1-channel Switching Gate Driver

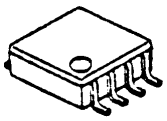
■ GENERAL DESCRIPTION

The NJW4841 is a High Speed Switching Gate Driver that is applicable 2A peak current.

The NJW4841 features are Withstand voltage of 40V, recommended operating voltage range: 4V to 20V and Fast switching time

The NJW4841 is suitable for DC / AC Motor Drive, Switching Power Supply and DC / DC Converter Applications.

■ PACKAGE OUTLINE



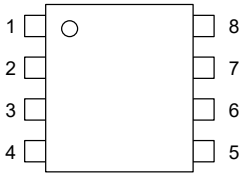
NJW4841R
(MSOP8 (VSP8))*

■ FEATURES

- Output Peak Current ±2A (peak)
- Operating Voltage Range 4V to 20V
- High Speed Switching tr/tf=25ns/20ns(typ.) at C_L=2200pF
- Corresponding with Logic Voltage Operation 3V/5V
- Built-in Thermal Shut Down
- Under Voltage Lockout
- Package MSOP8 (VSP8)*

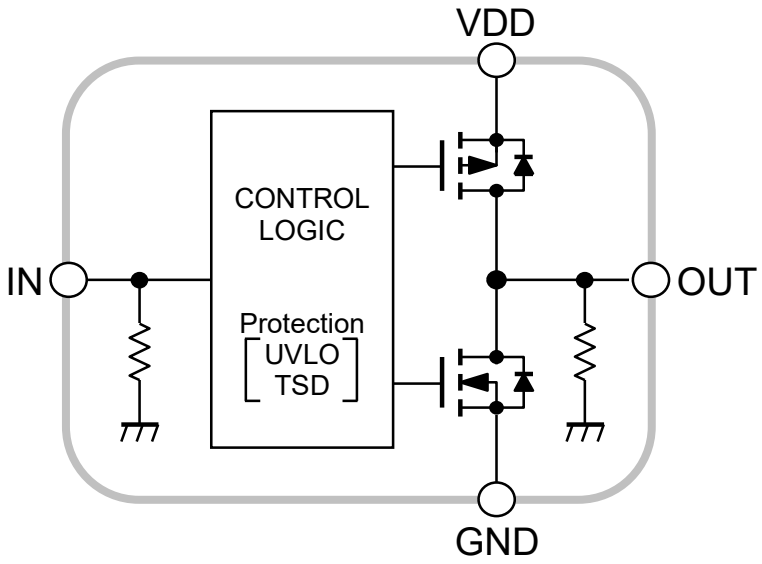
* MEET JEDEC MO-187-DA

■ PIN CONFIGURATION



1. GND	5. GND
2. GND	6. GND
3. GND	7. OUT
4. IN	8. VDD

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT	REMARK
Supply Voltage	V_{DD}	+40	V	VDD-GND Pin
Input Voltage	V_{IN}	–0.3 to +6	V	IN-GND Pin
Power Dissipation	P_D	720 (*1) 1100 (*2)	mW	–
Junction Temperature	T_j	–40 to +150	°C	–
Operating Temperature	T_{opr}	–40 to +85	°C	–
Storage Temperature	T_{stg}	–50 to +150	°C	–

(*1): Mounted on glass epoxy board. (76.2×114.3×1.6mm: based on EIA/JDEC standard, 2Layers)

(*2): Mounted on glass epoxy board. (76.2×114.3×1.6mm: based on EIA/JDEC standard, 4Layers),
internal Cu area: 74.2×74.2mm

