

Dual Half Bridge Driver

■ GENERAL DESCRIPTION

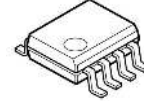
The NJW4810A is a general-purpose dual half bridge driver capable of supplying 1A current. Output duty=100% can be operated by high side P channel MOSFET. It can use as a full bridge driver by connecting VDD1 and VDD2.

The internal gate driver drives high-side/low-side power MOSFET; therefore, it is able to fast switching.

Additionally, it has protection features such as over current protection and thermal shutdown. And in the case of failure, it can output a fault flag.

It is suitable for power switching applications of DSP/micro controller.

■ PACKAGE OUTLINE

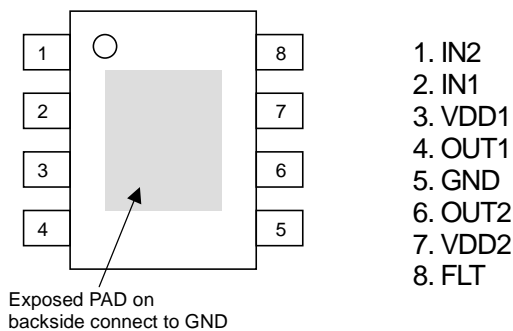


NJW4810AGM1

■ FEATURES

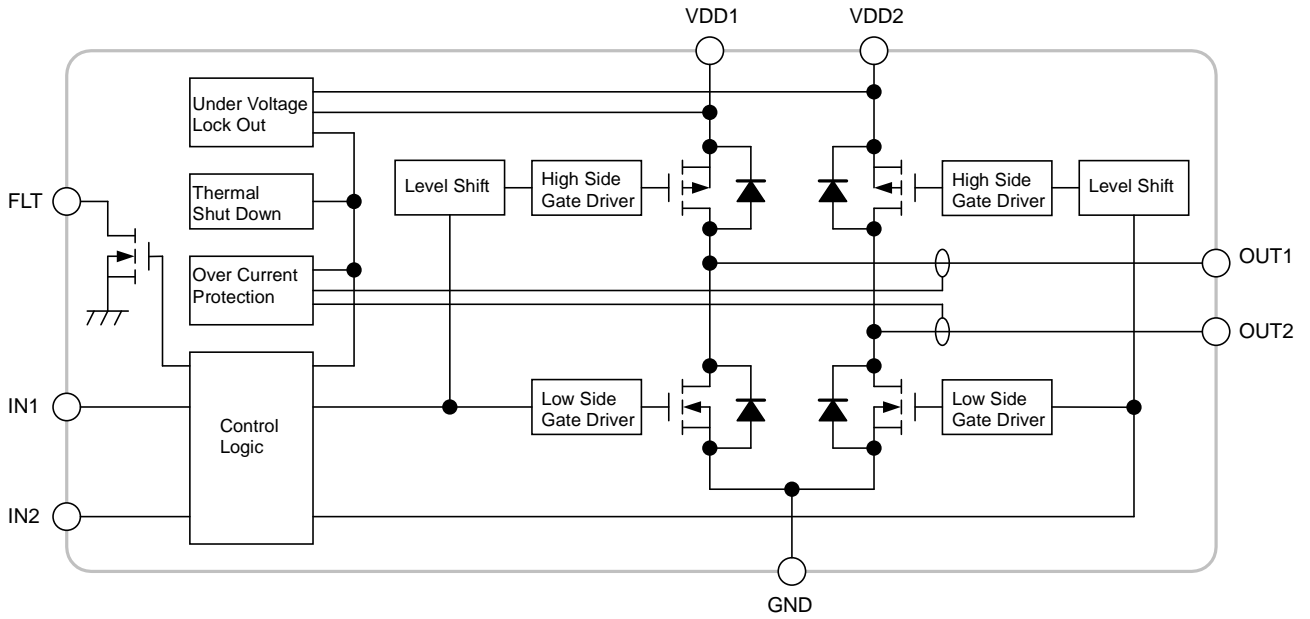
- Output Switch Current $\pm 1A$
- Operating Voltage 8.0V to 40V
- Thermal Shut Down
- Over Current Protection
- Under Voltage Lockouts
- Fault Indicator Output
- High Heat Radiation Package
- Package Outline HSOP8

