



SANYO Semiconductors

## DATA SHEET

# TND512MD

ExPD(Excellent-Performance Power &amp; RF Device)

## 3-phase Motor Drive Application

### Features

- 3-phase high side driver.
- Monolithic structure.
- Allows simplified configuration of driver circuit.
- Withstand voltage of 600V is assured.
- Fully compatible input to LSTTL/CMOS.
- High-speed switching.
- Output current : 170mA Source, 340mA Sink.

### Specifications

**Absolute Maximum Ratings** at Ta=25°C (All voltage parameters are absolute voltage referenced to GND)

Parameter	Symbol	Conditions	Ratings	Unit
High Side Floating Supply Voltage	V <sub>H</sub>		-0.3 to 625	V
High Side Floating Supply Offset Voltage	V <sub>FG</sub>		V <sub>H</sub> -25 to V <sub>H</sub> +0.3	V
High Side Output Voltage	V <sub>OUT</sub>		V <sub>FG</sub> -0.3 to V <sub>H</sub> +0.3	V
Logic Supply Voltage	V <sub>DD</sub>		-0.3 to 25	V
Logic Input Voltage(UIN, VIN, WIN)	V <sub>IN</sub>		-0.3 to V <sub>DD</sub> +0.3	V
Allowable Power Dissipation	P <sub>D</sub>	When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm)	0.9	W
Junction Temperature	T <sub>J</sub>		-55 to +150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

**Recommended Operating Conditions** at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
High Side Floating Supply Voltage	V <sub>H</sub>		V <sub>FG</sub> +10 to V <sub>FG</sub> +20	V
High Side Floating Supply Offset Voltage	V <sub>FG</sub>		0 to 600	V
High Side Output Voltage	V <sub>OUT</sub>		V <sub>FG</sub> to V <sub>H</sub>	V
Logic Supply Voltage	V <sub>DD</sub>		+10 to +20	V
Logic Input Voltage(UIN, VIN, WIN)	V <sub>IN</sub>		0 to V <sub>DD</sub>	V
Ambient Temperature	Topr		-40 to +125	°C

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**SANYO Semiconductor Co., Ltd.**

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# TND512MD

## AC Characteristics at Ta=25°C (VDD=VH-VFG=15V, CL=1000pF)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Delay Time	t <sub>on</sub>	V <sub>FG</sub> =0V		155		ns
Turn-OFF Delay Time	t <sub>off</sub>	V <sub>FG</sub> =600V		135		ns
Turn-ON Rise Time	t <sub>r</sub>			110		ns
Turn-OFF Fall Time	t <sub>f</sub>			40		ns
Turn-ON Delay Matching of U, V and W *	Mt <sub>on</sub>	t <sub>onu</sub> -t <sub>onv</sub>  ,  t <sub>onv</sub> -t <sub>onw</sub>  ,  t <sub>onw</sub> -t <sub>onu</sub>		30		ns
Turn-OFF Delay Matching of U, V and W *	Mt <sub>off</sub>	t <sub>offu</sub> -t <sub>offv</sub>  ,  t <sub>offv</sub> -t <sub>offw</sub>  ,  t <sub>offw</sub> -t <sub>offu</sub>		30		ns

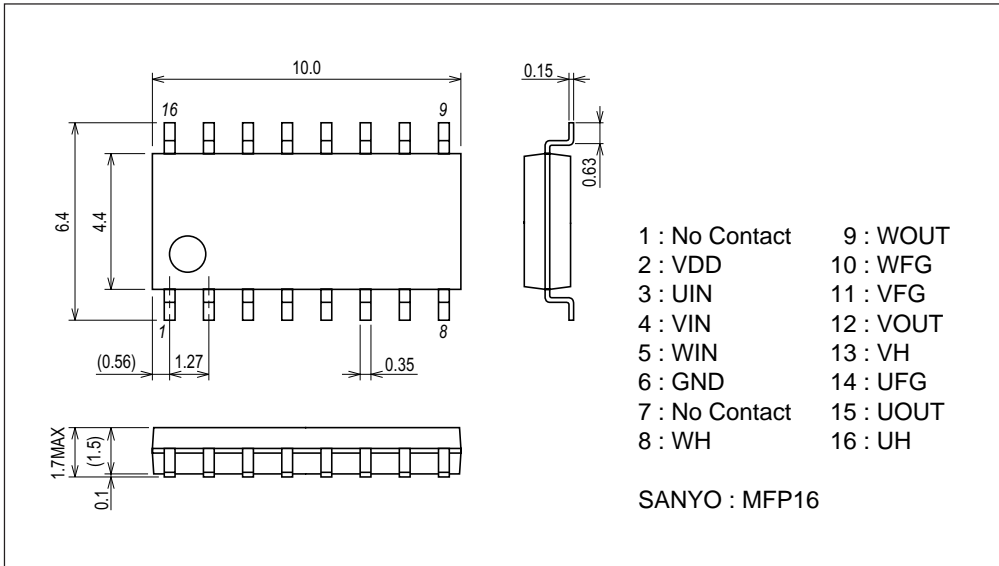
## DC Characteristics at Ta=25°C (VDD=VH-VFG=15V)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Logic "1" Input Voltage	V <sub>IH</sub>	V <sub>DD</sub> =10 to 20V	3.0			V
Logic "0" Input Voltage	V <sub>IL</sub>	V <sub>DD</sub> =10 to 20V			0.8	V
High-level Output Voltage, V <sub>BIAS</sub> -V <sub>O</sub>	V <sub>OH</sub>	V <sub>IN</sub> =V <sub>IH</sub> , I <sub>O</sub> =0A			0.1	V
Low-level Output Voltage, V <sub>O</sub>	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IL</sub> , I <sub>O</sub> =0A			0.1	V
Offset Supply Leakage Current	I <sub>LK</sub>	V <sub>H</sub> =V <sub>FG</sub> =600V			10	μA
Quiescent V <sub>H</sub> Supply Current	I <sub>QH</sub>	V <sub>IN</sub> =0V or V <sub>DD</sub>		50	100	μA
Quiescent V <sub>DD</sub> Supply Current	I <sub>QDD</sub>	V <sub>IN</sub> =0V or V <sub>DD</sub>		140	230	μA
Logic "1" Input Bias Current	I <sub>IN+</sub>	V <sub>IN</sub> =V <sub>DD</sub>		20	55	μA
Logic "0" Input Bias Current	I <sub>IN-</sub>	V <sub>IN</sub> =0V			1	μA
V <sub>H</sub> Supply Undervoltage Positive Going Threshold	V <sub>HUV+</sub>		7.6	8.9	9.9	V
V <sub>H</sub> Supply Undervoltage Negative Going Threshold	V <sub>HUV-</sub>		6.7	8.1	9.5	V
V <sub>DD</sub> Supply Undervoltage Positive Going Threshold	V <sub>DDUV+</sub>		7.6	8.9	9.9	V
V <sub>DD</sub> Supply Undervoltage Negative Going Threshold	V <sub>DDUV-</sub>		6.7	8.1	9.5	V
Output High Short Circuit Pulsed Current	I <sub>O+</sub>	V <sub>OUT</sub> =0V, V <sub>IN</sub> =15V, PW≤10μs	170	200		mA
Output Low Short Circuit Pulsed Current	I <sub>O-</sub>	V <sub>OUT</sub> =15V, V <sub>IN</sub> =0V, PW≤10μs	340	400		mA

