

MOS INTEGRATED CIRCUIT

μ PD166100, 166101

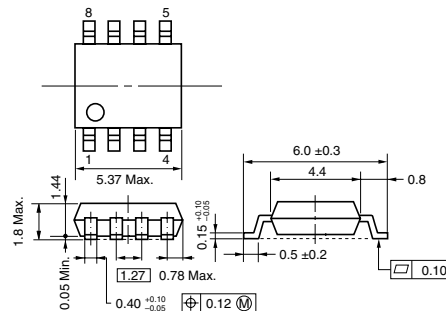
N-CHANNEL LOW SIDE INTELLIGENT POWER DEVICE

The μ PD166100, 166101 are N-channel Low-side Driver for Solenoids and Lamp Drivers. It build in protection functions.

FEATURES

- Built in current limit and thermal shutdown circuit. Thermal shutdown will automatically restart after the channel temperature has cool down.
- Low on-state resistance: $R_{DS(ON)} = 160 \text{ m}\Omega$ ($V_{IN} = 5 \text{ V}$, $I_{OUT} = 0.8 \text{ A}$, $T_{ch} = 25^\circ\text{C}$)
- Built in dynamic clamp circuit
- μ PD166101: Dual channel Low-side switch
- Small and surface mount package (8-pin SOP)

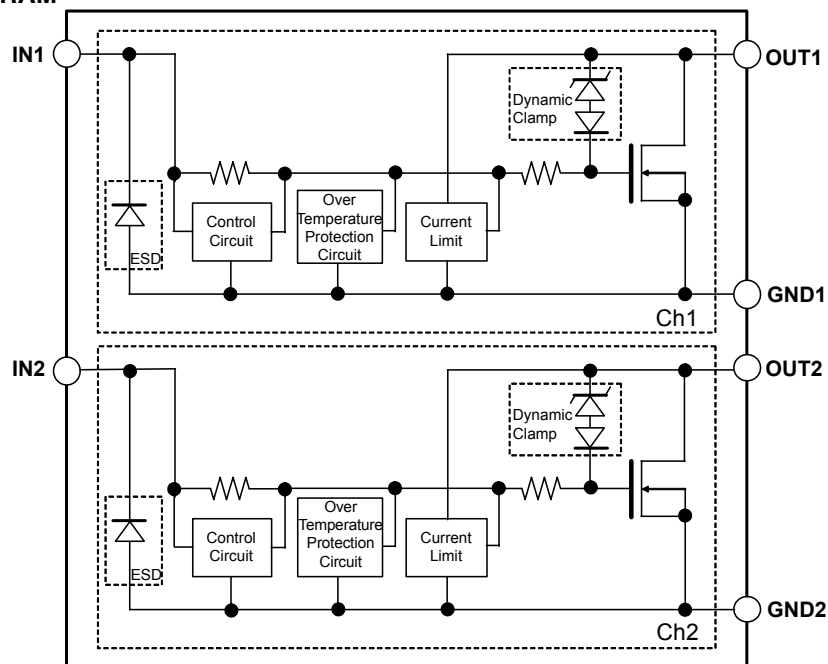
PACKAGE DRAWING (unit: mm)



ORDERING INFORMATION

Part Number	Package
μ PD166100GR(20)	8-pin SOP
μ PD166101GR(20)	8-pin SOP

BLOCK DIAGRAM

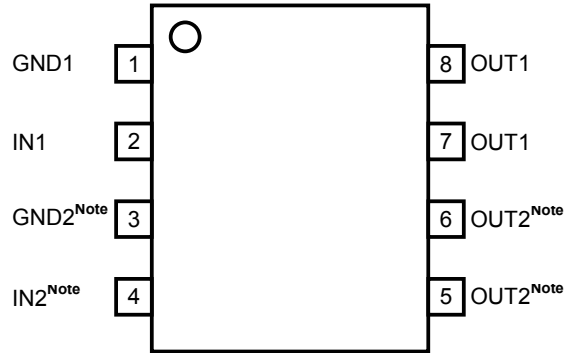


Remark μ PD166100: Ch1 only

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PIN CONFIGURATION (Top View)

- 8-pin SOP
 μPD166100GR (20), μPD166101GR (20)



Pin No.	Symbol	Function
1	GND1	Connected to Ground
2	IN1	Input terminal1 (active level is high)
3	GND2 ^{Note}	Connected to Ground
4	IN2 ^{Note}	Input terminal2 (active level is high)
5	OUT2 ^{Note}	Output terminal2
6	OUT2 ^{Note}	Output terminal2
7	OUT1	Output terminal1
8	OUT1	Output terminal1

Note μPD166100: Pin No.3 to 6 are N.C.