■ PIN CONFIGURATION



NJW4810A

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT	REMARKS
Supply Voltage	V ⁺¹ , V ⁺²	+45	V	VDD1-GND pin VDD2-GND pin
Input Voltage	V _{IN}	-0.3 to +6	V	IN1-GND pin IN2-GND pin
FLT pin Voltage	V _{FLT}	-0.3 to +6	V	FLT-GND pin
FLT pin Current	I _{FLT}	1	mA	
Power Dissipation	P _D	0.9 (*1) 3.1 (*2)	W	-
Operating Junction Temperature	T _j	-40 to +150	°C	-
Operating Temperature Range	T _{opr}	-40 to +85	°C	-
Storage Temperature Range	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)

(For 4Layers: Applying 74.2 × 74.2mm inner Cu area and a thermal via hole to a board based on JEDEC standard JESD51-5)

■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
Operating Voltage	V ⁺¹ V ⁺²	8	-	40	V	VDD1-GND pin VDD2-GND pin
Output Switch Current	I _{OM}	0	-	1	A	OUT1, OUT2 pin
Input Voltage	V _{IN}	0	-	5.5	V	IN1-GND pin, IN2-GND pin
FLT pin Voltage	V _{FLT}	0	-	5.5	V	FLT-GND pin

NJW4810A

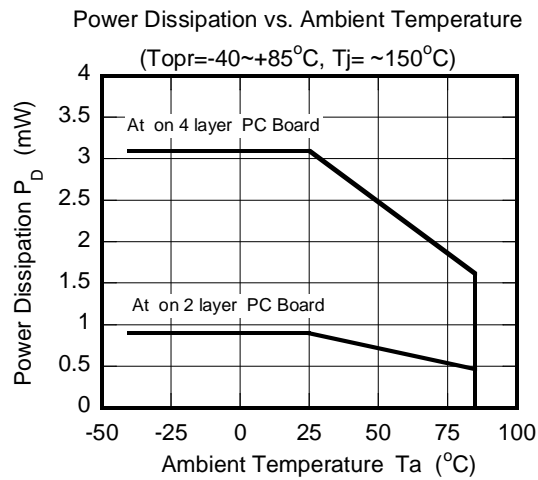
■ THERMAL CHARACTERISTICS

PARAMETER	SYMBOL	THERMAL RESISTANCE	UNIT
Junction-to-Ambient Temperature	θ_{ja}	139 (*1)	°C/W
		40 (*2)	
Junction-to-Case	ψ_{jt}	19 (*1)	°C/W
		3.7 (*2)	

(*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)

(For 4Layers: Applying 74.2 × 74.2mm inner Cu area and a thermal via hall to a board based on JEDEC standard JESD51-5)



■ ELECTRICAL CHARACTERISTICS

(Unless otherwise noted, $V^+1=V^+2=12V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
General Characteristics							
Quiescent Current 1 (Operating)	I_{Q1}	$V_{IN1}=V_{IN2}=0V$	V^+1	–	0.9	1.7	mA
			V^+2	–	0.3	0.8	
Quiescent Current 2 (Switching)	I_{Q2}	$V_{IN1}=V_{IN2}=0V$ to $3V$, $f_{IN1}=f_{IN2}=750kHz$ antiphase 50% Duty Cycle	V^+1	–	3.7	5.5	mA
			V^+2	–	3.2	5.0	

Output Block

High-side SW ON Resistance	R_{DSH}	$I_{OSOURCE}=600mA$	–	1.0	1.8	Ω
Low-side SW ON Resistance	R_{DSL}	$I_{OSINK}=600mA$	–	0.75	1.3	Ω
Over Current Limit (*3)	I_{LIMIT}	High-side and Low-side	1	2	3	A
Over Current Limit Protection Time (*3)	t_{OCP}	High-side and Low-side $R_{FLT}=47k\Omega$, $V_{FLT}=5V$	15	30	80	ms
Output Rise Time	t_r	$V_{IN1}=V_{IN2}=0$ to $3V$	–	3	–	ns
Output Fall Time	t_f	$V_{IN1}=V_{IN2}=3$ to $0V$	–	5	–	ns
Dead Time	Dt	$V_{IN1}=V_{IN2}=0$ to $3V$	–	50	–	ns
Output Rise Delay Time	t_{d_ON}	$V_{IN1}=V_{IN2}=0$ to $3V$	–	120	–	ns
Output Fall Delay Time	t_{d_OFF}	$V_{IN1}=V_{IN2}=3$ to $0V$	–	120	–	ns
High-side SW Leak Current at OFF state	$I_{OLEAKOUTH}$	$V^+1=V^+2=5.5V$, $V_{OUT1}=V_{OUT2}=0V$	–	–	1	μA
Low-side SW Leak Current at OFF state	$I_{OLEAKOUTL}$	$V^+1=V^+2=5.5V$, $V_{OUT1}=V_{OUT2}=5.5V$	–	–	1	μA
OUT pin – VDD pin Potential Difference	V_{PDOV}	$I_{ORH}=1A$, $V^+1=V^+2=5.5V$	–	0.9	1.5	V
GND pin – OUT pin Potential Difference	V_{PDGO}	$I_{ORL}=1A$, $V^+1=V^+2=5.5V$	–	0.9	1.5	V

(*3): The overcurrent detection time may take $1\mu s$ (max). During this time overcurrent protection circuit does not detect an overcurrent. Therefore, you should control the pulse width and frequency of IN1/IN2 pin to prevent a continuous over-current in short-term.