## Package Dimensions

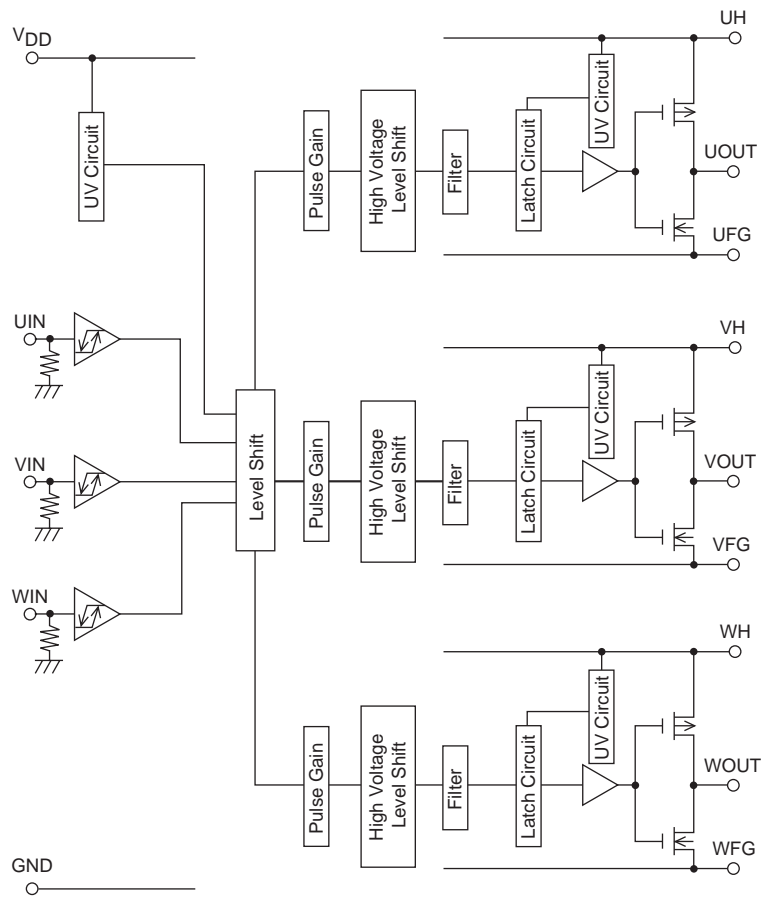
unit : mm (typ)

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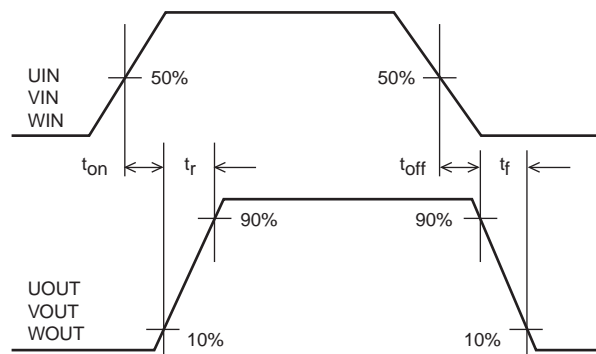
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## Block Diagram

