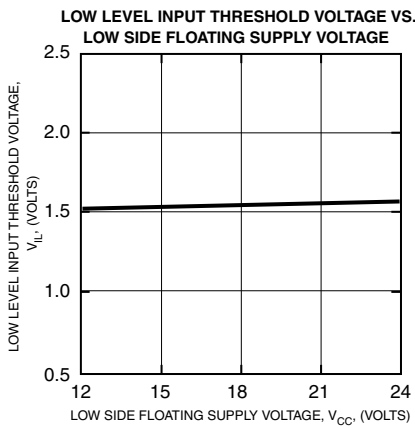
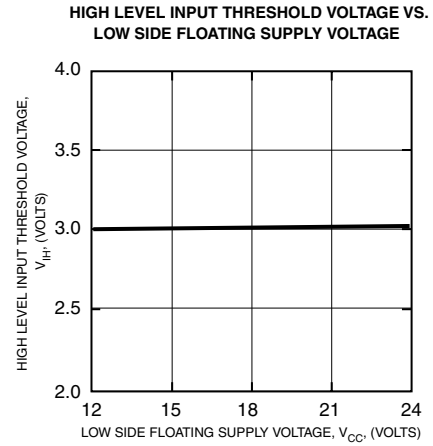
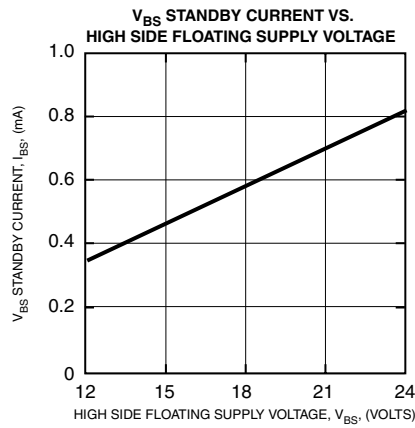
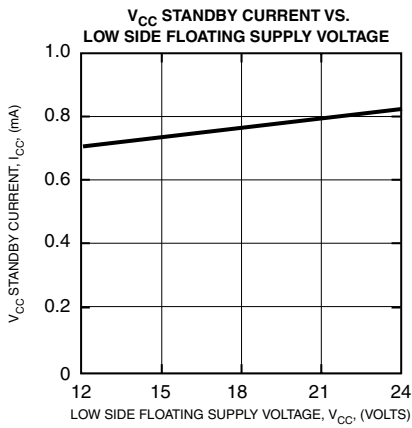
Characteristics	Symbol	Test Conditions	Min.	Typ. *	Max.	Units
Floating Supply Leakage Current	I_{FS}	$V_B = V_S = 600\text{V}$	—	—	1.0	μA
V_{BS} Standby Current	I_{BS}		0.25	0.50	0.75	mA
V_{CC} Standby Current	I_{CC}		0.50	0.75	1.00	mA
High Level Output Voltage	V_{OH}	$I_O = 0\text{A}$	14.9	—	—	Volts
Low Level Output Voltage	V_{OL}	$I_O = 0\text{A}$	—	—	0.1	Volts
High Level Input Threshold Voltage	V_{IH}		2.5	3.0	4.0	Volts
Low Level Input Threshold Voltage	V_{IL}		0.8	1.5	2.0	Volts
High Level Input Bias Current	I_{IH}	$V_{IN} = 5\text{V}$	-50	-20	—	μA
Low Level Input Bias Current	I_{IL}	$V_{IN} = 0\text{V}$	-200	-100	—	μA
V_{BS} Supply UV Reset Voltage	V_{BSuvr}		10.5	11.5	12.5	Volts
V_{BS} Supply UV Hysteresis Voltage	V_{BSuvh}		0.2	0.5	0.8	Volts
V_{BS} Supply UV Filter Time	t_{VBSuv}		—	5	—	μs
Output High Level Short Circuit Pulsed Current	I_{OH}	$V_O = 0\text{V}$, $V_{IN} = 0\text{V}$, $P_W < 10\mu\text{s}$	—	-125	—	mA
Output Low Level Short Circuit Pulsed Current	I_{OL1}	$V_O = 1\text{V}$, $V_{IN} = 5\text{V}$, $P_W < 10\mu\text{s}$	—	40	—	mA
Output Low Level Short Circuit Pulsed Current	I_{OL2}	$V_O = 15\text{V}$, $V_{IN} = 5\text{V}$, $P_W < 10\mu\text{s}$	—	150	—	mA
Output High Level ON Resistance	R_{OH}	$I_O = -100\text{mA}$, $R_{OH} = (V_{OH} - V_O)/I_O$	—	120	160	Ω
Output Low Level ON Resistance1	R_{OL1}	$V_O = 1\text{V}$, $R_{OL1} = V_O/I_O$	—	50	60	Ω
Output Low Level ON Resistance2	R_{OL2}	$V_O = 5\text{V}$, $R_{OL2} = V_O/I_O$	—	100	130	Ω
High Side Turn-On Propagation Delay	t_{dLH}	$C_L = 1000\text{pF}$ between OUT – V_S	100	—	500	ns
High Side Turn-Off Propagation Delay	t_{dHL}	$C_L = 1000\text{pF}$ between OUT – V_S	100	—	500	ns
High Side Turn-On Rise Time	t_r	$C_L = 1000\text{pF}$ between OUT – V_S	—	220	—	ns
High Side Turn-Off Fall Time	t_f	$C_L = 1000\text{pF}$ between OUT – V_S	—	110	—	ns
R_{OL1}/R_{OL2} Switching Output Voltage	V_{Oth}		1.5	2.5	4.0	Volts