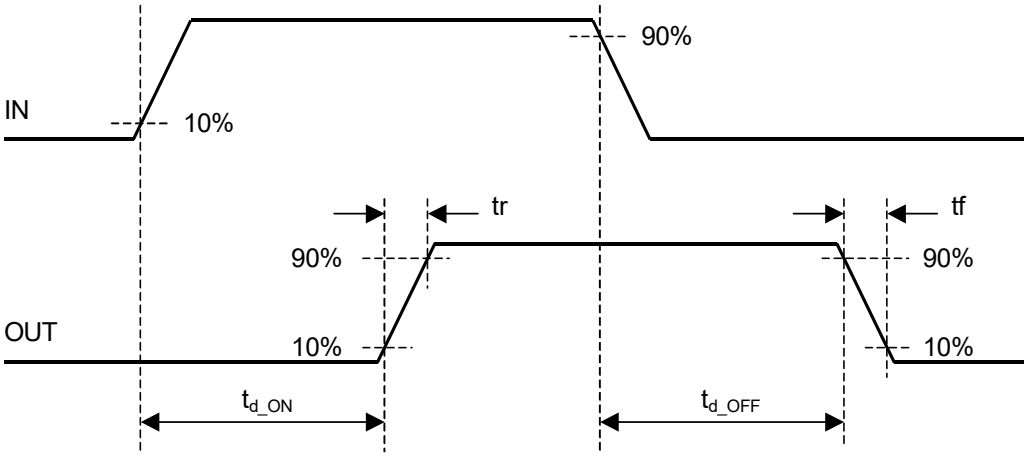
■ RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Operating Voltage	V_{DD}	4.0	–	20	V	VDD-GND Pin
Input Voltage	V_{IN}	0	–	5.5	V	IN-GND Pin

■ ELECTRICAL CHARACTERISTICS (Unless otherwise noted, V_{DD}=16V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
General						
Quiescent Current	I_{Q1}	V_{IN}=5V	–	1.5	2.5	mA
	I_{Q2}	V_{IN}=0V	–	1.3	2.3	mA
Output Block						
Output Peak Current	I_{PK1}	Pulse Width ≤10μs, V_{OUT}=0V	–	2	–	A
	I_{PK2}	Pulse Width ≤10μs, V_{OUT}=16V	–	2	–	A
Output ON Resistance (High-Side / Low-Side)	R_{DSH}	$I_{O-SOURCE}$=100mA	–	2.1	3.9	Ω
	R_{DSL}	I_{O-SINK}=100mA	–	1.5	2.8	Ω
Output Pull Down Resistance	R_{OUTPD}		60	100	140	kΩ
Input Circuit Block						
IN Pin High Voltage	V_{IHIN}		2.0	–	5.5	V
IN Pin Low Voltage	V_{ILIN}		0	–	0.8	V
Input Pull Down Resistance	R_{INPD}		60	100	140	kΩ
UVLO Block						
UVLO Release Voltage	V_{UVLO2}		2.8	3.3	3.8	V
UVLO Operating Voltage	V_{UVLO1}		2.5	3.0	3.5	V
UVLO Hysteresis Voltage	ΔV_{UVLO}	$V_{UVLO2} - V_{UVLO1}$	–	0.3	–	V
Output Rise/Fall characteristics						
Output Rise Time	tr	C_L=2200pF, V_{IN}=0 to 5V	–	25	–	ns
Output Fall Time	tf	C_L=2200pF, V_{IN}=5 to 0V	–	20	–	ns
Rise Delay Time	t_{d_ON}	C_L=2200pF, V_{IN}=0 to 5V	–	40	–	ns
Fall Delay Time	t_{d_OFF}	C_L=2200pF, V_{IN}=5 to 0V	–	45	–	ns

■ TIMING CHART



■ PROTECTION CIRCUIT OPERATION

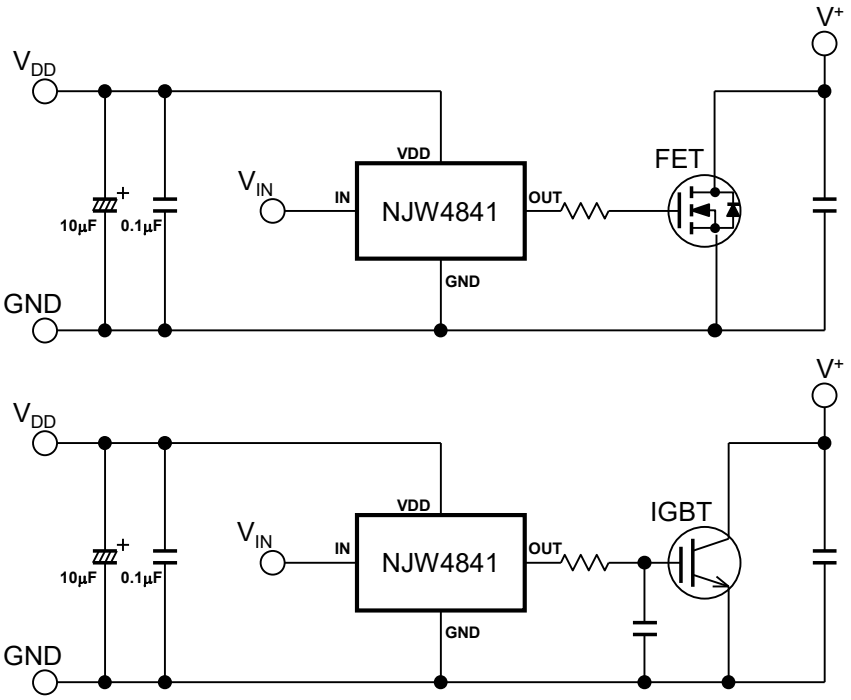
•Under Voltage Lockout (UVLO)