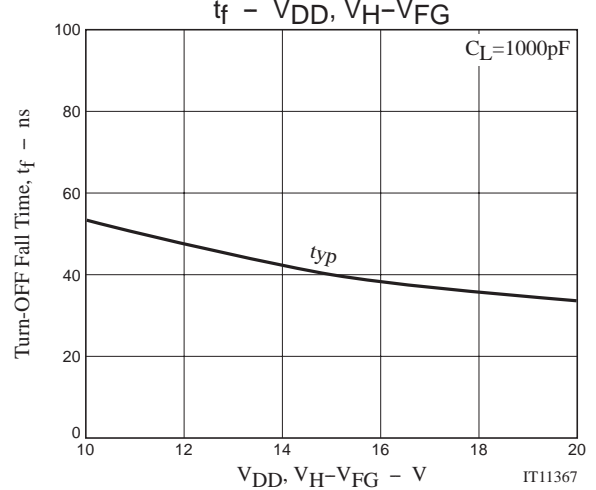
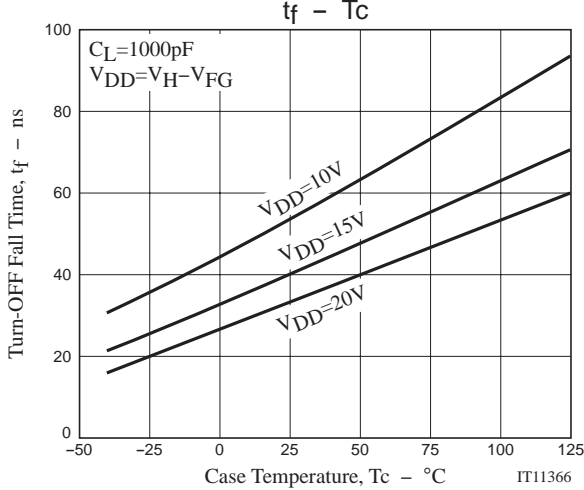
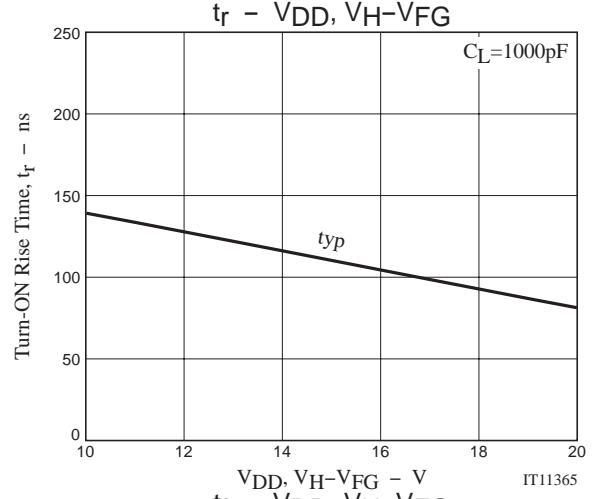
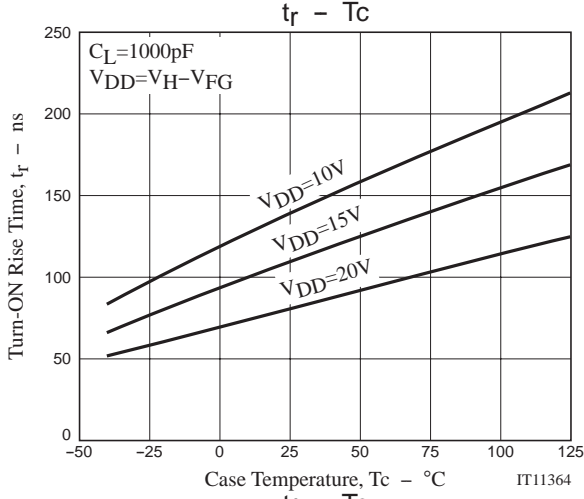
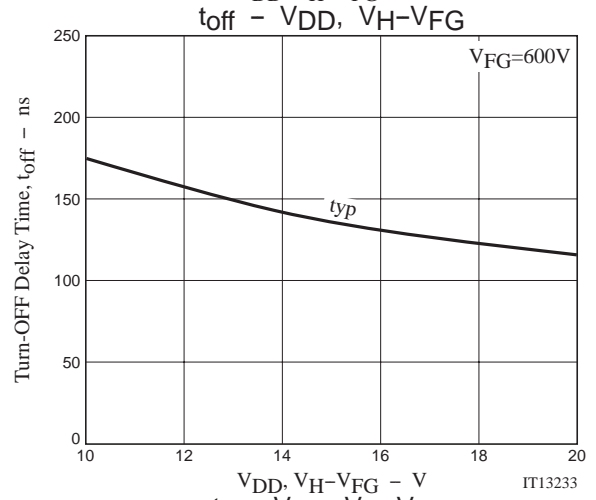
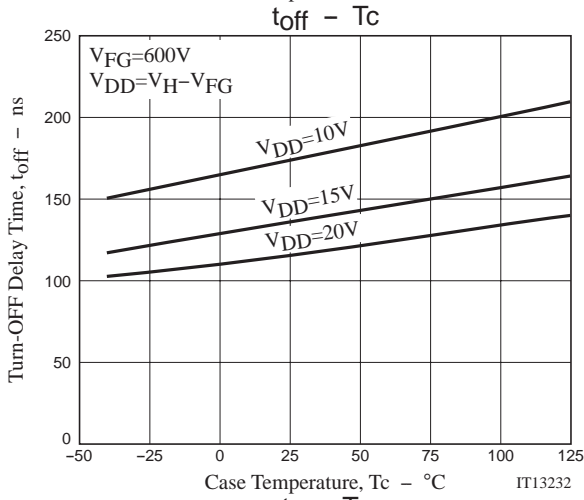
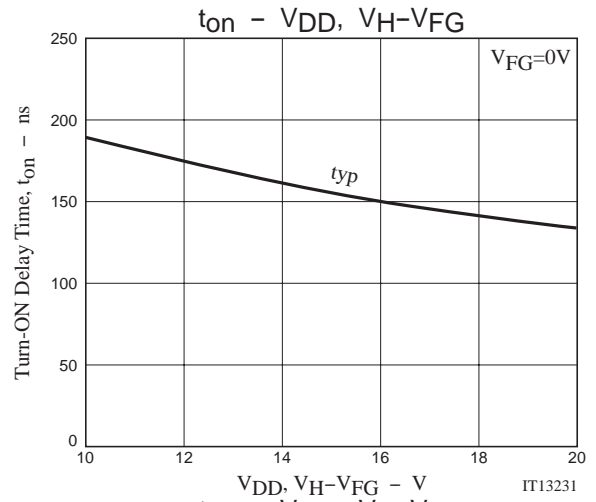
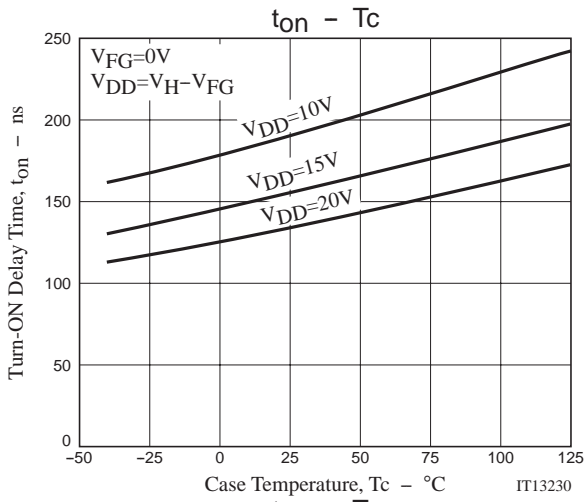