ABSOLUTE MAXIMUM RATING (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Rating	Unit	
Output voltage	V _{OUT}	V _{IN} = 0 V, DC	40	V	
Input voltage	V _{IN}		7	V	
Negative input current	I _{IL}		-10	mA	
Output current	I _{OUT(DC)}	V _{IN} = 5 V	SELF LIMITED	A/UNIT	
Total power dissipation	P _D ^{Note}	μPD166100	On-State	1.5	W
		μPD166101	2ch On-State	2	
Channel temperature	T _{ch}		150	°C	
Storage temperature	T _{stg}		-55 to +150	°C	

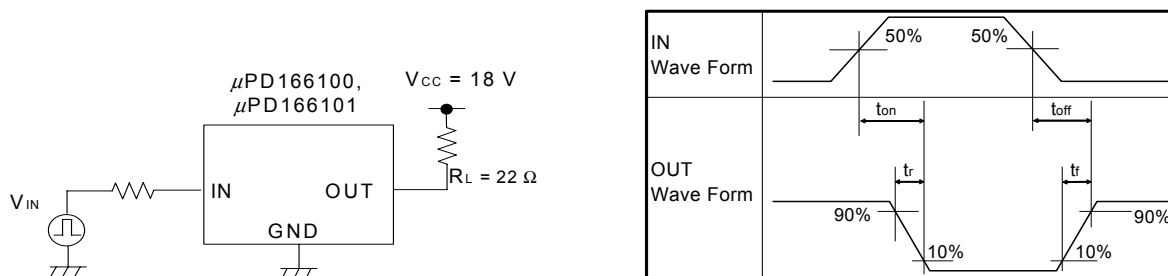
Note Mounted on ceramic substrate of 20cm x 20cm x 1.1mm

ELECTRICAL CHARACTERISTICS (T_{ch} = 25°C unless otherwise specified)