Input Circuit Block

Input pin High Voltage	V_{IHIN}		2.0	–	5.5	V
Input pin Low Voltage	V_{ILIN}		0	–	0.8	V
Input pin sink current	I_{IIN}	$V_{IN1}=V_{IN2}=5.5V$	–	0.01	1	μA

Under Voltage Lockout (UVLO) Block

UVLO Release Voltage (*4)	V_{UVLO2}	$V^+1=V^+2=L \rightarrow H$	6.3	7.0	7.7	V
UVLO Operation Voltage (*4)	V_{UVLO1}	$V^+1=V^+2=H \rightarrow L$	6.0	6.7	7.4	V
UVLO Hysteresis Voltage	V_{UVLO}	$V_{UVLO2}-V_{UVLO1}$	–	0.3	–	V

(*4): UVLO operates at each line (V^+1 and V^+2)

Fault Function (FLT pin)

Low Level Output Voltage	V_{LFLT}	$I_{FLT}=500\mu A$	–	0.25	0.5	V
OFF Leak Current	$I_{OLEAKFLT}$	$V^+1=V^+2=5.5V$, $V_{FLT}=5.5V$	–	–	1	μA

NJW4810A

■ PIN OPERATION TABLE

INPUT			OUTPUT					Mode
IN1	IN2	VDD1, VDD2	FLT	OUT1 High-side SW	OUT1 Low-side SW	OUT2 High-side SW	OUT2 Low-side SW	
L	L	V^{+1} and $V^{+2} \geq V_{UVLO2}$	ON	OFF	ON	OFF	ON	Normal
L	H	V^{+1} and $V^{+2} \geq V_{UVLO2}$	ON	OFF	ON	ON	OFF	Normal
H	L	V^{+1} and $V^{+2} \geq V_{UVLO2}$	ON	ON	OFF	OFF	ON	Normal
H	H	V^{+1} and $V^{+2} \geq V_{UVLO2}$	ON	ON	OFF	ON	OFF	Normal
		V^{+1} or $V^{+2} < V_{UVLO1}$	OFF	OFF	OFF	OFF	OFF	UVLO

INPUT			OUTPUT					Mode
Tj	I _{OUT1}	I _{OUT2}	FLT	OUT1 High-side SW	OUT1 Low-side SW	OUT2 High-side SW	OUT2 Low-side SW	
Tj > 150°C			OFF	OFF	OFF	OFF	OFF	TSD (*5)
	I _{OUT1} ≥ I _{LIMIT}		OFF	OFF	OFF	OFF	OFF	OCP (*6)
		I _{OUT2} ≥ I _{LIMIT}	OFF	OFF	OFF	OFF	OFF	OCP (*6)

(*5): After the TSD function operation, when the junction temperature becomes less than 125°C, NJW4810A returns to normal mode.

(*6): NJW4810A returns to normal mode after the elapse of a certain period of time after the OCP function operating.