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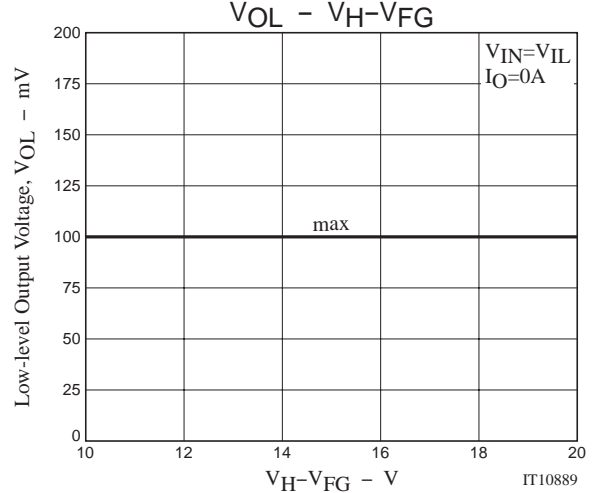
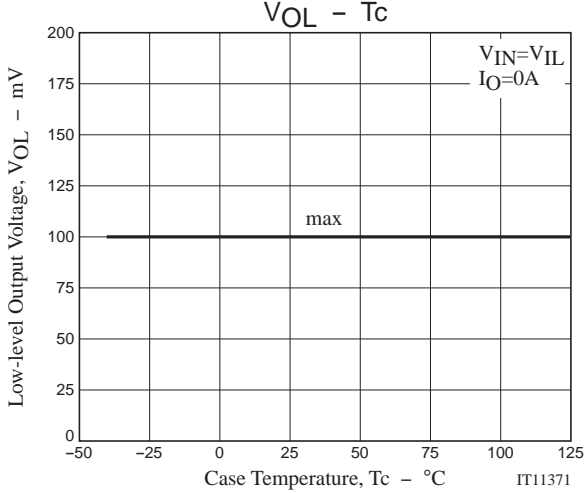
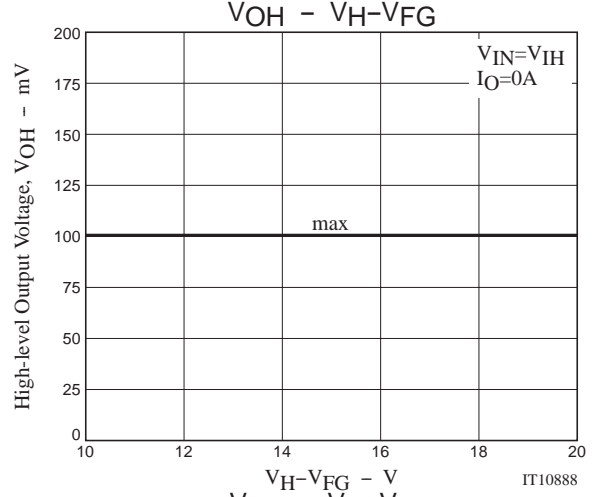
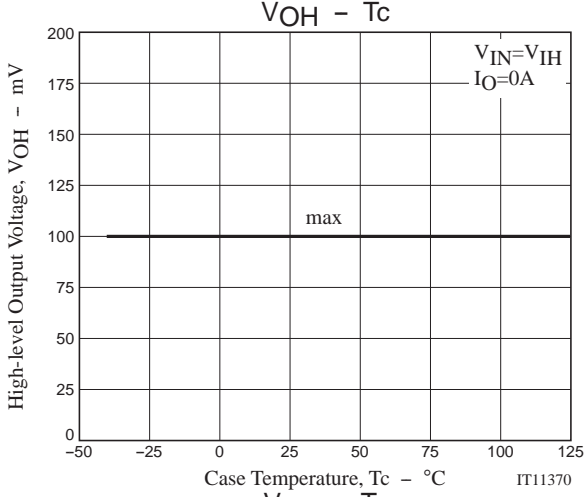