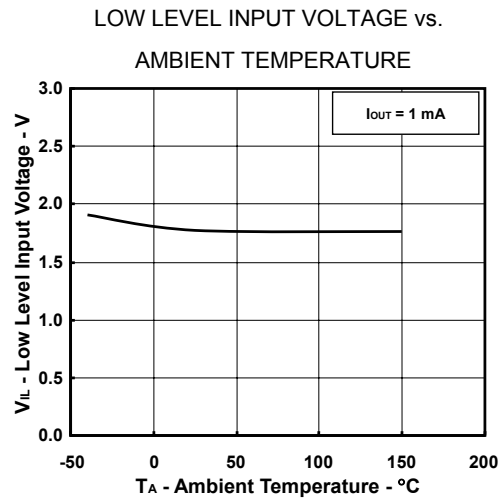
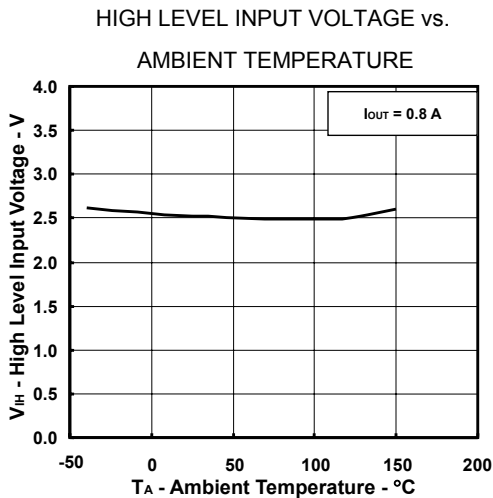
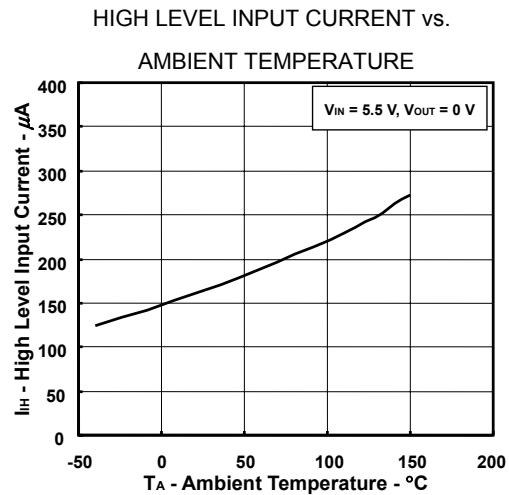
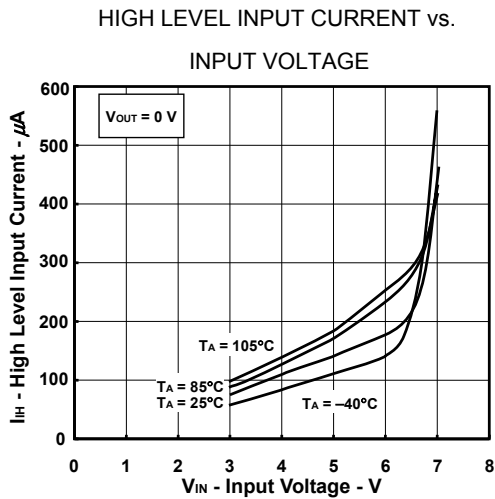
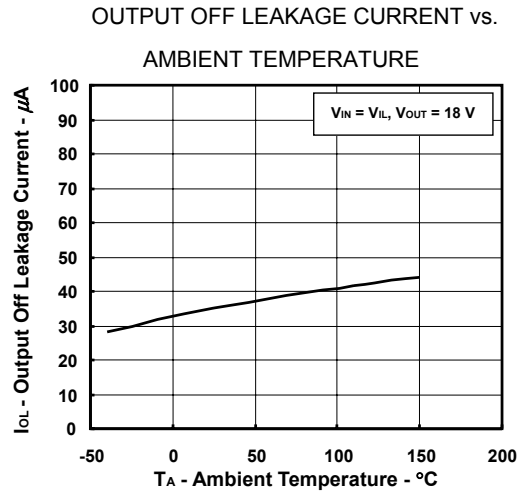
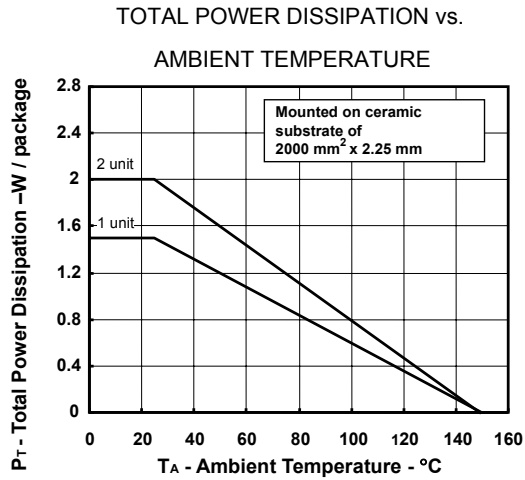
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output clamping voltage	V _{OUT}	I _{OUT} = 1 mA, V _{IN} = 0 V	40		60	V
Output Off leakage current	I _{OL}	V _{IN} = V _{IL} , V _{OUT} = 18 V			100	μA
High Level Input current	I _{IH}	V _{IN} = 5.5 V, V _{OUT} = 0 V			300	μA
Low Level Input current	I _{IL}	V _{IN} = 0 V, V _{OUT} = 18 V	-10		10	μA
High Level Input voltage	V _{IH}	I _{OUT} = 0.8 A, V _{OUT} = 0.2 V	3			V
Low Level Input voltage	V _{IL}	V _{OUT} = 10 V, I _{OUT} = 1 mA			1.5	V
ON-state resistance	R _{DSON}	V _{IN} = 5 V, I _{OUT} = 0.8 A			160	mΩ
		V _{IN} = 3 V, I _{OUT} = 0.8 A			195	mΩ
Turn-on time	t _{on}	V _{CC} = 18 V, R _L = 22 Ω,			120	μs
Rise time	t _r	V _{IN} = 0 V to 5 V,			80	μs
Turn-off time	t _{off}	R _{IN} = 10 Ω			200	μs
Fall time	t _f				80	μs
Thermal shutdown detection temperature ^{Note}	T _{HI}	V _{IN} = 5 V	150			°C
Current limit	I _S	V _{IN} = 3 V	1			A
Input frequency	f _{IN}				1	kHz

Note The low side switch is shutdown if the channel temperature exceeds thermal shutdown temperature. It will automatically restart after the channel temperature has cooled down than thermal shutdown temperature.