The VDD pin has UVLO function for malfunction prevention at low voltage condition.
When the VDD voltage is less than UVLO Operating Voltage, the output pin is turned off.
When the VDD voltage rises to UVLO Release Voltage, normal operation resumes.

•Thermal Shut Down (TSD)

When the junction temperature reaches to 170ºC typ., the output pin is turned off.
When the junction temperature falls to 160ºC typ., normal operation resumes.

■ TYPICAL APPLICATION



■ APPLICATION TIPS

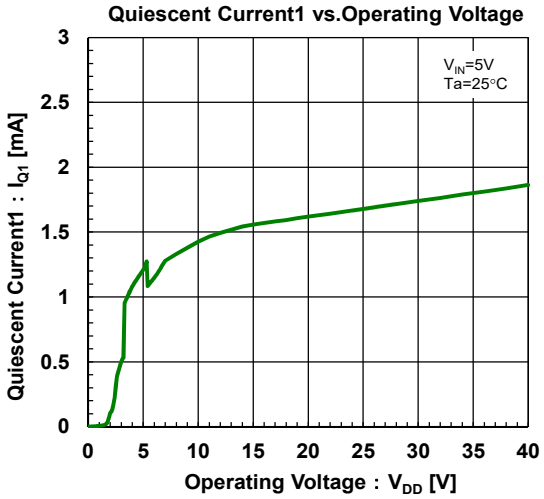
In the application that does a high-speed switching of NJW4841, because the current flow corresponds to the input frequency, the substrate (PCB) layout becomes an important.

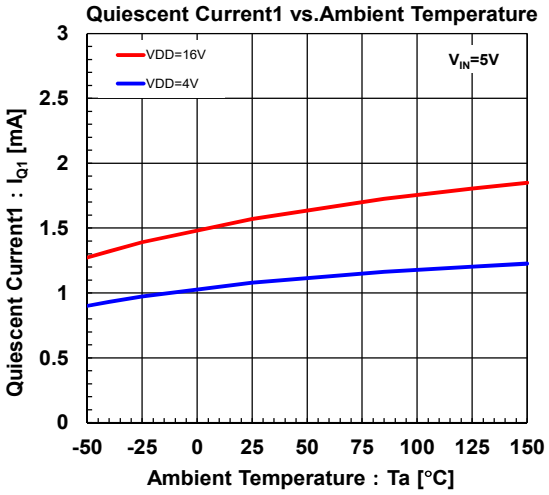
NJW4841 is driving the High-side/Low-side SW gate with high speed to reduce switching losses. The transient voltage is generated by parasitic inductance and a high-speed current change of high side and low side SW.

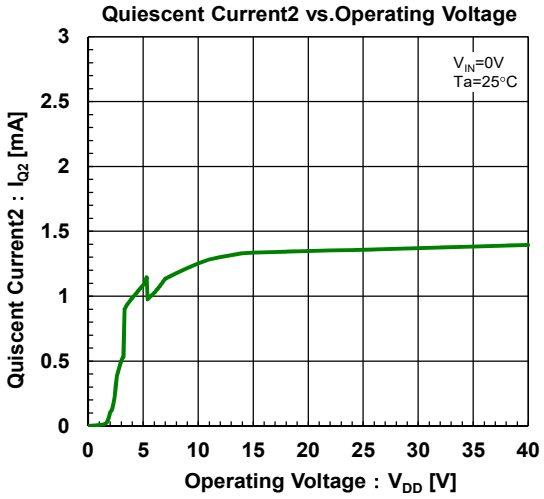
You should attempt the transient voltage decrease by making a current loop area minimize as much as possible. Therefore, you should make a current flowing line thick and short as much as possible.