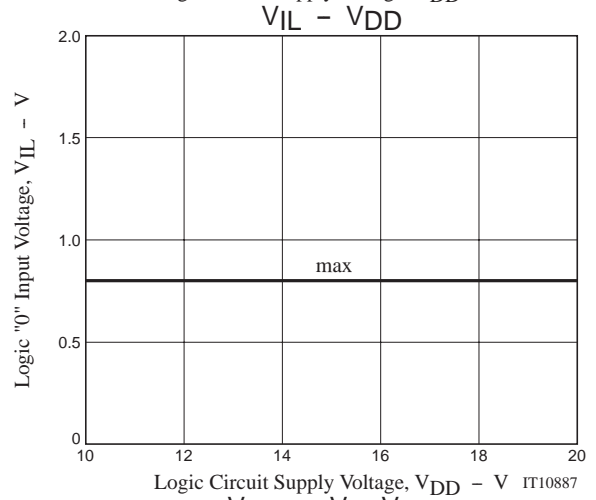
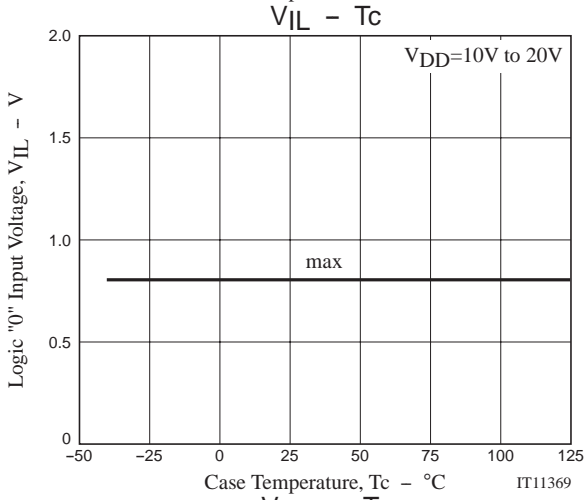
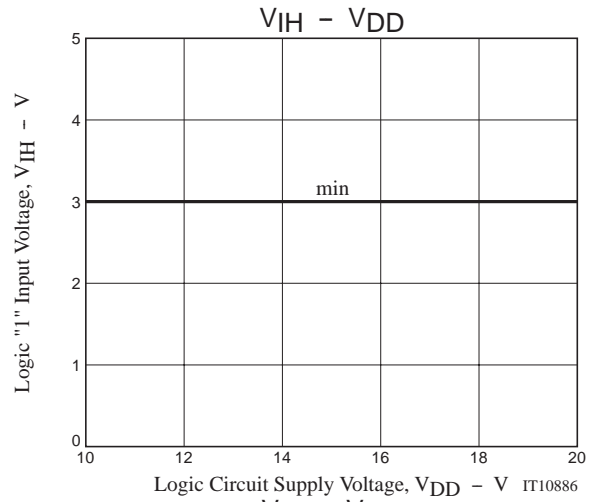
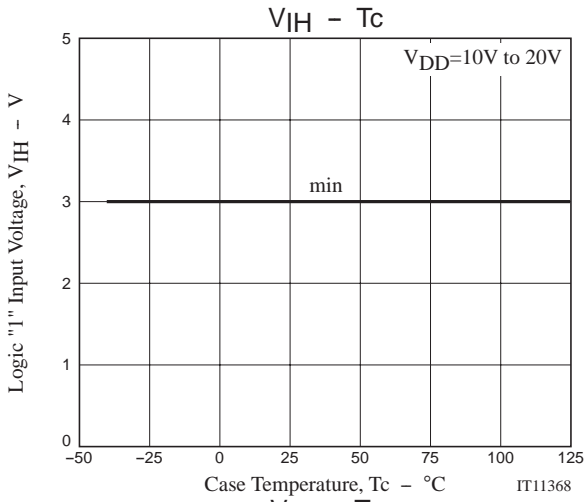
## Switching Time Waveform Definition