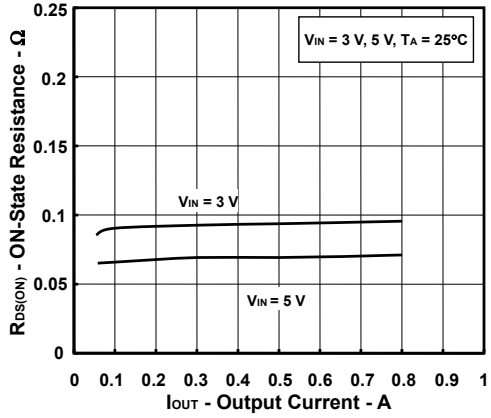
TEST CIRCUIT



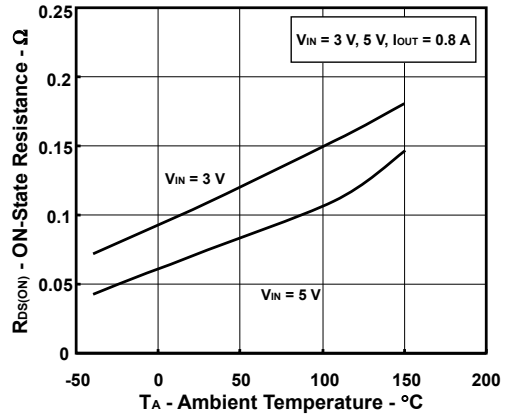
TYPICAL CHARACTERISTICS



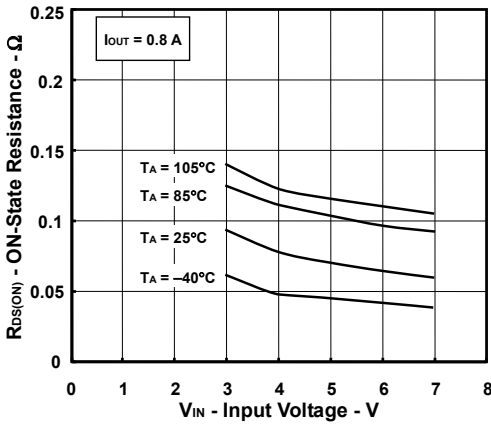
ON-STATE RESISTANCE vs.
OUTPUT CURRENT

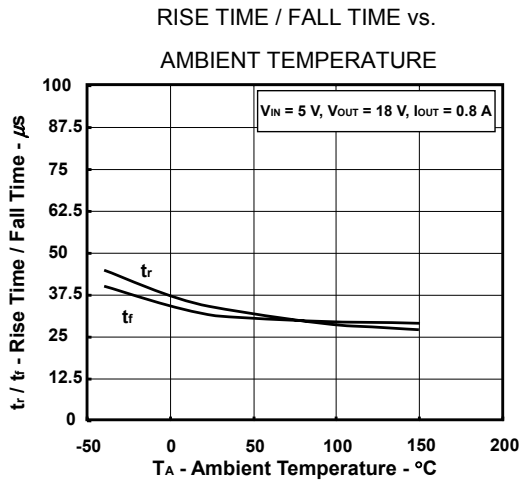
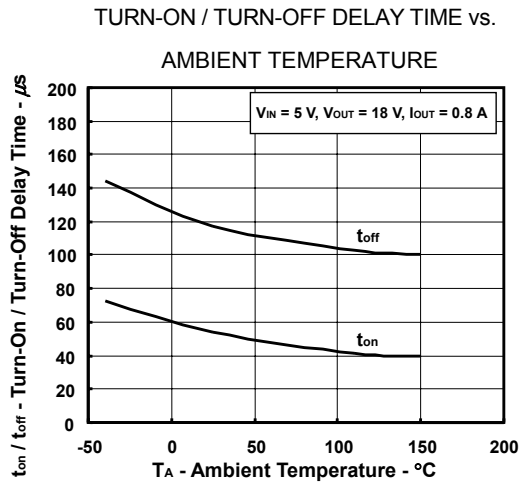
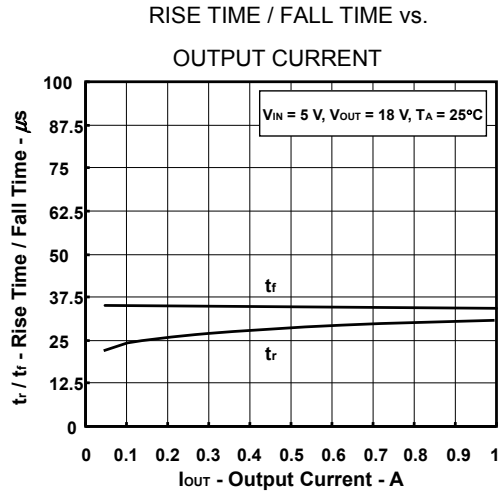
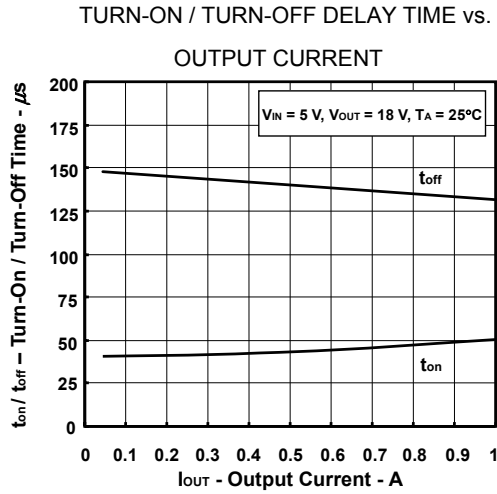