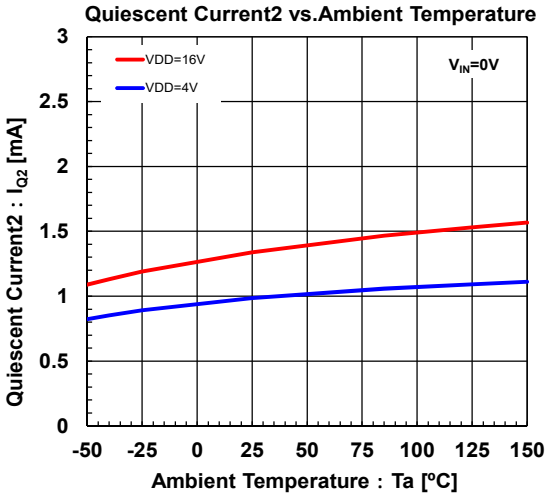
You should insert a bypass capacitor between the VDD pin and the GND pin to prevent malfunction by transient voltage and/or exceed maximum input voltage rating. The recommended bypass capacitor is low ESR and fine high frequency characteristic (NJR recommends 0.1μF or more).An aluminum electrolytic capacitor is recommended for smoothing capacitor (NJR recommends 10μF or more). However, you should use large capacitor by sufficient evaluation (assessment) due to load condition and/or application use environment. (There is a possibility that the supply voltage rises by inductive kickback when the supply current of the inductive load is large.) The bypass capacitors should be connected as near as possible to the VDD pin.