■ TIMING CHART

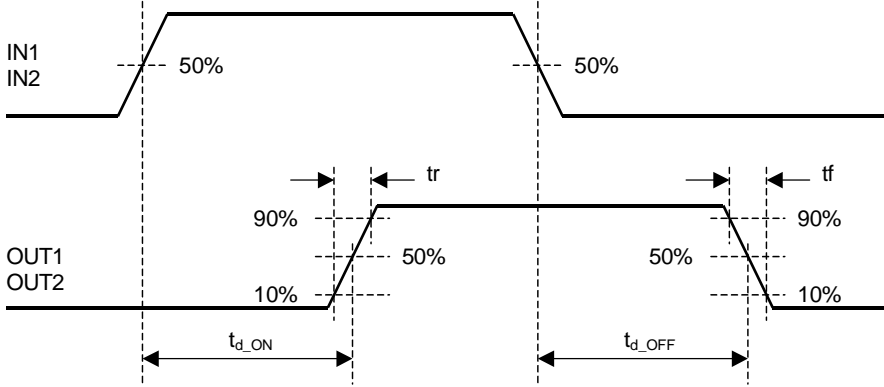


Fig1. Output Rise/Fall Time, PWM Rise/Fall Delay Time

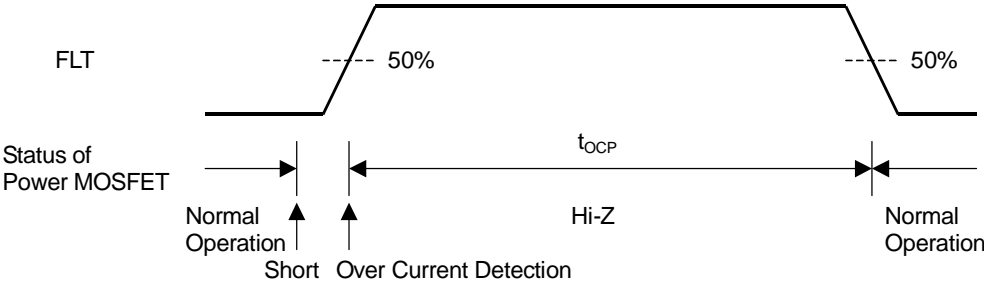


Fig2. Over Current Limit Protection Time

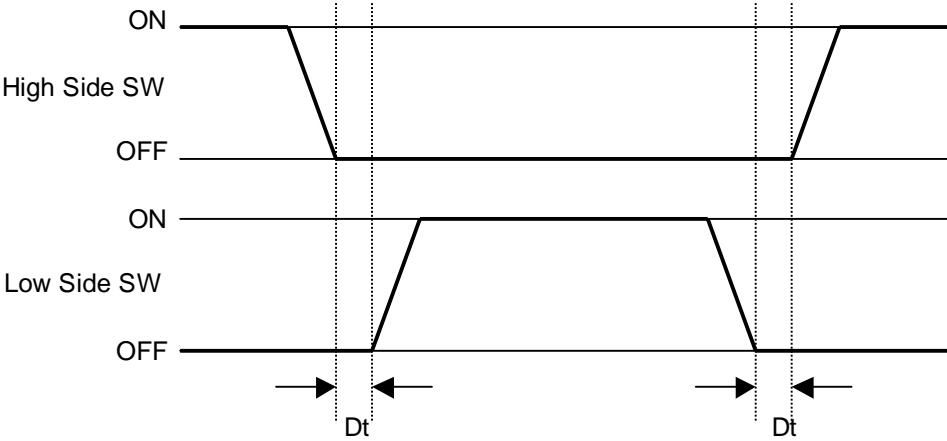
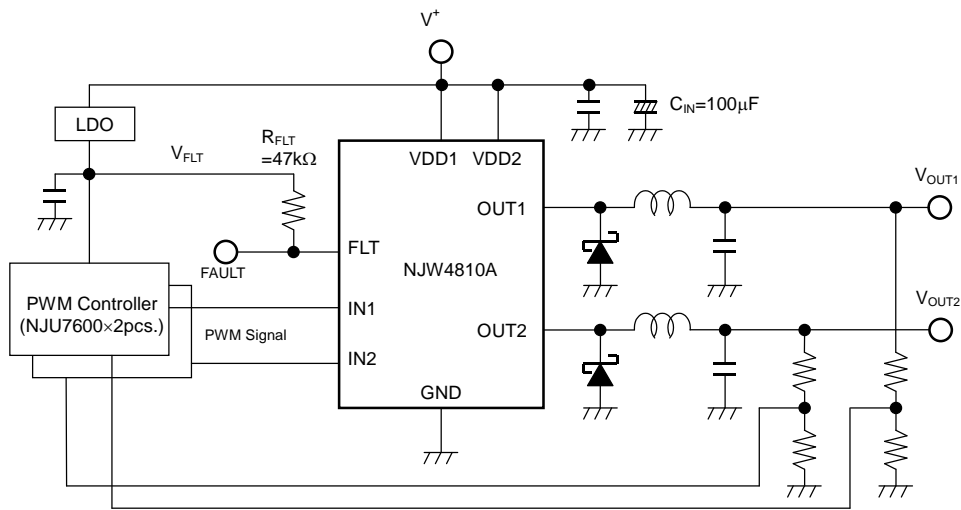