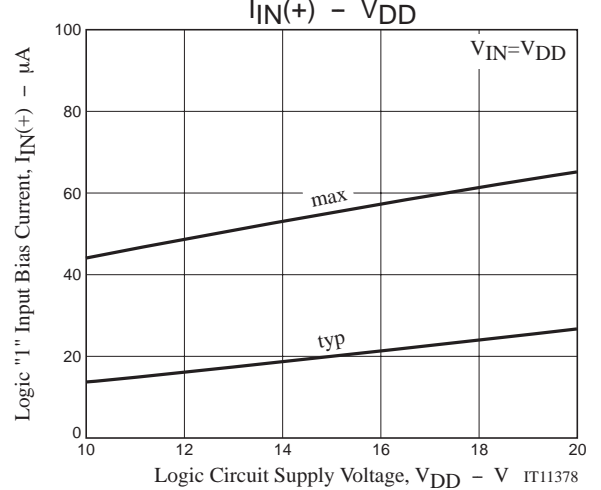
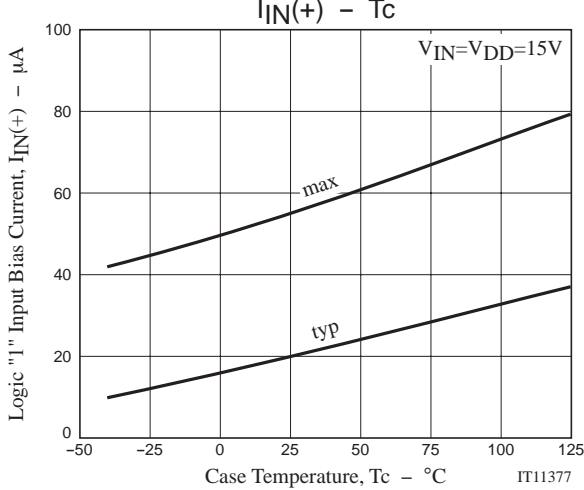
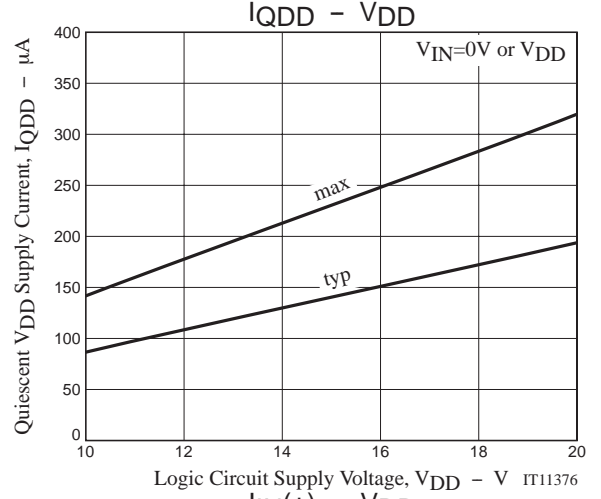
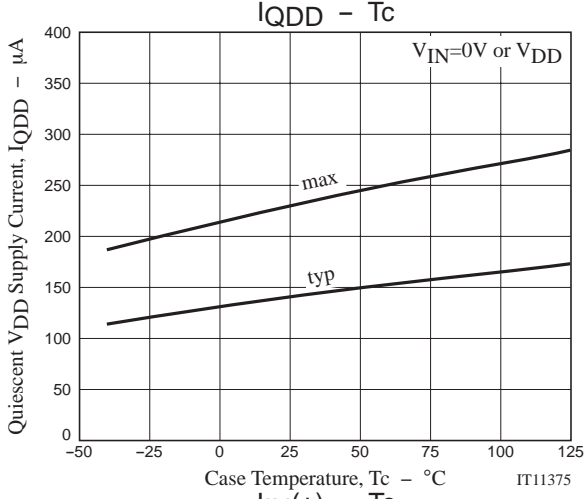
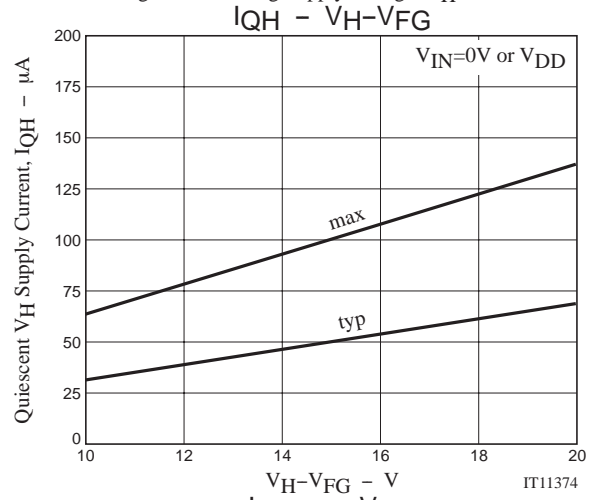
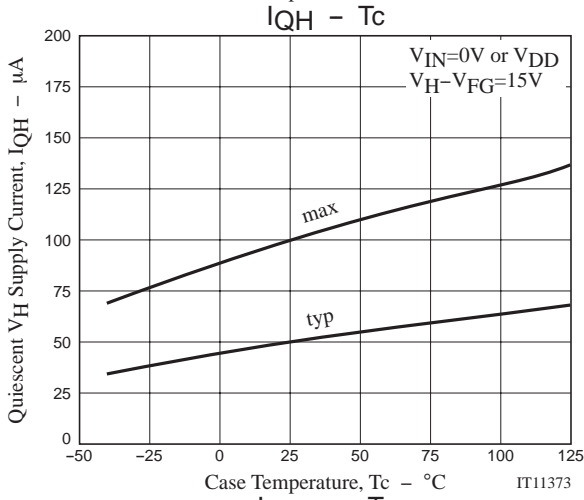
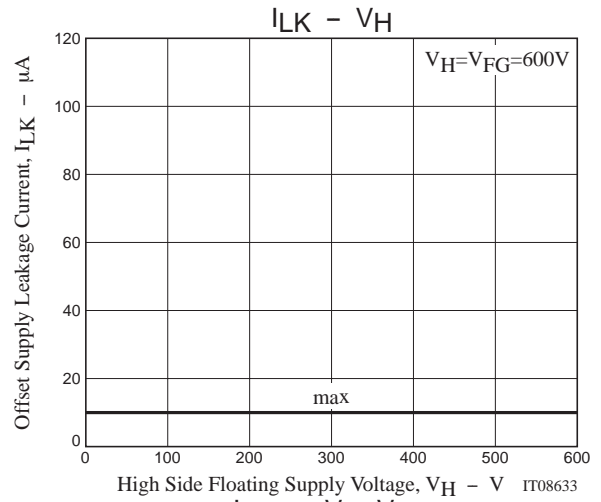
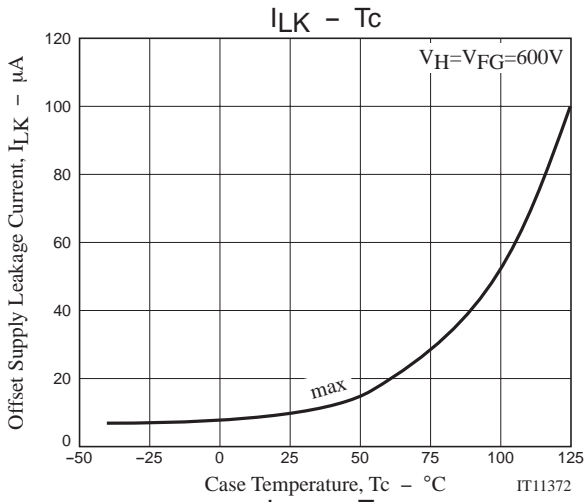