ON-STATE RESISTANCE vs.
AMBIENT TEMPERATURE



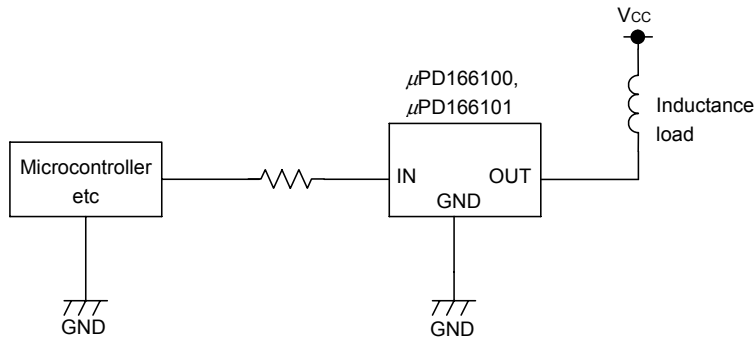
ON-STATE RESISTANCE vs.
INPUT VOLTAGE



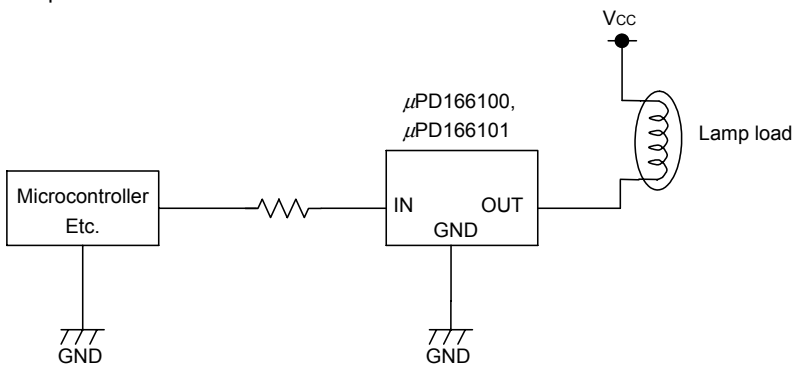


APPLICATION CIRCUIT EXAMPLE

(1) Inductance load



(2) Lamp load



Caution This circuit diagram is a connection example, and it is not the one to mass-produce it.

RECOMMENDED SOLDERING CONDITIONS

When soldering this product, it is highly recommended to observe the conditions as shown below.

If other soldering processes are used, or if the soldering is performed under different conditions, please make sure to consult with our sales offices.

μPD166100 GR (20): 8-pin SOP

μPD166101 GR (20): 8-pin SOP

Soldering method	Soldering conditions	Symbol
Infrared ray reflow	Peak temperature of package surface: 260°C, Time: 30 seconds max (210 °C min.), Number of reflow process: 3	IR60-00-3
Partial heating method	Pin temperature: 300°C max, Heat time: 3 seconds max (per pin)	-

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