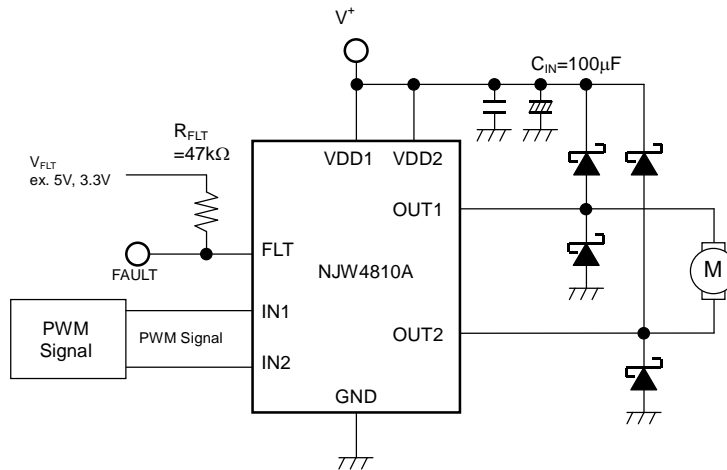
Fig3. SW Operation and Dead Time

NJW4810A

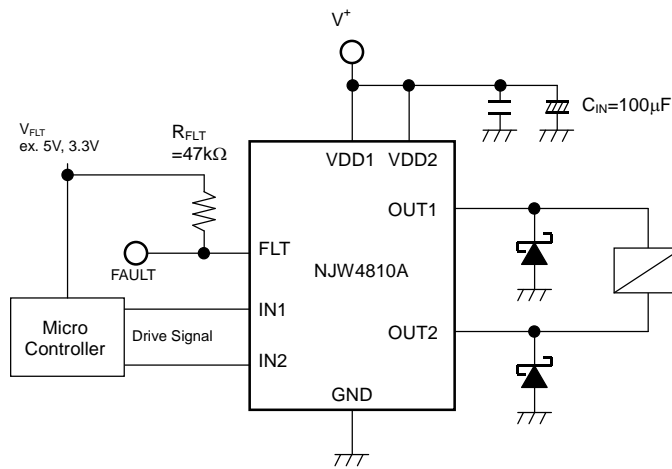
■ TYPICAL APPLICATIONS



2ch Synchronous PWM step down switching regulator

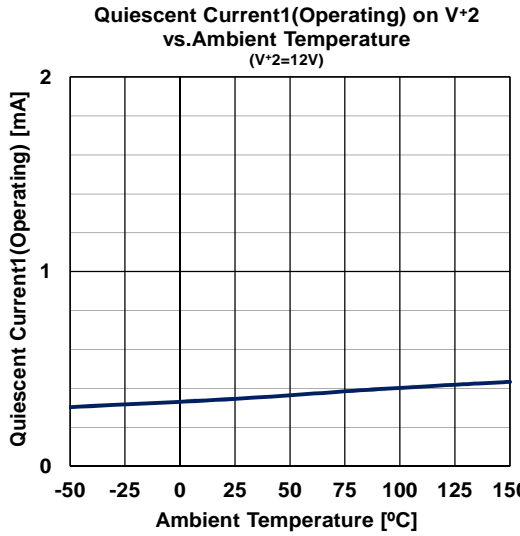