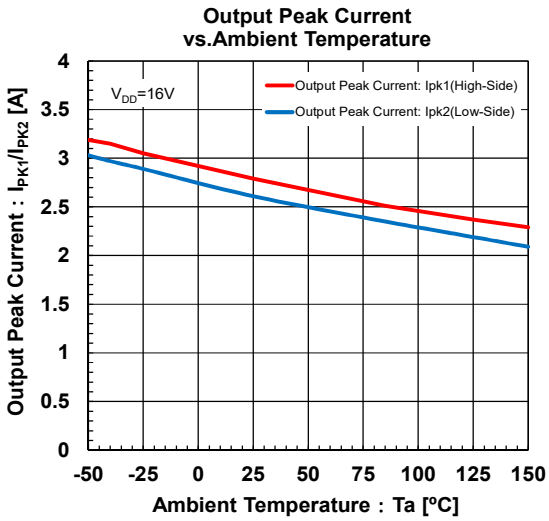
■ TYPICAL CHARACTERISTICS



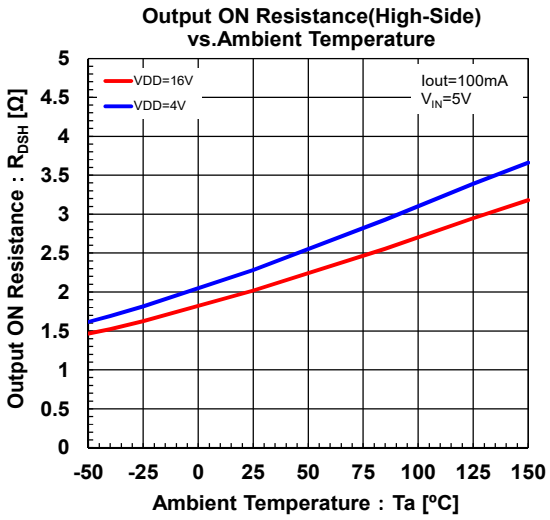


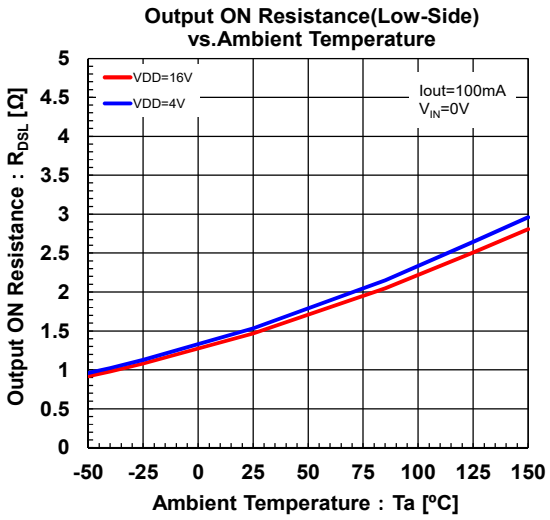


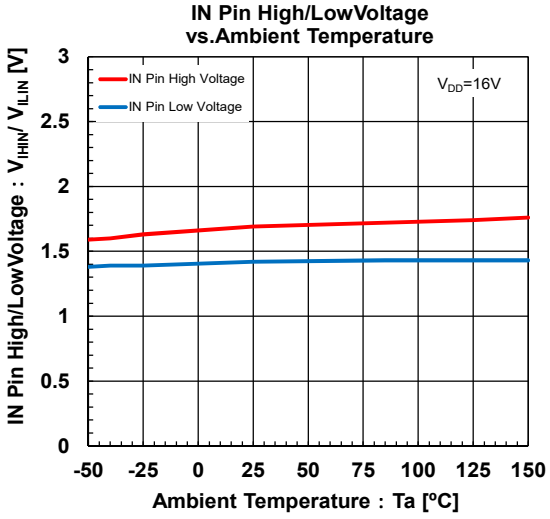


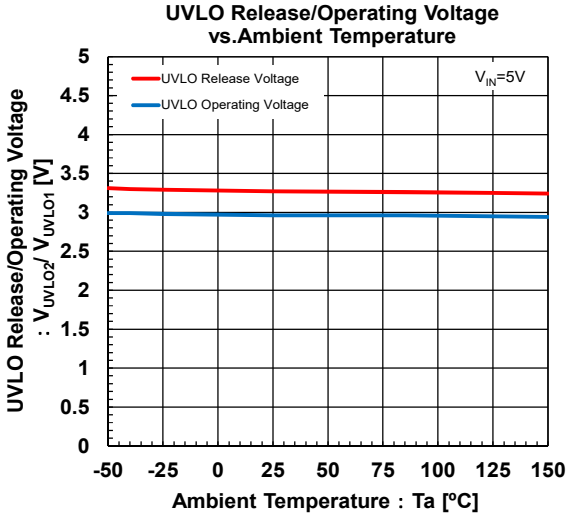


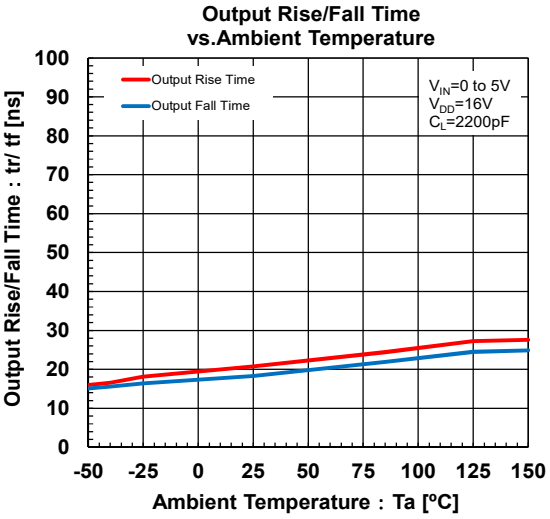
■ TYPICAL CHARACTERISTICS

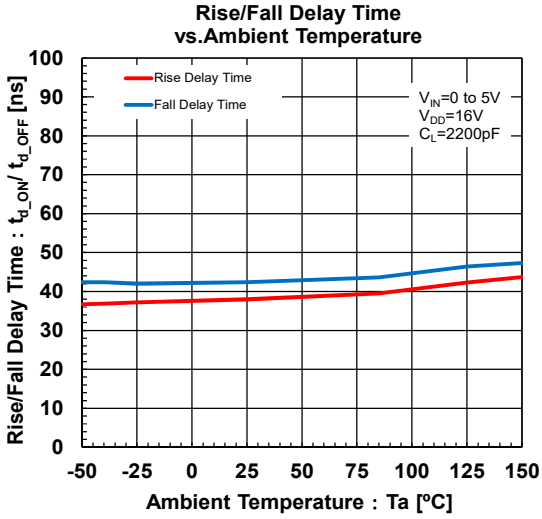












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