*Typical is not specified.

M81705FP

HVIC, High Voltage Integrated Circuit

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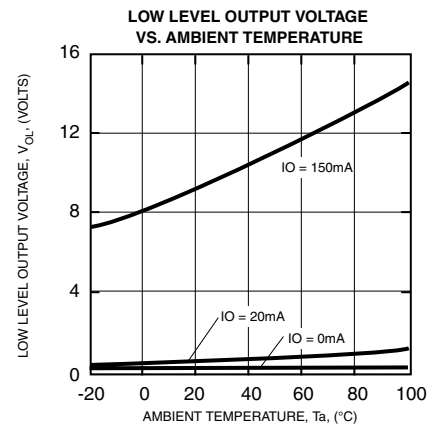
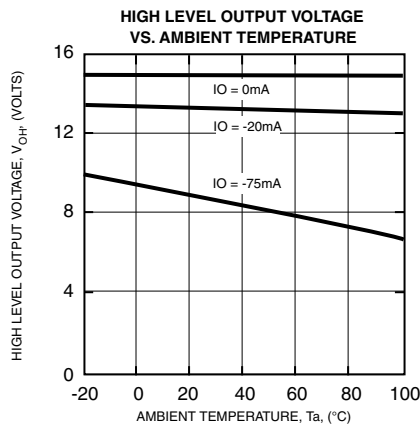
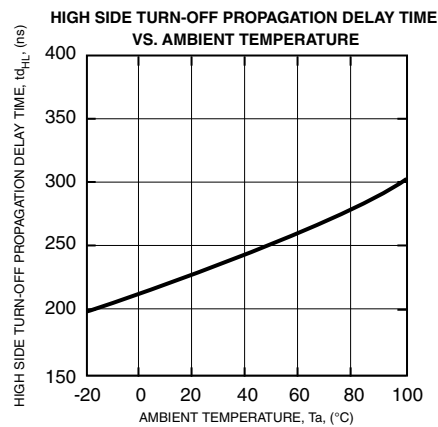
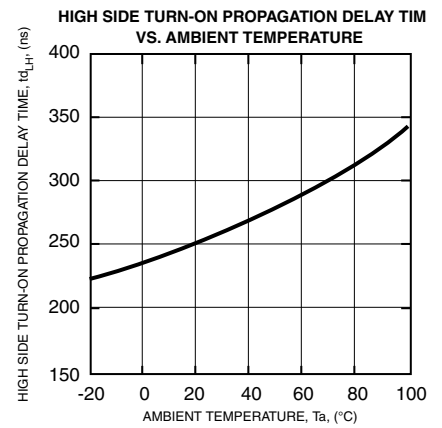
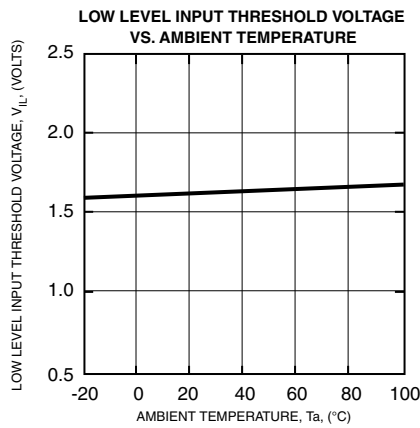
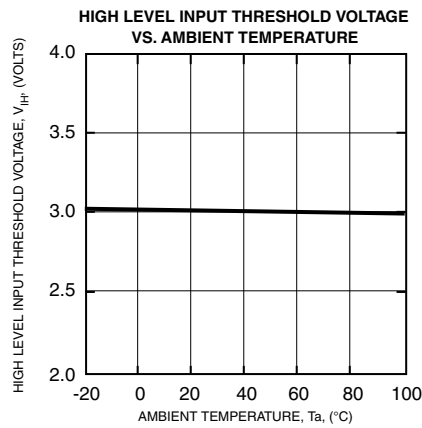
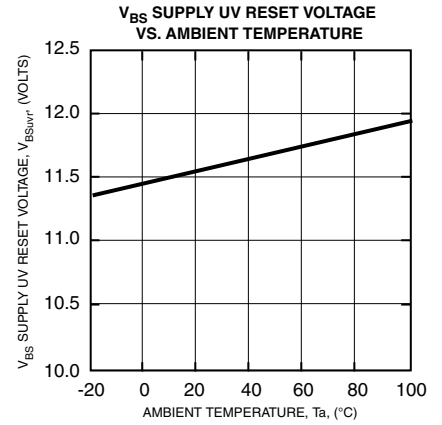
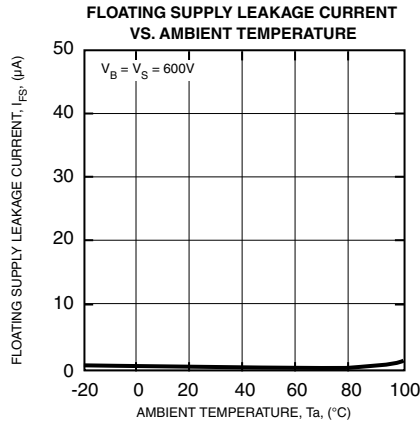
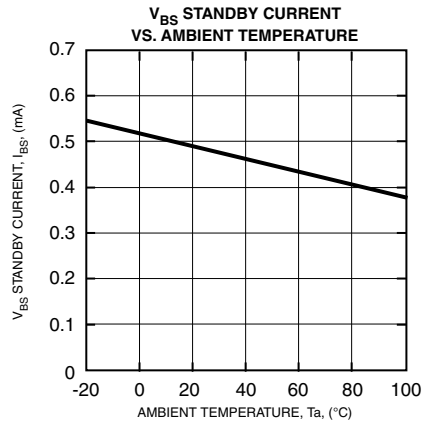