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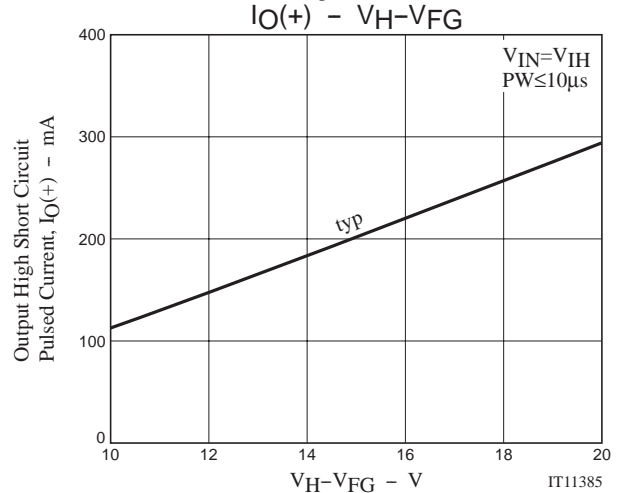
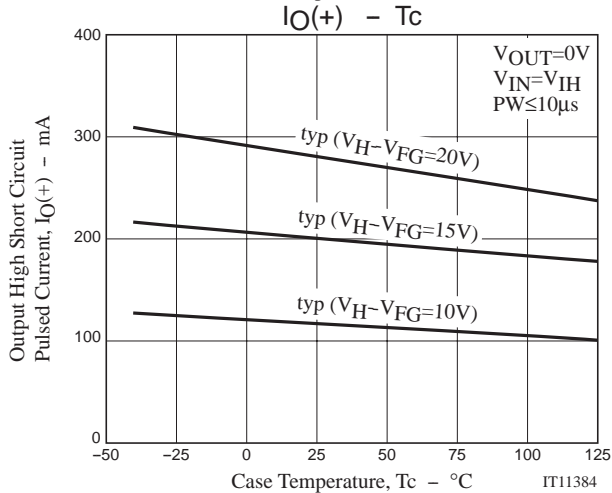
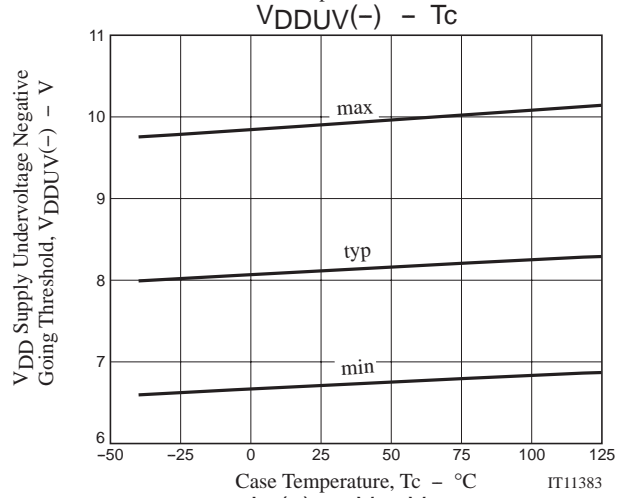
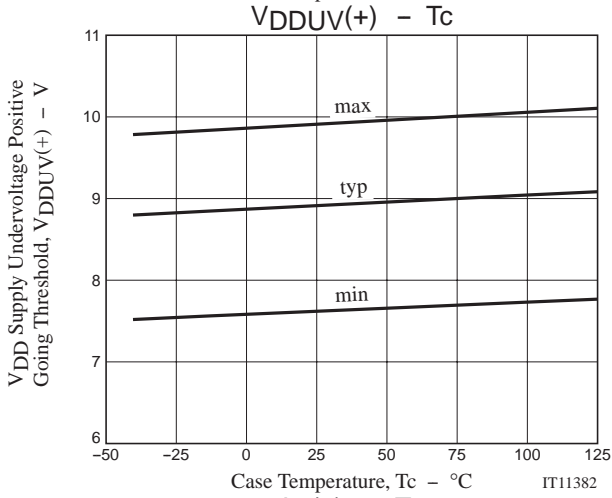
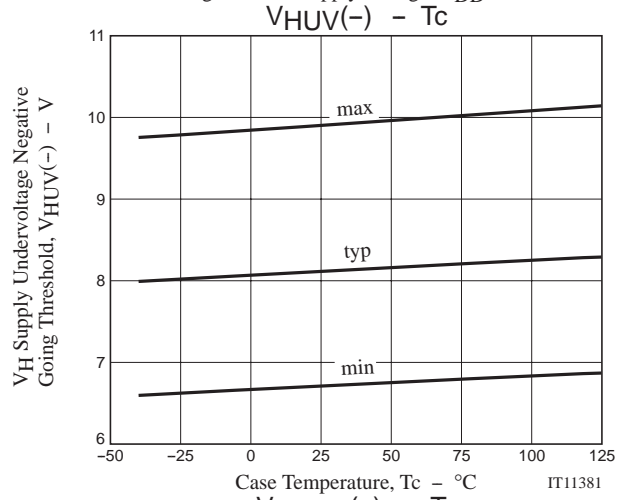
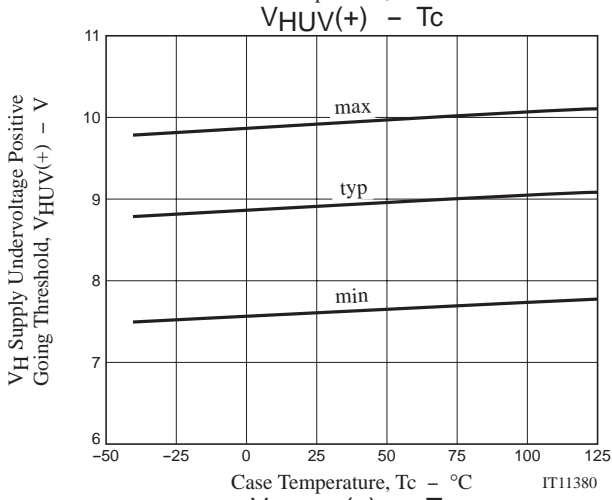