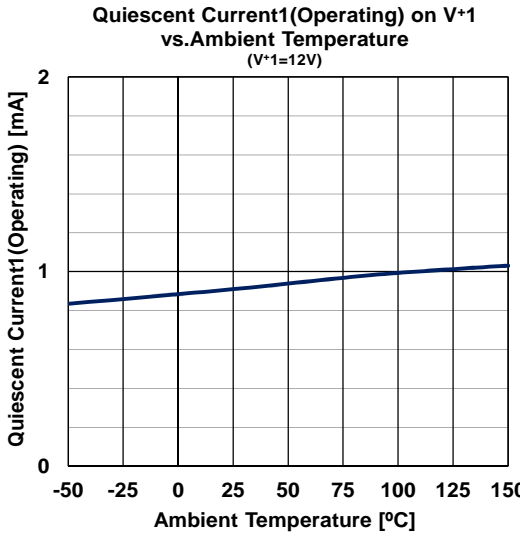
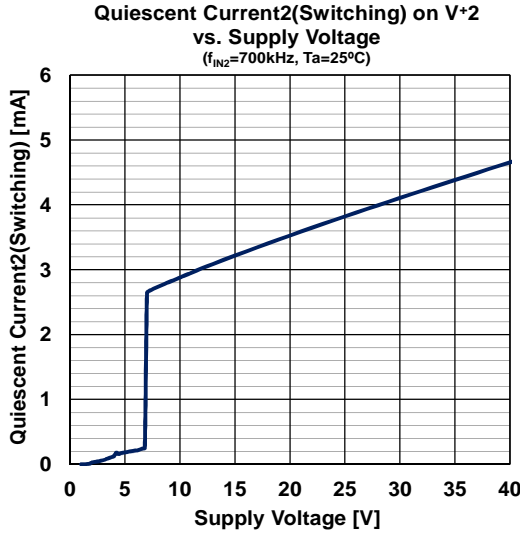
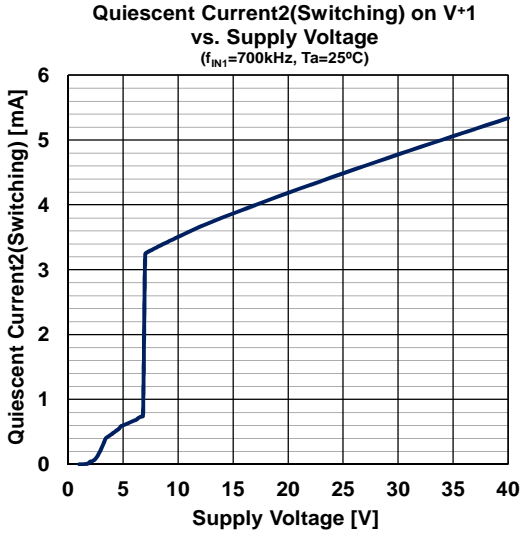
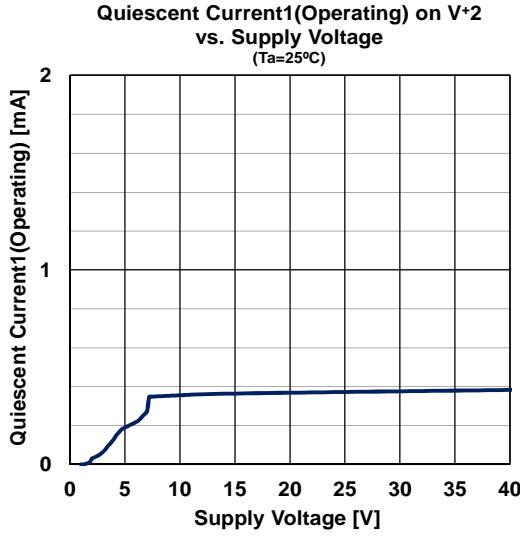
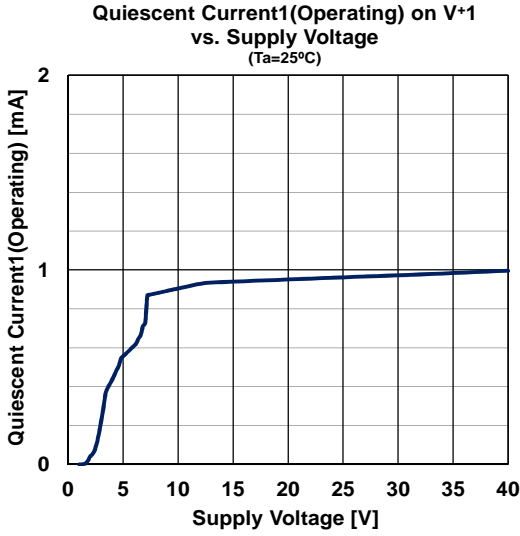