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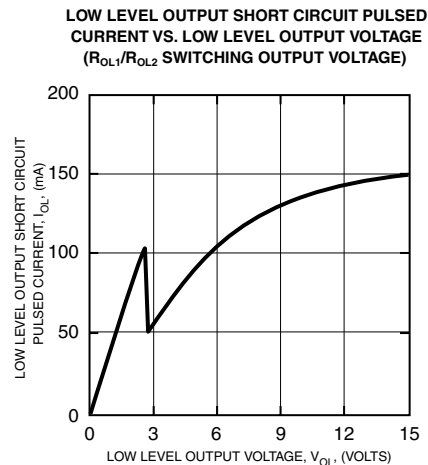
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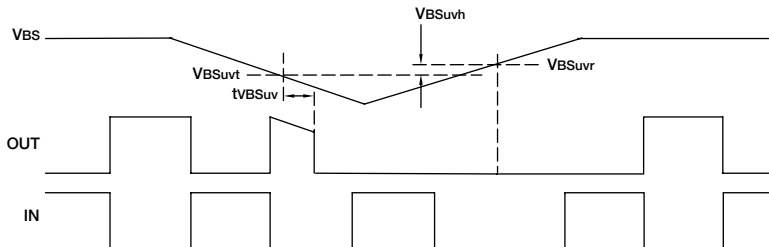
TIMING DIAGRAM

1. Input/Output Timing Diagram

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

2. VBS Supply Under Voltage Lockout Timing Diagram

When V_{BS} supply voltage keeps lower UV trip voltage ($V_{BSuvt} = V_{BSuvr} - V_{BSuvh}$) for V_{BS} supply UV filter time, output signal becomes "L". And then, V_{BS} supply voltage is higher UV reset voltage, output signal keeps "L" until next input signal is "L".

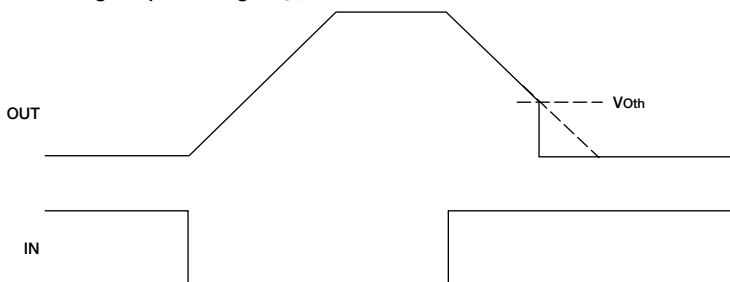


3. Allowable Supply Voltage Transient

Firstly, supply V_{CC} with voltage. Secondly, supply V_{BS} with voltage. In the case of shutting off supply voltage, shut off V_{BS} Supply Voltage firstly. Secondly, shut off V_{CC} Supply Voltage.

In case V_{BS} or V_{CC} is started too fast, output signal may be "H".

4. ROL1 / ROL2 Switching Output Voltage V_{Oth}



As shown by the solid line of the timing chart, the output on-resistance drops at " V_{Oth} " level when the output is in the "L" state (output level falls). Below the " V_{Oth} " level, the output level falls more steeply.