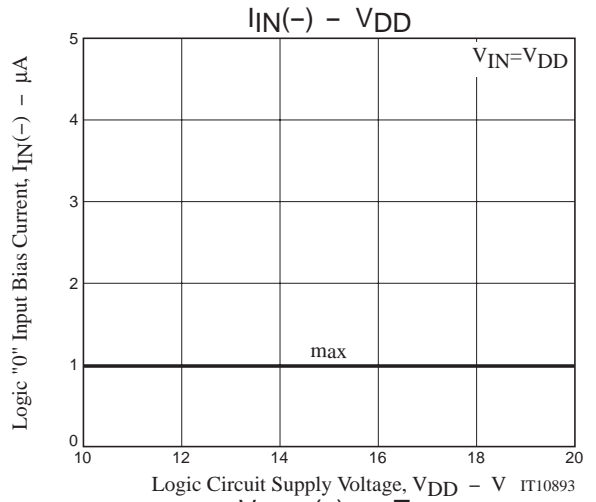
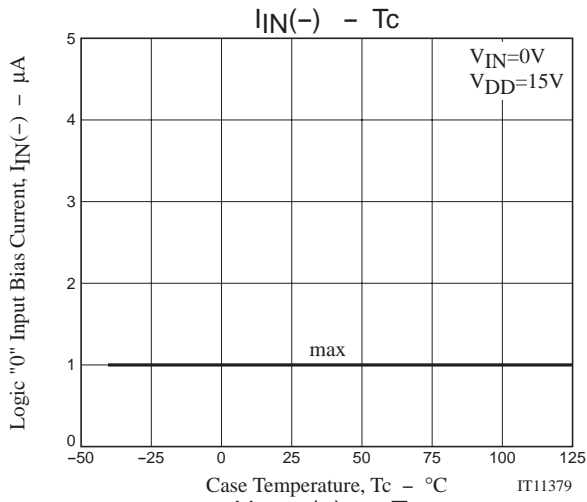
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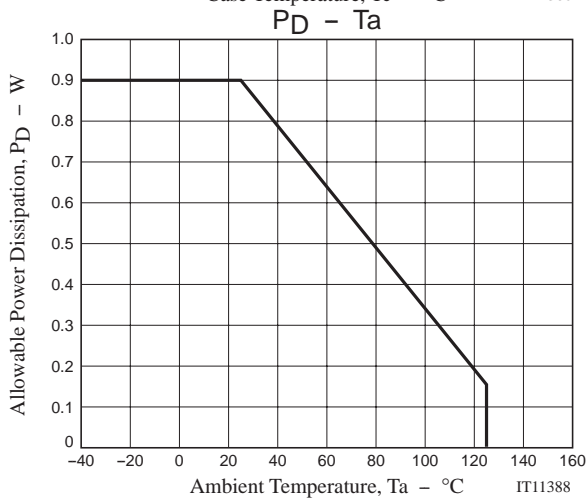
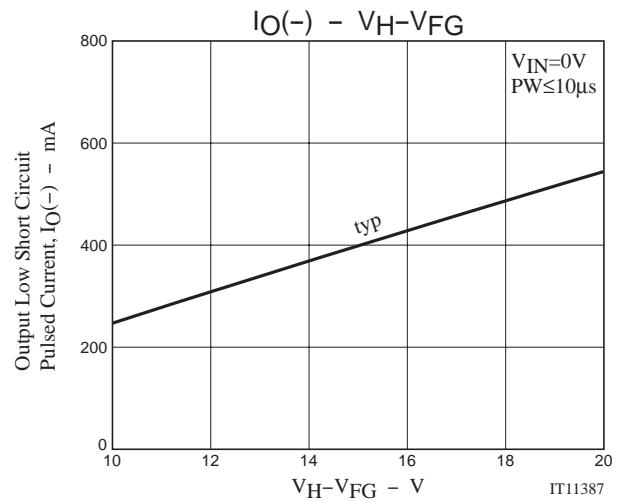
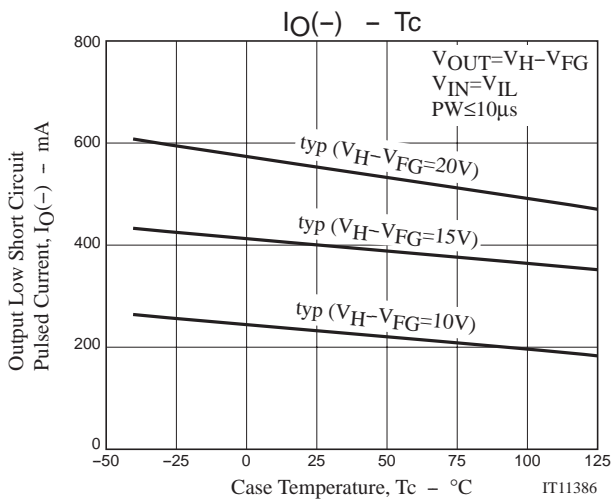
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