Full bridge motor driver

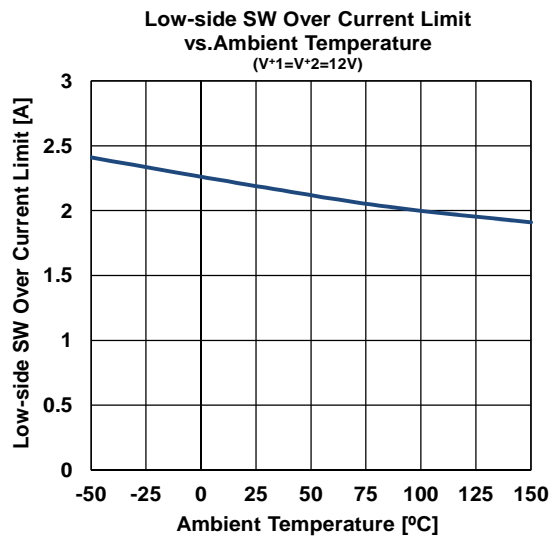
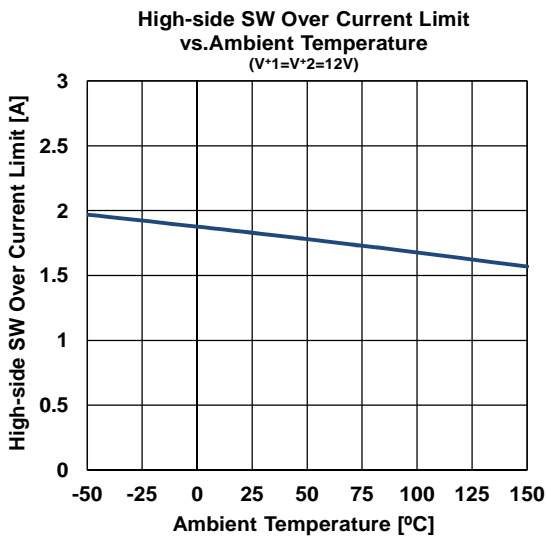
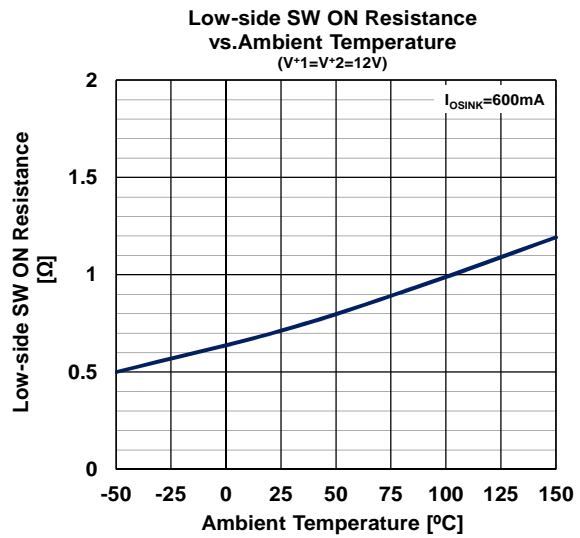
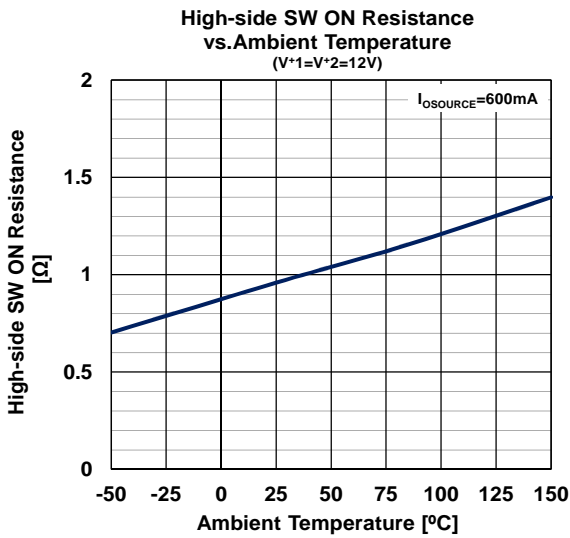
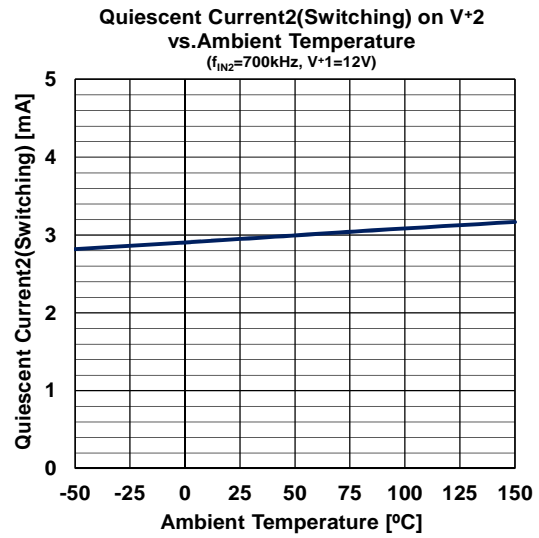
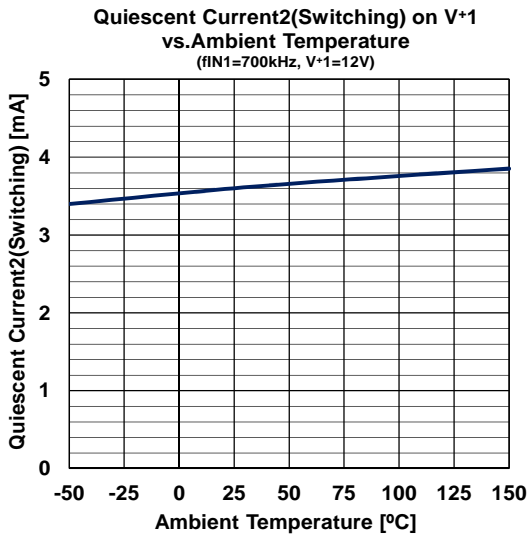


Latch type solenoid driver

■ CHARACTERISTICS

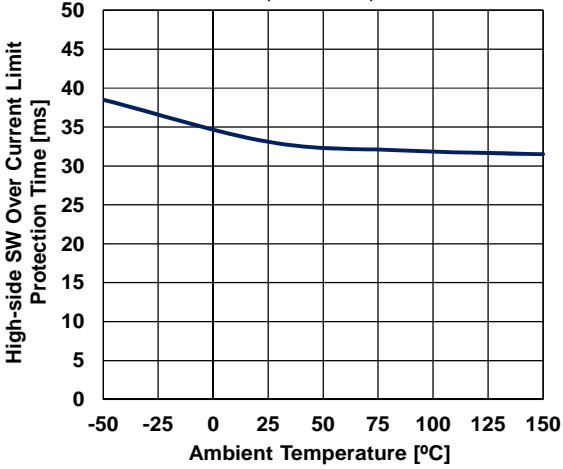


CHARACTERISTICS

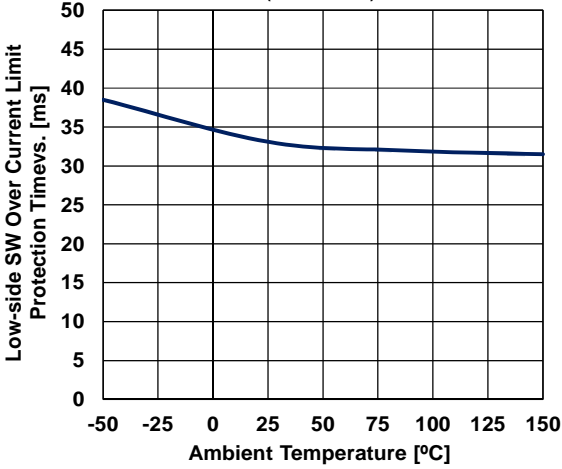


■ CHARACTERISTICS

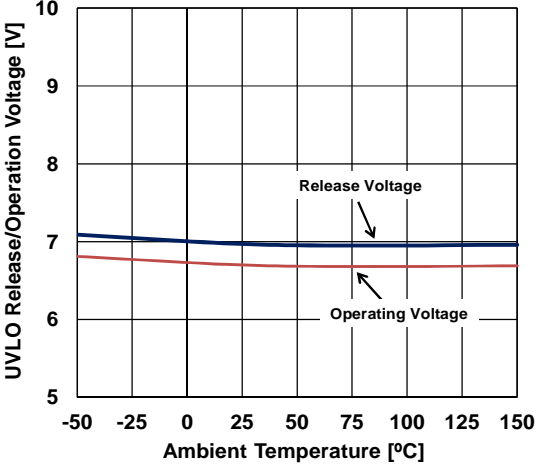
High-side SW Over Current Limit Protection Time vs.Ambient Temperature
(V*1=V*2=12V)



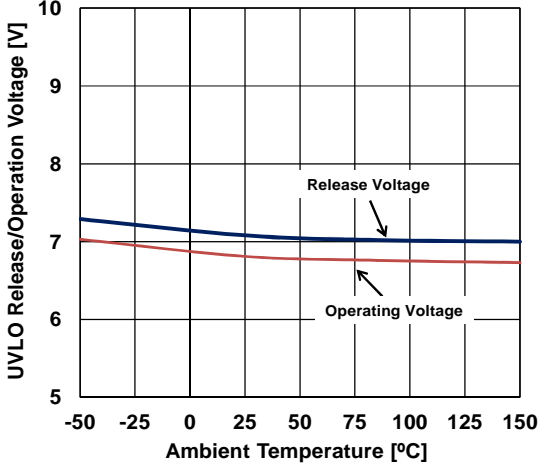
Low-side SW Over Current Limit Protection Time vs.Ambient Temperature
(V*1=V*2=12V)



UVLO Release/Operation Voltage vs.Ambient Temperature
VDD1 side



UVLO Release/Operation Voltage vs.Ambient Temperature
VDD2 side



MEMO

[CAUTION]

The specifications on this datasheets are only given for information , without any guarantee as regards either mistakes or omissions.

The application circuits in this datasheets are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[NJR:](#)

[NJW4810AGM1-C-TE1](#)